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If you're looking on a site with a map function, you may also see a map with the location pinned and an option to get turn-by-turn directions to the place you're calling. Reverse phone number lookup is done when you have only a phone number and want to know who it belongs to before you call. To do a reverse number lookup, choose a site that offers the service, such as WhitePages, navigate to the phone lookup section and enter the number. Some results may be free, while others may require a fee to unlock the information. Reverse address lookup is another type of search you can do if you only have part of the information about the number. it, you enter the house number and street in one search box and the city and state or zip code in the second search box before running the query. This type of search doesn't deliver consistent results, though it can be useful and delivers some results in map or satellite form. Brief History of Phone BooksThe first printed phone book was handed out in 1878 in New Haven. It was a single printed card with some numbers printed on it. The printed phone books grew in popularity during the decades and centuries. Then, in 2005, the demand for printed phone books started to drop. By 2017, many states in the United States had even made it illegal to print phone books, according to TruthFinder. MORE FROM QUESTIONSANSWERED.NET The Dargenous Gift The Flames of Hope Photo EditingPortrait RetouchingPhoto CollageDesignHow toTools Because everyone is pressed for time, the need to look up the summary of this book or that one is sometimes a priority. Therefore, a wide variety of sites are available containing them. Follow these guidelines to learn where to find book summaries online. Websites and BlogsMany websites and blogs offer summaries of chapters in books for free to their readers. Some present notes, reflections, and reviews that their readers can comment on, discuss, or reflect on. The purpose of these websites and blogs is to present an informal setting for people to enjoy books without feeling the pressure of making a purchase. Some of the bloggers and website owners also provide video and audio summaries, as well. It's possible to find chapter summaries of books available through subscription services, as well as book apps. Some of these services provide audio, PDF, and infographics of the books. If that's not enough, some of these services provide audio, PDF, and infographics of the books. If that's not enough, some of these book apps and subscription services also provide links to videos, reports and TED talks for the books, as well.YouTube Channels offering Book Summaries If you would rather not read a summary of books, there are many YouTube channels offering book summaries online. 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Often (he di.~cuss ion in this book nt'cesliarily includes politi(al. economic, weial, and phitosophic:l.1 Ls. Xl xii PREFACE all sides and to he able to explain why (h~y reject the onc:s the), f(; "ject hefore- rhey rake a posicion. I bdi~'e Ihl~ approach prepares them to Dekle new controversies. They can figure The arguments on our rhe consequences of \'arious propos:.ls, generate" arguments for each side. and c\"lluarc rhem. I encour-J.ge S [U denL~ to chink in prillt:ipl es. rat her rh.ln case breast'. o r At least (0 5('C char rhe sam e principle appears in Jiffen:nc cases t. ~ My point of view Any \\'rirer on sub jects such as chose in this hook ha.~ some personal opinions. positions. or biases. I belie/'e srrongly in the prin ciples in rhe Bill of Righu. I al..o have a gellt'fa lly pn!>.ili/'c \·iew of (('chnology'. including comp ut~'r technology. DOli Norman, a p~}'choJ()gist and technology of ut~'r technology. DOli Norman, a p~}'choJ()gist and technology of ut~'r technology. 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By the end, most S:ly they h:.lV Additional sources and Web sites for this textbook Th r: nutr:s .n chr: t"nds uf the chap ters include so u ro:s for specific intinma rio n in the tCXt and. occa,~i()nall)', addhiom.l informarion and comm(.'nc. I u.m;1Uy PUt on(' endnote at or near the end of a paragraph with snuw..OS for the whole paragraph. The lislS of refeI~nct"s at the ends of rhe chapter.~ include some rhat I think arc particularly IL~ ful or interes.ting hu II;aiom reasons, and some
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I am vel')' gratefu l to them: B(,th Givens (l'ri\'3c), Rights Clea ri nghouse). Ronald Cn:enburg (Loyola Univenity), Susan Keenan (Won,:cS((. r roly{cch In.uiwtc}), G reg Lastowb (Rutgc ls Un i\crsity). Timothy Lee (Show Me .Insti tUTC). Em:'H Leis. at Chapc:1 Hill). I [hank rhe following people for rC\'iewing the second edition at' rh~ hcginning of this project and providing many suggestions for the new edirion: Ri chard]. Boning (California State University), Julie L. John. rREFACE "" Texas at Ausdn}, C layto n Price (University of Missouri. Rolla). Birgit Tr~gl·n7.a (California Stare Univenity, Northridgr). ;;and Jeanni e M. Walsh (Universi ty of North Caro lina ar Ch.tpeJ Hill). M:m}' peopl~ at Prcllfice Hall and 'JexTech Internacional wo rk('d nn producing (his book I am gra(dul to [hose I interacted with direcdy- 'Ira This edition includes some m:u a.~isra n n: fmm Ldand Bcr:k. John L. Clirmli. Sherry Clark, Jost'ph Jeannie Manin . Abo Riggins. Carol Sa nders. j;ack Sanders. :Vlilcon San k. Deborah Simpmn. J ud Vernor Vil1ge. Many former students suggl..'Sted rekv;tm Ulpics .and ~ent me articles: Cindy Clar. John Coulomhe. Liond English, Mary Dnr.'t')' Evam, Stephen Hinkle, Sang Kang. and Philip Woodworth. Michael Schneider and Judy Gcmi.ng initiated my writing in {hi., area when they a.~ked me to con uibu te J. chapter. "Social and Leg(ll hsuc,~." to thl."ir u:xroook An /IlVillItitm In Compuur ."k irnCt'. .ft'rry \(:esrby, Wt"S1 Publishing Company.ga\,{" permission to reust" portinns of that chapter. I emhusiaslically thank you all~ Most of all. 1 thank my hush: Ind. Keith Mayers, m,. SYSTem administrator, editor, rcs This page intel 1 {ional~1' le}i blank 1 UNWRAPPING THE GIFT 1.1 THE UBIQUITY OF CoMPUTERS AND THE RAPID PACE OF CHANGE 1.2 NEW DEVELOPMENTS AND DRAMATIC IMPACTS 1.3 AN INTRODUCTION TO SOME ISSUES AND THEMES 1.4 ETHICS EXERCISES 2 Chapter 1 Unwr: Jpping the Gift P,.>WIIN,.,. tUrflrrWr: to GM rwyth. 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Undaunud Cou''gt. abom the Lewis and Clark expajition. that information. pcopk. and goods moved no faster than a horse-and this limitation had nOl changed in thousands of miles away and instamly and insta view Web pages from around the world. We fly at more than SOO miles per how. Telephones. automobiles, airplanes, radio. household electrical applia.nas. and many oth~r marvels we take for granted were invented in the late 19th and early 20th centuries. They led to profound changes in how we work and play, how we get informarion. how we interact with our neighbors (evcn how we define our neighborhood). and how we organize Stoction 1.1 The Ubiquity of Compu(e:rs and the: Rapid Pace of Change: 3 our family livC'S. Although fast paced when comp:ued [0 earlier rate; of innovation. ,hl" changes we~ gradual compared. to those in the computer age. Our enrry into space was one of the most dramatic feats of technology in the 20th cC'mucy. Spumik. , he first manmade satellite. was launched in 19;7. Neil Armstrong walked on the moon. or a large amount of commercial or rrscarch activity in space. Space tourism for me very rich is in an early stage. The moon landing has had Hull" direct effect on our daily lives. But have- you used a computer today? 1 used to ask my students this question on the fina day of class. I had to remind them that their microwave oven or their car might contain a microprocessor. Now. so many people carry cell phones and iPods that the answer is immediate. A day without using an appliance comaining a microchip is almosr as rart' as a day without turning on an electric light. The Ian few years of the 20th century and the beginning of the 21st are characterized by the ubiquity of computers. the rapid pace of change that accompanies chern. and cheir myriad applications and impac[S on daily life. When we speak of computers in this book. we include personal computers and mainfr:ames; embedded chips that control machines (from sewing machines); and {he Net. or cybeoJnce. Cyberspace is built of compurers and mainfr:ames; embedded chips that control machines (from sewing machines); and {he Net. or cybeoJnce. Cyberspace is built of compurers and mainfr:ames; embedded chips that control machines); and {he Net. or cybeoJnce. Cyberspace is built of compurers and mainfr:ames; embedded chips that control machines (from sewing machines); and {he Net. or cybeoJnce. Cyberspace is built of compurers and mainfr:ames; embedded chips that control machines (from sewing machines); and {he Net. or cybeoJnce. Cyberspace is built of compurers and mainfr:ames; embedded chips that control machines (from sewing machines); and {he Net. or cybeoJnce. Cyberspace is built of computers and mainfr:ames; embedded chips that control machines (from sewing machines); and {he Net. or cyberspace is built of computers and mainfr:ames; embedded chips that control machines (from sewing machines); and {he Net. or cyberspace is built of computers and machines (from sewing machines); and {he Net. or cyberspace is built of computers and machines (from sewing machines); and {he Net. or cyberspace is built of computers and machines (from sewing machines); and {he Net. or cyberspace is built of computers and machines (from sewing machines); and {he Net. or cyberspace is built of computers and machines (from sewing machines); and {he Net. or cyberspace is built of computers and machines (from sewing machines); and {he Net. or cyberspace is built of computers and machines (from sewing machines); and {he Net. or cyberspace is built of computers and machines (from sewing machines); and {he Net. or cyberspace is built of computers and machines (from sewing machines); and {he Net. or cyberspace is built of computers and machines (from sewing machines); and {he Net. or cyberspace is built of computers and machines (from sewing machines); and {he Net. or cyberspace is built (e.g.• Web servers), c;ommunications dC'Vlccs (wired and wireless). and ~torage media. but its real meaning is the vast web of communications and information that includes the World Wide Web. lht. Informat. commercial services. news and discussion groups. chat rooms. e-mail , databases, and so 01\. that are accessible from allover fhe world. The first dectronic computers were built in [he 19405. The nrSt hard-disk drive. made by IBM® in 19S6. weighed more than a ton and stored only five megabytes of data. roughly the amount of space in one high-resolution photo. Now we can walk around with 150 hours of video in a pocket. Now a disk with a terabyte (one trillion byt~) of storagc-edback about its popularity in a new way. More connections The connections facilitated by the Web have numerous other applications besides personal communicarion. We cite jusr a few examples. H/nn(dicill~, or long-distance medicine. refers to remOle performance of medical exams, analyses. and procedures u... ing specialized equipment and com pUler ncrworks. Telemedicine is used on long airplane 8ighrs [0 help [fear a sick passenger and to ascertain whether an emergency landing is needed. Prisons use telemedicine to reduce the risk of cscape by dangerous criminals. Some small-rown hospitals use two-way video systems to consult wirh specialisrs at large medical cemers--elimina[ing the expense. [ime. and possible health risk of rransporting the patient to the medical center. A variety of health monitoring devices now send their readings from a patienr's home to a nurse over (he Internet. This technology eliminates (he expense. time, and inconvenience of more frequent visits. while enabling more regular moniroring of conditions like blood sugar Section 1.1 New ~ dopmcnu and Dramatic Impacts 13 in diabetics, and helping (0 carch dangerous conditions early. Telemedicine goes well beyond transmission of information. Surg~ns in New York wed video, robotic devices, and helping (0 carch dangerous conditions early. Telemedicine goes well beyond transmission of information. Surg~ns in New York wed video, robotic devices, and helping (0 carch dangerous conditions early. arc being developed for emergency situations. Th(')' an save lives of soldiers, wounded on battlefields, far from expert surgeons. The Web connects srudenlS and teachers in "distance
learning" programs. Many specialized high school courses and some complelC:- college programs arc offerro entirely on the Web. People who live in rural areas, who time. who have varying work schedules that conAiet 'h1th normal class schedules, or who have small children at home benefit from increased Ic:aming opponunities at home. The impact of the connections provided by the dramatic in remote or less develoJXd areas of the world, many of which do nor have telephones. Mountains and (ruck jungle. with no roads, separate villagers in Bario. Malaysia. from the next town. The viUage:rs usc a satellite connenion to order supplies. [0 check the market price of rice to get a good deal when selling cheir crop, and to e-mail family photos (0 distant rdatives. Farmers in Africa get weather forecasts and instruction in improved farming methods. An Inuit man operates an Internet service provider for a villagers in Nepal sell handicrafts worldwide via a Web site based in Seanle. Sales have boomed more villagers have «gular work, dying local arts are reviving. and some villagers can now afford [0 send their children [0 school. 1.2.3 COllABORATIVE EFFOIO"S AMONG STRANGERS Wikipedia®, the free, online, collaborative encyclopedia. is an excellent example of collaborative projects among Jargt- numbers of strangers worldwide that produce extremely valuable products for the public. Wikipedia exemplifies another phenomenon new with the Internet: public2lion with no editorial board in common. Thousands of volunteers. nor carefully selected scholars. write and continually edir and update Wikipedia. Anyon(" who chooses (0 panicipare can do so. Encyclopedias are normally selected scholars. wrirren by ex~rt scholars sc1ectcd by editorial boards. We expect encyclopedias 10 be accurate and objective. Few would have expected Wikipediis open model ro produce. useful. rnsonably reliable. well-written product. Bm it did. Within five yean oEilS start in 200 I. Wikipedia had more than a million cn(J'ie§ in English and more than five million in all its dozens oflangu.ages. far more ilian long respected Encyclopedia Brilannica®. It is more up-to-date than a printed encyclopedia or one distributed in annual editions on DVD. Wikipedia is onc of Ihe Internet's mOSI usco reference- sites. It is an excellent reference- sites. It is an excellent reference of the internet's mOSI usco reference- sites. It is an excellent reference of the internet's mOSI usco has flaws. Some aruch.'S have errors. Some are poorly writtl:'n. some clearly biasc me 14 Chapt~r 1 Unwrapping the: Gift The Open Directory Project ~ (ODP). the directory of the Web organiud by lopic arras, is annher valuable project creared by thousands of voluntr('cs around th(' world. Many p?pular search engines, including Googlc[™]). Lycos'T1tol, NmcaJKT70I Search, and AO(n. Search. use the OOP to provide their dirn,-ory servicl!'S. The Web abounds with other cxampk"S of coUaborative pro; ens. some organiU'd. like Wikipedia and the ODP. some spontaneous. Scientists coUaborative pro; ens. some organiU'd. like Wikipedia and the ODP. without fhe Imctnn . Informal communities of programm('rs. scattered around the world. cr('atc and maintain free softwatc. Informal, decemralized groups of people help investigate online auction fraud. murd('r. stolen research. and other ctimes. People who hav(' never met collaborate on creating entertainment. The number of larg(' online collaboracive projects is likdy [0 increase significantly. Some collaborative projo: u could hav(' dangerous results. To fC'duce the 80 wofilkgal immigrants, a governor ofTcxas proposed scrting up night-vision Webcams along the Mexican border to be monitored by volunteers on the Internee Will monitors of a border Webcam go ouc and attack people they see coming across the border? What training or selection process is appropriate: for volunteers who monitor ~uriry Webcams~ In China. a man posted the online name of another man he believed was having an ~air will his wife. apinSl him.c) Anti abonion activists created a Web site comaining the names and home addn.-ssc:s of doctors who perfonn abortions; some of the doctors were killed. Mobs and individuals emotionally involved in a political or moral cause do not always pause for the details of due process. 11K:y do not carefully determine whether they ide-milled the correct person. whether the person is guilty of a crime. and what the appropriate punishment is. On the other hand. police departments in several counui('s cffc 1.2.4 E-COMMERCE AND FREE STUFF In the) 990s (hc idea of communiries. And onlin~ eommuniries. And onlin~ eommuniries. And onlin~ eommuniries. few brick-and-monar businesses and a few young entrepreneurs recognized the potential and benefits of online commerce. Among (he earliest traditional businesses on the Web. United Pared Strvicc' and Federal Expr~s let customers check the status of packages they scm. This was both a novelty and a valwhele service. Among (he earliest traditional businesses on the Web. United Pared Strvicc' and Federal Expr~s let customers check the status of packages they scm. This was both a novelty and a valwhele service. started selling books on the Web and became one of the' most popular. reliable. and ~r. friendly commerdal sites. len year,," ahe'r it "opened" for businesses followed Amazon. ereuing new businesses followed Amazon. ereuing new business, its annual sales reached almost \$8.S billion. Many Web-based businesses followed Amazon. Wro sites. Online sales Sa:tion 1.2 New J::kvdopmcnlS and Dramatic Impacts IS in rhe U.S. increased more rhan tenfold from 1999 ro 2005. Now. people buy and ,ell \$20 billion of merchandise on eBay each year. Forrester Rrsearch, Inc., csrimarC'd char online sales would grow w \$329 billion in 20 I O. For Europe. Forrestt'r projeCled online ,ales of £26} billion in 2011.7 Some of the benefits ofc-commerce are fairly obvious: We can consider more products and seDers, some far away. in less time and withou(burning gasoline ro get there. Some are less obvious or were not obvious before [hey appeared. Auction sires gave people access to cwtomers they could nor have found efficiency before. The lower ovcrtK:ad and the ease of comparison shopping on ,he- Wc..-b brought down prices of a variety of products. Consumers who do price-comparison ~arch on Web before buying a new car typically ,ave abour \$400.' Growth of commerce on the Web required solutions (0 several problems. One was (fwe People were reluctant to give rheir credit card numbers on the Web (0 companies rhey had nor dealr wirh or even heard of before. Enr me Free_tuff Librari~ provided free news and entertainment before (he invention of computers and the Internet. Bur there- is so much more free Sluff now. :a truly astounding amount on the Web. and :access to it is far more convenient than it was before. For our computers, we can get free e-mail programs and e-mail accounts. browsers, filters, firewalls, encryption software, software to manipulate photos. software: forvi~ing documents and videos. home invcmory softw,uc. amispam software. antispywan: software available for free. We can find free game-playing programs for old gamcs like chess and bridge and new computer games. Phone !iCrvicc via SkypeTM is free. There are: fr~ dating services on the 'Tht U~ :m d ~utilr of p.tY"""flt ."1;arl juli 011 III(' \l'~b hx] .. 1, luunt likk df~:t; ~b."". peopk ...:ntrihutc ITIDft to ~~riuhk 16 Chapc~r I Unwrapping (he Gift me Web. Major music festivals oncr their concerts for free on [nterncr, a nice altcmarive N • the classified ad sire, one of the most 1"0 paying 530 to \$500 for a tickel. Craigslisr popular Web silcs in the world. is free 10 people who place ads and people who place ads and people who read Ihem. Major (expensive) universities such as Sunford. Yale. can download whole books from Google. the Open Content Alliancc!'}oj. and other sowces for frec.'" We can set up our own blog on a frcc blog site. and we can read other blogs. online news services. and online versions of major prine newspapers from all over the world for free. MySpacc. Fae We pay for libraries with taxcs. Advertisers pay for broadcasting radio and television programs. On the Web. advertising pays for many. many free sires. bur far from all. Wikipcdia carries no advertising, donations pay for its hardware and bandwidlh. Craigslin charges fees of some bwincsscs that POSt job announcements and brokers y...ho POSt apanment linings in a few cities. That keeps rhe site free {O everyone else and free of orner paid ads. Businesses provide some free information and service; donations or grants fund rhem. The org.mizarions can provide mort and reach marc people on the Web rhan Ihey could previously wiili brochures and radio or IV ads because the COStS arc so much lower. One of me distinct and delightful fcalUrcs of the Internet is Ih:u individuals provide a huge amo unt of fret' stuff simply because: it pleases them to do so. They arc professionals or hobbyists or JUSt ordinary people who enjoy sharing their expertise and enthusia~m. Generosity and public service flourish in the Web environment. 1.2.5 ARTIFICIAL INTEWGENCE, ROBOTICS, AND MOTION Arlificial intelligence (AI) is a branch of \,."omputer science mat develops meories and techniques for making computers perform (asks thac we normally (or used to) think of as requiring human intelligence. Ir includes pla), ing complex stralegy ga~ like chcs.... language translation. diagnosing disea.~~. making decisions based on large amounts ofdam (such as whom [Q approve for a loan), and understanding spe~ch (where "underscanding" might be mcaswed by the appropriateness of the response). AI also includes [asks performed automatically by the human brain and nervous system. for example, vision (capture and imerpretation of images by cameras and software). learning is acharacteristic of many Al programs. That is. the output of the programs. That is.
inputs it encounters. Many AI applications invol~ plltum "cognition. that is. recognizing similarities among differ~m "Buulu ;lvOIiUhle for fl'ft duwnMJillg arC' in Ihe publ ic: domain (Iholt i" OUI uf "'Vyrigiu). Section 1.2 New Dn-dopmC'nls and Dramatic Impacts 17 things. Applications include rt'ading handwriting to allow aummaric sorting of mail matching fingerprints. and matching faces in photos. Early in the development of AI. rc:scarchers thought the hard problems for compulers were tasks that required high intelligence and advanced uaining for humans. such as winning at chess and diagnosing disc..-ases. In 1997 IBM's chess computer. Decp BluC'Tlo4, ~at World Champion Gury Kasparov in a tournameOl. AI researchers rraJized that narrow, specialized. skills were easier for computers than what a five--year-old does: recognize people. carry on a conversation. respond intelligently to the environment. Work on developing machines with general intelligence continues. Here we provide some examples of s~cialized applications many in medicine and other life-saving areas. This form of AJ is now a part of so many computer applications that we no longer think of them as astonishing advana"s not long ago. When a man had a heart 3n3.,k in a swimming pool in Germany. lifeguards did not see him sink (0 the bouom of the pool. An underw; ucr surveillance system. using cameras and sophisticated software, detected him and alened the lifeguards who rescued him. A similat system alerted lifeguards in a busy swimming pool in France when a man blacked OUI underwater. They saved his life. The software distinguishes a swimmer in distress from normal swimming pool in France when a man blacked OUI underwater. shadows. and reRections. It is now inslalled. in many large pools in Europe and the United Srala. Search engine designers usc Al techniques in (heir algorithm.li to sdecr and rank sites for search resulu and to guess what the user mean(if the search phrase contains typos. Auromared Web sites chat answer questions u...se AJ [0 figure Out what a question means and find answers. Amilock braking sysrems (ASS) in automobiles we sensors and computers to concrol the pn.'ssurc 00 the brakes (0 PRowot skids. The ABS is more t."Xpen than human drivers .t safely stopping a car. Parallel parking tak.:s skill; luxury cars compute and plot the appropriate parking path and park themselves. Speech recognition, once a difficul(research area, is now a common tool for hundreds of applications. Comporer programs Ihat tcach foreign languages give instruction in correct pronunciadon if they do nOI recognize what the wer says. Air rraffi, controllers train in a mock-up tower whose "windo,,,"s" are computer screens. The uainee directs air traffic that is entirely simulated by computer. The computer responds when the trainee ~pealu to (he simul,uion allows more imcnsive training in a safe e-nvironmenr. If the rrainee dirccu rwo airplanes to land on (he same runway at same time, no one gets hurt. People used to think that whc.'n fingerprints were found at a crime scene, (he police routinely matched them against thousands of priOiS on file to hnd a suspect. 11Us was not true. Fingerprints of a specific swpcct could be compared, bur matching fingerprints used to make sketches of crime swpecrs from witness descriptions. Now, computer systems generate pictures of a suspect me 18 Chapter I Unwrapping the Gift and search databases with criminal mug shots [0 find a match. JUSt as AI software can distinguishes suspicious behavior by :I CU5comer in a s[ort' thar might indicate shoplifting or other crimes. Thw (without constant human monitoring) . an Alequipped video system call help prevem a crime. The goal of 17th- and 18th-century calcul.acors was modest: to au[Omate basic arithmetic operations. It shocked many }>topic at (he time. That a mindless machine could perform tasks associated with human intellectual abilities was disconcerting. Centurin later. Garry Kasparov's loss to 2 compute r gener:uc:d worried .2ctides about the valut--or loss of va)ue--of human intelligence. People continue to debate philosophical and soci.21 implications of AI)[seems th.2t each new breakthrough is met with concern 2nd fe:lf at first . A few years later, it is taken for gramed. l", piiE.., itmlflf How will we react when we can go into a hospilal for surgery b h"~f/-~~"I AI: performed cmirely by a machine? Will it be scarier dun riding in w> SfflUII ;... U tlx firs[aUlOmaric elevator? How will we react when we can have a conversation bye-mail or phone about any topic at all-and not know if we are conversing with a human or a machine? How will we react when chips implanted in our brains enhance our memory with gigabytes of data and .. search engine? Will we no longer be human? me Robotics Robots are mcchanic.al dc.-vices that perform tasks traditionally done by humans or [asks {hat we think of as human-like activities. Robotic arms have been assembling products in factories for dcc.ldes. They work faster and more: accurately than J>Cople can. A robotic milking machine milks cows at dairy farms while farmhands sle-rp. Robotic de-vices now are generally controlled by computer sofcware and include aspects of AI. Just as general intelligence: is a hard problem for AI. genenl movement and functioning is a hard problem for AI. genenl movement and functioning is a hard problem for AI. genenl movement and functioning is a hard problem for robots. speed service. A robO(pharmacist machine. connected to a patient d2tabase. plucks the appropriate medications from pharmacy shelvC".'i by reading bar, odes. checks for drug interactions. and handles billing. One of its m3in goals is reduction of human error. Physicians do complex and delicate surgery from a console with .2 3-D monitor and joysticks that control robotic instrumc:nts. The software fihC'rs OUt a physician's shaky movements. High-cnd gadget SlOres sell robot vacuum cleaners that are hazardous to propic:-. They inspect undersea structures and communication cables. They search for survivors in buildings collapsed by bombs or earthquakes. They explore volc.anocs and other planets. They move or process nuclear and ocher hazardous wastes. me Scction 1.2 New DevdopRln1u ~nd Dramafic Impacu 19 Various companies and researchers are developing robors with more general abilities. For several years, Sonyn, sold a roOOt pet dog, Aioo (roOOt pet dog) ~. It walked (with a camera providing vision). It responded to commands and it learned. Several companies make robols with a more or less human shape. Honda's Asimo. for example. Motion sensing and control How do robors walk, climb stairs. and dance? liny mOlion-sensing and gravity-sensing devices collect status data. Sofcware. sometimes quire complex, using AI techniques. intcrpreu (he dna and determines the necessary morions. [hen sends signals to morors. These devices--accelerometers. or m,mJ {for microclccuomtthanical systems}-help robots and Segway's motorized scooter stay uprighr. They provide image stabilization in digital cameras. They detecr when a car has crashed or when someone has dropped a laprop. The system deploys an airtx.g or trigg 1.2,6 TOOLS FOR DISABUD PEOPLE One of the moS(heartWarming appHcacioru of compUler technology is me restoration of abilities. productivity. and independentHI. "US C Chapc('r I K. '). 10. II I;:. I.'. 14. I''' 1(,. Ikon lhot u>unling ;,uKI wkli,,,,, ~ l.nn ..il("lo ;1I~1 _\C' V k O liJu. und .In: indUlI...t. Robert D. Atx i n~lIn . "I(,. Ikon lhot u>unling ;,uKI wkli,,,,, ~ l.nn ..il("lo ;1I~1 _\C' V k O liJu. und .In: indUlI...t. Robert D. Atx i n~lIn . "I(,. Ikon lhot u>unling ;,uKI wkli,,,,, ~ l.nn ..il("lo ;1I~1 _\C' V k O liJu. und .In: indUlI...t. Robert D. Atx i n~lin ... Jcn ftll th~ blin.!. in an c·ll1.u1 m ~~c Illnic-. J'o.Ill E. Ri&tiu n. "Tn :hnol..);Kal (; ..;m Ar.. CUllill); (:U~I . . . ntl.loh~. in Srrvk:C">. - W'.tfl .vITf, l(lHf"/f,J. '.c:!\t'u.llry 14. I ??1, I', .A,l S-lul H.msdl. "C.II.Ih t..'LKhinn CCluug Gr~cJy.II" Bilt !Lnx." Nel" }or~ 1/".",. Fd)fu,ar~' HI. 1994. fl. A I. C I (, . 8,. L..oui1 r. Pnjmoln {W...b.wunh . I?'XJ) "IIJ j . l. :-.I,ki.· (I'ruguin Boob. ItF 7), r~pn.1i"cI.I'. --,. Unwrapping the Gift "'nw-.h'" 17. ~,u"'''~ 1I>ot'ti in .he- I'r.,."""JofIof 'l.n.lim. indud.. }c'" 'I''' I-]Iin. M.Holli" "M IN M ...,m;',.(,,1 lifo": A" I m""du J:'hi:.J] Thro? : CLwilJll JJnd (j,nI~~"''1 &.uIJ'IXS' 1nJ cJ. (W Phllnw/'kr (\k II.lcLocml>c::r I ')')51. I'. .\8. L M.Kki(\Un III J. JItI'r1Iti "K N~ht MIIJ Ur/vII.(...) "nolhC", I~.m 11,,,1 ftJUW b.: uSt"ti lin po>ili\"'I: ri):hh i~ cmi,kmnm . 21. SUIIIC" g".I). "1'P";tI'O be:: C"lhK';a/I,I" " 'tong in lhc:nnc:h'o. 1.11 C1J.!IIpJr. gC"m...:iJC". ;llthnugh .. rtC"n il i~ bc::UIb BOOKS AND ARTICLES Many ofrh~sr rrftrmas i"dudr lopia that art' cowrd Ihrolt,r;hou.t this book So",t' O{I« r¢rmw in Chapur 9 IrI\$tI illcltu:lt' topiN cOllt'r~d througbout this bock. • Th~ Alli3ncc: for 'I«hnology Access. C'mnpuur Rrsourul for Proplt' Wi,h DiJabi/ilirJ. 4th ~d. Humc:r House Publishers. 200.4, www.•uaccc."Ss.org. • Dc:nning. P('ter J. . ed. 711t' Int';sibk Futfl": Tk St'lIm!~JJ Intrg1'lllion o!u rJmo!OfJ btlo Lift. McGraw Hill. 2001. t::l1('ryd~ly • ''''itT,,,,,d • Augartcn. Stan. Bit by Bit: All HillOry of Compulm. Ticknor & Fidds, 1984. 'Ine earl)' history. of f.:uursc. • Cairncrou. Frances. Thr D, nllJ of Dijt.1ntr 2. 0: How tht (.'ommuniCdt;Om Rl'tIO/ulirm !] Changi"g Our Lil't'S. Hlrv::ard Business School P~s.s, 1.001. C avazm. Edwvd, and Gavino Morin . C.Ybmpa. (41fd ,)" Llw. MIT Ilres.s. 1?94. • Oenning. Pt:rer. and Roben Metcalfe: fk.yond Gzlrukuion: Thr Nnet Fifty Yrdn of Computing. Copernicus. 1997. • Denouzos. M ichold. What Will &: /-Iofl World nflnformdtion Will Chfmgt' {)IITLjt,t'j. Harpt"rEdg('. 1997. IJlt' A~ 43 Organization md Web Sircli • • Ellin. Joseph. M(mlfj~"1, wd Ij,r Me,ming of Lift: All Illroductloll 10 Erhitill Thmry. Harcoufl Brace
Jovanovich. 1995. Gershenfdd. N.:-il A. Whm f1'ings Srllrr to 111ink. Henry Holr & en .. 1999. • Langford, Duncan. cd. Imallet £thiN. St. Martin's Press, 2000. • McCoondl. tko . and Jackie Huba . Ciriz.m MdrlUlrrJ. Kaplan ftublishing , 2006. De5cri~s how ordin.uy people in8uencl" other consumers, democratizing marketing. Foundations of the Me-taphysic of Morah John locke-'s "Natural Rights," and other cla!iSinl essa~"S on ".. cious ethical theories . • Ordi,ulry !7opk to &ar Big M,dia, Big GOI.vrnmrm. and O,J"r (,oli4'/\$, Nelson CurreOf. 1.006. • • Narveson, Jan. lv/omf A1durn. Broadview Press. 1993. The first chapter give."!; a good. very readable imroduCfion (0 moral i u ~. Pojman, Louis. Elhim/ Throry CLmical Conumporary &,,4ill1.l. 2nd cd. Wadsworth, 1995. Includes John Stuart Mill's "Utilitarianism." Kant's "'j'he Illld : ,4 Rosc-noer, Jonathan. C)b"l4w: Th, th,I'II,rnrl. Springer Verlag. 1997. • Spindlo. Richard A" and Herman l~ lavani . cds. &,u/ings in C.'rhuElhiCJ. Jones 3ntl B.Irtleu. 2001. l.dW • Tap~'ort, Don, .and Anthony D. Williams. Wiltinomi('s: /loU] It-fass Coll]lbordliun ChnTlgrs Etxryrhing. Portfolio, 1006. • Vinge. Vernor. Ililinbou's End. Tor.10()(" A scien(.:t' fi([ion novd, ser in the ne.. r future. that imagines how computer technology may affect communication. education. medical care. and many beets of ordinary life . 0 R G A N I Z A T ION SAN D WEB SIT I S • The Online Ethics Centring and Science (National Aadul us. They can use the tools to reduce crime and increase security-and to infringe privacy. & ample: search engine, views some results. then goes on [0 another task, he or sheexpects [hat the phrase is gone-gone like a telephone convers:uion with a friend, or a few words spoken to a clerk in a store. After all. with millions of prople doing many searches each day for work. school. or personal uses, how ,ould it all be stored? And who would want all (hac ulvial information anyway? That is what most people thought about search queries until IWO incidems in 2006 demonstrated that it was all stored. it could be relear.cd, and it mancred. Search cngines collect many terabytes of dara daily. A terabyte is a trillion bytes. h would have been absurdly expensive to storl' chat much data in the reccm pan, but no longer. Why do search c..'nginc companies swr mass of d .. la? And why should we care? If your own Web searches have been on innocuou.~ wpics, and you do not care who sees your queries. consider a few topics people might search for, and consider why Set:tion 2.1 PrivaL")' and C..ompurer T~chnotogy 49 they mighr wam ro keep them private: health and psychologkal problems. b.ankruptcy. uncontrolled gambling, righi-wing conspiracies, left-wing conspiracies. :alcoholism. antiabortion infonna{ion. pro-abortion information. erotica. illegal drugs. What are some possible consequences for a person doing C'xtensive ~search on the Web for a suspense novel about terrorists who plan [0 blow up chemical fac[Ories? The federal government presented Google with a subpoena- for cwo momhs of user t search queries and all the URIs that Google indexes, It wanted the data to respond to COUrt challenges to the Child Online Protection Act (COPA), a law incC'ndcd. (0 protect children from online marcrial"harmful to minors." (W" disl"USS COPA in Section 3.2.2.) Google protested, bringing the issue (0 public :;mendon. Alrhough the subpoena did not ask for nam es of users. the idc-a of the government gaining access to the deuils of people's searches horrified privacy advocates and many people who user search (,ngines. Google and privacy advocates and many people who user queries.4 A few months laler, release of a huge database of search queries 3.(AOL sho\lro'Cd (ha(privacy violations occur even when (he company poJiey. an employre pur the data on a Web site for search technology reS4." archcrs. h included more tholl 2.0 million search queries of more [han 650.000 people from a [hrc 011 their own name or address. A process called ~idmtifi(alion idemi6cd ochers. Rc-idcn[ihcalion m(':IOS identifying the individual from a set of anonymous data. Journalists and acquainunces identified people in small communities who searched on numerous specific topics. such as the cars own, (he spans (t. ams thf..")' follow, their health problems, and their hobbi es. Ont.'c idcntifi('d. a person is linked to all his or her olhcr ~-arches. AOL quickly removt'd the data, but journalists, researchers, and omers had alrc;ldy copied it. Some made tM whole dna SC't available o n the Web again. mey • Anything we do online is rccordl"d. ar ica.u briefly, and linkec ro our computer, nOI our name . • A-wl,lOCn.l i~ .I ~·O".I11 mdc:r fu r !,... m~.. ,"c: IU f,1\'C lolinwnt' , p,,..,tdc:JuUnt'OC'IlU VI ur if '>lh", intuntUl ion for;ln invcslig-aliQn !li...L I A. i. (onm oon. we UK .h" .C:'1lI UILL (."on for -uniiulnl rn.uUl\:c I, ,()r~) iniornllllly fur iJc:nlific:n.. or ...JJn-t.Sn, o f (If J umclll) on .hc: Wrb (Ihc: ~uj n& ,, 1 Mcmbcc Ilf AO l.ucJ Ihc: lu m" ...,: li" il~ rd c...>euf Iltcir sr.. r~htjurljl-'; ...J.timin~ Ihc: rdc:..uc: viul-un.! ruughl~' Ic-n fnk rJ ami i l;KC: I,~. SO ChaptC'r 2 Privacy + Wirh the huge amoum of storage space available. companic.~. organizations. and governments save huge amoun[~ of c.bta that no one would have imagined SOlving in the r('ceoc past. + People often are not aware that information about them and their activities is being colkacd and saved. + Leaks happen. The existence of the + The government sometimes requests or demands sensitive personal data held by h\l + Information on a public Web site will be found by people other rh:m those for whom it was incended. h is aV'.lilahle to everyone. + Oncc clara goes on the Internet or infO a datahase. it .'i«ms to Ia.\(forever. People (2nd automated software) quickly make and distribute copie~. Ir is almost impossible to remove released information from circulation. + It is extremel}' likely that d3t.a collected for one purpose (such as responding to a user's search query) will to be used for O[her purposes (such as business planning). + We cannot dircctly prol(:ct information about ourselves. We: must depend on the businesses and organizations that hold it [0 protect it from thieves, accidemal leaks. and government prying. 2.1.3 TERMINOLOGY AND PRINCIPLES FOR DATA COLLECNON AND USE In this section we presem som ... terminology about collection and usc of personal information gatl]l'ring describe... collection of personal data. InvilibJe information gatl]l'ring describe... collection and usc of personal information gatl]l'ring describe... collection of personal data. InvilibJe information gatl]l'ring describe... collection and usc of personal information gatl]l'ring describe... collection of personal data. InvilibJe information gatl]l'ring describe... collection of personal information gatl]l'ring describe... collection and usc of personal data. InvilibJe information gatl]l'ring describe... collection and usc of personal data. InvilibJe information gatl]l'ring describe... collection of personal data. InvilibJe information gatl]l'ring describe... collection and usc of personal data. InvilibJe information gatl]l'ring describe... collection and usc of personal data. InvilibJe information gatl]l'ring describe... collection and usc of personal data. InvilibJe information gatl]l'ring describe... collection and usc of personal data. InvilibJe information gatl]l'ring describe... collection and usc of personal data. InvilibJe information gatl]l'ring describe... collection and usc of personal data. InvilibJe information gatl]l'ring describe... collection and usc of personal data. InvilibJe information gatl]l'ring describe... collection and usc of personal data. InvilibJe information gatl]l'ring describe... collection and usc of personal data. InvilibJe information gatl]l'ring describe... collection and usc of personal data. InvilibJe information gatl]l'ring describe... collection gatl]l'ring describe... collection and usc of personal data. InvilibJe information gatl]l'ring describe... collection gatl]l'ring describe not aware that rhe information is being (ollected or how it will be used. he or she has no opportunity to consent or withhold consell(lor au colleaion and we. Invisible i fannation gathering is common on me Web. Here is one l"xamplc: A company of I'cn:d a free program rhat changed a Web browser's cursor inco a cartoon characteror other imac Million.~ of people installed (he program and then later discov('rcd that (he program scnr (0 rhe company a report of (he Web sites its users visited. along with a cus[Omer identification numocr in the sof[Wan:. Ci S«lion 1.1 Priv,II.:Y and ComplHcr T«hnology 51 [ntcrnct service pro\'id('~ (ISPs) and Web sites can invisibly collect such details of our online .a.ctivitics as where we went, what we bitcs can collect such information a particular page. Even when we know that Web sitcs can collect such information gathering. Even when we know that information a particular site is collect such information. we often are no(aware of juse what information gathering. /"opk, orr mtTr allta (Ifa transaaion. liKl a groC(ry "uipl. -A w()man whose psychologist's not~!> ~rt" read by ~n insurer. IO Use of personal information for a purpose other than the one for which it was suppH~d is called s(contitzry uS(. Examples include' sale of consumer information [0 marketers or other businesses. ~ of intonn.uion in various databases to deny somrone a job or to tailor a political pitch. use of numerous databases by (he Intern:li Revenue Service (IRS) to find people with high incomes, and the use of a supermarket's customer database to show alcohol purchaSCf!i.on should have over secondary uses of his or her personal data. The variclY of uses iIIustr:uoo by the few t.xamples we JUSt gave suggests that different soludons arc appropriate for ditlercm users 2nd different use such a~ a person's Social Security number
(SSN) to match records. Computer files to determine characrerisdcs of people mas(likely new customers. Governmem agencies usc them (Q de:lect fraud, to enforce other Jaws, and to find terrorist suspects or evidence of terrorist activity. They use computer profiling to identify people to watch-people who may have a "propen..~ity" to do so. Data mining. computer matching. and computer profiling are, in most cases, examples of secondary usc of personal information. me Principia IOr data collection and UK 'l'he first principle for ethical (C(.'3tmenr of personal information is illfonlt~d consml. People want. Some pour OUI details of their personal lives on television shows. Some POSt personal profiles and video displaying ,hdr lives and emodons to the world. Others UiC cash to avoid leaving a record of their purchases, encrype all their e-mail, we servi~s SeClwn 2.1 Privacy and ComputC'rTc:chnology S3 organization. (We have choic('S ahom participating in rome governmC'nr programs. but of coucs" many are mandarory.) Mrer informing people about what an organization docs with personal information, the next simp]cs[and most desirable policy i'i to give JX."Ople .!iome thical guidelines. M any busin~ss policic... include versions of mem. Many laws in {he U.S... Canada. and European counuics do also. There is wide variation in interpretation and implementation of the principles. For example. businesses and privacy .: Idvocates disagree about when personally idemifiable information about them is collcc,ed. what is collcc,ed. and how i, will be wed. + Collea only ,he dara needed. • Offer a way for people to Opt oue (rom mailing lists, advenising, transfer of their data 10 other partie-c;, and orher ~condary ll. Provide stronger protection for sensitive data, for example, an opt-in policy for disclosure of medica] data. • Keep dua only as long as o('('ded. • Maintain accuracy of data. Where appropriate and reasonable, provide a way for people to access and correct data stored. about them. • Protect sccuriry of data (from theft and from accidental leaks). • Develop policies for responding [0 law enforcement requests for data. Wh''P'' rrivacy Principles for l' ersonal 1 nformarion data to law enforcement agencies when requeued. Some do not. The emiry that holds the data decides how far [0 go in protecring (he privacy of irs members or cwtorncrs. The individuals. those who can be harmed or inconvenienced by meaS(' of their daca, are rardy aware of the government request. Thus, the entities [hat hold the data. have a responsibility to those people. Planning for various possible scenarios, developing a policy, and announcing i[(and following it) arc all part of responsible management of other people's personal data. The privacy principles in Figure 2.1 were developed with b~ databases of busincs.~s and government in mind. The principles in Figure 2.1 were developed with b~ databases of busincs.~s and government in mind. The privacy principles in Figure 2.1 were developed with b~ databases of busincs.~s and government in mind. systems and Google's Street View). They do not :lddres... the growth of wer-supplied content on the Web. People supply a huge amount of information abour memselves to the public (or some parr of it, such as members of a social-necworking site). The Facebook incident described in the box on the next page illustrales that privacy problems can arise bei..unc: IBM. wme eviaed. In theo.pat1tDent of Homdand 64 Chapt~r 2 Privacy Security, rh. Census Bumou prq>aralli.ts .howing the number of p vuicty of techniqul."S to look for a SUSpCCI. collecting evidence from a variety of sources. Now government agencies can search rhrough huge volumes of information or. as we sec in ,he surveillance nampll"S in &ccion 1.2.2. through huge crowds of peopk ~king prople who look suspicious. One result is th.u, in many ca..o;es, a presumption of guilt replaces the traditional presumption of guilt replaces t additional taxes. Innocem !XopIc art' subject to embarrassing searches and expensive investigations and some-rimes arc more easily hidden. C riminals can hide more easily in large. anonymous cities---or travel more easily to another city. Do databases and search technologies simply make the work of law enforcement agencies more efficient and up to doltC'. or do they fundamentally change the relationship between citizen ;1;nd government? m" nata mining and computer matching to 6gbt terrorism Before the terrorist attacks on the U.s. on Septem~r 11. 2001. law enforcement agencies regularly lobbied for increaS ~ction A TtCHNOlOGY 2.2 "Big Brother Is Watching You" 6S FOR PROTtCTING ""\lAC ~asencies wartl 10 scr«n airline P....... lists for known or suspect terrorists. They want to sctccn other databases too (e.g.~ workers in the trallSpOnarion industry or other sensiri~ infranrucrure indwtries). They do nOI like 10 disclose theil Ii... of suspects. knowing "",.. te. en AUG.... and other businesses often do not. want to turn over information about their passengers and customers to federal arc prolected. asencin including rhe SSN as partofrhe ID nurnberfor farmers who gor Joansor granrs. In 2007. the USDA admi".d that .ince 1996 ir had inadverundy included rhe SSN. of more rhan 35.000 farmers on the Web site where it postl.-d loan detai1s.i.i This example illusuates how pDccices ~un well bdore me Web have continuing «pefcUMions. It also illust£ importance of car(>fu] and thorough evaluadon of decisions (0 puc material on m(> W~b. Thefe arc likely many similar examples that no one has yet noticed. SSNs are too widely available to securely identify someone. Social s«urity cards arc easy (0 forge, but ,hat hardly matters because pt.'Oplc are rudy asked for the card. and numlxrs arc rarely verified. The Social Security Administration itself used [0 issue c.ards without verification of the information providro by the applicant. Criminals have little trouble creating false identiries, whereas innoc(>nr, honest people suffer disclosure of 96 CluprC'r 2 rrlvacy personal informacion. arrest. fraud. destruction of their credit fating. and so on. because of problems with the SSN. Gradually. governments and businesses began to recognize the risks of careless USC' of the SSN and reasons why we should not use it so widely. In 2007. a federal repon ur~d federal agenciC'S (0 reduce unnecessary we of the SSN?~ It will rake a long time to undo the damage irs widespread use has already done to privacy and Ilnancial security. A DeW oacion.alID syst.... I Pldur lilt~ Nazi ~mtnny. th~ Sovj~t Union, and nparthdd South Africa all had) vny robwl idmtifiration syrt~mr. Trw. idmtifiration ryrt,mr dn not Ct/UH rymmly. bUI idmti,ficdtion IJrtnm a~ vny gOOd ad",inirtrdtivt rysUmI that tyrtInnit\$ ojim us~. -Jim Harper. Diroctor of Information Policy Swdin. Cam Institutc7S Various national ID card proposals in recent years would rcquicitizenship. employment. health. tax, financial. or other data. and biomerric information such as M"tr-lb"w fingerprints or a rctina scan. depending on the specific proposals. the cards St.-ti,,11.5.J.: J would also accC"Ss a variety of databases fOr additional information. Advocates of nationallD systems describe s~eral bendl's: you would need the actual card. no! JUS! a number. !o verify identity. The cards would help reduce fraud both in private credit-card transactions and in government ~ndit programs. Use ofID cards for verifying work digibility would prevent people from working in me U.S. illegally. Criminak and terrorists would be easier to track and identify. Opponents of nationalID systems argue mat they are profound rhrea(S {O fr«dom and privacy. "Your papers." please" is a demand associated with police statcs and dictatorships. In Germany and France. identificiltion papers included cil(: pc:rson's rdigioD. making it easy for rhe Nazis to captwe JC\\.'S. Under the infamous pass laws of South Africa. people carried passes, or identification papers. that c.ltegorizrd. mem by race and controlled where [hey could live and work. Card, with embedded chips or magnetic strips and the large amount of personal information they can carry or access to the machinery that reads the cards. Thus. they would not always know what information they are giving others about themselves. Theft and forgety of cards would reduce some of ,he potential bene6ts. Peter Neumann and Lauren WeinstC'ln warned of risks tha(arise from the databases and communiettion complexes that would support a na[ional ID card system: "The opportuniries for overzealous surveillance and serious privacy abwes are almost limitless. '0 S«tion 2.3 Djv('rK' Priv~ Topics 97 as are opportunities for ma.o; querading. identity theft . and draconian social engineering on a gl'2nd sClle. "76 A woman in Canada could not get her tax n:fund because tax agrncy insisted she was dead... Her identification number had mistakenly ba:n reported in place of her mother's when her moWer died. She would SliD have bCC'.n able: (0 get a new job, withdnw money from her ba.nk account, pay her rem, send e~ mail, and go [0 her doctor while she was resolving the problem with the (ax agency. What if (he- worker verification database? Or what if a misuke cancelled the one (D card requiU'd for all these tra.nsactions? A critic of a proposal for a national identification card in Australia describ«i the card as a "license to exist."n The terrorist anacles in 2001 brought new proposals for r~uiring t"Veryone in the U.S. to carry a secure national ID card. (Many of the airplane hijackers had government~ me issued ID cards, some valid, some fake.) The REAL 10 Act, passed in 2005 and effective in 2008. attempts to develop a secure national identification card by setting federal Slandards for driver's licenses (and state-issued J0 cards. for mose without driver's licenses). Licenses mwt meet the federal facilities. By implication, they likely include working for me federal government and obtaining federal
benefits. h is likely rh:u the government will add many new uses, as with the SSN. Businesses and state and local government will add many new uses, as with the second state and local government and services. The feckral government will add many new uses, as with the second state and local government will add many new uses, as with the second state and local government will add many new uses. medical care in the U.S. (c.g., Medicare, benefits for veterans, 2nd num('rous fed('rally funded progr.ams). Ie is not hard eo envision the driver's license being required for federal medical 10 card. \lach person must provide documentation of address, birth date. SSN, and legal status in the United States. Motor vehicle departments must verify the validity of the documents submitted and scan and score them. in uansfcrable form , for at least ten years (making motor vehicle records a desirable target for identity thieves). The licenses must satisfy various requiremencs to reduce tampering and counterfeiting, and they must include the person's phoro and machine~readable information to be determined by the Department of Homeland Security. The REAL 10 Act puts the burden of verifying id('ntiry on individuals and the state moror vehicle depandents. Many StateS object to the mandate and ics high roses md difficulties. Several stoues voted not to participate. Residents in states without a fedenlly approved driver's license could experience serious inconvenience. At chis point j[is unclear whether the huge scope' of federal programs will force compliance. Many European and A"ian countries require." national 10 cards. An unpopular plan for an expensive mandatory national 10 card in the Uniced Kingdom nailed in 2006 when 98 Chapter 2 Privacy e-mails about weaknesse'i of the plan leaked from gov('rnmcnr offic~. The government of Japan implem('mro a national computerized regi.'i[ry system [hat included assigning an ID number to every citizen of the coUntry. The system is for government uses, with initially approximately 100 applications. but evcncually probably chousands. h is intended to simplify administration procedures and make them more efficient. Privacy advocates and PCOt('St('rs complained of insufficicO[privacy protection. potcntial abuse by government, and vulnerability to hackers. 1.- AJ soon as you air willing to put your homt. Jour ojjiCt. your saft dtpont box, your bilu lock, .'fOur gym Itt,. and your tUsk kty all onto otlt anti aslt tilt govnnmrnt to isstlt that ont .try. you will Ix okay with tIN IUIttonal/D. But until t/,tn. Wt n"d to think mort in ttrms ofdiVtrSific4tion ofitkntifictltion systnns. \-Jim Harper. Director of Information Policy Studies. CafO Institute78 2.3.7 CHIWREN Computer technology and the Web raL i1 diffc:mu from COrA, (he: Child Online: Protc:uiofl Au.;t ce:nwrship Jaw. We: me:n[joni!'d COrA in Set:1ion 2.1.1and diKUss il mOle: fully in Ch.l.plc:r 3. & crion 2.4 Prorecring Privacy: Technology, Mari 99 began implem~nting policies designed [0 protect m('mbers. Protections include running ads warning girls about saf~ practices and scanning for nudiry in phoros and removing them. profiles of 7000 registered sex offenders (OU(of 180 million profiles). *79 Some Web sites block e-mail to members Wlder age 16 unless the sender knows the members; hence, large loopholes remain. Parents can install sofrwaf('

on home computers that genel 2.4 Protecting Privacy: Technology, Markets, Rights, and Laws 2.4.1 TECHNOLOGY AND MARKETS Many individuals. organizations, and businesses help meet the demand for privacy to some degree: Individual programmers POSt free privacy-protecting software on the Web. Entrepreneurs build new companies to provide technology-based privacy protections. Large businesses tespond to consumer demand and improve policies and services. Organizations such as the PriV31."Y Rights Clearinghouse provide excellent information "'MyS~c: lurnnl over information such as the PriV31."Y Rights Clearinghouse provide excellent information "'MyS~c: lurnnl over information such as the PriV31."Y Rights Clearinghouse provide excellent information "'MyS~c: lurnnl over information such as the PriV31."Y Rights Clearinghouse provide excellent information "'MyS~c: lurnnl over information such as the PriV31."Y Rights Clearinghouse provide excellent information "'MyS~c: lurnnl over information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent information such as the PriV31."Y Rights Clearinghouse provide excellent in ~oftw.II'e uso 10 idemity SCII offc:ndc:I'11. 100 Chapter 1 Privacy resources. Activist organizations such a..'io the Electronic Privacy Information Cent~r (EPIC) inform the public, file lawsuits. and advocate for better privacy protection. Awareness ----- Most pMpk hall(jigu"d out by now you can i do anything on th~ Wtob without kaving a "cord. -Holman w: Jenkins Jr., 200080 Holman Jenkins got it wrong in the quotation above. In 2000, tech-savvy people were aware of the uacking of Web activity. but most ordinary people were nor. In 2006. the disclosure that Google. AOL, and other companies that operare search engines store search queries shocked people. Still. each new rcvelation about personal data collection or loss of sensitive personal data surprises people. Since the mid-1990s. however. television programs. newspapers, magazines and the Web. As consumers, once we are aware of the problems and potential solutions. we can decide to what extent we wish to use privacy-protecting tools. br: more careful about thr: information ~ givr: out. and consider the privacy demands of customers. As computer professionals. we can design systems with privacy protecrion in mind. building in prorecrive features and designing so that others can easily be added later. Privacy enbancing technologies for consumers New applications of technology. Soon after "tcchies" became aware of the usc of cookies by Web sites. they wrote cookie disablers and posted them on the Web. Web browsers added options to alen the user [0 reject it. MQIr "bout Software to block pop-up ads appeared soon after th~ pop-ups ~ ';,:1.~U;~ appeared. Companies sell sofcware to scan PCs for spyware: some versions are free. Several companies provide services. called anonymizers. with which people can surf [he web anonymously. leaving no record mat identifies [hem or their computer. If we want to rt"S[ciC[our Web site to family or a specific group of people. we can set it up to require registration and a palOsword. A free blog service allows a blogger to specify the access group (e.g. family. friends, the world) for each posting. Of cou~. registration removes some privacy: T«hnology. Markets. Rights. and Law~ 101 SeveraJ companies offt'r products and scrvict's 10 prevent forwarding. copying, or prinring of e-mail. (Lawyers are among [he major customers.) A free servia offers e-mail Ihat sdf-deslfUC(s after a u.ser-specified time period. These are a very few examples of the many products and technology 41 pplications that we can uSC: to profer our privacy. They are not panaceas. They have advamages and disadvanuges; rhey do nOI solve all problems. They illustratc lhat indivKiuals. businesses, and organizations are quick 10 respond and make privacy-protocoting tools available. Encryption is such an importam technological tool for protC'Cting privacy (as well as business and military infonnation) Ihat WC' discuss it at length nexl. Encryption i, : Cryptography is th, art and ,, imu a/hiding dA/4 in pkzin sight. -Larry l.oen 81 E-mail and data in tf.msir on the Internet can be intercepted. Wireless rransmissions can be picked our of the air. Someone who steals a computer or hacks into one can view files on it. Most eavesdropping by private citizens is illegal. Hacking and s(caiing laptops and crniir-card numbers arC'_ crimes. The law provides for punishmcn[of offenders who are caught and conviClC'd. bur we U~ technology (0 proteer ourselves. Encryption is a technology. often impiemc-nled in software. mat [ransforms dau into a form thac is meaningless [0 anyone who might intercept or view il. The dala could be e-mail. business plans, credit-caro numbers. imagts. medical records. and so on. Software a[the ttcipient's Web site (or on one's own computer) decodes encrypted. data so that (he recipient or owner can view the messages or files. Sof~ routinrly encrypts credit-card numbers when we send thC'm 10 online merchams. Often, people are not C'ven aware that thc..1' are u."iing encryption. The softwa~ on PCs and Web sitC's handle> encryption as most important technical method ror ensuring the privacy of m(."Ssagcs and data sen through computer network..... Encryption also protects stored information from inuudcrs and abuses by e-mployees. h is the bat protection for data on laptops and other small data-uoeage dcvicrs carried outside an office, Encryption generally includes a coding scheme, or cryptographic algorithm, and me specific scquen«s of characters (e.g. • digits or letters). called a Ir"s. used by the algorithm. For example. a coding scheme many children learn is one where each letter of me alphabet is teplaced by w, each c by an ~1 with this key. each It in the mcs.~ge is replaced by w, each c by an ~1 with this key. and so on. This is not a good encryption scheme. It 102 Chapter 2 Priva(Y Klauc..ny r,' For all ~ method. wod until "?, :.i?' f---:' '!!:--'~ tho; ...~ past few .dtcada. both the 'smda andthC recip\eat of an enaypt«l IJICIAS< in.... kDoW' t.r---I Icecp it from ocher ..., ryonc else. This pmcnts a problem. If the key could be safdy sent by ~ :, laIIle commwUeation method as the the message could be safely sent withouf encryption. Gcnctally, keys must be ~ttcd by a more secure, hence men expense of penon or can, mCI)'J1" 1i!\ti,0! b...u... is oftcn casy (0 figure' out (he original message) without knowing the key. Military and commercial applications use much more sophisticated methods. some based on complo: mathematics. Using mathematics. Using mathematics in, dl~m'l:: .lgnl &ction 2.4 Protecting Privacy: Technology, Markc=ts Rights, and Laws 103 to break a code, that is. (0 decode encryptM messages or files without the s«:rct key. For many encryption technology h:LS a flt"Xibilicy and variety of applications beyond proteccing data. For example. it is used to create digital signatures. authentication methods. and digital cash. Digital signation, aimed at reducing the risk of unauthorized access to medical information online. the end of unauthorized access to medical information online. American Medical Association issues digital credentials [0 doctors that can be verified when a doctor. for instance. visits a laboratory Web site to get patient test results. There are likely to be thous.ands of applications of this tcchnology. Digital cash and other encryption-based privacy-protected transaction methods can let us do secure financial transactions electronically without the seller acquiring a creditcard or checking-account number from the buyer. Some techniques ensure that bank records contain no information linking the payer and recipient of the funds. Incy combine the convenience of credit-card purchases with the anonymity of cash. With such schemes. it is not easy (0 link records of different transactions to form a consumer profile or dossier. These techniques provide both privacy protection for the consumer with respect to the organizations against forgery, bad checks. and credit-card fraud. However, cash transactions make it harder for governments to detect and prosecute people who are laundering money earned in illegal activities. earning money they are not ~portingto tax auchoriries, or transferring or spending money for criminal purposes. Thus, most governments would oppose and probably prohibit a truly anonymous digical cash system. Some digital cash systems include provisions for law enforcement and tax collecdon. The potefilial illegal uses of digital cash have long been possible with real cash. It is only in recent decades. whh increased use of checks and credit cards, that we lost the
privacy we had from marketers and governmeO{ when we used cash for most uansacrions. me J '_'-'''_' ~~' 1 prwary 1 -Nadine Strossen, president of the American Civil Libertio UnionS: Business tool. and policies for protecting personal data A well-designed database for sensitive information includes several features to protect against leaks. intruders. and unauthorized employee access. Each person with authorized access to the system should have a unique identifier and a password. A system can restrict users from performing certain operations. such as writing or deleting, on som~ 6les. User IDs can be coded so that they give access to only specific parts of a record. For example. a 104 Olapter 2 Privacy billing clerk in a hospital does not need access to the resulLo;; of a patient's laboratory tests. The computer system keeps track of informacion about each access, including the ID of the person looking at a record and the particular infOrmation viewed or modified. This is an audit trail. It can be llS("d later to trace unaumorized activity. The knowledge mat a system contains such provisions will discourage many priva..')' violations. Databases with consumer information or Web-activity records arc valuable :assets that give businesses a competitive advantage. The owners of such lists and Wllimited distribution. (Recall that Google fought a government subpoena for user search queries.) Thus. for example, mailing lists. often. are not actually sold; they are "rented." The renter d()('S not fC'ceive a copy (electronic or otherwise). A specialized firm does the mailing. The risk of unauthorized copying is thus restricted [0 a small number of firms whose reputation for honesty and security is important to their business. Orner applications also use this idea of trusted third parties to process confidential data. In some states, car-rental agencies access a computer service to check the driving record of potential cwtomers. The service examines the motor-vehide-department records; the car-rental company does nO[see me driver's record. Public opinion and consumer preferences have a strong impaCt on decisions businesses make and on the success or failure of specific products. as well as whole businesses. We saw that Facebook provided more privacy controls to members opposed (Section 2.1.3). There are search engines that do nO[store user search queries in a way that allows linking them together to one person. 84 In an earlier (pre-Web) inddem. Lotus Development Corporation received more than 30.000 negative letters. telephone calls. and e-mail messages after it announced plans for a database with infornution on nearly half the population of me United States along with software that would permit users to generate mailing lists based on a variety of marketing criteria (e.g.• income categories, shopping habits). Lorus dropp & ction 1.4 Protecting Privacy: Technology, Markets. Rights, and Laws 105 and. in addidon, stopped ac~pting advertising on their Web sires from sites that do not post privacy policies. The Direct Markedng Association adopted a policy requiring its member companies [0 inform consumers when they will share personal information including unlisted telephone numbers. driving histories, and all information about children. There, of course, continue to be many businesses without strong priva.cy polici~ and many mat do not foHow their policy. The examples described here repf' ('scnt a s.trong trend, not a privacy utopia. As some problems are addressed, new ones cominually arise. , . Pntirot fMdical information is confidmtia/. It should not bt discUJst'a ill a pub/if piau. -A sign. directed at doctors and Staff. in an elevator in a medical office building, a reminder to prevent low-tech privacy leaks 2.4.2 RIGHTS AND LAW In SC(:rion 2.2.2. we considered some aspects of law and Founh Amendment principles related to prmection and interference by government. This section focwes mainly on discussion of principles related [0 rights and legal protections for ~rsona1 data collected or used by other people, businesses, and organizations. We separate legal remedies from technical, management, and market solutions because they are fundamentally differeD[. 1be latter are voluntary and varied. Different people or businesses can choose from among them. Law, on the other hand, is enforced by fines. imprisonment, or other penalries. Thus, we should examine the basis for law more carefully. PriV2CY is a condition or state we can be in, like good health or financial security. To what atent should we have a legal right to it? Is it a neg:uive right or a positive right (in the sense of Section 1.3.2)? How far should la.w go. and what should be lelt to the voluntary interplay of markers, rducational efforts of public increase of section 1.3.2)? How far should be left to the voluntary interplay of markers, rducational efforts of public increase of section 1.3.2)? activities on property rights and contracts. There was no recognition of an independent right to privacy, In 1890, a crucial article. "The Right to Privacy," by Samuel Warren and Louis Brandeis 8 'i (later a Supreme Court Jusrice), argued that privacy was distinct from other rights and n~ded more protection. Judith Jarvis Thomson, an MIT philosopher argued in a 1975 essay that the old vi('w was mof'(' accurate, that in all cases where a violation of privacy is a violation of someone's righu, a right distinct from privacy is a violation of privacy is a violation of the' Claims and argumenrs of the' Claims and argumenrs of the' S(' papers. Then we consider a varicry of other ideas and pcrspccti~s abom laws to protect privacy. One purpose of this section is to show the kinds of analyses that philosophers, legal scholars. and economists perform in rrying to elucidate underlying principles. Another is to cmphasizt importance of principles. of working oUt a mrorecical frame. Work in which to make decisions about particular issues and cases. me Wan.... and Brandeu, The inviolat. p mistak. fi,nl the: nnrJo.v m "P'ms.ibk, .:and coruidN'~ improve:rntnu in into:"m~II" .tio.:i 11x- N"uion;tl Highw~}' Traf'fK S.Jcty Adminiiln!ion re:quirc; th~1 UInl;lL-.c,h inform ()wnfr~ if ~ Cll' i.; c:tjuippc:d with 3 dna 1'Il'l'Ol'de-r vul spc'1-"ifia Ihal lhe (lwnCT's con'lC'nI i, n«df'cl U'lu,:rln::, .bra liom Iht' rn:OI'de'f. 10. Quota in Thn. Fr.&l1~i," -Sprc:ad ofRccoNl SciD l'alKOt r'no; of l'riv~q'~ion.~W~U 51fft' p/",...,I. Dcumbn l(J, 2006. p. A I. II. The I'm-OIl)' Righu Clearinghouse: lummwl.CS SC'YC'ul ~l): cili~~t'ts of f~ir InIOnn.a-tio n rrim.ipb in ~l\ Review of lhe: Fair In((,rm3tion I'rindpb, ~ c). ...pri\'~q riKhb .ory,J3. /lairintU.htm. 11. Ru.:hi S.lllgh.... i. ~ Fxm.....11t GCh 3 FM. dirt,~ Scptc:mhn~ .: !006, bk";.(;oCc:booL~'t.mlbl ..g.php~po~ .. 2107%7 130: M~rk Zud(t'.hng, "An OpcIII..cflC'r lilom M~r\c. Z'K"nhc-". 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Privacy Internalional's FreqUC'ndy Asked Q\Kstions page on idcmicy cards: www.privacy.orgfpi/activitie5/idcll.d • Privacy Rights ClcaringhollS(:: www.privacy.orgfpi/activitie5/idcll.d • Privacy Rights Clcaringhol PARADIGMS 3.2 Contllolung OFFENSIVE SPEECH 3.3 CENSORSHIP ON THE GLOBAL NET 3.4 POUTICALCAMPAIGN REGULATION: NET NEUTRAUTY OR DEREGULATION? EXERCISES low a. PIC < 3 F...dom of Sp «ch 3.1 Changing Communications Paradigms ,. CongTr\$J Jh4J1 malu no law ... dbridging fh~ /rutiom OfIpuch, or ofth~ plrIS.... -First Amendm~nr. U.S. Connitutj()f\ ~ we obstrve-d in Chapter 1, the Imernet brought us extraordinary opportunities for increasing f~e expression of ideas, easy and inexpensive communication ~(Ween people of different countries. and extraordinary opportunities for increasing f~e expression of ideas, easy and inexpensive communication ~(Ween people of different countries. and extraordinary opportunities for increasing f~e expression of ideas, easy and inexpensive communication ~(Ween people of different countries. and extraordinary opportunities for increasing f~e expression of ideas, easy and inexpensive communication ~(Ween people of different countries. and extraordinary opportunities for increasing f~e expression of ideas, easy and inexpensive communication ~(Ween people of different countries. and extraordinary opportunities for increasing f~e expression of ideas, easy and inexpensive communication ~(Ween people of different countries. and extraordinary opportunities for increasing f~e expression of ideas, easy and inexpensive communication ~(Ween people of different countries. and extraordinary opportunities for increasing f~e expression of ideas, easy and inexpensive communication ~(Ween people of different countries. and extraordinary opportunities for increasing f~e expression of ideas, easy and inexpensive communication ~(Ween people of different countries. and extraordinary opportunities for increasing f~e expression of ideas, easy and inexpensive communication ~(Ween people of different countries. and extraordinary opportunities for increasing f~e expression of ideas, easy and inexpensive communication ~(Ween people of different countries. and extraordinary opportunities for increasing f~e expression of ideas, easy and inexpensive communication ~(Ween people of different countries. and extraordinary opportunities for increasing f~e expression of ideas, easy and inexpensive countries. and extraordinary opportunities f .access to many voic~ and points of view allover me world. But freedom of speech has always been resuicced to some degree in the.' U.S. and [0 a large dc.-grcc in many other countries. In this chapter. we examine how principJe\i of freedom of speech from earlier media affect the Internet and how me internet affcns them.' We consider pornography on the Internet. anempn [0 restrict it. and attempts [0 cC'Stri 3.1.1 REGULATING COMMUNICATIONS MEDIA Ie is by now almost a dich~ to say that the Imcrnet lets U.1Ii all be publishers. We do not nCtd expensive printing presses or complex distribution systems. We need only a computer and a modem--or just a cell phone. Any business organization, or individual can set up a Web site. We can "publish" whatever we v.; sh; it is available for anyone who chooses to read it. In 1994. shordy before (he Web was widely used. Mike Godwin, then an attorney with the Electronic Froncier Foundation. describl..-d ,he df21matic change brought about by computer communications: It is a mediun far different from the u:lephone. which is only a one-to-one medium. ill-suited for reaching large numbers of people. Ie is a medium far different from the audience. For the first [inle in history. we have a many-[O-many media, iII-suilC'd for feedback from the audience. For the first [inle in history. we have a many-[O-many media, iII-suilC'd for feedback from the audience. For the first [inle in history. we have a many-[O-many media, iII-suilC'd for feedback from the audience. [0 have access, and in which you don't have [0 win the approval o(an editor or publisher to speak your mind. Usenct t and the Interne(. as part of (his new • Ahhough wmr "f our d;lO;UMion i~ in thr «JnlC'lll uf the" U.S. C.cKUliluliurl§ Finl AmmJrc\t"I'I. Ihe" ~rl;~nb. ~ principle. about t~ right [0 frttJom of ~h ;,apply ntun:: wi..kt). , An uny (r~ · Wrh) ~'("I lleu ion u{ InlC'f1Vt di:ku\...\ion grour~. Seclion 3. 1 Changing Communications Paradigms 1"5 medium. hold the promise of guarantet'ing, for the fin;t time in history, that the First Amendment's protection of frttdom of the prrss means as much to each individual as it does to Time Warner. or to Gannett. or to the N(w York 7imrs. 1 Individuals took advantage of that promise. As just one indication. the number ofblogs passed 50 million by 2006. Some 31"(" as widely read and as inAuential as
traditional newspapers. However. while computet communication relation. Telephone. movies, radio, television. cable, satellites. and. of course, the Intcrnet did nor exist when the Constitution was written. Freedom of the press applied to publishers who printed and disubuted pamphlettr" who printed and disublet disubuted pamphlettr" who printed and disublet communications technology according to its spirit and intention: to protect our fr~om [0 say what we wish. Politically powerful people. however. cominually try (0 restrict spct'ch that [hr~alens them. From the Alien and Sedilion Acts of 1798 [0 regulation of Policical Action Committec~, such laws have been used against newspaper edi[Ors who disagreed with t~ political parry in power and against ad hoc groups of people speaking out on issues. Attempts to reStrict freedom of speech and of the press flourish with n~ technologies. Law professor Eric M. Freedman sums up: "Historical experience-with the printing pres.... secular dramatic troupes. photographs, movies. rock music broadcasting, saually explicit telephone .services. video games. and other media--shows [hat each new medium is viewed at first by governments as uniquely inRuenrial. and therefore a uniquely inRuenrial. and therefore a uniquely threatening. "I (n this section, we introduce the traditional three-pan framework for First Am~nd meO[protection and governmem t'f'guladon of communications mroia. A.. we will see, modern communications technology and ,he Inrern('t require that ,he framework be updated. The three cnegories arc • Print media (newspapers. books, magazines. pamphlets) • BroadClS[(relevision. radio) • Common carriers (telephone, telegr2ph, and the posta system) The first cuegory ha... the strongest First Amendment protection. Although book... have been banned in the U.S. and people were arrested for publishing informacion on cenain topics such as contraception, me trend has been towud f~r government resuaints on the printed word. Television and radio :ue similar [0 newspapers in their role of providing news and entertainmenl, but rhe government regulares both the suuclUre of the broadcasting indwtry and the content of programs. The government- sundards of merit-a requircmem that would not be tolerated for publishers because of [he obvious Ihreat to frttdom of expression. The 146 Chapter 3 Frttdom of S~, h government has used threats oflic~nse revocation [0 get scations (0 cancel sexually ori~nted talk shows or to censor them. Cigarettc ads arc legal in maguines. hut banned from radio. television. and all electronic media under the control of the Federal Communications Commission (FCC). Some words may appear in prim but you mwt nOl speak them on rhe radio. The federal government frequently proposes rc:quill:'menrs to reduce violence on television broadcast companies and thr(';ttened (he broadcs(of a " 9/11" documentary because of profaniry by firefighters. Wheth~r you favor or oppose panicular regularions. (he poim is that the government has more control over relevision and radio content than it has over communication methods that existed at the time the Bill of Rights was written. The main argument used to deny full First Amendmem procection to broadcasters was scarcity of broadcasters was scarcity of broadcasting. In exchange for (he "monopoly" privilege of using the scarce. publicly owned spectrum. broadcauers were [ighdy regulated. With cable. sa(elli(cs. hundreds of channels. and competidon from me Internet, the argument based. on scarcity and monopoly is irrdev:mt now. but [he precedent of government-imposed rcsrrictions on contem. is that broadcast material comes into (he home and is difficult [0 keep from children. Common carriers provide a mediwn of communication (nol content) and mw(make their service available to L"Veryone. In some cases. as with telephone service, the government requires them 10 provide "universal access" (i.e.. to subsidize service for prople with low incomes). Based on the argument that common carriers a~ a monopoly (he law prohibits the-m from controlling the content of material thac passes through their system. Telephone companies were prohibited from providing content or information services on the grounds mat they might discriminatC' against competing content providers who must also use their tcl~hone lines. Common carriers had no comrol over comment, so they had no responsibility for illegal concent passing through. Beginning in the 1980s computer bulletin board syS[cms (BBS). commercial services like CompuServc. Prodigy. and America Online (AOL). and ultimately the: World Wid< Web hearne major arenas for distribution of news. inforlTUoon. and opinion. Because of the immense flexibility of computer communications systems. they do not fit neatly into the publishing. broadca.~ting, and common carriage paradigms. Cable television strained these categories previously. In commenting on a law requiring cable stations to carry cCHain broadcasts. the Supreme Coun said cable oper.uors have more freedom of speech than television and r.ldio broadcasters. but less than prim publishers..' But the Web does not fit bctwl:cn the exiscing categories any bener than it fits whin tht."nt. It has similarities (0 alllhrl"C. and. in addition. 10 bookstores. libraries, and rentcd meeting rooms---all of which the. law tre; us diffe-rendy. As new technologies blurred the technical boundaries between cable. telephone. computer ne[Works. and content providers. the law began to adapt. The Se Changing Conununications of service areas and many restrictions on services that telecommunications companies may provide. It also significantly clarified Ute question of liability of Internet service providers. Print publishers and broadcasters are legally liable for content they publish or broadcast. They can be sued for libel and copyright infringement. for example. They are legally responsible for obscene material in their products. SefoR" passage of the Telecommunications Act. several people brought suiu against BBS operators. ISIIs, AOt. and other service providers for content pue on their systems by oeht'rs. therefore not a common carrier. immunt' from suits for content. Similarly, ~rvice providers and content hosts might have faced criminal charges if a member poSted iIIegoal content. Similarly, ~rvice providers and content hosts might have faced criminal charges if a member poSted iIIegoal content. The Telecommunications ACt stated that "No provider or user of an interactive computer service shall be treated as the publisher or speaker of any information provided by another information contem provider: 4* In 1996 the main parts of [he first major Internet censorship law. theC., ommunications Decency Act (CDA), t were ruled unconstitutional. In this decision. a federal judge commenced that "as Ute most participatory form of mass speech yet developed, the Internet deserves the highest protection as print media? Efforts [0 censor it continue. We investigate arguments about, and the impacts of. censorship and other restrictive laws in Section 3.2. In addition, we will see in Section 3.2.4 that many innovative individuals and entropR"neurs who tried [0 publish information. advertise produces, and provide services on [he Web encountered legal problems (and sometimes fines), not because of explicit censorship laws, but because of long-standing laws that restricted commerce to benefit powerful organizations, businesses, and governments. In several cases, these confrontations berween new u!chnology and old laws resulted in increased freeclom. 3.1.2 FREE-SPEECH PRINCIPLES A~ we proceed with our discussion of free-speech issuC'S, it is helpful [0 remember several imponant points. The First Amendmem was wrinen precisely for offensive and/or controversial speech and ideas. There is no need (0 protect speech and publication that no one objeccs [0. The First Amendment covers spoken and written words. pictw(.'S. an. and other forms of ·~r"i..:e provider. rut renuin "-t risk in nl;lny wUlllrie~ cumple. in 1004 II", hc-;w of eBar in Indill W~ urestc.i !J.«auloC someone sold pornogrolphk yidcus on e&y's Indun \ite. The video ibClf did not "-P{K".ar on the ~jte, ;lnd Ihe ...,Ilet viololted coffipJ.ny policy by ...-Iling thenl. t P;b!.ed L~ Tille V uf the Tda;(jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of ideas and opinions. (h includes. for example. wearing armbands [0 express suppont of support of the Tda; (jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of ideas and opinions. (h includes. for example. wearing armbands [0 express suppont of the Tda; (jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of ideas and opinions. (h includes. for example. wearing armbands [0 express suppont of the Tda; (jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of ideas and opinions. (h includes. for example. wearing armbands [0 express suppont of the Tda; (jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of ideas and opinions. (h includes. for example. wearing armbands [0 express suppont of the Tda; (jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of ideas and opinions. (h includes. for example. wearing armbands [0 express suppont of the Tda; (jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of ideas and opinions. (h includes. for example. wearing armbands [0 express suppont of the Tda; (jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of the Tda; (jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of the Tda; (jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of the Tda; (jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of the Tda; (jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of the Tda; (jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of the Tda; (jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of the Tda; (jmmunic~liom
Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of the Tda; (jmmunic~liom Acl. 148 C.hap~r 3 Freedom of Spet'ch expression of the Tda; (jmmunic~liom Acl. 148 C.hap~r of a politicdil cause.) The First Amendment is a restriction on the power of government. not inruviduals or private bwincsscs. Publishers do nor have to publisher is not a violation of a writer's First Amendment rights. Web sites. search engine companies, and magazines may decline specific advenisements if they so choose. That does nor violate the advertiser's freedom of speech. Over the course of many yean and many cases. the Supreme Coun has developed principles and guidelines about protected expression. When a government action or law cause people to avoid legal speech and publication OUt of fear of prosecution-perhaps ~Cluse a law is vague-the aclion or law is said to have a "chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First Amendment rights, Couns generally rule (h:u laws with a significant chilling effect" on First A responsibility to weigh the arguments and decide whether or no[[0 commit the mega] act. The First Amendment does nor protect libel (making false and damaging sr; ltcmenu) and direct, specific rhrears. Inciting violen~. in cerra in circumstances. is illegal. Although the First Amendment makes no distinctions among categories of sp« mesc Nctworked compurerswill be [he priming presses of me twenry-first cemury. If they are not fec c of public [i.e., government} control, [he continued application Secrion 3.2 Controlling Offeruiw Spc-«h 149 of constitutional immunities (0 nond~ctmnic mechanical presses, lectu~ halls, and man-tiuc.J.tion, breast cancer. (l"ITlinism. or gay and lesbian riglmi ..., "I'he home p~lgC of Yale Un jve rs iry'.~ bioll)gr department A wresrling site and a moro n.:yclc sport mag:l zim' site v The \X'ch sin: of a candidate for Congress ('o nrainingsrarc mt'ms abom ahoninll and g Ull comrol ? A map of Disney \X/orld (I don't know why.) ... Tht' Hcrirage Foundation (a mnscrv;llivc think tank) and a Quaker site Filtering Examplc:s o bvious [Q a person reviewing rhe site. Files transferred by some file-sharing systems arc not filtered. 'rhe wc,lkncssl."S of filrers, cspct"ially when rhey wl.~ r(' hrs(hei ng developed. should nor be a big surprise. Filters improved wilh rime, but il is nor pos..~ih l(' to complerdrcliminacc errors and subjectivity about what to block. None of the solutions we describe in (his hook for problems generated by new technologies art' perfect. TIH:Y have strengths ,md \vc.lkncsscs and are useful in some circumsrances and nor orh(,.~rs_ Parents. (or administrators ofprivat~ SdlOOl~) can cart."fully ft"'V iew dIe charaCteristic.'. ofcompc[ing producrs and make a choice ahout whether to lL«: one. The weaknesses, how(,vcr-p.mi cularly rh e blocking of legal marcri al-do pccscm a free-spccch issUt: whl."l1 It~gisla[Qrs mandate filters. And St.-ction 3.2 Controlling Ofic ll~i,'t. Spc.,('Ch 157 rhar is what (hc next major law, the C h ildren's). Inrcrn c(Protc,c [io n Act (CIPA), did . A~ il applies to libraries (and schools), \VC describe problems raised hy [he Intcrnct in libraries bd()[c the Supremc Court rukd on C IPA in 2003. Problems in libraries bd()[c the Supremc Court rukd on C IPA in 2003. Problems in libraries bd()[c the Supremc Court rukd on C IPA in 2003. Problems in libraries bd()[c the Supremc Court rukd on C IPA in 2003. Problems in libraries bd()[c the Supremc Court rukd on C IPA in 2003. Problems in libraries bd()[c the Supremc Court rukd on C IPA in 2003. Problems in libraries bd()[c the Supremc Court rukd on C IPA in 2003. Problems in libraries bd()[c the Supremc Court rukd on C IPA in 2003. Problems in libraries bd()[c the Supremc Court rukd on C IPA in 2003. Problems in libraries bd()[c the Supremc Court rukd on C IPA in 2003. Problems in libraries bd()[c the Supremc Court rukd on C IPA in 2003. 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Problems in libraries bd()[c the Supremc Court rukd on C IPA in 2003. Problems in libraries bd()[c the Supremc Court rukd on C IPA in 2003. Problems in 2003. Problems in 2003. P RI."Scarch Counci 11:; for laws 1.0 prc\'cll(minors Cro m obrainin g sexually l..'Xp.licit Jn3{eri31 on (he Internee. After the first rejccdon of cOPA by a federal approach. That year, Co ngress passed C IPA. The autheJrs of CIPA :lm:.'mptcd to avoid the courrs' criticisms of th e CDA and CO PA by using I'hl~ federal governmem's funding power. C IPA requires that schools and libraries that schools and libraries that schools and libraries that parriciparc in certain flxier'oll programs (receiving ft'deral m OII(.-Y for technology) insraJI fihering software on allInlcrner terminals ro bloc..:k J.CCc:ss 10 sites with child pornog raphy, obscene rn;uerial, and material "harmful to minors." Of course, many schools and .libraries rel }1 on (hose funds. Civil Ijb\,rties organiuuiollS and the American Library A'isociation sued to hlock CIPA.u. T he Supreme COUrt ruled in 200 3 that C IPA does nor yiolate the First Amendment, CI PA doe (mCrI11'[. It sets a condition for receipt of ccfllin feder.)1 Ill11d,. C ouns often accept such conditions. The court made it dear that if an adult :asks a librarian musr do so. Ahematil'es to censorship Art' IIt"W fl'Stricrions on IIHcrncr (;ontcnt needed ro prmcct child.ren (and to shield adulrs fro m material rkn is oH'-:.'nslv(' to them)? Are th('n.~ other solutions that do not threatL'nlO diminish free discussion of serio us subjl'cts or den y sexually explicit material to adults who "\...ant it? As we have seen for m any problems, rhert" arc a variety of so lutions based on rhe marker, (echnology, rt.'Sponsibilit)], :lnd cducarioll. as w(,.'11 as on enforcement of .: iscing laws. '~/e :lln-ady nored rhe ava ilabil ity of fi lters as a ma jor argum~m agains[censorship laws. The development" of .: iscing laws. '~/e :lln-ady nored rhe ava ilabil ity of fi lters as a ma jor argum~m agains[censorship laws. '~/e :lln-ady nored rhe ava ilabil ity of fi lters as a ma jor argum~m agains[censorship laws. The development" of .: iscing laws. '~/e :lln-ady nored rhe ava ilabil ity of fi lters as a ma jor argum~m agains[censorship laws. The development" of .: iscing laws. '~/e :lln-ady nored rhe ava ilabil ity of fi lters as a ma jor argum~m agains[censorship laws. The development" of .: iscing laws. '~/e :lln-ady nored rhe ava ilabil ity of fi lters as a ma jor argum~m agains[censorship laws. The development" of .: iscing laws. '~/e :lln-ady nored rhe ava ilabil ity of fi lters as a ma jor argum~m agains[censorship laws. The development" of .: iscing laws. '~/e :lln-ady nored rhe ava ilabil ity of fi lters as a ma jor argum~m agains[censorship laws. The development" of .: iscing laws. 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availabil ity of fi lters as a ma jor argum~m agains[censorship laws'' = lln-ady nored rhe availabil ity of fi lters'' = lln-ady nored rhe availabil ity of fi lters'' = lln-ady nored rhe availabil ity of fi lters'' = lln-ady nored rhe availabil ity of fi lters'' = lln-ady nored rhe availabil ity of fi lters'' = lln-ady nored rhe availabil ity of fi lters'' = lln-ady nored rhe availabil ity of fi lters'' = lln-ady nored rhe availabil ity of fi l for free, Volumary usc of filtering systems i_~ an obvious rool for protecting children. By 2006 more ,han half nf families wirh teenagers med fil[~rs on rhli.. ir cOinpurcrs. Wc bridJy de-scribe 3 variety of mhcr approachet: be-sides censorship law.~. Wireless carrierll. such as VCriWII and CingulaI'. set strict '" decency" standards fiJI' companies pr()viding content for rheir nctworks. 'I'he ir rules are detail ed and suieH.'r chall what the government can prohib iL17 Comm~rcial services. online communities. and social-n erworking sites develo p poli cies co prore:n members. i\ few reme-die., indude expelling subscrilX'rs who posr or e-m ail material banned by law or th e sire's policies, removing offensive ma[e rial, and a.iding law enfi.lfccmcnt with illVc.:'sdgations of child pornography or anempts ({) Ille(.~l and mo!.cst children. MySpacc began developing H."C llO olob'Y to keep track of mcmb~rs who POSt picrure,~, to help (race all}'OI1~ who posts child pornography. In response r.o m arker demand, companics offer online !len 'ices and \'\feb site.... targered to families ilnd children . Some allow subsc rib{"rs (0 lock childrt:n our of (enain areas. Parent .. can scr up accolilUSfor Se Comrolling Ofl~n~ivc Spcl'(h ~diin"few wC±k\$ of the bombing o~.!~()klah~ma City federal building i'~:,; 'JS~?" [?c Senate's terrorism 'a,ld technology sohco.mmiucc- hdd hearings on "The, Availability of Bomb Making Inf()(nJ;lrion on [h~ Jmcrncr." There are similarities berwccn the controversy ~P:9ut" bomb~making inform:uion is already widely available in trauitional media, PtQtecrcd: by ,he 'First Amendment. It also has lcgidmau: uses. Information about -how [0 make bombs C;u\ be found: in (he Ent)'dopttlul Brit~IImjc" (which pomogn.phy. bo~b~making describes how co make an ammonium ni[fa(C' and fuel oil bomb. is available to public in a bookl« called , ne the "Blaster', Handbook"-pubUshcd hy the U.S. Dcparrmcllt of Agriculrure. Fa rmers usc explosives ro remove tree stumps.28 First law .. gainst [nt~rnel until information ob"ailnc'd m~ke"otllhs a la~ they carri"L(~oh . fi)c anyone: who U";[o'O""C:'1;> information -knowing or will , be:Lised 'to commit there.. have been he accepted. 'J'hl' video game industry devel oped a raring system that provides an indica tion/or parcll(s abour rhe~mounc of Sl~X. proEmiry. and vioicflO: in a game.> 1 Some online game sites restrict their otll..~fi ngs to nOll v ~olcm ganK's and advortise t.h .. t" poli(.-y. Manyonlinescfvicesdistribute information with t'ips on how m contJol wharchildfell can VI sirt.'S of the Fln and organi:t.:at ions such as rhe N arional Center for Missing and Exploited Children'~~ provide information abo U { fisks (0 children and guidclim."'S for n.:dudng [hem. (One simple recommemblion is 1.0 place rhl~ computer in the living room or fam ily room where a parent can ea.'iily observe a child u''iing it.' C hild pornogr.tphy is illegal, and it is illegal w lure children imo sexu;'ll aas. FL't.ieral agents regularly make arrests for these aimes where ,mspL,(,{S usc c-mail , chat rooms, and socia1-netwo rking sites. fed eral agents liSt' surveillance, coure orders fl) fl, ... d c-mail (as the Electronic Communication ns Pri\~dcy .A.Ct requires). search W3rra]I[,'i, Sling ope rations, 3]Id undercover investigations to l)uild their cases and. milke [he arrests. Parents havc a~ responsibility to supervise their children and to teach rhem how to dcal with inappropriate ma[crial and chreats. Parents havc a~ responsibility to supervise their children and to teach rhem how to dcal with inappropriate ma[crial and chreats. Parents havc a~ responsibility to supervise their children and to teach rhem how to dcal with inappropriate ma[crial and chreats. Parents havc a~ responsibility to supervise their children and chreats. ,uion and instruction in cxpcc{cd behavior can Jvoid mallY problems. livo-poilJt-fill]) millioT) fise .Amt"rim Ouline. Thm's like a city. Parents u'Olildn't Iff thei,. kids go tl,,, ,,da ing hI n elt)' of 2.5 milliml p~()pk witl)(Jflt tbmt, or withoUl knotl·in/{ Wlltlt Ihty're going 10 be doint -Pam McGraw, America OnlincJ.l (Th e numlX'r ()r AO L mernbt ts bl'er g ft'W lC) n1t)n.:' than 30 million .} 3.2.3 SPAM Whar is rhe problem? Wl.' loosely describe spam fl, ~I'AIII . sl';'lIn .~ , frowning O\I(milt, , .) NVcru li.'11 Sl'ction 3.2 Conrrolling Oifc-]lSi w Spl"l"ch 161 Spam :mgers people beca use of both [he COIHCnt and rhe way Ie is scm. Conrent can be ordinary co mmercial advcrtisin g, polirical adv('n ising, soli citarions for funds from nonprofil organiz:llions, pornography and advc.rtiscmcnc..1; fo r it. fraudul ent "gel rich quid.~sagC':s :sent by a law firm to 6,000 bulletin boards or 11];."WS groups in 1994 . Ar thar rime. any ad\'eJ"li sing or postings nor directly rdared fO the topic o f the group raised the ire of Nce users . \'V'ithin l t~"\v years, as e-mail usc grcw, OIIC nororiolls spammer alone was C"stin13.tcd (0 be sending 25 million c-mails per day. In 2002 Horntail. with flO million spam c-mails per day. The number of sp:un mcsslgc-s filtered our by AOL peaked at about 2.4 billion per day. An anrispam expert reponed a ratr of roughly 30 billion spain messages per day worldwide in 2006.3" Cases and free-speech issues In 1996 about hal f o/" rhe c-mail advertising service calk'd Cybcr Promotions. Cylxr Promotions. Cylxr Promotions ()b{ai n~d an inj unction again.st AO L'.s uSr.! of flIrcrs, daimingAOL violated io; f irst Am endment rights. Thus beg-JIl rhe banlc over the h.~gJ.1 sratus of spam. Cybcr Promori ons' caS(' wa..~ weak , and the injuncti on was soon removed . Why did AOL have rhe righ! co block incoming spam?Thc spam used A01.'5 computers. imposing a (osr on AOL. AO L's property rights ;\!low it (0 decide what it accepts on its system. AOL is a m~mbers hip organ iz:ltion; ir can imph.'mcm poli cies to provide thl: kind of environmem it believes irs members wanr. Finally, AOL is a pri\':w: com pan}'. not a q()YcrnmcO(institut ion. The first AmendmclH prohibits go\'crnm enr from restric[ing freedom of speech. On the other side, some civil liberties. organiza lions were unc ... I SY about ;ulowing AO I.. ro filrcr c ~ mail h('Cau sc.~ 1\01.. decided what e~mail (0 block fmm irs members. They argued that because AOL is large, it is a lot like [hc post officc. and ir should 11m he allowed 10 block any mail. O ver the next few ye:us, AO L hied several lawsuirs and sought in junctjons ro srop spammers from .~ cnding u ll solicited bulk mailings to membc~. Notice thc: subdcshifr: Cybcr Promotions sought an injunction h) smp AOI.. from lilt ering our .il s ('-mail. AO L sought injunnio lls to srop sp:unmc-rs from scnding e-mail. Filtc rsdon ol.\'ioi.au a spa.mmcr's freedom of spt.'cch . but dat.'S :m or(ic r not [0 send the mail viOiah.' freedom 162 C h3PU'! 3 Fw:dom OfSPI'Ct:h of speech? We Ii.'>hxl sC'veral argument_~ why a service. provid er should be free to fil[er incoming mail. Do any of the argument chat rhe spam II ses Ihe n.'cipiclH comp:Uly's property (compucer system) against its \',: ishes and imp()sL'~ a COSt on the r~cipicn(. AOL and olher sl'rvices won multimillion-d o llar scuiemcfHs from Cybc.'r Prommio ns and orh(.'r spammcr5.. O ver a period of less than two yl~.H'S. ~l torll(.'r Intd e mployees. He disguised his n.'tIIrIl address, making it difficult for Intd to block his e-mail with a filter.Intdsought acoun order prohibiting him from .\t'nding mono' c mail to its cmployees (al"\vork). Note thilt in {hi ~ GISc" (he spam was not commercial. Intd argued char freedom of speech gaw Hamidi the right. to operate his own \X'eb sire, but did nor give him {he right to intrud~ in in tel's propl'rry and IISC irs equipment to deliver hi.s In('ssages. imd argued that the c-m'lil was a torm of rrespass. The Count said (hat the e-mailing was 11m trespass becausl~ it did not damage lu red 's compul ers or cause economic harm to the company. (The coun said (hat the e-mailing was 11m trespass becausl~ it did not damage lu red 's compul ers or cause economic harm to the company. (The coun said (hat the e-mailing was 11m trespass becausl~ it did not damage lu red 's compul ers or cause economic harm to the company. (The coun said (hat the e-mailing was 11m trespass) because economic harm to the company. rrespass law might apply (0 spammers sending commercial ('-maiL) Thl.' dissenring judg~s argued that Imd 's property rights over its compuc('.rs should allow rhe company (0 exdude unwanred c-mai!.}') Amnesty (ntl'rnational has long used i L'i n(,(work of thousa nds of volullr.ccrs ro flood governmelll offic.:ials in various coulHrics with mail whell a politil.."'31 prisoner is bl'ing w uured or is in imminent" dang(.'C of excc.:utjon . Now, volun ceers (an log on [0 its \~eh site and send a prewritrcn ~~Ill ~li] ktt('r. T his is not commcrci.ll mail, bur ir is intended to be of large \'olume and cercainly the recipient dQ(.'~ not solicit it. Various political and advoca",Y' ()1'~:.lni13rion s usc {he same kinds of systems. People ch or spam. depc nding on how sympatheti c we are (0 the specific org;lni1.:lcion's I1lCSS:lgC? Solutions from market.s, technology, and business policy h et.xiom of speech docs nO[rcqui rc the intended li~ tcner, or e-mail recipient, to listen. Businesses and programmers created a vark ey of filcc:ring produces (0 screen our spam at (he rccipienr's sire, by blocking messages Sel"l ion 3.2 Con (rolling Oifellsiw Spt: ('ch 163 with parricularwords, and by mon:sop
hi ~r ica {ed merhod.~. rspshlockccnain c-nuil from rhcir systems entirely and also let. illdividual. members establish (heir own lists and crircria for m;i1 to block, Pr~Klucts an: avaibblc that Hag Web sires in search engine rcslllr.~ rhar arc known to geller. He spam c-mail w visirors. People can get "disposable" e-mail addrcssl"s for use Wilh online acitivity ,hat might gencr.Hc spam. They can arrange ro forward mail from rhar address to {heir I"C"JI e-m otil address and cancel [h e disposlblc address if it starts gerring roo much spam roblem, called (",hallcngc- response spam filtering, t.he filcer program :lutuma(ic Isr. - ------ - 164 Chapu·[3 Freedom of Spe-ech We Saw that filters are not perfeer. They block more or les.~ rhan (he material from young children, it might be acceptable on the side of blocking some disincentive. Some proposals m~lk(' the paymenr;11l opdon to the recipient. with rhe idea that most people would not invoke the charge for most personal e-mail. bm would dick co charge when c-mail comes from an adverriscr. Many groups object co the very idea of charging any fce to send ('-mail. For example, Richard Cox of Spamhaus, an international antispam organization commented that "an ('-mail charge will destroy the spirit of the Internet. "18 Critic.~ say charges might reduce use of c-mail by poor people and nonprofit organizations. Th,' first significant pay-to-email scheme actually implemented ('-mail service. The e-mail certified ('-mail service. The e-mail service) and for the service and for the service and for the service. The certifier makes agrccmcllfs with ISI\ and e-mail service providers that (hey deliver certilied mail to theil" members. images and links included, wirhom purring the mail through fibers. The messages appear in the recipiem's mailbox with an indicatioll [hat they are "ccrtified." In 2006 AOL and Yahoo made such an agreement with Goodmail's certified mail service. Large companies like Time Ine. signed up as senders of c('([Hied e-mail Esther Dyson had suggested a sender-pays model for ('-mail in 1997. \X/hen Goodmail brought rhe idea to public anention nearly ten years larer, she again wrote in suppon of such plans. She argues that many people might like some form of "ccrtified" email, and it would he good to have competing companies offering such services. They might be more etTL'Criv(' at reducing spam [han the regulatory approaches tried so far (including the CAN-SPA"1 law we describe nexr).[)yson says we should not expect e-mail to be free forever jlL'H became it was at the begillning)9 (:ritics of certified mail schemes like Goodmail's, such a, ~ Spamhaus and the Electronic Fromier Foundation, believe the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive not to improve filters. Som,' object panicularly to schemes like (his one where the service gives ISPs incentive n ccrti6carion fcc have an incentive [0 overfilter, (hat is, (0 filter out legitimate c-mail so thar more senders will need to pay for certification. They fear char free ('-mail will disappear. It is interesting ro !evit."'.\! how artitudes abolt spam filtering have changed. We saw that in the larc 1990s, when AOLbcgan aggressivdyfilrcring to blockspam, some Internet 1---' --- .- _.. Sl'ction 3.2 groups compared the hltcring to Contro!iing OfFensive Speedl cc-nsorship. Even rhough .AOL \ . . 3.S not :] [65 govcrnmcnf large and million.~ of pc-oplc received their m~il at AOL. People worried rhat the pcc..'Ccdefl(of a large corpor.J. {ion fillering c-nuil for any reason could ICoid La emiry. it WJS corpor.u-iol1s fillering c-mail because of COmetH. they did not like. Nnw, many advocal-Y groups aud customers of ISPs sec spam titcring; Is a valuable and essential service. Now that du. . lrHl.:rne(has grown from a c()mmUnil}, of scientisC5 and {cchit.s IO a world that includes commerce and crim.in als, ar(;... (crrifica(ion services another hdpful adaptation or a thre, u? Antispam laws The federal CAN-SPAM Act (whose full name is (he Controlling the Assault- of NonSolicitl''(i Pornography and Markering Mes....ages (for easier filtering). opr-our provision s. and methods of generating e-mailing lists. Commercial messages must include valid mail hcader intormadon (that is, faking [he "From" line w disbruisc the sender is prohibited), a valid rerurn e-mail address. and valid physicaiposuladdress. De.... 166 Chaph'l' 3 Freedom of Sp {'cch 3.2.4 CHALLENGING OLD REGULATORY STRUCTURES AND SPECIAL INTERESTS 'fhi' bt'ftuty of it (til is that tlu Illternrt PUII my littl' /mn 11t,,/timuiona/ ((ImpIll]. ()7] (f ptIl' with (I -Andrc.'\\' f-rccmantlts, pig: tarmer, wilusc \X:!ch si t\.' indudes video dips of his pig.~41 Most people would n or consider invcstmcnc newsletters or ads for wine and real eSGH.C to be otTcnsivl' material. Howl..'vcr, one of ehe POilUS we make at [he beginning of thi s chapeer is [hat some people will find s()mer.hing offensive abolH almost any kind of COnl(:OC. H eccwe dis(' us..~ restrictions on (hesc Ind similar Ollteriai on {he Int~rncr. Several companies sel l self-help s()frw]n: to ass iST people in writing wills. prelnariral agrccmcnls. and many other legal documcms. The software includes legal tonus and iosrruetions for liUing rhem OUL It is a typical example of rhe backlash of special interesu who see Threa(5 to their income and influence, a'lexas judge banned Quicken legal .sofrwarc from 'Texas. . . IeX ScC(iun :S.2 Con{willing Offensive Spct"Ch 167 re'luireITu:: IH!i . The d('ci.~ion was imponam in eliminari ng a fequiremc lH for government approval to disClL~S certain subjects on ,he Nct or via sofrware. By raising an issm' of free speech on t'hcWeb, this case led to {t'rminarJo[l or a long.sranding unconstitutional rcstf'dinr offrct' speech in traditIonal media as wd1. 41 The \X/eb providt's the porellcia.l .for reducing price.' of many products by climina.ring rhe.' "middleman." Small producers who e.~ annor afford ,"xpcnsive disuibuwrs or wholcs:llcrs C311 set up a \Veb sire and scll din..'Ctly to consumers nat ionwide. BOI nOI if .-hey operated:l small wine-fY, Thiny stalC:s in (he U.S. had bws restricting the shipping of out-or-state wi nes di rectly to conSUIners. Th~ laws protected St.ilte rCV('IHH:; stare goVC'rnments cannot collect sales taxes 011 tllany out-of state sales. State governments argued chat the laws were need ed ro prevent sales to min ors. This was a \vc:lk argul\'IC'nt in states tbJt. pl~rmil' din~C[ship mcJ1(s from in-sure wineries, and bt"Ca us(' stares (l)uld require Inrcrne[sdl l!rs ro gel proof of age. lawsuil."i in several scates ch:dlcngro (he laws against om-of-scan' wille shipments, New Yo rk also banned lu/vertiJing om-o[·sratc wines directly to consumers in rhe sr.atc. A winery rhat advertised its win 3.2.5 POSTING AND SELLING SENSITIVE MATERIAL: ETHICS AND SOCIAL CONCERNS 168 CIUpll.t 3 Freed')1n of Spet:ch MO.ii[, of our discussion so far. and much of {he d.ebare about cl.·nsorship.focuses on censorship laws, laws prohibiting dis:rriburio n of or access [0 certain kind'i of materi:!]. There arc also social and cthiL-a1 l-ISUC:S a1>ou[publica(ion and disrributiol] of legal malcrial. Nazi marcrials, vieiou!; personal anacks by bloggcrs , information aboU(how [0 make bombs, :md even maps and other inlorma(i()(l [hat might be of usc to terrorists. In rhis sl"Clion, we consider .~omc of these. Lacge companies fe-... A policy n, '\er5al by Y:t100 il.lusnates .~t)mc of rhl.' dilemmas. A years ago, Yahoo e, xpallded its onlinc sron: for adult mareria l (erorica. Sl"X \-ideos. and so fouh - all kgal). Many usc, rs complained. Crirics objected that because Ywoo is a large. mainstream company. its anion gave accepI; lbiliry to pornogriphy. Ir alst) gave adult-material selkrs easy a ch S!""nion 3.2 Co ntrullill~ O tt.... nsi"t: Spe J69 obligali o n (0 omic ve ry oHcm iw s.ites from search rcm]rs~ The peo ple who sef pnlicy in such compani es t'3ce diffi cult glle~(ions. Should a search engi ne display links ro discussi o ns about suicide and suicide hodmes, but not "how to" sires? How should a search cugine respond 10 a search for graphic pictures of w ll cge smdents"? How :;;hould it rc.~pond
to a search for graphic pictures of can un: by (he governnH.'Jl(of its country or by lerrori sts? Search engines provide an extraordinarily valuable and fun res llltS. Small Web ,it.. and individuals To make (his di scussion concrete. \ VC" consider a \X'eb si te ahoul suicide for tcrm inally ill p3t ie.~nts in consmm, scve re p:.l.in. "111c points we raise here apply ro sires with other k inds of sensitive information as well. What should (he site o rganizers consider?. . First, even if rhe site is nor aciveni sed, sear~h engines wi11 find it. Depressed tccnagers and dcpres..-..cd aduk~ will find it, What we pm on a public Wt~b site is public, availabl e to everyone \vorldwidc. The organi7.crs .~houJd th ink about poremial risk.. , and research t.hem. Then what? One opdon is IO dec ide not to sC t up rhe sire at all. Suppose the site o rganizers d\x ide to proCCL>O beClusc th~~y bdiC\-'~ rhe planned in#()rm;uion has significant va.luc fi.) r 1111': im cndcd audience. \'(!hat can th ey do to rt:duce risks? Perh aps re. quire a P;I.'i sword 10 access dle si u". How would somrom" ohrain a p:miword? \(/ould a simple wailing period reducc the risk of ust' hy tempor, lril), depressed peop le? Would the PJssword rcquif('Int, nt dist, xwragc access hy imcndl' d users h\;XJ USC of privacy con(crns? People who post risky marc rial have an cr.hical responsibili ty to seriously considt'r questions such as these. Tht' answers arc not obvious or t3..\y. Similarly, individuals should ext'rd sc n:sponsibili 1)' and di scrction when posting ro \Xicb si(e.-. Suppose someone''' posts a fal~ profik of a friend as a joke. A ~rn;,11 g ro u p of frie nds might have a big laugh . The fu nnier and cleverer it is, the more it mi gln bt. copied, ('-mailed, and rcpos(cd elsewhere . The friend 's cmplorer, prospt."'C tive l'mployc r, or grandmmht. r might sec II. 'What po (clltiai damage could it do: Ti:) summa rizc. here arc a few guidelines for making de(isiolls abour posting sensitive material: Consider unimended readers or users. Consider potential risks. Consider ways to limit access t() intended mers. Rem ember ch.n if ca n. be diffi cult rn remove ma rerial from the Ncr once }"OU have.' posred it. "SOUI!;" piJt: i!~!f. and ~I\ y CJL.....lUt~t~m("LII IIf it, 10 bo.' illl11f;l.1. h,r di.: ~~k.: (If this Ji,> !Ile Vt''pit- ~l1in ~ up to.' site Ju nm 170 Chapter J Fr(cdom of Spc~ch 3.3 Censorship on the Global Net i: T"t, cojle~ ht[U]t's I'merged (IS 1/11' primary JIlttr'!.'" f]/IIt'W] .uul rumor. 111 J 675, ~,-'i].lrln I~, J'tt]picious (I] 1tlllr~" mlt'n lire of pitW!S w/u'l''', he public tmd(J' :~ mfonn.illtOII, #ml the cClffa "OItUS down. lh ! - Pel~r L. Bl'mstcin 4'i 3.3.1 THE GLOBAL IMPACT OF CENSORSHIP }; or a long [illl~. thl~ "conventional wi.~om" among I11ml users Ind obscrvcn of the Net is a protecrion against cen:oiorship. \X'eb sict's will conrent that i:oi illegal in o ne country can be set up in some oc her country. People in cOllntrit's th.u censor news can access informal ion Over the Ncr fi-om other coumrics. E-mail and fax machines played a signinmnr role during the collapse of rhe Soviel Unil)ll and the democracy dcmonsrr]liom in China's 'fian aumcn SquClre, Afrer the government o fZimhabwe: shur down 1"/')('! VI/i!;, NI!UJJ. an indC'-pende lH newspaper, and issued arrl.'SI warrants for dozens of i(s journalis {s in 2003. [he newspapt:r established it~clf on the Web from a sitc i.n So urh Africa. In some ways" however, the glo balness of cht: Net makes it easier lor onc nation co impose restrictive sta ndards on olhcrs. We saw (in the box ahoul. rhe Amateur Aclion bullrtin board in Sc.crion 3.1.1) chat national ccnsorshi p bws applied to [he \X'cb in [he U.S. would wipe OUI me notion of community smndarru, Acrions by some go\'crnmclHs threaten the no(ion of dille-rem Il 3.3.2 YAHOO AND FRENCH CENSORSHIP D isplay and sale of Naz..i memorabilia :ue illegal in fmnce and Ge rmany, wirh sonw ~xcC'p'-ions for historic.11 purposes. '["vo anriracism organizarions sued Yahoo in :1 French court in 1999 bc:causc French people could view Nazi memorabili a offered for sale on St...:tiOll 33 Censorship on thl' Global Net 171 Yahoo's U,S.-based ;\Ucrion ~it~s. T he .French govcrnmenr also brough t. crimina.l charges aga inst Yahoo and fo rmer CEO Tim KQogle tor justifying J crime 'lgains[humanity. (Yahoo's fre ndl si(l's, hased ill FrancC', complied wirh dle french law.) These (,:as,-'s wcrl.' widd r viewed as a rb reat to frt.'Cdo m 01 speech, and. the civil C'lse was not fully n..-st.] b:d 172 Chapter 3 Fr~c.-dol11 of Speech 'Tim Kooglc did not go co Fr;ulcc TO attend his trial. Yahoo and Koogle wcrl~ ;lcquiucd because rhe coun

decided that pcwlilring rhe auC(ions was not "jus rifying" rhe Na7.i crimes. 'rh!.' decision did not resolve (he issue of whether one co ulHry's government could bring criminal charges against con[I,'nr providers based in anorher country tor conrect legal in their own country, It is also worth Ilming thar proced.uC'Jllaws vary significantly in difkrent coumrics. In [he U.S,. (h(' govcrnmt:nr may not appeal acquittals. The French government app c~2, tipp~ri1:~ (t!'].(I;r:iI~g real~zed t~lis ...was 3.3.3 CENSORSHIP IN OTHER NATIONS ,,,"'-....". --'~~~~'~~ = ... --" -.-----...... , '~ -~, ~?" The offia ('lammumimtiom is ortiert'd fQ find tllttys 10 eJlJll rt' tlJot fhl' U5t' oftlJt' f \ Inumn buomN impossiblr, The /vlinimy for {hI' fromuthm q/VirtJtI: 41111 ofVia is obligt'd /II TIIJ]lliror rhe vrrla IUILI punish "i()/IIION. PUIII'IIfWIt .~ "t -Excerpt from the 'Ediban ed.ict. banning allimernet' lise. in N"ghanis(:Ul. 2001 ' I '['he.- vibrant communication (he Internet makes possible t.hreatens govc-rnmelH s ill coullIries that lack political and cultural freedom, Many governments have t.1.ken st.eps [() cut, or sc riow; ly nxlun:. lhe Row of inform.uion and opinion on (he Ne({as opprcss ive gOVc.'-rnmcllfs haVe.' do ne ('arlier with other COIIIIIIUlic; l.rions mc.'dia).'" We give a sampling of such rcstricfi(\IIS, In countries such as China and Saudi Arabia, where tht: nJcional govcrnmclH owns the Interne!. backbone (the communications lines and computers through whidl pcopll~ access information), the governments insu l! (heir own compulers bcnveen the Net a.nd dH: peopl" with sop hiSlic;tn:d hrcwalls aJld tih("rs to block whal lhe)' do not want lheir people to see. 'rh e g,ovcrnmem of Saudi Arabi,1 blocks pornograph y and gambling. itS m,111}' coumries m ight, bur it also blocks sites on the Bahai filirh . (he Holocaust, :md religious ~ In p... b.nd. for c)'Jmptc, bdiHC the .:()mmUIII ,~! r."'·Cfllm"UI r(ll, it W;I.> illC!(dl H) m:U.\~ a photocopy wilhmll pt'nnt,' iiull Irmn gOVCtlUll,,1lt' \.t"II>i1.)r) SeCl'iUfl 3.3 Ccnsrmhip on rill." GIQbal Ner 173 conversion of Muslim s ro orher t3ilhs.lr hl()cks sires wirh informarj()n abour :monymizcrs, tools [0 rhwart filters, and cncryplion. Iran. wieh more Ihan seven lllllion Interner users, at various limes hlocked rhe sites of ,unazon.(om,W'ikipcdia, rhe Nt'w York Time]'. and You"Ti.Jbt'. It also blocked a site advocating dIc end 01 (he practice of sroning women. Generally, rhe governmenc says it blocks sites IO keep out d(.'caden!" Web pagl.:s wirhom official permijs.~ion, posting of material about policies, and pl)sc.ing of an)' material deemed by (he government {O he harmful t.o its policies. Under an official permijs.~ion, posting of material about policies, and pl)sc.ing of an)' material deemed by (he government {O he harmful t.o its policies. Under an official permijs.~ion, posting of material about policies. Under an official permijs.~ion, posting of material about policies. Under an official permijs.~ion, posting of material about policies. Under an official permijs.~ion, posting of material about policies. Under an official permijs.~ion, posting of material about policies. Under an official permijs.~ion, posting of material about policies. Under an official permijs.~ion, posting of material about policies. Under an official permijs.~ion, posting of material about policies. Under an official permijs.~ion, posting of material about policies. Under an official permijs.~ion, posting of material about policies. Under an official permijs.~ion, posting of material about policies. Under an official permijs.~ion, posting of an official permijs.~ion, posting of material about policies. Under an official permijs.~ion, posting of an official permijs.~ion, posting of an official permijs.~ion, posting of an official permiss.~ion, posting of an official permis earlier law, possession of an unaurhori zed modem or satellite dish was punishable by a jail term of up {()] 5 years. Erim..-a prohibited foc_crner a(c('ss. Many countries in the Middle East limit access. Vietnam uses filreringsoftware to find and block anricommunisr 111c:.~sages coming from other wunries. The legality of sarellite dishes in many parrs of Asia and rh~ Middle East is funy": (\(' here rhe t('chnolog)' has nor caught up. governments still restrict old COInIIIIInic].rions media. A rival ofZimbabwe's 200 I presidential election was charged with possession of an unlic ensed (\vo-\vay radio.) In so me long-unfree counui,.:-s. governments arc struggling with the difficu lties of modernizi ng their economy and {cchllology while maintaining tight" control over information. China. so far, is managing to do both. In {he 1990s, when fewer people used the Web. the government H.'(luired m('rs of the Internee to rcgisu:r with the police. In 1999 a C hin ese COUrt senlenced an Internet ClHrepren~ur to tWO year!> in jail for sha ring t:'-mail add resses with :..l pm-dclOocracy Internctjournal based in the United Stalt,:s. Now more than 130 million \\'rite blogs, 'rhe government strictly COntrol., and censors what' people rl-.:ld and what they post. C hines(' rcgul::uions prohibi[' producing retrieving. duplicating ,Hid spfi.:'3di ng in t(Hmario II (hat Illay hinder publ ic order." Censurl-J. sites and topics indude discussion of democracy, religious Silt'S. human rights orgallizations including Amnesty hHcrmuional, news and comment. 1 ry abour 'laiwan and 'liber, economic news, and repons of major accidents or naruml disasters and outbreaks of diseases. C hina bannl-d Googk- in 2002. Later, :.IeecSos to Google's U.S. ha.~ed Chinese fircW'; llls and filten. 111c gov 174 Chapu,', 3 Fn:cdo/ll ofSpt"ech Singaporc h3s made ;) gr~{ and s ucces...~ti11 ,, £fon to build a hi[!h-tC'Ch economy. Inrernet censorship hws bur. did nor In 1999 its govcfnlncnr rebxcd cnforcemc..'nc change t'hem. Singapon:: requi.res that online political and religious groups regi stcr with tht: gowrnmenr, Content providers arc prohibited from distribUling material thar could «undermine public morJls, poliuc~1 stabili ty or religious harmony." The government now blocks requires that online political and religious groups regi stcr with tht: sites.")' Critic izing or insulting current and former leaders is unacceptabh: in many countries. Egyptian blogg('[Ka.rcem Arner was. senlcnccd to several years in jail filr harming narional unity :lnd insulcing Isla m and rhe Egypri'Hl pn.:si(icl1r.% Turkey and Thailand blockl.:d YouTub~: because \'ideos insuic('d their foundt.r and king. rcsp('ctivciy. or 3.3.4 AIDING FOREIGN CENSORS Fradom of exprmiol1 im'[Il IIIirWT priufir/(dillt am Vl' pusIJed d5id~ w/UIJ de, ding with (/ dictlltunhip. - Reportt'rs WithoUl Bordc-rs"7 Internet companies, slich as search engines. service providers, sellers of tilrering system..., and auCtion silcs. that ;uc- based in free c{}unries offer services in countries with strict censorship. Wh.:ll are ,heir re... ponsihilitic... ? Cisco Systems Inc. helped China build its filteri.ng sys rcm {hat concrots ; ICCC.s.S by Chinese peopk~ (0 rbe Net. Googlc, Yahoo, Microsoft. and other U.S. companies help China. resrrict acccU to the Internet. The Chim'sc sites of Yahoo and MSN comply with local law and omir nnvs srories thal offend the government. Microsoft .s. -1 id it censored terms like "freedom" and . . dcmocracy" on its Chinese ponal. Microsoft :'IIso shut down a Chin csc journalist's hlog 011 its MSN Spaces sit'c that critid2.cd the Chinese government. 58 Yahoo is believed I'o have pn)\'id~'d information to rhe Chi nesc government rh:u helped idenri fy at Icas t one person who was then jaded for hi... \\'riring. Yahoo, describing du' consequences as "serious and distressing," said ir wa... required to comply wi('h C'Jlinese law, and the company had not been wid [il, rcason for the government rcque.~ t' for tht' informurioll. Google held out longer, refusing to censor ics search engine. ahho ugh it lu.d rakc ll some steps toward resultions access to informari()II in C hina. Coogle:- did fila'r m.Herial on {he C hinese v Section 3/i Political Campaign Regulations in Cyberspa.:: c 175 We consider some issues these activities and incidems raise. If companies do business within another country, they must follow the laws of {hat country. \X/hat are the rradcotE between providing services to t.he people of the councry and complying with its govcrnment's censorship requirement:;? How do rhe issues in China differ from Frenchand German-based branches of U.S, online auction sites banning Nazi memorabilia? How do tht"'}, differ from filte'ring OUt pornography laws that have stricter antipornography laws that have stricter antipornogr { han the U.S.? To what extent docs, or should, rhe prospect of a huge business opport.unity in a new country affect the company's decision? Should companies draw a line, perhaps dgrceing (0 fcstrict "Kcess t.o information. but refusing to disclose information. but refusing to disclose information. but refusing to disclose information. might need w identify a person whom it SUSpCCL~ of sulking, fraud, posting child pornography, or other crimes. In most countries a scn'ice provide information in rhose cases. If the government docs nor disclose the fCason for a request, Of is dishonest about the rcason, how can a service provider make an ethical decision? Google has long promoted the ideal of access to inform. Hiotl. Irs mission, according (0 a Google anorney. is "[0 organize the world's information and make it universally useful and accessible. ")') Google concluded that [he company could nor provide a high level of service in China \vi(hout a local presence. Thus the agreement ro operate in China and block man::rial rhe govcrnmclH (onsidc:rs sensitive "vas a decision {hat some access is bener than no access. Reponers \X/itholll Borders pointl:'d out that ''A Web site not listed by search engines has little chance of being I()und by users.
Th(' new Google version means that l..'"Ven if a human rights publi Don't be evil. -Google's infonHal corporate 3.4 Political Campaign Regulations in Cyberspace [n his run for the 2004 Democratic presidential nomination, Senator Howard Dean made news by raising a very large amount of mOlley ill many small co-ntributiollS 011 the Web. Since {hen, \Xicb sires, official campaign blogs, and online fund raising have 176 Chapter 3 Freedom of Speech became standard campaign took Unofficial blogs and Web site instead of in older media. Thousands of gwups (feau: their own online fund-raist'fs [or presidential candidates. In rhis section \\'c look a(problems of applying U.S. political campaign laws [0 the Internet. The laws were wricTen mostly in the 1970s for media SIIch a, and wealthy Illdividuais. Campaigns of candidates for public offices (called "hard money"). Res[rictions 011 mOIlt]' contributed to political panies and groups other than a candidate's official campaign committee (caUed "soft money") were much looser, but there arc derailed reporting requirements. Political speech protected by the FirstArnendment. The Supreme Court had accepted comriburion limits, reporting requirements. and o[her restrictions on political campaigns as constinnional on the argument that lack of such regulations would threaten rhe democratic political syscem. The Court has said that the FirsrArnendment prorcel.'i the right of un individllalm spend his or her mone)" directly, to express opinions about candidates and political issues. However, "coordinated 'Ktiviries," that is, activities that arc in sOllle way coordinated with an ofncial campaign committee, arc considered contributions) must be given a value by the campaign. reported as contributions, and counted agains(the contribution limit for the donor. Political action committees, which C~III consist of a few individuals organized for a shorr-term project. must regi.ner and follow campaign regulations. Perhaps you can begin to see q ut?srions (hat come up for the Web. Is linking to a candidate's Web si[e a 'coordinated activity'? How much is it worth? How would you kllow when you have reached your comribmion limit and have to rake down the link? How would a camp'lign comminee know about such contributions. had been using;) huge ;mlOlInr of soti: money to influence ck~C[ions.. Corporations. unions, and organizations avoided prohibitions on paying for ads direcdy supporting candidates by running so-called "issue ads" supponing a candidate implicitly. Congr('s.~ passed {ht~ Bipart.isan Campaign Reform Act (more commonly known as the McCain-FeingoldAct) in 2002. McCain-FeingoldAct) corporate and union ads by n_~stricting issue ads. h prohibited corporations (which include many nonprofit organi7..ations) and unions from paying for television Of radio ads [har show a candidate's name or face \\'ithin 60 days of a convcmion or pnmary 'Ih" law made sponsorship of such ads a criminal ottense. How does this affect freedom of political speech? In one example, an advoca Campaign laws, ltwritt's [he detailed regulations and enforces (hem, The FEe recognized that applying j\1cCain-Fcingold to the Internet would raise significant problems. It interprL,tcd the new law as designed fi.)r media such as television and newspapers and exempted the Internet for all kinds of communications, and specifically political campaigns, exempting rhe Internet could soon seriously reduce the relevance and effectiveness of campaign regulations. A federal judge, in 2004. ordered the FEe [0 devdop rules lo apply McCain-Feingold to the Internet. \X'hile rhe F EC worked to devise rh(' rules, bloggcrs worried about barh old ;lnd new rules. \Vould they get in (rouble jf they linked to campaign Web sites or reposted online ads, brochures, posirion papers. or news releases produced by a campaign committee? 'rhey worried that they would be silenced if [heir links or advocaq' were ilUerpreted as "in-kind" contriburions and dle value exceeded rhe comributions and dle value exceeded rhe comributions arc as low as S250). When a few individu; th or a gra.~sroO(s group set up a Web site or collabor; Hc online ro promore their views on a ballor issue or candidate, do they have to registrer as a political action committee and file conuibution and expenditure report.s? What is the value of a campaign position paper c-mailed ro 300 people, or 3,000 people? The fcar of violating some regulation, (he ...ost onegal advice, and the potential cosr of defense, J1d fines would chill freedom of Spet~(h Numerous examples) ind adVOGK)' developing on the Web. 178 Chapter 5 Frt"edom of Spet~(h Numerous examples) suggest that the concern was justified. The governor of hiss (are.1'hc governor filed a complaint against him. suggesting (hat he he required widentify himself on [he Web site and file financial statements. Another man set up a Web page to express his opposition to rhe reelection of a member of Congress. He was wid that he might be Sllbjt."'Ct t() reporting requirements, Thesc'W'eb sites appear to be harassment., and the complaints appear to be harassment., and the complaints appear to be dear examples of speech the hrsrAmcndmem protects, and the regulations and the uncertainty about how they applied to rhe Internet, encouraged such tactics. More recem off-line examples show thar. regulations arc applied in unexpected ways. Opponents file complaints, .so intimidation is an issue. The FEe inyestigated four men who put up a homemade campaign sign because the sign did not say who paid h)f it. When a race car driver anadled a campaign sign w his car, (he FEe interpreted it as an unreported campaign contribution by a corporation. Org, like many professionals. the driver has a corporation. Ordinary individuals who volunteer for political campaigns face investigations and heavy fines because of mistakes in following {he complex laws. 61 Many areas of law arc necessarily complex. But, as we poim our in scveral places in this book. compk"X laws tend [0 benefit large enTities char can afhud lawyers. They duearen paniciparion of ordinary people-which is desirable in politics and which the Internet assists. \Ve describe one ('ase in a bit more detail. It could have happened on the \X'eb. '1'''0 radio talk show hosts in Washington state helped organize a campaign to repeal a gas tax increase. They supported rhe ballot measure on their program. Several municipalities that benefit from [he tax sued the campaign. They argued that the campaign. committee had to report them as such. A court ruled in rheir favor. Becaust. of campaign contribution limir.~. the talk show hosts .would have to stop talking about the initiative on their programs in the few week.. before the election. It said the (alk silow hosts were not subject to the reponing requiremcilts and comriburion limits because [he Washington law cxemp](.'d commenrary in news media. On(' of rhe judges scared "Today we arc confrOlw." FEe rwes for the. Internet and a Supreme Court ruling on McCain-Feingold In 2006 the FEe issued rules for rhe Imcmc(.6") The FEe decided that GlInpaign regularions \\oudd cover content (e.g., ads) placed on a Web site for a fcc. Online campaign activity by individuals who are nor compensated arc tAcmpt from [he S,:criun 3.5 Anonymity 179 contribution and expendirurr regubrions, Jond {he "exemp tion applies wherher the individual :1C15 independently or in coordin.trion wirh a candid; lrc" or politIcal committee or party. 'rhus rhe FEe removed the worry abouc (uncompensa ted) coordinated activity, Content one purs on o(1e's own Wt'b site, campaign m:u(rial sent in ('~mail, and blogs are exempt. Crearing or hosting a c; lmpaign-relared Web site and. providing links (Q campaign Meb sites are eXI, 'mpc activities (if the site is nor paid fiH doing so). Reproducing campaign mat(.'rial on one's own Wt~ b site is exempt (~\gain , if nOI paid). Camp~ign rL'gula {ions make some exceptions for news media. 111(' fEe ruled thar the Jl1L'ttia exem prion applies ro ncy."S media \',rbose only pn::sellCe is online. This is an important ~U\d posirive decision. (There might be problems with irs applicatioll, "Airernafiv{''' newspapers. in rhe pase, oft'en had difficulty gcrring pres.s credentials for their reporters. On rhe Web, an individu:tl can be ~l media emir)'. How will [he VEe scicc{ media t~ ntiti es thar qualif}r for the cxemp(ion?) The fEe devised a fC': ISOn: lblc appJic, uion of rhe hIW to the Ncr, perhaps me best that free-speec h advocates could expect. In 2007 rhe Supreme Court ruled that the -M cCain-Feingold restrictions on ads during campaign periods arc ullcon stiturional. It said [hat issue ads : lfe protected by the FirsrAmendmcru; the restrictions on ads during campaign periods arc ullcon stiturional. protecting freedom of politl"""JI speech and removcs some pmcmial problems of extending campaign regu6tions IO dle Intc:rnet'. 35 Anonymiry :r k'l The Coi(miai prm WlfS c/.,1rIlcteriud irrtgulllr "pptdrfIIU, psrndonpllous L~ imlra/I)/,. tIml (I]V/ltrrous JIlck ofrtsp(,(t for ,my form ofgoutrl1111(·nt. , ,,'lo ;;. ~ -"Scient't:.lechnology. :IIId fht: First AInl!nJmCI1I. " U.S. Office of l i:chnology Asst:ssm~nt --~~~~ 35.1 COMMON SENSE AND THE INTERNET From the d(:scripriol\ quO[ed above , {he colonia1 pres..~-t.h e prc~s (he authors of the rirsl Amcnclml,..nt [() the U.S. Con:'itit.ution found ir so importam. !O proccct-had a lOt, in COtnlTII'n with (he 1.11t.c rnet, including conmWCfSY about anonymity. Jonathan Swift published his humorous .. nd biting r~oli{it'al Sa (ifl~ G'uililJt'yj Jim'tis anonymously. Thonlll Paine's n.um.~ did nor appear on the first primings of Cnmmo11 Sense. the book char roused support fOf the American RellnllHion. The Fcdt~raJisll)3pcrs, published in newspapers in 1787 and 1788. argued for adoption of (he 11C\.... U.S. 180 Chap rer 3 Freedom of Spt"Cch C onsriuHion . The a.uthors, Alexander Hamiimn, j ames Madison , , Ind john jay. had
already SC rvl--d the nt."Vo'ly fn..'C confederation of stales in impon:uH roles. Jay I:acr beca me chief ;u.~ ticc of the Suprl'me C oun. ami Madi~n later becam(,.'. pn~.sidcnt . But when they w rOl!! the Federalist Papers. they used a pseudonym s a... well. In the nineteenth cen tury. when it was nor considered proper for women ro wrile books. women writers s uch as J'vt.uy Ann b'Ans and Am ~mline Lucile Aurore Dupin published under male pscudonym .~, or pen names (George Eliol and George Sand). Prominent professional and academic people usc pseudonyms ro publish mllfder mysteries) scieJll~c fiction, or orher nonscho.larly work, and some writers-for example, rhl." iconoclastic H, L. Menckcll-used pscUd{mYIH. for the fun of it. On the llll'ernct, people talk about personal things in discussion forum.s devoted tt1 lopics such as heaJrh, gambling habits, p rohlems wiTh tecnagc children, religion , alld so o n. MallY people use pseudonyms (" handles," aJiases, or screen names) to keep their real identity private. Victims of rape and of other kinds of violence and abuse and uscrs of illegal drugs who arc trying to quit are :.unong those who benefit from a forum where they GUI talk candidly without giving away rhei r identi ty. (In traditional in-pason support. groups and group counseli ng sessions. only first nalnes arc used . to prot(..(t pri \-.;1t'Y.) \Vhis ucblowers, rt..ponill ~ on unethical or ilk-gal activities wirhin th e govcrnmt'nt agc ncr or business wh l' re Illey work . ma)' choose (0 rdeasc information via anonymous postings may be low), In wartime and in countries w irh o pprc:.'ssiw government's, anonymity can be a life-or-dea th issue. Reporters. human rights activists , :Illc ordinary people use an onymous I!:-maij to prc)(("cr themselves, To send .lllOnymous i.>tnail, one sends the message to a femailer service, where rh e recurn addrl'ss is stripped ofT and the message is re-scnt to thi." intended recipienr. Mcss:lges COil be roulcd through many intermediarc destinations' to more thoroughly obscure their origins. If someone wants to remain anonymous bur receive replies. he or she can usc a service where a coded If) number is attached m th t> message when the remailer sire, which forwards [hem to thl' origina] person. Thus people can have conversations where neither knows che idenli ty of the orher. Jo han Hclsingius SCt up eh e first well-known "anonymous; rhe sYS(t:111 rcmined identifying information.) It was cx tremely popular and grew to an csrimaroo 500,000 users worldwide. Hdsingi us hccamc a hero (0 dissidents in (Olaiirarian coufHrit.s and to frcr-sJX"/Cch and privaL")' supponces evcl)'\vhcrc. He dosed his rl'mailcr in 1996 aft.er Iht' C hurch of Scientolob'Y and the government of SingdPorc took aC(jon [0 obeain (he names of people using it. By lhen , many ocher similar scrvices had becom e.' available, Several btl.'~incsscs, such as Anonymi7..('r.com , provide: a v:uiery of sophisticated tools and se rvices char enable us (0 send c-mail and s urf[he \\feb a nonymously. Some anonymity 181 service" use encryption schemes to prevent t~ven the company that operates them from identifying the mer. Instcad of sroring personal information for automatic momhly billing, somt~ companies destroy payrnenr informacion after each credit-card transaction is completed and r(;.'guire users to pay monthly {O renew. The inconvenience process by government' agencies and others. Many people usc anonymous Web hrm....sers to thwart the cfTorrs of businesses t.o collect int{mnation aboll[their Web activity and build dossier" for marketing purposes. The founder of a company that providt~d anonymous Web surfing services said [he company developed tools to help people in Iran. China. and Saudi Arabia get around their governmelUs' restrictions on internet ~\\fd) ~itt,~ ,an.lctctmint {he JP ;I on lilt" \Vt"hl o(~ \';~iwr. Tb.;,y call blo~'k ;KL"C!i~ hum ~pe(;i!icJ J.Jdr,,_.\~s m PUt up altern,Hc page.\ for lho,c \.isiwrs. 182 Chapter 3 Freedom of Spt'e(h Introducing anonymity online from AmericaN tY-press. Don't fUlVt' home pages without it. -Newspaper aJvertisement for AtllL'rican Express6" 3.5.2 IS ANONYMITY PROTECFED? For rhose nor using rrue anonymity services, secrecy of our idemit}' online depends both on the priva Political speech. but there arc still many ways in which the government can retaliate against its critics. There are also many personal reasons why someone might not want to be known to hold certain views. Anonymity provides prorection agaimt retaliation and embarrassment. The Web enables anyone to express their opinions anonymously. Can they do so? The Supreme Court has repeatedly ru!t.d that the freedom of speech guaranteed by the First Axnendmenr includes the right to speak anonymously (in print). In 1995 the Supreme Coun invalidated an Ohio state law under which a woman was fined for distribution of anonymous political kaflets (by an individual) is an exercise of freedom of speech protected by the First Am.endmt.'nr. The COUrt said "anonymous pamphlt~rcering is not a pernicious, fraudulent praL'tlec, but an hOl1or;lblc rradirion of advocacy and of dissent. Anonymity is a shield from the tyranny of the majoriry."70 A fctler;ll COlirt threw out Geo'rgia'; 1996 law agJinSl using a false identity on [he lnt(;.~rnc(. ciring the Supreme Coure decision in the Ohio asc. As we saw in S(;.'C[ion 3.4, reponing rt'quircmcIHs in election campaign l.aws r(..~tricl Section 3. 5 Anonymity 183 Criticizing corporations J11h:rntt stock ihtfSagt III]ltrds (tri' ta Wtt!/ Strt'Ct what fldlt mdio jj tf) ('uH'ent tt]f.'1/ti: Ocullionrtlly crud! ujim wrong. Fequ('t1tb' t/S(/m but nonethelm II l'iMl and widely 1]5et! flnofl where JI('()p/e call spetlk tlll'ir miruk -Aaron Elsrein, Wall Street Journal reporter! Facebook. Yahoo, Jobster, AOL, and other services and networking sites have thousands of networks and discussion forums devoted to individual companies. Investors, employees. and other services and networking sites have thousands of networks and discussion forums devoted to individual companies. freely discuss rhe compallies. On some, much of the discussion centers on investment iSSIICS, which include how well a company is run and its future financial prospects. Businesses have two areas of legitimate complaints: postings that include confidencial business documents or other proprietary information. People post false comments staring that a business is near bankruprcy or [hat its managers arc committing fraud. They POSt personal accusarions-for example, that the executives, a former employee posted particularly nasty comments about a company and its executives, including charges of adulrery. When sued, he apologized and said he made it all up7~ We are nor exempt from ord.inary ethics and defamation laws merely because we arc using the Inrernc[or signing commclUs \vith an alias rather [han a real name. On [he other hand, many posrings arc simply strong criticism. 'I'his is free speech even when the business normally gets a subpoena ordering the service to disclose [he person's real name and. address. Ofren, the service docs not inform (hc person rhat it has disdosed [he informaTion. A popular stock char site said it received roughly one subpocna per da)' and did nor have the staff to notify everyone. AOL gives members 14 days notice bdorc rurning over (heir information, so a member has an opportunity fO fight a subpoena in court, Yahoo did not notify people \vhen tik')" were the target of a subpoena-until one person sued y.dlOO for disclosing his identity to his employer. The Embroidery Software Protection Coalition subpoenaed Yahoo for (he real names of embroider)' hobbyists to Slie them for defamation. The hobbyis(s had criticized the Coalirioll for sending more than a thousand letters threatening people with fines for buying embroider). It is widely believed ('hal' businesses usc the lawsuits, which they do nO[expect ro win, as a tool to obtain the identities of people who atc expressing rheir opinions (legally) and to intimidate (hem into being quiet. This general tactic-filing a lawsuit to stifle criticism by intimidate (hem into being quiet. This general tactic-filing a lawsuit to stifle criticism by intimidate (hem into being quiet. This general tactic-filing a lawsuit to stifle criticism by intimidate (hem into being quiet. Stra tcgic Law... uir Against Public Participation. 73 Free-speech advOGHCS developed legal defenses for thc "aOll'S of people who arc exercising frt:'edom of sp receives a subpoena for thc llH mber'.~ identit)'. Gradually, as more anelltiOll foclised on the dUCJts fl) fr('c speech, some courts rejcc(,e d some subpoenas ftlr real names. Start--s pass.:d Jaws ro reduce frivolous .suits. A C;uifomia court applied an existing anti -SLAPP law (0 the Inrcrner. Lawyers proposed a gener;}1 defellSe ro defamation suirs for message board comments: Thes(' forums arc full of exaggeration and sh rillness. (ruly be damaged ill such a forum and chere is no ddarnation. A federal judge ruled for a ddendam s.lying rhat Internet postings arc almost always opinions, which arc proceeds. They arc "full of hyperbole invective_, ... and b_nguage llot generally (ound ill Jan-based documents: ,:-4 Should (he hyperbole of [he Net I'rot(,(, I people who inu.'nrionally libel orhers~ %ich of (hese .~ugg('srio ns or policics arc usdu] fOf protecting criricisll while holding people responsible for illegal speech ? 3.5.3 AGAINST ANONYMI'IY Anonymity versus community In some comexrs. anonymity is ~ccn as unneighborly or risky. The \'(IELL,* for example. takes the position thal people should take responsib ility for their opinions and statements by lenillg their icienrities be known. Esther DY!lon, editor of Relt'{I.fe l.O and a frequent writer on the colllputing environment, commented that "anonpni[y is the oppositt:' of ('olll munity" {while also commenting lhat (here arc simlrions whert' anonym ity is okay) ?';
Dyson was careful to make rh e d isrillnion Ihat many overlook: P('oplc might objt.:cl to something, choosl.' not to use it. and discourage its usc. Commc nt'ing on a lawsuit challenging Georgia's ami-ano n ymi ty law. Dyson ~aid "Anonymity should n't he a \.' rimc. Committing cri mes should be a crim c.',7(i Many \,feb m.arketplaces :::and produc(-revic"...' sites rdy on us('rs m f~vicw produccs. Rcvii..'\vs arc anoll ymous or identifi~d by handle or pseudonym. BUI some(imes publi sh l'r,~, aUl·hor,..., sellers, and their friends POSt multiple glowing f!;.'yjcwS of their produC{s using ;l variet}' of aCCOUllr nallles. Sirnihrly. co mpet ing aurhors or e-ncmit.'S could posr crir iGli S{'Ction 3.5 Anonymity 185 reviews usingmuhiple pseudonyms. Amazon addressed the prohlem by esrablishing a realname verification system and encouraging. bur not requiring, rcvie\vcrs to sign reviews with their real names, Real-name reviews an: marked as such. and readers can give them more weighr if rheychoose. Olher online markets, cBay and Shopping.com, for example, idt~ntify reviL"'Wers by pseudonym but provide [he fCviewing and shopping history of reviewers so that users can decide how ro value the reviews. Because of its potelHial (0 shield criminal activity or because they consider it incompatible with politenL'ss and Ileriquece (online etiquette), some sen' ices and online communities choose co dis(Ouf/Jgt' or prohibit anonymury. Some require idemitlcation of all members and mefS. Some do not. accept e-mail from known anonymous femailer sires. On rhe other hand, Web sites that hosr debate on comrovcrsial issues or discussion of socially sensitive topics often consider anonymiry to be a reasonable way to prorcer privacy and encourage open, honest discussion. If policy decisions abour anonymity arc made by those responsible for individual services and web sites, the policies can be flexible and diverse enough to adapt {O specific services and web sites, the policies can be flexible and diverse enough to adapt {O specific services and clienteles. Laws against anonymity An insfill1U' oIth! ino;p!tc(/ble comeTlltuisJn tim/arrogance ()fth~ Turkiih a~toms "uthoritits U)(IJ re((."m0' evidt'nat/ by'/; (prohillition tltht' imporliUhm of ryptWriUfs into tiN.' count~y. The rt'ilSOI1 Jfdvl.17lCl'd by the (wthoritit~s.for this step is that typewriting 410rds no cll'/() to tilt dtltiJ()I; (trid t/)(/t thntfon: ill ,hi' t"vt'nt of seditiow or opprobrious pamphlets or writinss lXfcut('d b); tht 1)'Pt.'writtr bril1,g cimtlated it ul()u/d be impossible /() obtain any dew b)' which tht opt:mror of the mtU"hint' could Ig tidad. .. , The .~ame decree also tlpplits trJ mimeogntph and other similar dupliCilting mru'hines mul mediums. -Scimt~fiL' Amaiclln. July 6, 1')0 I n Anonymity on che Internet is used for criminal and anrisocial purposes. Ie is used for fraud, harassmcm, and cx(Onion. Ir is used to disrribme child pornography, to lilx.'i or threaten others with impunity makes it difficult to (rack wrongdoers. Like encryprion, anonymity technology pose. strong challcngc,~ ro law enforcement. The U.S. and European countries arc in the process of devdoping laws char require ISI's to maintain rec()rd~ ofonJine activity for a specifit, J period of time for potential ust.' in criminal investigations. Such laws prevent true anonymity. Civil libertarians, privacy advocares, and ISPs object thar such requirements conflicr with rhe First Amendmem and privacy and that the record keeping would place an expensive burden on the ISPs. The potential t()f illegal access [0]86 Chapter 3 dH.~ records Fr~'cd()m ofSp by government agen cies and others would also compromise fr(,cdom of speech and privacy advocares, and ISPs). Many of {h~ core issues arc (he same as [h ose in the law-enforcement controversies we discussed in C haprcr 2. Docs the potcmia] for harm by criminals who use anonpniry ro hide from law enfi)[ccmem 0lltwl'igh (he loss of privacy and restraint on freedom of speech for honest people who USI' anonymity responsibly? Is anollymity an imporra,1U protection agai.nst possible abuse of gove rnment', power? Should people haY(' the right 1.0 usc avail:lblc (ooLs, includ ing anonymizl'rs, to prot ect their priv:ac)'? We can send hard(;npy mail wid,OU(a rerum address. Should there be morc n..-srric [-iom on anonymizl'rs, to prot ect their priv:ac)'? We can send hard(;npy mail wid,OU(a rerum address. Should there be morc n..-srric [-iom on anonymizl'rs, to prot ect their priv:ac)'? We can send hard(;npy mail wid,OU(a rerum address. Should there be morc n..-srric [-iom on anonymizl'rs, to prot ect their priv:ac)'? We can send hard(;npy mail wid,OU(a rerum address. Should there be morc n..-srric [-iom on anonymizl'rs, to prot ect their priv:ac)'? We can send hard(;npy mail wid,OU(a rerum address. Should there be morc n..-srric [-iom on anonymizl'rs, to prot ect their priv:ac)'? We can send hard(;npy mail wid,OU(a rerum address. 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Should there be morc n..-srric [-iom on anonymizl'rs, to prot ect their priv:ac)'? We can send hard(;npy mail wid,OU(a rerum address. Should there be morc n..-srric [-iom on anonymizl'rs, to prot ect thei Neutrality or Deregulation? Direct censorship is not the only [anor thal can limi(rhe amount. and vari..~ ty of in formation aV:1ilablc (() us on the Internet. Bw;incsses sometimes ust;.' {he government's regularory power t'O delay or prevent comperidon. Th l' relevision networks used law to delay fotble for more dlan a decade. I~or d ecades U.S. broatit:asting competinil's lobbied «) keep low.power radio stations (cukd "micro retdio") virt ually illegal. In Section .3 .2.3, WI.' saw that there was controversy abour whether paid sc:rvices. such as cenified e-mail, would crowd out Jrce versi ons of rhe s, n'icc. dms restricting availability l'O lhoscwho could or would pay. The issue we diSCll'iS here also involves. in pan, lo bbying for compctiri, 'c Jdvanragc by I:trge con1p-1: donut". ..., {Ih., 1,-,,,,4 14,, COIf-'UJ l.il'", ... r. /, t!. l·i. "Cul n·/lt State HfIn(tH' filt~'1illg." £J'/C 4 1. Tlln!i" lJo' ilIA Ibd·"jef1lpcrcJ Blllgllw! tnc,~ Nt''' jilrk 1ihi.~. '\prj['J. ::007. ww\Y. tc(hllcw ~w'Jrld. ~l lnl / slury!St,774.hlllll (J('~ .lUI,., 11 . 201n. 4 ~ . 1''' cl L. rk rnucili. A.(; {;,1if tilt' {;oJ;: TI-r Rn rtdf J.'dUr SlIIIJ'1"ki, /,: Ouh n 'Wile)' &:: SI) M . '1'.196), p. R'). 'i('. Slt'wan IhL:a. uThl:" NC l E....lp... CCIt:; " lrH t'm l't :: a~ ·I;:rmr i" .~ q 50 gc. 'i')10. ~I B.rry &:.IuL:. ''I:'IIIMn Will All!)", A.: : Nt u' Jiork 7JNUl. AlIgll~ t 26. 2001, p, N. In 1006 Aji;h :II1iu ~ n c~u]'IL,Jt((ll n..-:", "it'IU': "Ill! vi(Aim. i\.!J.r. IILA II. Unittd 51,IIrJ_27. .'\111...1SlumlJ., "',x..'l rd eM C mien Sci Strict D C"("eUo'::~' S!:II'I J:IIJ~ tor (:om(:n!. - U:&U S"Uf JIHWJ.II, AI)ril 27. lOot;. pp. BI. B4. 28. Bw.:k,...It~b. "1\Uclll~t. u Tcl'l"li~(. " (rh'j"wift' DiJ/,ald .. M .. ~· II . 11)")'); Brm:\,; :\\o:(~ \ ~ T'lr\\ct ; imcmct: ' COttilmmiflfmlll! "/ fly A H - l;. 31 .l2.w"'· . lIIi., ~ i\gk id~.'-t'm . .n , QUtlt....! in DAviJ Frn:lcr. ~ Chi ldrrlt Lum.! limn HI'I1K Itr iUI"l11el A'·qll; l.illt'lJlce.~. " A~j.j)c. ilt~....] Prn,), Jun,· 13 . I')')~. .'H. Vi' tCITi 'l .Mmph~' Barrel, "SPUII HIII!n,~ Forbc).(;v!ll. jul, .t!. 100::'. nll·m bcl·~. f."Ilt's.c()m/fiHl)C ..]1007/ (F.Bi 1154.Jurn! (J,WA>C:(\ St,.lo: mIK·f U . 2(WF). D~\'I ~ KrJ \c t .\ ."\:lhuu N;l."tj ·A u clion~ (j.,~e (;'X:s If) 194)1. Chapter 3 Freedom of Speech Reporter; with"'ll Hi!! Riti!f tI, l.t/F. Jdtrey)v1. O'Brim, "free Agmt," IFirYrl, .\]Y 200]. p.7" 67.:'>:eil King, "Small Sun-ell Helps CIA Ma,k JLI .\lol'(·s un \X·ell." 1X"a11 ,Vr.etjT~'Jrg 7·i ludgI",bl')g.hlog,'p()f,:otlt.i 1005 i I II vinl ____ trf-spea k,-(Jul-cm~nd -Ileutr~lit;-. lnml, Nowmber 8, 2(0) trf-spea k,-. l 81. hhn.h 2UO(" {IU{)tt'd1>11 the Wej, ~ite of H:mdl OA"the irUcrU Fiourj,h Online Despite Ne,v S:\ 114. l.Jw.~ Roher! D. Alki"")[1, "I.e"ding the [·Cnmmt'rG· PI~ying ridd: Em.uting T:tx a;,d R.:guhtOTV E1irnc~\$ fi)1 Ofliu~ and OiHine BIJ.'iin ...,>-.,o," I'w~res~i\'e PO!iL;' Im(illl June JO, :!005 lvlas>H1Hl C:lbbrc,;i, "Qui,'k, Hide the 'LlIb~" Ti'fIII' MOlY I:: lOOt), p. 60. Books .Hld An ides - ,~ ,;:S , BOOKS AND ARTICLES • Abrams, Floyu. SpM/ting !"'u(~': Tria" of flu first Amrnd"'~III. Viking Penguin, 2005. Includes a chaptr on free spel'Ch issues oursid.: . he Uni red Slates. • Corn-R.:vcre. Robert . "Ca ught in the Seamb.~ \X'c:h: Docs the Internee's Global Rc--3ch Justiry Le.~~ Freedom of Speech?" 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Eugene Mfrecdonl nfSpecch in Cybe rspact:' from the Lisrc:::ner's 196 Chaprer 3 Frc.-edom of Spect:h Perspective: Private Speech Restrictions, Libel, State Action, Harassment, and Sex:' Uni/'I'J'Sity ofChiCtl.,(o Legal Forum, 1996, Ji7-'436. • Walker, Jes.~e. Rebel, on th! Air: An Alternative History o/Radio in Amaicd. New York Univenity Press, 2001. • X("1J1ace, Jonathan D. ~Namdes.s in Cyberspace: Anonymiry on the Internet," Cato Institute Briding Papers, No. 54. December 8, 1999. INTELLECTUAL PROPERTY 4.1 INTELLECTUAL PROPERTY 4.1 INTELLECTUAL PROPERTY 4.1 INTELLECTUAL PROPERTY 4.1 INTELLECTUAL PROPERTY AND CHANGING TECHNOLOGY 4.2 COPYRIGHT LAW AND SIGNIFICANT CASES 4.3COPYING AND SHARING 4.4 SEARCH ENGINES AND ONLIN AuthoJ)' and Infh!TliOrJ the ~xdJtsjVt' Right to rht'ir rt'JI't'cti llt! \17i"iliTigs dnd Dis(()vl'ril'i . (\ , 4.1 Intellectual Property and Changing Technology 4.1.1 WHAT IS INTELLECTUAL PROPERTY? H ave you ever posted on thc ,\(lcb a homcm.lde video set (0 a popular song? H :iVC you reco rded a [devised movie co watch later in thl' week? Have yot] downloaded musi, or a movil' from the \V'cb wichollt paying for it? H ave you e-mailt:d a (Opy o f an onl ine news arriclc 10 a dozen frie nds? Do you know which of these 3Clions arc legal .3 nd which are illegal. and w hy~ Is it legAl for :l search engine {O copy video and booh in order ro display cxcerpls? How do both copyriglu owners and those who me OT sell rhe works of ochers abuse- copyright? How should inrcllccmalprope rty owners respond to new rechnologies and the increased copying thar res ult s from rhem? Will str ict notions of copyright smoTher the new creativity enabled by mod ern Technology? We begin our exploration of the second to new rechnologies and the increased copying thar res ult s from rhem? explaining rhe concept of intellecrual property and reviewing principles of copy ri ght b.w. Creati ve wo rks such as books, anidos, plays, SU llgs (both music and lyrics), works of an, movies. and software are protected by copyright. If a work satisfies rhe req lliremenrs t()f copyright, it". has leg"11 protection when it is crcaled. Patent. anofher legal concept (hat defines rights t l) im ell('cn",) property, prorens some soft.ware. The applications and d('c ides wheth('r lO gram th~m. In addit ion to copyright ;t nd pate nt, ther(' oUC olher (orms of intellectual propat)' that various laws protect. They include [r]dcmarks/ Hade sccrt"ts. a nd o rhers. This chaprer concentrates more: on cop yright (han other for ms of intellec tual prop~rl)' bC(.:ausc digital rcchnologr and [he Imernel aff~c t ,o pyrighr so strongly. Parem issues • A 'nll~ma,!t is ~ ~rmb{)1 (" won!. phra.\C', lu~u_ ur lIthe'1 dc-vied Ih al idt"l'llijI:'!> .:! 1'IOJIII.:(;\mVm Ihe ,ompJJI~' dllt pl'vdu~.'~ it. Co m pan in m,IY regiMtr uadl:"!l\'-Irkl wilh the t;oYt,nftlcn! iu (Ifd~'r' tu pfOlL'l:1 (j ... ncbl~ip antl.:onuul w..~ of their llkrIU T!.::>-. (r.. SC'Clion 4.1 Intdlt."Ctual Property ::and Changing lechnology 199 for software and Web technologies have h('comc quite important. We discuss them in Section 4.7. Why is imclJecruaJ property given legal proh:nion? The value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyrightholdwire] the value: of 200 Chaptel4 ImdlcC[ual Property U,S. copyr describe: ., {O make copies of the work .: to produce derivative works. such 'is transIm:ions iuro other languages or movies based on book... + (0 distribute copies ., w perform the work in public (c.g., mus!(-, plays) to display the work in public {e.g., artwork, movies, computer games, video on a Web site}. Ilesraurants, bars, shopping centers, and karaoke venues pay fees for the copyrighted music they play. * Movie makers pay for the rigin ro basc a movie on a book. evell if rhey make significant changes {O rhe story. Making a copy of a copyrighted work or a parented invcmion docs nor deprive anyonc else of the work's usc. Intellectual property differs from physical propeny in rhis way. Thus t.lking intellectual property br copying is different from {heft of physical property, and copyright law does nor prohibit all unauthorized copying, disrriburion, and so on. A vcry important exception is the "fair usc" doctrine, which we discus.... in Section 4.2.2. Uses of copyright dur the copyright and th.u onc of [heft of physical property, and copyright all unauthorized copying. exceptions in the law docs nm permit arc infringements of the copyright and arc subject to civil and/or criminal penalties. Fact.. , ideas, concepts, processes, and methods of operation are not copyrightable. i · Copyright protecrs creative expression, rhat is, [he expre expression of an jdca is often nor clear. Hence, man)' cases of alleged copyriglu infringemem involving similar, hut not identical, works arc legally uncertain. Many go to COUrt. The government grants patents (under Tide 35 of the U.S. Code) for invemions of devices and processes. Patents prorect new ideas by giving (he inventor a monopoly 0[1 ehe invention for a specified period of time (e.g., 20 Yl'ars). Parents differ from copyriglus in (hat rhey protect the invention, not just a particular expression or implementarion of ie Parent la,,,' prohibits anyone else from using the idea or invention. Thus, if the invention of a word processor, Web search engine, or ('-commerce shopping cart were patentable, companies that sell or use [hese products would have to make agreements with, and pay royalties to, the patem holders. Intellectual-property prmC'nion is well established inWestern countries bue n()t in all area... of the world. Mos{ of ehe issues in this chapter are \virhin a come-xt (hat accepts 'Nm aU do. of .:uur,c. Inn it il tilt .I~~.,ptcd~;L!\J. k1;,tl-prJ /i'JJII Chapltl' 2, d,al '0111 aJwxJt~" su&:,'t~[giving f)Coplt pW!""'ny dghl' ill EI.t:[s ;ilimH dlt'tf11i.ek"", lan_I would rt_IHict lilt: lksirabl", flow uf il!forlil~liull whnc~.'> wpyrir,ltl hw nx-ugnilt:} Ihal (:opyrigllting Section 4.1 Intellectual Property and Changing ledmology 201 rhe legirimacy of inte-llectu; ll-propeny prorecrion bur (evolve around iL~ extent, how new tcchnology challenges it, and how it can or should evolve. Some people argue that there should be no copyright protecrion fiH software, that we should all be frl'c (0 copy
software without restrictions. We daborate 011 these views in Section 4.6. " 4.1.2 CHALLENGES OF NJo."WTECHNOWGIES C(}/~yright Imv wifl disirtftgratf'. -Nicholas Ne"", pe,nr., 'N(UJ t(clm())lo before. -Pamela SamueLmn2 Previous technologies raised challenges to intd1ccrual-properry' protection. For example, photocopiers made copying of printed material easy. Eulier rcdlllologics, how..'vcr, were not nearly as serious ,1 rhl'ear as digiral technology. A complete phorocopy of a book is bulky, sometimes of lower prim quality, awhvard to read, and more expensive than a paperback. Computers and cheap Some of the technological f.lctors arc the following: + storage of all sorts ofinft)rmarion (text, sound, graphics, video) in standard digitized material and rhe fact that each copy is a "perfect" copy: -:- high~volumc, relatively inexpcl1sivedigiral storage media, such a.~ hard disks, compact discs (CDs), DVDs, and memory cards: * (0 scanners, \\'hich simplify convening printed electronic form; [('Xl. photos, and artwork compression hHmars that make music and movie files small enough copy, and store; to (0 digitized download, ., the Web, which makes ir casy to find, download, and post material; ;,. broadband (high-speed) Internet connt'Ctiolls th.lt make rransfcr of huge files quick; ~ Some pt'()pk rcit'...! tilt: whole /lotion of wpyrigim J.nd patcllt.\. 'nlCY ..;c~ the"," m~'\:llJnisms J., pwvi,hng gtWCnUllt'llI- or spttth. ;!nd limiting f'f(aJuniv",dfoTIL Thi.1 i.\~nc is indq-.endtnt o(gr;111tca llI(J!lopoJi"", viob.ting (reeci(>!n t;e> 202 Chapter 4 ~ Intclle(:tu:d Property peer-ro~pcer technology, \vhich permirs e;l.~y rranster of flies over the Internet by large numbers of srrangcrs withour a CI..'mraiized system or service; .;. software mols for manipulating video and sound, enabling and encouraging nonprofessionals (photographers) and professionals (photographers) and photographers) and photogr wrir.ers) who owned copyrights. and it was generally businesses (legal and j}Jegai) that could afford the necessary copying and production equipment to infringe copyrights. Individuals rarely had [Q deal with copyright law> Digital technology and (he Internet empmvered us all to be publishers, rhus to bIXome copyright owners (for our blogs and photos, for exam ph.'), and they empowered us all to copy, and thus co infringe copyrights. The first category of of the lecrual property to face significant thrcus from digitalmcdia \...as compmer software used (0 be common practice> As one writer said, it \\>as "once considered a standard and acceptable practice (if it ,vcre considered at all)."'-:; Pl.'Ople gave copies to friends on floppy disk:.;;, and businesses copied business software. People traded warn (unauthorized copies of sofiware, typically after its copyprotection has been "cracked") on computer bulletin boards long bcf()ce rhe \'\feb. SoJt\-vare publishers began using [he {('rlU "software pira Secrion 4.2 Coprrighr Lnv 111ld Significant Cases 2-03 indusrr)', estimates (har people copy, tr"dc, and sell billions of dolJarl'i of its intcllccrual propcny wirhout authorization. Fearing that widespread copying and file sharing would severel y reduce its income, the emcrc; unmcm indunry broughl its ongoing b;nrl" IO prevent uO; l u[horizcd usc of irs produces to the digiral world and the Web. Its mcdlOds indude a mix of measures: (echoolog)' (0 derect and rhwart copying. - (both reasonable and abusive), and lobbying for expansions of copyright hlW. fair O[not. EvcnHlally, as we will sec, some began ro devl. jop IH..'W business models to pro\o'idc digital content to the public in convenient forms. Users and ohscn'crs of digiral media and of the Internc[debare wherher copyright can sur . . ive the enormously increased ease of copying and the habits and cxpccrations Ihat developed ahom sharing information and cnccnain01cllr online. Some: argued that co pyright would survive, mostly becausl' of firm enforcement of copyright la\.... Oth ers said the cJ.sc of copy backgrou.nd and help illu5rratc how new rcchnulogics require changes or darifications ill law. 4 Tlu.' first U.S. copyright law. passed in 1790. covcn:d books. maps, and charts and pfO'cccrcd them for 14 years. COllgre·s5 later cxtcnd~d (he law to cover new technologies: photography, sound r~cording, and movies. The ddinirion of an unauthorized copy in ch(' Copyright An of 1909 specified chat it had (Q be in a form rhat could be seen and n.-ad visually. Even with the technologies of the early 20ch century. (his requirement was a problem. A couer applied it in a ca.~ about copying a song O fl(O a perforated piano-music [011. (Amomarlc pianos- played :such rolls.) A persoll could llor rcad the music vi.mally from rb e piano roll. so du' COP)' was not iudged ;" viohu ion of (he song's copyright, even rhough i! violated (he spirit and purpose of co game wid, thL' identical program; they likd}' copied tht' ROM . .But hecause the ROM could not he read visually. a co un held that (he copy did Ill)! infringe dll' program's copyrighr. (, Again, I hi s did not well sen: e rh(," purpose of copyrighr. Thl' decision di({ not well sen: competitor's sales of (heir work. 204 Chapter 4 Intd!ccwal Pl'Operty In 1976 and 1980 Congress revised copyright law to cover software. "Literary works" prorecced by copyright include computer databases that exhibit creativity or originality' and computer databases that exhibit "authorship," { hat is, contain original expression of ideas. Recognizing chat technology was changing rapidly, rhe revised law specifics that copyright applies to appropriate lirt~rary works "regardless of the nature of the material objects ... in which they are embodied." A copy could be in violation of a copyright if the original can be "perceived. reproduced, or otherwise communicaced by or from the copy. directly or illdirccdy." One signifiGmr goal in the development of copyright law. illmrmtcd by the examples above, ha'i been to devise good definitions to extend the scope of protection to new technologies, As copying technologies improved, another problem arose: A lot of people will break a law i1'iti5 easy to do 50 and rhe penalties arc weak. In the 1960s growth in illegal sales of unaurhori7.ed copies of recorded music (e.g., on tape) accompanied rhe growth of the music indlL'ary.
In 1982 high-volume copyright infringcmcnr. In 1992 making multiple copies of copyrighted work "willfully and boses of commercial advamagc or private gain" became a felony. Making or distributing ten or morc copies with retail value of more than \$2,500 within six months became punishable by up to five years in jail. The copies could be ofdifTcrellt programs (e.g., one copy L'ad) of (en programs). Fines under some circun \$2')0,000. 8 Copyright O\vncrs could sue or the government could prosecute a company if (en employees Ollt of hundreds or thousands have an illegal copy of a program 011 their computers. Many intellectual-property users and auorneys believe making ren copies worth \$2,500 is too small an offense to merit such severe penalties. The No Electronic Thch Act, passed in 1997. is stricter. It was a r('spollse [() thl: David LaMacchia. an MIT student, ran a bullt'tin board on a university computer. According to prosecutors, users of the bulletin board copied more than a million dollars' worth of copyrighted software, including popular applications packages and game ~, all in less than rwo months of operalion in 1994. LaMacchia did nor charge anyone to use the bullctin board. T'ilere was no "commercial advantage or private gain." The government dropped charges against laMacchia after a judge ruled that the law under which prosecutors charged him did nO{ apply. In response to the growing phenomenon of sharing files for free on the Internet, rhe No EleCTronic Theft Ac[made it a criminal offense ro willfully infringe copyright hy reproducing or distributing one or more copks of copyright An (DMCA) in It)98. This very imporran[law has tWO significant parts, The anticircumYCntion provisions prohibir making, distributing, or using tools (devices, software, or s('rvices) to circumvem technological copyright holders. The anricircutllvenuon provisions arc extremely comrovcrsial. They oudaly devices and software thar have legitimate purposes. They criminali1..c actions that Section 4.2 Copyrigh[Law and Significant Cases 20S require rules, spr:cifiled codes. when consuuc.dng or rernGr Sega's games. thar was fair compC'tition. Accolade was not selling copies of Seg. is games. I,, } fn another 1992 case, Aldr; (ul1lU; ,,~ Ninulldo, the COUCt also ruled that making copic.~ of a program for reverse engineering (rn learn how it works so that 3 company CJn make 3 comparible producd was not (opyrighr infringemclU. Ir is a fair "research" usc. The t:.ourt applied (he same arguments in 2000 in deciding in favor of Conncaix Corporation in a su it by SOllY Comp uter Emerrainment, Inc. Connecr ix copit-d Sony's PlarScarioll BIOS (the ba., S~crion 4.2 Copyright Law and Significant Cases 209 huge PC industry aud (he low prices we pay for PCs owe much (0 reverse engineering of the [8M PC's BIOS in the 1980s. Phoenix Software. concerned abour charges of copyright infringement, did not copy IBM's software. Instead, the company employed a team of engineers to painstakingly observe and documelll in detail how the IBM program bdla\Td. Then, anorher ream wrote new code to do the same tUllctions. '1 'he court d Sharing music: the Napster case W'ben Big Sue! dud tilt' auta industry Il'tTl' wuler preJ5urr during the 70s from low-cost imports. their/irst imtincr wtts not to chrmgc their ()utm()d~d mflnt~fili turjngp'a1it.f induury has f-lTkm d hut to /){,Jl'ech the amrts to hrlr thf' ()utiltluien. nJC record simil, fr ttlck. -Karl Taro GrL"Cnfcld IS MP3 is a file~compression form; u thac reduced the size of files by a factor of aboul 10-12, so that people could download a song in a few minutes.* In 1997 and 1998, college students and other music hobbyists set up hundreds of MP3 sites on the ~rcb, making thousands of songs available. They considered MP} a marydous tool for promoting their work without the need for a contraer with a large record company. But MP3 has no mechanism for preventing unlimited or unauthorized copying. Most trading of M1'3 files on the m.lin record-company trade organization, shut down m; wy MP3 si[es by threatening legal anion. Napster opened on the Web in 1999 II' ~III till" udy I ',)9(h, wirhnm MI'5 Mltl wilh fht".,!mvtor "m: tbrec·mimuc WIlt:. Ol(>lit"lll\ \I\(·d rht11, I! woal] ha\~ ["ken mughly ~ d.~y III download 210 Chaptcl4. IntdlcCIU:JI Prop~rt}' .~how ed rh:a the Icg.d !iys(c.m can .~ (ill have a powe rful impacc. The arguments in the case apply to m ;Ul)' other si{('S and serv ices on the Internee NapS(1~ r were the f()]low ing: The is.mes in rill' lawsuir against .:. Wa. ... If nor, was Napsrer rcspol1sibk for tht., actions of ils users? NapsIC-c argued rh;u- lhe sharing of songs by ils users? NapsIC-c arg Signific:wr Cases 211 law requires comp:lnie... (0 make an effort £0 prevell{ copyright violations, but Naps{.cr did nor rake sufficient .~rcps to eliminate unauthorized songs or users who commir.red violations, but Naps{.cr did nor rake sufficient .~rcps to eliminate unauthorized songs or users who commir.red violations. Naps!cr ,iccd rhe Sony BC(.U113X ca.Se, in which the l"Qurt .o;aid [he maker of devices with substantiallegitimare uscs is n(]t liahle for Wit'rS of the device who infringe copyriglHs. t:ven if the makl'r knows SOIlle will. N:lpHcr had substamiallcgirim.uc uses in promoting new bands and artists who wert' willing ro le(uscrs copy their songs. Thl' recording indusuy argued that Napsrer down. The rccord companies objected [0 how Napster 11Sl,d widely awilah]c technology t.o aid copyright infringement. They wanted Napster to stop listing so ngs without permission of the copyright owners. Sony's relationship with a cust.ollc r cnded when dle customer bought the Beramax machine. Napster to stop listing so ngs without permission of the copyright owners. access IO songs they copied. The court said Napm:::r \Va.~ liable because iI had the right and abiliey to supervise irs system . induding rhe copyright-infringing acrivil"ies. Although it did not charge for copying songs. it expected rh e free copying to arU:lct u sers so that it would make money in other \rays. Thl' co un ruled in 2001 [hat N~pstcr "knowingly encourages and assists in the illfringt'ml~]][of co pyrights." Is The court orde-rcd Naps[cr to remove from its lisl"ings song tides provided by rhe record companit.'S. It faced civil suits (hat could have required payments of billions of dollars in damages. After some ineffect.ivc attempts to manage (hc song lists, Napsrer shut down. (Anol"iler company bought the " Napster" name and 110W operares a legal online music service.) File sharing: MGM v. Grokster About the time of rhe Napswr decision . new peer-tn-peer sofrwan..' appeared, and num erous companies and Web sin."s sprang up to provide pccr-fO-pcer file-sharing scrvi1.:cs (Gnutclb. Morphem, Kaz.aa, and others). Within months of G ilurdla's appearance , fi)r example. more (han a million files were avaibble. Many were unauthorized J/1P3 music files and unauthorized sofm arc. The~' systems presemed a new challenge for du; emcna inmcm and soft ware industries. Ther enabled copying or files among users on the internct without a cemral service. like Napner, to sue when lL'it'rS infringe copyright., . III MGA4 v. GmlWry. (he music and movie industry sued Grokstcr :Uld Streamt':'.lt Networks (the owner of Morpheus). The companies did nor provide a c(''' mral service or lis] of music tiles available on the disks of mcrs (as did Napsrer), hut they provided the software tor sharing files. Tedlllologisr.~ and supporters or file sharing argued lhal peer-(O-pt~(":r fik~ transfer programs had potential for many productive. legal uses. (They were correct.) A lower count and an appeals cour(ruled thal" distribution of file-sharing software does not. violal' copyright law's. These rulings seemed consistel with the Suprent. ~ Court's decision in Ih~ Sony Beramax em.'. in 2005, hO\\'cver, [he Supn.>nll~ Conn unanimous] ' ruled [hat intell cl"[Ual-propert]' owntl"S could sue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua]
Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al aboue (he companies for ellecouraging copyright 212 Chap ter Inn.'.'! I 'clua] Pmpl'ny infringement. Al Ka7.33. The Napster and Grokstcr decisions made it dear, ha l businesst's (hat encourage copyright infringcllH:llt and provide' {Ools ro do so as a fundarnenml part of [heir business modd C;Ulllo t operate It1;ally. Man y file-sha ring (;ompanics seftic.:d suits wi,h rhe enlerrainment t ind ustry. plying mill ions of donars. Sh arman Netwo rks, owner of Kaz;la. agreed (0 a S115 milli on settlement. Grokst:er shur do"vll and was sold for a token fe\.. Many others shU(down. Critics of the decisions worried that they rhn.-;l(Cncd devclopolCIII of nt'W peer-lo-peer re(hnolo~'Y and applications. 4.3 Copying and Sharing Unautho rized copying and sharingofmusit-, and now video, (Ominucar a hllg" ra te on th e Web., M usic sales have sn:adily dropped since about 2000. Undouin, 'dly; emenain menr comp; lnics arc losing i!ICOml~ and potencial income they cou ld earn from their inTel lect ual property. At; we seek snlulions to rhis problem look ... dillcl'cm from diHcrcnf perspectives. What does it mean [() solve rhe problems of technolog, v's impact ()n intclkctual-propeny rights? \~'ha{ arc the problem is to gct (hem cheaply and convenienty. To wri lt:''rS, singers, artists, and actors-and 1'0 rht' pC'ople who work in production, marketing. and management-the problem is [0 4.3.1 DEFENSIVE AND AGGRESSIVE RESPONSES FROM THE CONTENT INDUSTRIES Ideas from the software wills the fir.H digital product to be widely copi ed. Individuals traded popular software on floppy dis.ks with the view that it was okay bl'l"aU5C it W,)S ca.~r and the software W:IS cxpensi, 'c. Sofrware piratcs sold large numbers of copied programs (and still do). In rite 1980s and 1990s-, cmploYl'CS of manr bus ill es.~cs and organi1.a[ions (including newspaper Section 4.3 Copying and Sharing 213 companies, archirectural firms, manIltaC(uring companies, archirectural firms, manIltaC unamhorized copic,'i of software tor large numbers of computers, A variety of techniques for protC'cting software were developed early, wirh varying success. We describe a few. including n:dlliques to dlV.'art copying. lawsuits, and aggressive law enforcement, Soft-ware companies encoded an expiration date in frcl' sample versions of software. The software destroyed itself after [hat date. Some business software can run, thus ensuring that the software runs on only one machine at a time. Consumer software publishers use "copy protection" on diskettes to ensure that you cannot copy il diskt~((e or, if YOLI can, the copy will not run. Some sot[ware requires activation or registrarion with a special serial number. Many companies have dropped these {(:chni(lucs, largely because consumers dislike them. Cusmmers do not like [he inconvenience of replacing a copy-protected diskette if something goes wrong. Some cusmmers refuse to buy copy-protected software if [here is a nonprorecred competitor. Some of these systems were "cracked"; that is, programmers found ways ro thwan the protection mechanisms. Some companies have sold programs that deactivate rhc built-in copy prorection on other programs. The principle of the Sony Betamax case applied in a case where a software vendor sued a company selling J program to thwart it" copy protection: The coun ruled (hat, because (he program had lawful applications (e.g., enabling someone to make backup copies), the company could sell it. * 19 Activation features irrivate customers: they inconvenience people who want to moY(' their software when rhey replace an old computer. Software industry organizations, dubbed "software police," were active in business of copyright law were so dear that the business or organization agreed to fines of hundreds of thousands of dollars rather than go to trial. Software copying by businesses decreased, due in part (0 better understanding of the ethical issues involved and in part to fear of fines and exposure in a business Sofn.vare Alliance (BSA), 1 software indmtry organization, still "busts" a few hundred companies each year for using illegally copied software. BSA otfcrs [(.".. ard, of up to \$1 million for people who report seriom offenders. Law enf()fcemcnt agencies raided s\vap meets. warehouses, and other sires and pros ,.;1,;1; the other wa.' WilY. ..;k dtkd hdim: C(Jn);n:,...~ pa.s,;~d [h~ DMCA. Ull]~r the' DMCA th~ JO:LL,itHl pwb~bly would biVC gllne 214 Chapter -1 Imdlcc[U;] Property Sofcware companies obtained co urt ordl:r,~ and fih..d iawsuirs (0 shut down Inlc:rnt't bullerin oO; lrd sa nd Web sitcs. They {; Irgeted InfCf11efscrvi ce providers (I S f'.~). rhre.Hening legal act.ion against', [hose whnsc subscribers operated fik-sharing services or traded Un:.lUI"hori1.ed flies via pcer-to-peer software, pressuring dU?111 to cancd a,ccoun{s of ;tHcgcd offenders. They continue to pllrsuc well-publici1.Cd prost."cur;ons o(.wyonc infringing rheir copyrighrs. The entertainmenl industry has filed hundreds of dollars. On (he early continue to pllrsuc well-publici1.Cd prost."cur;ons o(.wyonc infringing rheir copyrighrs. The entertainmenl industry has filed hundreds of dollars. On (he early continue to pllrsuc well-publici1.Cd prost."cur;ons o(.wyonc infringing rheir copyrighrs. The entertainmenl industry has filed hundreds of dollars. On (he early continue to pllrsuc well-publici1.Cd prost."cur;ons o(.wyonc infringing rheir copyrighrs. The entertainmenl industry has filed hundreds of dollars. 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Banning, suing, and taxing There has been much crit icism of some of [he [:lClic~ and aggressive cnfon:cmcuf efforts we juS { described. The content industries defend their actions as essential to protecting cheir intellectual property from lh \$cccio n 4.3 As new companies imroouced ~l variery of Ilt...... Copying .and Sharing 215 producrs and service.~ to deliver eIHcr(a tnm cm in flexible and conveniem ways, The costS of fighfing indu.u ry laws uIts dl;;'ctively shut som ... of them down, wilh 110 uiallO ...kcide wherher their products. It prt..-"Ssun...-d device mak ..'rs m dc:sign rheir ~)'stems SI) that fIIt's in unprotected formals do not play wdl----()r ar all. Such requiremt:nts could reduce illegal copying, of course. They, however, int erfere with the use and sh uing of material in the public domain. They r('sniet legal c()'pyi ng for pe rsonal use and mher tail' uses. Laws re(l uiring or prohibiting specific felru res violate the freedom of manufacturers to
dc-velt)p and sc U products rhey consider approp riate. A~ an airernarivc to banning media and devices that inccc:l.se {he likelihood of l..'opyright hol ders for losses expected from unauthorized copying. In the 1960s. th ... y inuoduced special (:1., {cs 011 photocopiers and magnetic [:..].pe and later added taxes on manufacturers of PC~. prill[('(s. SC:.l.nncrs, and recorders. Many add significant taxt's (0 i Pods. cdl ph ones. and blank DVDs. The faXt:S [Ocait:d more man a bi Uion euros in 2005. Advocales of thl."S(, rax("s argue thar makers of copying equipment arc responsible for losses their equipment causes for inteUcctualproperty owners, and the sdu~mes arc a n.'lsonablc compromise in a situation where it is difficult to cdtch each infringer. C ritic.s argue [h.u (h e taXL"S make e(]uipmem more expensive. penalize ~quipll1ent makers unfairly. eh.uge hones(users unfairly, ;]nd poliricize the difliculr job offairly distributing [he money collected. Should we ban or restrict software, a (cchnology, a device, or research because it has rhe pmeIlliai for illegal use, or should we ban only (h c illt.'gal us('s? This question addresses a principle covering much more than the e mcrrai n mcil l industry fights to ban, delay• .:md tax: electronic devices and media that make copyriglH infringement easier. In (Juptcr 2, we described the FBI's and NSA's pressure to ban n.:lcphonc technology rh3t is difficulr [0 cap ~lOd enc ryprion schemes that were d ifficult for rhe-m co crack. Law cnforccmem 3gcncies advocate b:mning anonymous \X/cb browsing and e-mail. because they em hide criminal activity. The issue ()fballning or rcs(rit.:ci ng l'Ools thac haY(" criminal wes aris(-'s in numerous :lrca.s ullCcia[cd ro compU(cr (('chnolog),. Some U .S. ci(ies prohibil the sale of spra y pl inr 10 m inors, beGllIsc (he}, migh(p3im gr3fli d on walk Of course, (hey might. paint a bookcase. Some r ities ball chewing gum . because: so

me people discard (he gum 0 11 lhe strect. making a mess. Manr cu umri ... s prohibit ordinary people from owning guns 10 pro rl.X((h eir homes or businesses. beaus.., some people misuse guns. Laws han drug pamphe rn,t1ia. because pcople might usc j[wirh illegal drugs. Some of rhcse laws mak l' prl.'Venrioll of specifit.: crimes easier. For example. iI migh(be hard [0 find the person who painted graffiti. but if is CJsy to reduce the sak of spray painr by threatening shop owners with fines. 216 C haptt"I -1 Inrd lt.'clu:l1 PIO)len r In a frC'C society. which should win : rh e freedom of people [0 develop and usc ronls for legal purpos(.'s or rhe prevention of porem ial crimes? 'fh ose who reject the polk)' of banning a lool [hat has borh legitiman.' :1.nd ille-gal USt~S argue ir s absurdity by taking it {O irs extreme: we should look at each application individually, cons.idering rill..' risks of harm. Propon ents and lobbyislS for bans on tool'i usually ra nk the damage they (;ou ld cause (in general or to rhe imcrests of rheircliclHs) mon: highly than (he loss offreedom and convenienn' to rhose who would use the (001 honesd y and productively. We can randy predict all rhe creative and inn ovative (legal) uses of a new rechn ology. Hans. delays, and expensive restrictions often cost al l of sociery the unforeseen benefits. ~rhc [(;.'ChnoJogics listed in Section 4.1.2 as causes ofprob lcms fur intclk'Ctual-propeny protf.'crion. U'e the foundation of the incredible benefits of [he c.:o mpurer and commun icatio ns revolurion. Digital rights management Digital righ properry in digital finma ts. Copy protection on softw:uc diskc({cs was an c:Hly cX:J.mple. DRM has hf.'';t)l]l | more sophistica ted. h includes hard\\'a rc and M"rf 111"1/11 soft\varc schemes using C'llcryprion and other It)ois. 'M usic comp3. ni~s. ~I", TI('I)I}/i(m; movie studios. :md book publishers hesitated to deliver digital copies 2~:' :: ::>t'1/UJl/l.4. / of their produces on the \'(leb without DRM because they could not preven(mass copying. DRM provides flexib il ity. allowing the producer of a file to specify a use r may do with it. \Xlidl the ability to build in li mil.~ on [he li fe or u se~ of digit.i7.cd works, record companies hegan (0 scll songs 11i usc::d di(fcrcm DR.M sdlcmcs for music.) Some DRM provide produt.'ts do not work on mJchincs running the Linux operating system, Movie companies usc DRM to provenl viewers in Europe from playing a 11 cwie on DVD lega lly purchased in the U.S. and vice ve r!ia." We: have long had rhe right [0 !en d and resell a physical book. record. or CD that we owned, rrhcsc. aniv irics do Ilot rl.'t1ui re making a cop)'.) If we could nor lend or resell a \....hI.I tor ror • ~.f fmnl); lni e~ [(",:-.olion rd,'l."" n\Ovi;,~ in thifferc/H hdp 1h" 111 mll'l:lt;t: their nM rkctinr,. (]"'lU;,~ u, litf"n. 111 dnwl ~nd with , lilfe'C(lt IIrie... C.ll1lt.1h hal>ctl 011 St'crion 4.j Copying .and Sharing 217 book {O:1 friend. the friend might buy a copy. providing income [0 thl", opyrighr. owner. BUI coun." and law cstablished the principle thar rhe copyright owner has rhe righr only (0 {he "firsr sall:" of a copy. The buyer may transfer the purcha... cd copy. Publishers, cspccially of textbook..., which resell often, lobbied for legislation requiring a royalty to the publisher on t"ach 1c5.11e; ("hey were unsuccess ful. DRM cn'lbles the indusuj' h> prt'\,(·ut lending and selling:J. purcha.'icd copy. DRM puts long-accepted uscs of, and rights w use, inrelkcrual properly at risk. Will pr PJy. 1n 2007. EMf Group and Universal Music Group (two of rhe largesr music co mpani es in the world) announced thlJ would sell songs withour DRM at numerous online ourlers. to This was a- -- - - -,.,"".... L... Evay lim" tt 42: J~IIr-uldfif.ureJ uut haw tu 100·k sul"llt"thing up, iT 14-,.,'('ar-old is gfling to figurr OHt II IWt! program, - Jim Griffin . Inusi,.i ndusuy cOflSuitaml:! 218 Chaplc,'" Inrdlt'cmal Property Programmers and rescarchers frequently find wars {O cr:l.ckor thwart DRM and orher copy-prmccr.ion schemes Ihat comrol Usc" i of movies, ('-books, mw.ic. a.mong orhcrs. The DMCA prohibirs making, distribuTing. or using lOols {devices. software. or st:rviccs} to circurnvcnc L(."Chnologic.11 copyright prmCC(lOn systems used by copyright prmCC(lOn systems used by copyright prmCC) to circurnvcnc L(."Chnologic.11 copyright prmCC) t decisions prorC'ctoo rCl'hnolngie.~ ,hat have signifi.t::;.)nr legitimau.. , noninfringing uses. Thl' DMCA even if a person or company (ur dcvicl' a company makes) docs not infringe any copyrights. We noted that DRM controls resnict t~\ir lIses and llse of matt'rial in tht. public domain. The DMCA ban on circumventing controls has a few exceptions, nUl dlt:y are limitl'l and do not include fair uses, char banning it ViOi:HtU freedom of speech, and {hat programmers need ro discuss computer (ode and tcchniGucs. None of these arguments mane-red much. The judge ruled that DcCSS wa.~ illt-gal under (he DMCA and ordered its rt'moval. Soon after the decision, descriptions of Dl'CSS appeared on the \Veb in haiku, bar code, shorr movies, a song, a computer game, ~Uld :Ht. 16 Most of these publications of ,he code were prmt'sts of the judge's decision. They demonstrate how difficult it is (0 distinguish bctween expression of an opinion. which rhe First Amendment strongly procc:c(s, and compU[er code, a form of spect'h the judge said the governmenr could more easily rl'gulate. t In a similar case (D\/D Copy COli/rot AJsocillfioll v. Bunn~r). couns dis.lgreed about whether an illjum:cinn against publishing DcCSS was an ullconstitUlional {csrrainr on free spl.'Cch. '[11(, Clifornia Supreme C oun s~lid thar prohibiting someone from publishing a comp.my's [rade secrefs does nor violate onc's freedom of speech. Another courr ruled {hat DeeSS W;Ui \vidcly available when Bunner pos {cd ir. -}'herefore, it wa.~ nor a trade St'C-fct, and rhe injunnion did violalc his (rct.-dom of speech. Meanwhile, Jon Johan sen was [ried in Norway under a Norwegian law, The coun ruled rhar it was nor Dcess "Th.., mhtr~ dw.,t to relluin allunymou,. l l~.~l1 th.!!· "n"ln'lioll cxpon rub (di"'-'Ii'li~d in Ch~pLn 1), lik(' Ihe DM CA. rtLl Secrion 4..3 Copying and Sharing 219 illcg;tl to break DVD .~ ccu rity ro vicw legally purchased DVDs and that rhe prosec utors had not proved Mr. Johanscn used the progmm to illegally copy movies. In another ca.~c. a {C'] m of researchers responded to a challenge by {hc Secure Digi(al Music Jniri .aiv(' (SDM), and industry consor6 um , In resr its digir,al w3rcrmarkingschcU11'S (a t()[m of digital copyright protention) for music 1ik,», The researchers quickly found ways to thwart several of the techn iques and phUIU,>d to pn:scllt a paper on the fbws in rh(' prO[{'C(ion schemc..~;u;)}{Ures we have nor thought of-it ~ tlnn'rJJo~ would be inc~!';t1, The DMCA restricts circum\'cntin~' COP)' protection ~~~ "ij)t..'fj]l.~ IIK t' 1:1 DMCA: for R'wrs,,' engineering to products, Co mpanies avoid !iN,,,,; i .6..! the practice I>eGluSC the leg~liry remains murky. The IIL"W. innovative products, Co mpanies avoid !iN,,,,; i .6..! the practice I>eGluSC the leg~liry remains murky. The first vidt os people posted on the \Xlcb (initially primarilr on You'lube and MySpacel showed events (and no nevcms) people rccord "xi wirh (heir video camcr;.\s. Amateur (reat ions still make up a large proportion of posrcd vidC(}s. Quickly, however, cn::a(ivity and availability of video editing roots Icd to more sophisticat ed creations ...set to music ;wd conraining clips from movies. TV .~ hows , concerts, and so on. These components :IJC proctcd by copyright and vinuaUy all used without authoriza tion, Oticn , pL'Ople just post s""gmenrs (If TV programs or other commercial video. For t:xamplc. at onc point. Viacom claim ed {hal people viewed dips fTOm irs cable TV channels on YOU'TilOC sO, noo rimes per day, Viewers wah::hed an unauthorized copy of a Salurday Night 1.iv(' skit' millions of times. Whi ch of thesc u~('s of copyrigh(-infringing malertal postcd by users? Arc. m ere solurions 220 ChaptC'r 4 Inrdlcctual Propt'rrr "Why", and the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] do the fair-ll~c gui delines pennie? Arc s ite operators responsible for copyrighted m'Heria] ~~~~'~ parndigm ur.ettu,~
dlcy"rd,Uy wantea chern. Through Napster, they had access [0 a huge "inventory," nOf J.imi,[t"d to one particular srore or music lilicLThcy could get songs tha,r were rii.t commercially available. The), like-debe con:venience of getting their music online. 'o f video clip, from They could download and playa song from movies .abour for each copy and-were aClf""Cpc distribution ()f~OJlgs,.ill thar ppl~ wuld easiIY':OD" When\,""plc anywhere; -rhc.,), did nor need to have a physical CD wirh ,hem, The NapSter variery of then new n:chnologics to mhl'r (h an lawsui ts and criminal actions dllr ca n address , he- prohlem of infringing uses in ways [hat do not discourage o r destroy new creative- forms and venues? Let's consider the first questi on by reviewing a few argumclHs relared (0 fair usc for r different kinds of vidl,;.'os. first , of course, when videos do not usc anyonc dsc's m,w:riaJ, {here is no problem of possible copyrighe infringemcur. Videos {hac me a small p iece of ;1 larger work m igh r. be wirhin the fair. ust' guiddin('s (though the limit on the acceptiblc size of the copied malerial is not always c1C'J.r). People who post such amarcur videos arc nlll receiving any payment; they an: cn:ating new cntcrrainmcn({of va rying quality. to be sure}. Lip-syndling to a popular song (a common rype of video) raises morc questions because- the whole so ng is used and performed in public. It probably docs not affect the market for profess ional recordings of rhe: son g- bur even am a(CUI thearers pay fees [0 perform copyrighted works. (hough thc), generally charge lor 'ldmissicHl. Unaur.hori1..Cd posring of professiollal work. (.'specially long cl ips or whole work.~, more dearly is most Section ,1.3 Copying and Sharing 221 ofren nor fair usc. When millions of people can easily view an unauthorized video of a band or singer performing a hit song-or the best pan of a TV program-it probably docs affect the market for the work. The copyright holders lose potential sales and ad revenue. Thus, SOIne instances of posting videos containing unamhorized material are likely fair lises and manr arc not. What arc the responsibilities of rhe sitcs on which people pmr videos? Video-sharing sites do not charge the public to view the videm. They earn revenlle, however, from advertising that people view because the videos anract rhem [0 the site. The Napster and Groksn:r cases (Section 4,2.3) show {hat sllch companies have legal responsibility for contributing to copyright infringement. The DMCA protects sites from lawsuits for copyright infringement. infringing material when requested (0 do so by rhi:.. copyright owner in a so-called. takedown notice. The first. rcspome of many entertainment companies to (he video-shari ng pheno~ menan on Icgitirnarc sites was to send out floods of takedown notices. This is nm a satisfying solution for the sires or the public, or eyen for the copyright holders. Copyright holders are likely to imerpret fair-use principles narrowly and send [akedown notices for material rhat might be fair use. In one incident, X'endy Selrzer, a law professor, posted a video dip from a football g~lme. YouTube removed it after the National FomhaH League (NFL) sem a takedown notice, thell repos\:f,::d it when Sdtzer claimed it was an educariona! fair usc (demonstrating issues about copyright-tile dip included rhe NFLS copyright notice), and then lOok it down again after the NFLS copyright rotice), and then look it down again after the NFLS copyright notice. It is ofi'('n not obvious hm\{ a counwill imc'fpl'cr the fair-use guidelines. Web site operators arc likely to protect themselves by complying \vith requests from large entertainment companies. Large copyright holders arc unhappy that they have to continually search sites for marerial that infringe their copyrights and scnd rhl~ notices. Viacom complained that it spends tens of thousands of dollars C"dch month doing so. A more fundamental problem is that [he goal of removing all unauthorized copyright-infringing] material squelches creativity that new tcchnology encourages, Individual people who create something using pieces of other works rarely know how to find copyright owners and get permission. Aside from any small fce, the overhe-ad of managing permissions filr aU uses would be roo burdensome for both [hc public and the entertainment: companies. COfi[cm~sharing sites and the public w.IIn [0 keep popular material available on the sites. In the nexr section, wc see some potential solurions. Entcrtainmenr companies challenged rhe applicability of the safe-harbor provisions of the DMCj-\, requiring the rahxlown notices, to large commercial sites such as Youl'ube that host a huge number of unaurhorized videos, The companies argue that the large advertising revenue these sires take in depends in part on the unaurhorized coment. Seveml companies sued You'Tube, MySpacc, and other coftcm-sharing sites in 2007, The safe-harbor provision of [he Dl\1CA might have been appropriate for ,'(:reb sites of t:hc 1990s whose business plans did not depend on users posting huge aillounrs of coppighrinfringing material. Today's sires. the companies argue, arc similar to the peer~to-peer music sites (like Grok 222 Chapu.·I 4 Illdlt.'(.'maJ Propert}' Tlo.tal;cdo\\'n requirement of the DMCA is dearly open to abuse that threatens free speech (and fair competirion), A stUdy of rakedown noriccsfound that for about 30% of rhenoticcs; there is significant: question whether the materia'! actually does infringe copyright. The fair-usc provisionsprore much of it. for example. quotations from a book in an uufavorable book review. chan halfof the notices without 30% of rhenoticcs; there is significant: question whether the materia'! actually does for a book in an uufavorable book review. chan halfof the notices without 30% of rhenotic states should have fhi: fl.:'sponsibiJiry of filrcring out copyright-infringing material. The burden should nor be on rhe copyright holders. Viacom asked for \$1 billion in damages from YouTuhe has pointed out thar m 4.3.4 NEW BUSINESS MODELS AND CONSTRUCTIVE SOLLITIONS The more U'(' (lttmpt to pro/litk %, OVt:r11rf1t'nt l'rott'l'tion to tht old wlty oft/oing tl,, mtattlimnmt indust,:y to "dilPt b1t~im:ss, the kss motitffltion we prol1idt fa and brntfit.from nell) technology. -Les Vadasl., former vice presideru of lmepo Section 4.3 Copying a.nd Sharing 223 copyrighted medi,., the p';l, qlishing industries ~n(~~cing « enns and other "schemes hi' [he p~r. Publishers .of primed academic iOlig set subscription rates , J~4mals ' have £6;;;libraries higher [han for individuals' be6.:w etnorc people usc library copies. Organizations repr~ell[ing copyright holders for music, journals. and magazines made ''arrangements with users of such wor-ks [Q collect fc=cs. For example. the American Society for Composers, Authors. copyright fee,n",,,, ifey,e!0l", a written work ()ntinc.' N:"i'on:.I.'Wiit,,,s Union established. rhe pubU,cat.it>r> and Publishers (ASCAI') and Broadc.st Clearinghouse (0 provide tor COllie < Music. Inc. (BM!) collect hundreds of license fees for fwd"lce ·millions of dollars a year in fees for ,live Mapy of these schemecSj performances and recordings of songs secds of sohJtioillS.fo played in commercial places (including rcstaurants). In [he 19605. phmocopying machines gajned widespread use and hxl to increased copying .of mag':lzines :tnd journ3k Journal publishers forlled Copyright Clearance Center. The negotiates ycarlyJct.'S with large co'mf>anl whose employees frequendy .m~, . w of journal anidcsor other m,,,crial. agreements make- ic.feasiblc for ius(itutjonal. users of cOIPy,rig.h":dOI:,,et Music and movies-legally , :~ Th" smart pt:opir in musil' dr(' aln:ady It'orkin,,< on wa)'J to m.:kt. a ,.illg/(' playing --\ 1110 l !'htnp tn br wtmb l lt'lzli11{. - Holma.n W. Jenkins. Jr. 3! 224 Chaprer 4 Intdlenual Property The success of Apple's iThncs. which has sold more than :1 hmion songs and tens of millions of videos, showed that comp; mies can sell digital environment sllcces.o; fuliy. from rhe poim of videos, showed that comp; mies can sell digital environment sllcces.o; fuliy. providing music realized that th,,}, had to either filrer out indllsrry-owned material or make agrcemCll[S with. and payments to, music companies. Most people who copy or listen to songs online wam to hear current, popular IllLL Negotiated payments to, music companies. Most people who copy or listen to songs online wam to hear current, popular IllLL Negotiated payments to, music companies. company [0 pay a share of irs ad revenue w the entertainment companies. YouTube and Warner JV1usic Group. for example, worked Out such an arrangement for St'ction 4.3 Copying and Sharing 225 Warner mu.~ic videos. Some sbaring sites li se filtering software (bat examines files as people upload {hem. looking for digiral"fingerprints" of the cntenaintnent company's properties. Depending Oil agreement.s berween (he company material in their (usually noncommercial) nc:nions without the overhead and legal liability f(1f g companies that benefit from the advertising alld have the assets and expercist~ {() develop and usC' thl' sophisticated filtt~rillg tools m ...kc the payments. The com racl. an More uses of advertising Some music companies that benefit from the advertising alld have the assets and expercise and experc damaged music fiks, called ; decoys." on file-sharing siH.'S. The d Fan fiction includes stories wrinen hy aillateurs using characters or worlds from popular hc(ion such as Harry POH.c r and Star Trek. There is a lot of it. One H arry POH.c r and Star Trek. There is a lot of it. One H arry POH.c r and Star Trek. There is a lot of it. One H arry POH.c r and Star Trek. 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Star Trek. There is a lot of it. One H arry POH.c r and Star Trek. There is a lot of it. One H arry POH.c r are star trek. There is a lot of it. One H arry POH.c r are star tr and cnvironmc-nts in fiu1 fiction arc creative imellectual property covered by copyrighc. Fan smrics arc not COpjl~S of cop)'righred work, but rhey are deri valive works. Thus, public display of fan finiol) 226 Chaptt':I' 4 Intdb.'wal Property \$h.Jpl1ginfofmation amd cre"tivevvo.-k trtajo'rcha.ractedstkofWeb culture. rheadvent, of the Web, a large ooITIIllunity of. computer programmersdcveloped the of sharing software.) Many, •••••• :-~:h:i:andartists, including those who ." work on rhe Web. are willing a degree. How can rhey non.rontirt\erai.lu casily-'-without a publishing company's staff of lawyers and without the overhead of explicit auth()rization-:indi'-d.IC what they are willing to let others do with their works, pur .,1til c domain. or set a .hnN" ••1, work~ From the user perspective. how does someone else's Website easily provid, os. Like so Inuchon qcterOline if the photographer carcs; and Wbe. or she must get permission or pay a ;, fee? Many people arc willing to respect the Er.l\)l'Cen"'nt is preferences of an author or artist, . bur it easy-",.-w;e. is oftcn not easy to determine what those /·r.h!e(:r;,ariivc C"mmQnslie preferences. are. Creative Commons,3:! a organization, developed a licensing agreements inspired GNU Gencml Public License for th' generally ((. quire authorization from rhe copyright issue. The case of posting on the Web and finding an audience encouraged a big growth in f.1n £inion, most of it un; 'Imhorizcd. As with blogs, quality ranges from professional to trash. 'X"'ith derivative works, publishers worry nor only abom loss of potential revenue but also about damage ro their image. (For example, on the carly Internet., the Walt Disney characters in "indiscrct~t" poscs.) 'rhe response of writers and publishers to fan fiction was more calm than the response of {he mu''iic and movie industries to unauthorized distribution. of their products on the Web. Fan hcrion remainscoflrroversiai, and some authors and publishers threaren lawsuits, but many publishers trecognized rhac fan ficrion is not a big ducat to their revenue and SC'(:rion 4.3 Copying and Sharing 227 that ;~mafeur writers are their customers. Some authors, including J. K. Rowling, allow if they arc noncommercial and nor pornographic. ,~rories based on their music, about the cthics of copying. The border between what is not ethical is often unclear. Many people who get their music, movies. or sofnvart~ from unauthorized sources realize that hey get "something for nothing." They benenr from the crt~a[iviry and elTon of others without paying for iLl(} most people, that seems wrong. On the other hand, much copying docs nor seem wrong. We explore some of the reasons and distInctions. Copying or distriburing a song or computer program docs nor decrease the usc and cnjoymen£ any other person gets from his or her copy. This flmdamcnt'll distinction between inrellectual property and physical property is a key reason why copying is echical in far more: circumstances (han raking physical property. Most people who create inrdlcccual property in cntenainmelU software. and so on, however, arc doing so to cam income, not for rhe benefit: of using their product themselves. If movie theaters could show copies of movies without paying for rhem, far fewer people and companies would invest money. time. dmvn(oads without an agrcclllenr with the publisher. publishers \.... ould probably not sell enough copies to cover COSts; they would swp publishing. The value of intellectual property is nO[JUSt the direct use and enjoyment one gets from. a copy. Irs value is also as a product offered to consumers to earn money. "J'hat is an aspect of dle property tharver the direct use and enjoyment one gets from. a copy. Irs value is also as a product offered to consumers to earn money. "J'hat is an aspect of dle property tharver the direct use and enjoyment one gets from. a copy. Irs value is also as a product offered to consumers to earn money. "J'hat is an aspect of dle property tharver the direct use and enjoyment one gets from. a copy. Irs value is also as a product offered to consumers to earn money. "J'hat is an aspect of dle property tharver the direct use and enjoyment one gets from. a copy. Irs value is also as a product offered to consumers to earn money." one can steal from thl? copyright holder. 'W'hcn people widely copy inrellectual property without permission, they dimillish [he value of the work as an asset [0 the O\llner. That is why much copying i,~ wrong. Supporters of unauthorized file-sharing services and people who advocate loose restrictions on copying imellectual property argue that permitting copying for, say, trying our a song or computer program before buying it benefits the copyright owner because it encourages sales. Such uses sccm ethical. and indeed hecause much of rhe '\,, rong" in unauthorized copying stems from depriving owners of income from. their product. the fourth of the fair-use guidelines considers the impac on the market for rhe product. We should, however, he careful not [0 go too far in usurping a copyright holder's decisions. Housinesses give free samples and low-priced introductory offers to encourage sales, bur that is a busillC-'is decisions. Housinesses give free samples and low-priced introductory offers to encourage sales, bur that is a busillC-'is decision.' for such choices. A businesses give free samples and low-priced introductory offers to encourage sales, bur that is a busillC-'is decision.' for such choices. A businesses give free samples and low-priced introductory offers to encourage sales, bur that is a busillC-'is decision.' for such choices. A businesses give free samples and low-priced introductory offers to encourage sales, bur that is a busillC-'is decision.' for such choices.' A businesses give free samples and low-priced introductory offers to encourage sales, bur that is a busille.' is decision.' for such choices.' A businesses give free samples and low-priced introductory offers to encourage sales, bur that is a busille.' is decision.' for such choices.' A businesses give free samples and low-priced introductory offers to encourage sales, bur that is a busille.' is decision.' for such choices.' A businesses give free samples and low-priced introductory offers to encourage sales, bur that a busille.' is decision.' for such choices.' A businesses give free samples are such choices.' A businesses give its own decisions abot1f how if rnarkets its product, not consumers who want frec samples, nor even rhe courts. People who copy for personal usC' or disuihutc works of others without charge usuaJly do not profit financially. Personal usC alw'lYs f:tir? Is financial gain always relevant? In some contexts, a profit mOlive, or financial gain, IS a facror in concluding chat an activity is wrong. In other contexts, it is irrelevant? In some contexts, a profit mOlive, or financial gain, IS a facror in concluding chat an activity is wrong. In other contexts it is irrelevant. Vandals do nor Chap tel 4 228 lnrdleclUal Property prohr financially from their action, bur vandalism is unethical (and a crime) because it desrroys---or reduces the value of-someone's. property. A profit motive is not a signincanr factor in determining where to protect freedom of speech.'" Freedom of speech arc in business to make prufic. Many kinds of abusive or l'hrcarcning speech arc unrelated to fimmcial gain but arc unethical. Here arc some argumems people make in support of personal copying or pas-ring content on the Web without authorization (in situacions that arc not clearly fair me) and some counterpoints to consider. wrong-in many cases it is not. These are brief suggestions tor analyzing the arguments. " f cantlot It/ford to buy the software (or pil)' the royalty for use oll wng in my tJideo/ There are many [hings \VC cannot allurd. Nor being able to afford something do~s not JUSt if)-' taking it. {o * 11]e tOmpd11), is {[Itirge. JV(a/thy corporation. The size and succes.~ of rhe company do not justify taking something from it. Programmers, writers. and perf(mning arris[s lose income too when copying is common, 1 wouldn't buy it ai thr reflil price (or pn.v the required fte) Imyu'ay. The compdny is really losing a sale or losing ret1cmtc. The person is taking something of value, geuing "something fi]r nothing, even if the something is less (han [he price the copyright owner \vould charge. Therc are times when we qC(something for norhing. Our neighborhood look~ bettef
when our neighborhood look~ ofgenerosity. Philosopher Helcn Nissenbaum argued that someone who copies software for a friend has a countervailing daim against the programmcis right {O prohibit making the copy: rhe "li'eedom to pursue the virtuc of gcncrosity.",)] Surely we have a liberty (i.e., a negative right) to be generous, and we can exercise it by making or buying a gift for a friend. It is less dear [hat we have a claim-right (a positive right) to be generous. Is copying the software an act of generosity from the copyright owner? ~111 Everyone does if, You would hefooliji) 110t to. The number of people doing somt'thing docs not determine whether it is right. A large number of peoplc in Ol1e peer group Challttr J. we m(Cnrlutlcd dUl (onlllcrdal it Ic,,) First Aml:II,lment prm.:(tiun. \p,,~,,'h, in p..tnU:u]Ir ~dwnL~in~. i~ ~11.::n'~pti(ju. Somc (oun dn:i~ions y)"" Section 4.3 Copying and Sharing 229 could share similar incentives and experience (or lack thereof) that affect their point of view. I Wilnt to use a song or vitko clip in my vitko, but I have no idra how to get permission. This is a better argument than many others. Technology has outrun tht' business mechanisms for easily making agreements. The "transaction coSts." as c(:onomists call rhem, arc so high that a strict requirement for obtain imdl('ctual propeny. + lin pOSlilJg Ibis vidro (or segmmt of" IV program) flJ il public st:rJJice. If the public service is clltcrrainmclH (a gift to the public service is ro express an ide-A or make some statcment about an important issue, the posring might be analogou. Cfe'Ating a review or a parody. In some cases, these might be reasonable fair uses with sodal value. Simply posting a complete program, or a substantial portion of one, to share is probably not a fair usc. Laws arc not always good guides for ethical decisions, but the f~lir-use guidelines do a respectable job of identifying criteria to help distinguish flir and unfair copying. Because of the complexity of the issues, there will always be ullcertainty in the application of the guidelines, both ethically and legallr The guidelines might need expansion and clarification to cover new media, bu[they give us a good framework that corresponds to sensible ethical crItcria. 4.3.6 INTERNATIONAL PIRACY Some countries traditionally have not recognized or protected intellectual property, including copyrights, patems, and trademarks. Counterfeiting of brand name products, from blue jeans to expensive watches and medicines, is common in some parts of the world. Ignoring foreign copyrights has long been common practice in many countries Thm, software, mmic, and movie piraL"Y in tht'sC countries arc varianrs of an old phenomcllon. Illegal businesses produce, transport, and sell unauthorized copies of du.' disks, documentation, and sometimes identical packaging for popular husinesses produce, transport, and sell unauthorized copies of du.' disks, documentation, and sometimes identical packaging for popular husinesses produce, transport, and sell unauthorized copies of du.' disks, documentation, and sometimes identical packaging for popular husinesses produce, transport, and sell unauthorized copies of du.' disks, documentation, and sometimes identical packaging for popular husinesses produce, transport, and sell unauthorized copies of du.' disks, documentation, and sometimes identical packaging for popular husinesses produce, transport, and sell unauthorized copies of du.' disks, documentation, and sometimes identical packaging for popular husinesses produce, transport, and sell unauthorized copies of du.' disks, documentation, and sometimes identical packaging for popular husinesses produce, transport, and sell unauthorized copies of du.' disks, documentation, and sometimes identical packaging for popular husinesses produce, transport, and sell unauthorized copies of du.' disks, documentation, and sometimes identical packaging for popular husinesses produce, transport, and sell unauthorized copies of du.' disks, documentation, and sometimes identical packaging for popular husinesses produce, transport, and sell unauthorized copies of du.' disks, documentation, and sometimes identical packaging for popular husinesses produce, transport, and sell unauthorized copies of du.' disks, documentation, and sometimes identical packaging for popular husinesses produce, transport, and sell unauthorized copies of du.' disks, documentation, and sell unauthorized copies of du.' disks, documentation, and sell unauthorized copies of du.' disks, documentation, and sell unauthorized copies of du.' disks, documentating (disks, documentation, and sell unauthorized Th China, tactories hidden on fanns produce millions ofI)VDs with pirated music, movies, and software, mosdy for expon ro other countries uncover millions of unalHhoril..l;xl copies. Pirated copies of cadl new version of \Vindows appear in orber countries bei{He the official release. Web sites that sell or share entrrainmem fiks v,:irhour authorization thrive in mallY countries. The Bw;incss Soft:\vare Alliance (BSA) estimates that piracy accounts for 35!Y u.s. 230 Chaptet'ti Imelkcfual Property billion per year.... Obviously, it is difficult to ge[.3ccurare figures for illegal acrivi(ics. To make irs estima[cs, th e BSA esrimales rhe average number of likdy software applicacions on each computer and (hen uses sales informadun (Q calculate rhe average number of appli~ 95 Armenia 94 Moldm'd 94 Alerbaijan 91 Zimbabwe 88 Vietn 86 Pakistan 85 Indohe~i3 84 Ukraine 84 CamE'ruon 27 Belgium 27 Uniled Kingdom 27 Finland 26 Swedef) 26 Switzerland 26 Austrlil 2S Denmark 25 jJpan 22 N ewZealand 21 United Slo"lle): o 10 20 30 EstimatcJ (Tht" 'fen High~st and W 40 so 60 P~rsonaJ Computer Sofcw:m: 70 Piracy 80 90 P~n: cn[agl" Ralt:S for 100 2006 "'en Lo\\'e.>;t].15 So:!!Ik: rqJOrn JC"~rihc thcs.: iigl]rc:~~~ lo\(-~ to fhl: ,'iIIIWJrc in]\I-'tl ...~ flom pirK~. h`i... imp(.~.~ihk` to I."s tim:m: ;:a((U[~\tlr 1mw many pwplc w.ing pir~,cJ ,UkW;II(" ,,".. wid bll Y full-prin' kgill ,upit's if the pir:ttt"d ~opi Q wt"rt" ll01 ~'Jil:lh!t". It is rc.nu:llbl.: W J:"])' th.Lt [11;!u y "~)ul.i not. so IIw dilrtt lu~' It) pubbh:: {\ i~ ~ignili':~ fll a ~ ignili':~ fll a ~ ig recover irs invcsrment in soft/r'arc developmen r. The tacr cha(the victims of piracy are from ~1.O()(h('r country. and 3. rich one. may make hoth th e people :md the govcrnmcnrs less indinc.'d (0 take acrion to rooUl:c unaurhoriZl.'d sales. In the U.S. • with many legitimate sell ers of cnIcrtainmcnr a.n d softwarc. eU.Homers are likdy (0 know when 11K")' arc buying illegal products or sharing unauthorized. files. rn countries where it is c.ommon (0 pu rchase food unpa...:kagcd iu ourdoor market's. customers may not think there is anything unusual (or \vro ng) abo u t {he way unauthorized vendor selling. for instance. a U .S. movie on D VD . lhan to fin d an aurhorized dealer. Anolher reason ror piracy in ocher coumries is (h at the economic d u.s. copyright arc lively low prices to artr:Kt Clls(Omcrs away from the jlIcgal market.) T hus, culture. policies. economic d u.s. copyright prorecrion in Chilu. Under pressure from the U.S. in the C'J.riv 19905. China passed laws ro prorect intellectual-property rights. and parricularly ri gh(.~ ft,r fo rl~ign wo rks, hut did nor (..'nf()fcc l'h,' laws. Som(' cop ying of soli ware repurt), of all CDs produced 36 More rec enriy, a.~ its economy has been growing, Ch ina m'ld!! more effective eRofts ro reduC(' illegal pmducrion . sale, and usc of inrellccr ual property. h ha.~ increased enforcement of laws. For example. a Chinc.'C' co un ruled. that :\ Web sirc infringed copyright by supplyi ng U.S. movies for downl oad without J.uthorizarion from the movie companies. 1\\-'0 people in Hong Kong got long jail sentences for using rhcir disk. reproduction com pany to m~kc hundreds of thousan d.~ of illegal copies (If music, movies, and software. Under press ure from a C hin('sc company [hat n:prcscnrs U .S . mIIS)C com panies Jnd owns rights to thotL~: Inds of Chi Ill~sc so n gs. Chi n a's major search ~nginC' removed th(lusand~ ofiinks to sires rhar.otf'c-rcd pirated songs. In China PC manufactUrers lIsed [0 sdl their machines bare. wilhom an operating system. This practice encouraged people to buy cheap. unauthorized copies. In 200(" rhe Chinese govcrnment required chat all PCs be sold wirh an. authorized ol)CJd(ing system prl'installed. Aho. according to the BSA, rhe Chin(~se govern ment sig nificamly reduced [h e lI SC of unauthorized soff\" arc by irs own gm'crnmclH agencies. 232 Chapter 4 Intdlcctual Property 4.4 Search engines and Online Libraries Copying is essential to many of {he operations and services of search engines. In order wrespond to user queries quickly. (he search engines copy and cache Web pages and sometimes display rhese copies to users. Search engine companies copy enrire books so dur rhey can search [hem and display rhese copies to users]. infringing material. Individuals and companies have sued Coogle for almost tvery search services? Should [hey be paying fees to copyright owners? As always. uncertainties about' [he legal mHllS of industry]. Should services? Should [hey be paying fees to copyright owners? As always. uncertainties about' [he legal mHllS of industry]. practices can delay innovation. Googlc boldJ)' introduces new services amid complaints of copyright infringemen(. hut fear of lawsuirs has deterred smaller companic.~ [hat cannot estimate business costs in advance if they do not knmv their liability. We consider arguments rdared [0 a few of rhe COil tested practices. Courts have ruled on cases for some; others remain open. The search-engine practice of displaying copies of ('xccrprs from Web pages seems easily {() fit under rhe fait-usc quidelines. The excerpted document-usually an advantage to the size in most cases. the site from which the search engine copies rhe excerpt is public,
available to anyone who wams to rcad irs comenr. \Veb search services arc a hugely valuable. In K~/iy v. Arribti So./i (2002), an appeals court ruled that copying images from Web pages, converting [hem [() thumbnail images (small. low-resolution copit.>sL and displaying the thumbnails to search -engine users did not infringe copyrights. In Field v. Coogle, :m author sued Google for copying and caching \'(leb pages is a fair use. In dismissing a similar suit that challenged both caching and the practice of displaying excerpts from a Web site, a coun compared Google to an ISP thar makes copies of Web p:lgcs to display them to users. For ISPs, automatically and temporarily smring data to transmir to users does not infringe copyright. 37 There are, however, some reasonable arguments on [he other side. Businesses operate most search engines. They cam significant revenue from advenising. Thus. the copying accomplishes a commercial purpose. The display of shorr excerpts call reduce income f.O copyright holders in some situations. A group of Belgian newspapers claimed thc), lose revcnue from subscription fees when Google di.splays headlines. photOs, and excerpts from {heir news archives. They \von a lawsuit againSl: Google (in a Belgian come) in 2007. ~C;u.:hil1g:. genel'~III that U.IC it W oplimil Section 1.5 Frce. Specch bsucs 233 In response to similar lawsuirs and disputes with other news services, Google ncgoriared [0 copy and display headlines, excerpts, and phoros. An adulr entcrtainment company; Pcrfect 10, sued Coogle is liable for copyright infringement because Google's scarch engine finds and provides links ro Pertccr 10 images on unauthorized sites that infringe Perfect 10's scarch engine finds and provides links ro Pertccr 10 images on unauthorized sites that infringe Perfect 10's scarch engine finds and provides links ro Pertccr 10 images on unauthorized sites that infringe Perfect 10's scarch engine finds and provides links ro Pertccr 10 images on unauthorized sites that infringe Perfect 10's scarch engine finds and provides links ro Pertccr 10's scarch engine finds copyrights, t.hus raising again rhe issue of when it might bc illegal to link to anorht~r Web page (see Section 4.3.2). Perfect to argued that Google could earn reveoue from the infringing sit(~s. In 2006, a lower coun ordered Google ro remove links to infringing sires; Google appealed. The tlna! decision could be significant ff.) f rhe cnrcrtainmcH { industry, professional photographers, and search engine companies. lict.~nsing agreements Books online In the 1970s, Project Guccnbcrgbcgan converting books in [he public domain into digital formats. Volunteers typed the entire text of the books-inexpensive scanners were not yet available. The University of California agreed to let Microsoft scan millions of books in irs collection that arc in the public domain. Google scans books covered by copyright. Google provides entire hooks for dovmload. bur only (hose that arc in the public domain. For books still under copyright protection, Google Book Search provides short excerpts from the impact on rhe market for books difler from the impact of people browsing books in a library? How does rhe impact compare to providing excerpts from nev..'spaper articles? Publishers and authors filed severallawsuirs against Googlc tor copying rheir books. "I'he suits remained unscttled ar the rime of wriring this book. So far, courtS have decided many-but nor all-issues, however, arise again each time technology makes copying and searching of more compk"X content (mo . . ies, for example) possible, 4.5 Free-Speech Issues We saw that the Di\tCA's resultions on the publication of circumvention software might be an unconsrirurional inlringcmcnc of free speech. Here, we briefly describe a few other ex3mpl('~ of confl icts hl~.rwc('n freedom of speech and inrdlccrual-property laws. Domain names Some: businessl's :md organizatiolls use r.radcmark-in.fringet111-IH claims to .sue or thrc;lfI.:n .m its against peopll' who n'gister domai n names (Web address4,'S) (h:H express criticism of die company or o rgani1.alion . If XYZ ,,,,'ere thl' flame of a big consumer products maker. XYZ might sli e somL'Olle with the Lnrcrnet dom ain name XYZlsJu nk.com. Thl' Pacifica Foundation. an opcrar.or of radio srarions that, ironi cally. called itM.'!f "frt't: spt.'C'ch radio,'> threatened suits against operaTOrs of several Web sitt;."s critical of Pacifica management. The -,~itcs used domaill naUles that included "p;,ciflc:I" or (hc caillcttcrs of a station, for exa mple, frecwpiW.org. A company name is a protected free speech. In many o bservers believl' rhar its use in a domain name is a form of ('omment, or product name is a form of C'additional et al. ('additional et lassicVolvo.com. a business (hac sells old Vo lvos and spare pans. (Ford owns Volvo.) Ford aJsosucd {he operator of jaguarCefltN.colll, a sire :lbOU1 jaguars (the animal), not Jagu:lrs (rhe car brand owned by Ford). At issue is how far control a product name extends. Courts dismissed many of these trademark suits. Some compa.n ies usc a market mech anism rather than lawsuils: They buy hun d reds of domain ll:lm t'S that include n~uncs of their products, not" m us('" (he names themselves. bur- {O prt'Vl'1H ochers from usin g them. or Posting documents for criticism Some org.anizarions and businesses anc.:mpt to silence [heir cri t ics b]' filing copyri gh tinfringcll1 was impos.'dblc and r.h:Jr ,mlall opcr:lcors like him do not have rhe insurance or deep pockers {O fight copyrighr-infringcmcnt.la\vsuit~ . He said he would h:we to shut down.'10 The freedom-of-'speech implications of ,~uch cases appear to bt' significant. How sHong is the fair-use argumcnr? One judge, in a ruling against the Chu rch. ~';lid : !TJhc dispmc was presented as a straightfony:ud one under copyright and trade ~cre,- law. Hmwvcr, [he ('ourr is now convinct."li [hat dl C primary moe,iv", Hinn of [thl" Church1 ... is (() stifle cr iticism of Scienrology in gen eral and (() harass irs critics. 41 However. in two c-ascs. couns found thou the men who pOSted material infringed the C hurch's copyrights. A judge fined onc ddcndaIH . found him in conte:mpt of ('oun for posting rhe transcript of his trial (v,!hidl includt'd some of the Churdl material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), and prohibited him from posting a lis(of\Vcb siu."S containing C hurch material), a Chun.: h dOCtInleIHs. (G(xlgic complied, but Ialer rl'swrt.-xi {he sites [0 its sl~..lrc h resuiu.)41 4.6 Free Software In Chapler I \\'e talked about all the trcc stuff on chc: Weh. Individuals pOST information and cn:au." useful Web sires. Large groups of lloluult.'Crs, who do nO(know each other) collaborate on projCCts such as Wikipcdia. Experts share {heir knowledge and contribute their work. Th i.~ creation of valuable information
"products" is decentralized. Ir has little or no ""manage men r" in the husiness sense. It Hows from incentives ot her than profit's and market pric.:ing. This phe nomenon . whill some call ...pcer production," has a predece, 'i\$or: the free software movemenr, begun in the I 970s 4 -' 4.6.1 WHAT IS FREE SOFtWARE? Fru SOfiWfirt is an idea, an ethic. advocated and supported by a large loose-knit group of tom purer programmers who allow and cncour..lgl' people (0 copy. usc. and modify rncir software. T he fiw: in free software. T he fiw: in free software means freedom, not neccesso: l rily lack of cosc, [hough often there i..~ no charge. Freeso frware cnrhu- 236 Chapter 4 Intellectual Property editor), and many compilers and urilities. GNU program~ arc fredy available and very popular among computer professionals and skilled amateur programmers. ~ With freely distribut.ed software, more people can use and benefit from a program. With source code available, any of thousands of programmers can find and fix bugs quickly. Users and programmers c;m ad'1pt and improve progr.uns. Programmers can usc existing programs t'O create new and bener oncs. Stallman compares software to a recipe. 'Ic.) enhJTce (he openness and sharing of free software within the current legal framework that providl."S copyright protection, the GNU project developed the concept of copylift. 44 Undcr copylcfr, the developer copyright " {he program dcvdoped from it, but only if they apply the same agreement to the new work. In other words, no one may develop a new program from a copylefrcd program and add restrictions that limit its usc and free distribution. The widely used GNU General Public License (GPL) implements copylefr. For a long time. technically savvy programmers and hobbyis.ts were the principal users of free software. Commercial software companies were hoscile [0 the idea. That view changed gradually, then mnre dramdtically, with the Linux kernel in 1991. Torvalds distributed it for free on the Internet, and a global network of tree-software combined it for free on the Linux kernel in 1991. development, generally on their own time after work. AI first, Linux was difficult to usc, not ,yell suited as a consumer or businesses referred to it 3.'i "culr software." T\vo carly users werc the company [hat did the special eHeets for (he movie Titdnic and the NASA Goddard Space Fliglu Center. Gradually, some small companiess product. began selling a version of LillUX along ...vith manuals and technical support, and eventually, major computer companies, including IBM, Oracle, Hewlcu~Packard. and Silicon Graphics, us 1~ ·"(;:-';C·s Not UN1X.~ (fl'Ogr like rct:ur~i,·t: ;)'tmn1"11'.);TechniclJly, Limtx j~ lh ... kernd. nr c, lte pMI, of the oper,ning ~y,'! Linux (,;artS In: from tht GNU proj,;cl. but the St"Clion 4.6 Fret" Softv.r.m: 237 applications. SUll Microsysr,em,'i Ilcensc.~ the Java programming language under GPL. Adopting the view of the free- software movement, companies expected rhar program mers would (ru~t rhe software movement, companies expected rhar programming language under GPL. Adopting the view of the free- software movement, companies expected rhar program mers would (ru~t rhe software movement, companies expected rhar program mers). impro/'e it. 'IBM pbccd full-page ads in major m.~wspap('fs announcing that it "embraced Linw(Ind the open-source movemellt IS a pillar of c-businc5.~. "45 IBM donates hundreds ofiIS paccJUs t.o the open-source movemellt IS a pillar of c-businc5.~." it ;L'i a considerable social bC'nc.lir. C ritics (and some suppor rters) offfce sofrwarc point out somc of its wc-aknesses. Much free sofn,,;tn: is nor l~a.'iy for ordin ary consumers (0 usc. There is no technical supporr number ro call fo r help. (Progran)mers and users share info rmation about. problems and fixes on very active \'\'ch sites.) Because anyone can modify free software. there arc many versions and few srand ards, ,rearing a djfficult and confusing environment for nonrt. 'chnicai consumers and bu.'iincssC's. Many businesses wall[(0 d("al with a specific vendor from whom they can request enhancement to reach a sistance. They are ullco mf" or nonrt.'chnicai consumers and bu.'iincssC's. Many businesses wall[(0 d("al with a specific vendor from whom they can request enhancement to reach a sistance. They are ullco mf" or nonrt.'chnicai consumers and bu.'iincssC's. Many businesses wall[(0 d("al with a specific vendor from whom they can request enhancement to reach a sistance. They are ullco mf" or nonrt.'chnicai consumers and bu.'iincssC's. Many businesses wall[(0 d("al with a specific vendor from whom they can request enhancement to reach a sistance. They are ullco mf" or nonrt.'chnicai consumers and bu.'iincssC's. Many businesses wall[(0 d("al with a specific vendor from whom they can request enhancement to reach a sistance. They are ullco mf" or nonrt.'chnicai consumers and bu.'iincssC's. Many businesses wall[(0 d("al with a specific vendor from whom they can request enhancement to reach a sistance. They are ullco mf" or nonrt.'chnicai consumers and bu.'iincssC's. Many businesses wall[(0 d("al with a specific vendor from whom they can request enhancement to reach a sistance. They are ullco mf" or nonrt.'chnicai consumers and bu.'iincssC's. Many businesses wall a sistance. They are ullco mf" or nonrt.'chnicai consumers and bu.'iincssC's. Many businesses wall a sistance. They are ullco mf" or nonrt.'chnicai consumers and bu.'iincssC's. Many businesses wall a sistance. They are ullco mf" or nonrt.'chnicai consumers and businesses wall a sistance. They are ullco mf" or nonrt.'chnicai consumers and businesses wall a sistance. They are ullco mf" or nonrt.'chnicai consumers and businesses wall a sistance. They are ullco mf" or nonrt.'chnicai consumers and businesses wall a sistance. They are ullco mf" or nonrt.'chnicai consumers and businesses wall software movc.:ment. Some of these wcaknl:sscs raded as businesses learned how ro work wi th a new pa radigm. Prog-r:lmmcrs crcated n\.' w busi nesses (0 suppOrt and en hance free. so ftware (like.: Red Hat for Linux). and mon:.~ established busin(:sscs embraced the Illovemcnr. 4.6.2 SHOUW ALL SOF1WARE BE FREE? Some people in the fn.:t. software movem ent d o nor belil'Ve that copyright should prm ect software at alL TIley argue that -all so ftware should frc l' software. Thus. here we con sider not the qUI.-'Stion ~ ls frt:e soff.vare a good ching?" bur "Should frc l' software. Thus. here we con sider not the qUI.-'Stion ~ ls frt:e software. Thus. here we con sider not the qUI.-'Stion ~ ls frt:e software. 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Thus. here we con sider not the qUI.-'Stion ~ ls frt:e software. Thus. here we con sider not the qUI.-'Stion ~ ls frt:e software. Thus. here we con sider not the qUI.-'Stion ~ ls frt:e software. Thus. here we con sider not the qUI.-'Stion ~ ls frt:e software. Thus. here we con sider not the qUI.-'Stion ~ ls frt:e software. Thus. here we con sider not the qUI.-'Stion ~ ls frt:e software. Thus. here we con sider not the qUI.-'Stion ~ ls frt:e software. Thus. here we con sider not the qUI.-'Stion ~ ls frt:e software. Thus. here we con sider not the qUI.-'Stion ~ ls frt:e software. Thus. here we con sider not the qUI.-'Stion ~ ls frt:e software. Thus. here we con sider not the qUI.context of thl' question. Arc wt: looking al it from the point of vit,\\, a programmer or busines~ de(.:iding how to rdC'.lsc sof[v,:arc? AI"I.-' we dL"Vdoping o ur persona.! opin ion about what would be good for so(.icq"? O r arc \ve :ldVoc3ting rh , u we change the lc-gal struCture to eliminate co pyright for software, to eliminate pro prktary sofrw::m:? \"'Iie will focus a ll t.he last two; Woul d iE be good if aU software were fr\.'"C software? And should we change {he legal nructure [0 require it? Free software is undoubtedly valuable, but. docs ir provide suffici ent incentives to produce (he huge quanriry o f consumer software available now? How arc free-software d evel opers paid? Programmers donate their work bec ause rhey be1 it."'Vc in the sharing ethic. They enjoy doing whar [hey do. Stallman believes char m~n y good. programmers would work like: artisI.~ II.)[Inw pay OUt of cOmmirJl)I'nt ro their crafL C omribu(ions, some from computer m;.mufacrurcrs, support \$(}mc frec sofrware cfforcs. Scallman h as sugges ted government gralHs to universit ies as ollorher way of funding Software or 238 Chapll'r In(dh:lUal Propl'rr)' development ? Would rhe fre c-software paradigm support rhe kinds of consumcf software sold in millions of copies? \X' hat other funding mel hods could developers u.~c? A supported. statioll and rcit'vision. It is a good analogy for frcc software. because most communi(ies have one li.H eller-supported. statioll and numerous proprietary Olles. S(allmall believes (har proprietary Soflw:1fe-particularly. the a.~pcct (hat pro hibit s people (rom making co pies and changc:s in program docs not deprive the program molif. or anyone cl sc. of
uSC' of II\e program. (We saw SOIn(, councrargumel1ts to this viewpoint inSectioIl4 ...15.) He emphasi1.es [he disrincrion bcr/veen physical property and intellectual property and intellectual property. He ;dso poims out that the primary purpose of copyright, as ua((~d in the U.S. Consri nnion . is LO promote progress in arr.~ and scie ncL'S. nor to compensate writers. 46 "For (hose who oppose copyright) as ua((~d in the U.S. Consri nnion . is LO promote progress in arr.~ and scie ncL'S. nor to compensate writers. 46 "For (hose who oppose copyright) as ua((~d in the U.S. Consri nnion . is LO promote progress in arr.~ and scie ncL'S. nor to compensate writers. 46 "For (hose who oppose copyright) as ua((~d in the U.S. Consri nnion . is LO promote progress in arr.~ and scie ncL'S. nor to compensate writers. 46 "For (hose who oppose copyright) as ua((~d in the U.S. Consri nnion . is LO promote progress in arr.~ and scie ncL'S. nor to compensate writers. 46 "For (hose who oppose copyright) as ua((~d in the U.S. Consri nnion . is LO promote progress in arr.~ and scie ncL'S. nor to compensate writers. 46 "For (hose who oppose copyright) as ua((~d in the U.S. Consri nnion . is LO promote progress in arr.~ and scie ncL'S. nor to compensate writers. 46 "For (hose who oppose copyright) as ua((~d in the U.S. Consri nnion . is LO promote progress in arr.~ and scie ncL'S. nor to compensate writers. 46 "For (hose who oppose copyright) as ua((~d in the U.S. Consri nnion . is LO promote progress in arr.~ and scie ncL'S. nor to compensate writers. 46 "For (hose who oppose copyright) as ua((~d in the U.S. Consri nnion . is LO promote progress in arr.~ and scie ncL'S. nor to compensate writers. 46 "For (hose who oppose copyright) as ua((~d in the U.S. Consri nnion . is LO promote progress in arr.~ and scie ncL'S. nor to compensate writers. 46 "For (hose who oppose copyright) as ua((~d in the U.S. Consri nnion . is LO promote progress in arr.~ and scie ncL'S. nor to compensate writers. 46 "For (hose who oppose copyright) as ua((~d in the U.S. Consri nnion . is and proprietary sof[ware complerely. the concept of copyleft and the GNU GPL providc an excellent device for protecting the freedom of free and proprietary sofrware. (hey provid(' an l. xcdlcll{ dL"'V icc by which (he tWo paradigms can be concepted of copyleft and the GNU GPL provid) and the concept of copyleft and the GNU GPL provide and excellent device for protecting the freedom of free and proprietary sofrware. lX'xist. 4.7 Issues for Software Developers There arc mall)' i.~sucs 3bouf copyright and parcnr rhat an' of panicular increast ro software in the ir products or to manage activities on their W('h sires. ~uzzy distinctions between hardwa.re and wfi-ware complicate some of the issues. Application of patents to exported products rai\$("\$ more Is.~ues. Legal scholars and sot"m.·are indLt'irry commentators e mph a.~ i·l.c [he need for ch.·a r rules so rhat companies can do their work without the:' threat" of changi ng bw and unforeseen lawsu ics . UnfOrlUnalt'ly. many qUt: stions arc unresolved. 4.7.1 PATENTS FORSOFIWARE1 Recall rhou patents prorL'C{ inversions of dC\ices and proces.~e.s. 'l'hcy give the inventor a monopoly on [hc invention for a specin.cd period of cime (c.g" 20 YC:lrs). Anyone cise who wants to use the ide" or process, or build a similar device. must gC(the aurhorization of the patent is an approprial protection mechanism for software. SOl11e people arc very nirical of specifi c parents rhl.~ go\'anmcnI has granted. There arc two aspects {() the debate. Firsr, wh , lt is rhe nafure of a nl.~w program ~ l.s if an invention. a new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kind of program ~ l.s if an invention. A new kin expression of ideas, algorithms, techniques? Second, \vhar are the practICal consequen(:es of each dloice in terms of encouraging innovation and products? Sofrv.'are i.~ so broad a field and so varied that specillc programs can he in either catcgory-invcmion or writing, The nrsr spreadsheet program, VisiCalc, introduced in 1979 was a remarkable innovation that had enormous impacr on ways of doing business planning and 011 (he sales of computer sof(\.\are and hardware. If the government had been willing to grant patents on sofrw; ue a((hat rime, VisiCak would likely have qualified tor one. Similarly, the first hypenexr system or peer-(O-peer system mighr be a patentable) invention. On the other hand, a particular computer game mighr have more in common with a literary work. like a novel. The Supreme Coun said in 1981 thar software, however, could he eligible for a patent:. In the 19805 and 19905, rhe U.S. Parenr. Office began to issue software patents. A federal COUrt with jurisdiction over parents upheld them, sometimes imerprcr.ing the Supreme Court guidelines loosely. The Paten(Ofnce is nO{ supposed [0 grant a patern for an invention or method that is obvious (so that anyone working in {he field would have used (he same mechod) Of if it is in wide use before the patent application is rlk·d. The Parem Office makes mistakes. It has granted some parents for techniques that were obvious andlor were alR'ady in wide usc. There is much comroversy about the standard for obviousness. 4.7.2 PATENTS FOR WEB TECHNOWGIES To patent or not? Commerce on the Web inmx: uced many new tools, such as online shopping baskets and one-click shopping. \~hich of these arc basic processes that any e-commerce site may usc. Which are patcntable inventions? Various organizations, including (he Electronic Frontier Foundation, argue that many patented techniques arc not particularly nC"\\' or innovative. For example, Amazon.com generated a lor of criticism when it sued Barnesandnoble.com for violating its patent on one-click shopping. Many in [he industry objected [hat rhe government should not have granted the suit in 2002 without disclosing the terms.) Critics of patents. like critics of copyright, see (hem as stifling innov".1tion on the Web. Others sce patents and the parent in the first place. as protecting innovation. If a technique hecomes widely used, docs [hat suggest the innovator had a valuable idea that deserves compensation, or docs it suggest the techniqu.: should be fredy available for all to usc? Do patents on \\7eb techniqu!'i and e-commerce me{hod.~ stifle innovation? Many busine ~ses routinely pay royalties and license fees for usc of intellectual property. Ie is a cost of doing business, like paying for electric power, raw materials, and so on. In some ca 240 Chapler 4 iurdlt.'clu: J.1 Propc.'ny other hand, companies invC'St a \'cry large amount of mOlley and "ffort to devdop something new. If one accepts the basic idea of parcll1s for ideas and techniques ImpicmelHl-xi in software. rhen one issue is how {O oe('l..'nnitH.' whether a part. i(.~ uhu patem applic.uion is worthy. Such decisions arc cmnplcx. They depend on the derails of parr.icular caSeS, apcnlsc ill he area, and knowll'dge of history of rclatcd lcdlno!ogy. A signific:IIIf S upn'me Courr ruling in 2007 (KI,;R I I. 1~/(Jlt!x) broadcn Some cases The financial impact of patctH dccisio ns " an be huge, and the compk'xlty of the iss ues makes dc(isions difficult. Lawsuits ofn:" lake many years. l\hny Web users remember Amazon innovating the idea of recommending b()ok~ to L'Ustomcrs based on their previous purclu.'ic.~. But Amaron may not have b"cn the source of the tc.:chniqu(· for doing so. Aner a f(·w years of 11('goriations that fdilcd to yield an agreements meant the company could demand licensing agreements and p; lymcnrs. Fricndsrcr ha.\ not been as successful a soci:ll~networking site a.. Exporting products A patent property only within the country that grants the patent. Thm, to protect against foreign companies making, seiling, or llsing its patented inventions without authoril..ation, a company must apply fix pa(cills in many countries. This is cxpensive, and litigation would occur in lhose coumrics. U.S. patem law prohibits companies in rhe U.S. from shipping compojlent.~ of a device to be assembled in another coumry if the device infringes a U.S. parent. In 2007 the Supreme Court ruled 011 a significant case bcn.vecn lviicrosofl and AT&T involving this provision. The case o:men..d on {he
question of whether a n1aster copy of soft/varc is a "component." We describe the case and then comment on it. AT&'l' patcnted a system that encodes and compresses recorded speech (analogous to MP3 cncoding and compressing music). Microsoft's \X'indows operating system includes software that enables a computer to encode speech using AT&T's method. and installed it on computers, AT&T contended that [he forcign~made copies of Window ... installed on the computers arc components, bur that rhe master software is nor a component of computers onto which it was copied. The Supreme Courr ruled for Microsofr. 49 lr sa.id rhar the prohibition on shipping components applied to companies shipping physical components that are assembled into the infringing devices. Congress would need to pa~s new legislation if it wished to provide protc(.tion for patern holders in ca.ses like [his, where a company ships a master copy of software. This case reminds us of distinctions between copyright and parent. (Would Microsoft argue in a. software copyright suit that the abstract software on a disk is not rhe essential component?) 1r and the other patent lawsuits we discussed in rhis section remind us that 242 Chapte, 4 [",dlt'ctUal Property many basic is..., ue\$; abour how patent appl ies [0 technology implemented in software arc srillunscnlcd. ,As one coun said about earlier L'tSues of copyright prorecrion tor sofrware, {he bounds of p;ltcnr, protection ;In; in a Slate of "crcative icrmenr," 4.7.3 COPYRIGHT AND SIMILAR SOFIWARE PRODUCrS Suhrlc problems about ddluing and klenrifying copyright vin\;u-ions arise in disputes abou t whether one software l'ompany's produn infringes the copyright of anotiler's. If :lllOlher work is simi lar. we have to oClcnnil\(' whether one software too. Some principles aboUT sofi warc copyrighr infringement' emerged from coun cases, but the boundaries of permissible uses arc nOl certain. Criteria In a 1986 case. u/1tt/Il] AHOcillUI (/, flU/OW Dema/ Laboratory. the court ruk>tl (h,1[J progrdffi lilal was very similar ro another in structure and performance, ahhough written in a different programming language for a different compU[('f, infringed the copyright on the first program. ')0 The ruling treated programs solllc/vhat like novels and movies, which can infringe copyright on the first program, remove from consideration rhe parts rhar :HC in (he public domain, :lrc common pracnce. or are the only eRicicnr way of accomplishing some parr; copyrigh(docs not protect them, Exercises 243 Then comp;ul' the remaining pans of the m'o programs to sec how si milar rhl..} arc . Any parr.i eu lar case would need expecr witnesses Ind a complex analysL~ of the programs to sec how si milar rhl..} . "Look and feee' The [erm look IUld fiel of a program refers to the user imcrfacc: the use of pull-down menus, windows, and icons, as wdJ as the specific commands, menus. icons, and so on used to select actions. 1 wo programs that have similar uscr inrcrfaces arlo.' sometimes caUed /l)OrkilliJu programs. The internal structure and programming could be ~ntirely different. One program might be faster or hal'e other advantages. Should dH: look and teel of; l program be copyrightable? Docs a workalike program it resembll's? In (he 1986 Wlu/fln decision mentioned earlier. (he coun found chat a user inrcrfJ.ce designed for the dental profession was , opyrightabl~.) In the early 19905, Lotus Dc\'dopmclH Corp .. producer of the Lotus 1-2~3 sp rcad.~hcet program. won sig nificanr copy righ[infringement suils ;lgainsr Paperback -Software International. Inc.. for using its mt'I1Us and cQm mands. An appeals coure rcYt'cscd rht' Lotus t'. Borland di. cision in 1995. The appeals court ruled chat menu commands are "a method of oper.ltion," explicitly cxdudc-d from copyright protection. They arc, me coun said, li ke the cOll[rols of 3 car.'il Other analogies t)ffcred by opponen c~ of user-interface copyright Jrt:' the arrangement of rhe keys on a typewriter or computer keyboard. The [rend of various coun decisions has been againsr copyright projection for look and feel. V; lriolL~ COlln..~ ruled [hat features like overlapping windows, pLII-down menus, a.nd common opl~r. ltions like CUt and past'e arc ours ide the scope of copyright. The main argument in favor of protecting: l user imcrificc is that it is a major creacivl~ effon. Thus, the usual argumCJICS for cop), cight and pa(C'm apply: protl'ct che program mers who create an intcrfa, ce so that (hey profit from their On rhe ot.her h, md, standard user Inrcrfaccs inc rease.' producrivIIY of users and programmers. We do not have lo learn new imerf.tces for l";.lt:h program. Prosra-m mers do nor have to reinvent (he wheel. (hat is, design a new interface just to be different. They (eln concemmtc on dCo,'\cloping the rruly new aspects of their programs. They can reduce dc\'dopmclH COS(S for Ilew programs, keep ing priel's down. cnon. EXERCISES Review Exercises 4 4.2 43 Wharaie- the four factors [0 be uSl·d in deciding whl.-ther a use 1)(copyrighred material is a fait use? Summarize ,the main ~a5ons why [he court in- the:: Sony -lktarnax case ruled that videouping II; 'movie from televisiun' to watch later was not an infringement of copyright, Describe (\'10 tecbnical n'leans of protecting copyright, Describe (\'10 tecbnical n'leans of protecting copyright) for the evision' to watch later was not an infringement of copyright of the evision' to watch later was not an infringement of copyright. the Digical Millenniuin Copyright At."'f? Gi~ one example whert' a roU.fC orden=d a Web :, it.: (0 remove 'liilks (0 :another site; List rome bendin of free. sonw:ue (in (he sense of Sccriun 4.6). General Exercises 4,7 4.8 4.9 4.10 4.11 4.1:! 4.13 4. 14 Describe tv.'o thin'gs the cntcrt'Jinmt'1l't industry has done to protect iu' copyrights. For each, tdl whether.you' think it is justified. Give fl":ISOIIS. A swap-meet own('t was sue" beo.uS(' a vendor sold pirued music CDs ~((h(' swap meet. The owner.was found liable for :"cont ribucory copyright infringement."' Wa.~ Nap.n er like a swap meN? DC:ICribe snmt'similariticsand differenCl'S bl."twt't!n a SWilp meet and Naps(cr. Your unde owns,,, sOlndwichshop. fie asks you [0 write, Ol,rdnvemory program for him. You arc glad to help him and. 'do not charge for Ihe program. The, program work.. (pretty well, and you discover later rh:tt your uncle should have Exercises 245 4.15 Which of the' foUowingactivitics do you think should be a fair use? Give reaSons using copyright law and/or (:ouct ClS¢S. (If you think the ethically right decision ditTers from (he reSult that follows from applying thefau..u5e guideline!>, explain how and why.) a) Making a copy of a friend's spreadsheet software to O'Y out for twO weooand then either deleting it or buyillgyourown copy. b) Making a copy of ~ computer game; playing it for TWO weeks, and then deletingk 4.16 Describe a siruationinvolvingmakingacopy of a computer game; sort for which you think it is difficult to decide if the copying: is ethical or nor. Explain (he rc=asom fOr the uncenainty. 4.17 Mr. J wrote the nrStserious book on the problem of sturreringaoout 40 years ago. The book is out of prior. and Mr. Jhas died. Mr. j's son wants tomakethisd; L~sic workavailable to speech pathologists by s,,-anriing it and puttingit on hi\$We:b page. The publisher held the copyright (still in effect), but another. company boughT out rhe originaipub-lishing company. The ron docs not know wh() has the copyrighr now. a) Analyze this casc according to the faic1usc guidcJines. Consider I. "ach of the criteria and tcll how it applies, Do you think Mr. 1's son should post thebtlok? b) Suppose Mr. son does put the btlok on the Web, and (he publishing company that holds the copyrighrasksa judge to issue an order for Mr.). torcnlove it. You're rhe judge. How would you rule: Why? 4.18 No one is rransferring some very old movies on old, 1; iererioraring film, to digital fOrmats for preservation because ofdifficulries in determining and locating the: copyright owncrs.~[aspectof ropyright law contributes to [his problem? Suggest some solutions. 4.19 Service Consul rants, a son-ware service company. provides software maintenance service to cusromers of a software vendor. Service consultate company argued mat (he copying was: a fair use, Give arguments for each side. Which side do you think should have won? 'Why?56 4.20 A search engine cOmpany copies millions. of books in a university libr-.l.ty, including books in che public domain and books still protected by copyright. It displayssegntc.-nts. say a paragraph, in respOnSe to uscrse;;arch requests; Analyze how the fair~useguidelines apply to this practice. Should the copying and display becotlSiderea fair use. or should the company need permission from thecopyright holdets for the hooks? (If you think the ethically right decision differs front the decision differs front have guidelines, explain how and wh)') 4.21 The first Mickey Mouse carmon appeared more than 75 yeao: ago. Give ethical and/or social arguments: both for and again/it eac:h of the following uses of the cartoon or the MiCkey Mouse character without authorization from rhe copyright. lell which side you think is-stronger, and why. Do not COnSider the copyright lilne period undt-'Tcurrent-law or arguments about the ethics of obeying or breaking laws, a) Post a digitized copy of the original cartoon on a video~sharing site. b) Usc the Mickt...,; Mouse charactetasthe spokcspen; on in an advertisement vcry stronglycrirical of a candidate running for president. c) Edit a digitued copy of tite original canoon to improvev: sual alldsound quality, produce copies with the dialog dubbed in various other languages, and sellrhou, rs 246 Chapter 4 Imdic 4 .22 Comparii~ selling music or movies (for aampit)can indudedigital rights :management roolsthilr cause files {() sdf~desttuct aflt't aspedfitdamollrit of {irne. Give 50ille advantages of
this practice. Doyou think it isethica] forenterrainrnenr businesses rosell content with such a limitation? Why or why not? 4.23 Industry lawsuits ·}ed to the demise of some companies du { produced TV recording devices. RecordTY.com, for example, set up a frcescrvi]; e allowing users to record television programs and store rhem on its \X'eb site for later viewing. Another company, SonicBlue. made the ReplayTV, a digital video recordt'f for tei('Yision programs (har could automatkaUyskip commercials and transmit copit'S to omt'f peOple with the same device. Were these companies and their pmdUCt'i clost'r roSony and its Betamax r('Corder or to Napsrerand Groksrer (see~ction 4 ...2.3)? Explain yourreasorts. 4.24 Do you think taxing ·media· and devices that :aid- copyright infringement. (as described in Section 4.3.1) is areasonable solution for collecting fees: to pay content providers? Give your reasons. 4.25 a) Suppose themoVieilldusny ask'i acoUI" to order a Web sire to femove links to other sites that review movi~ and provide unauthorized (complete) copies of the movies for downloading. Give arguments for each side. What do YQllthink the decision should be? Why? b) Suppose a religious organization ask~ a coun to order a Web site to remove links to other sites that have copies offhe organization's rdigious d()(uITII."nts. Give argument~ for each side. \Vha{ do you think the decision .~h()uld be? \Why? c) If your decisions are the same for both cases, explain what similarity or principle led. you to mat conclusion. Ifyour decisions differ for the two cases, explain rhe d~"tinction between the cases. 4.26 Which of the liaions mentioned in the fim paragraphofthis chapter are illegal? Why? If there is nor enough infortnarion given, explain what your answer would depend on. 4.27 Compare the following statements. Are they equally wlid {or invalid)? Why or why nO[? ishome butglary a good analogy fot dis.lbling copy protection? Why or why nor? One.s.i£k: effet:t oEche DMCA's amidri:umv~mionpmvisionistorcducc inccncive for the entertainment and publishing industries to devdop truly lirrong protection S("hemes.The DMCA allows them to use weak schemes and then threaten anyone who cr.lcks them with legal.actioo. One side effect of Jaws against burglary ism reduce incentive fur homeowners to use sturdy locks. The law allows pt::ople ro usl weak locks and {hen take legal action against burglary ism reduce incentive fur homeowners to use sturdy locks. The law allows pt::ople ro usl weak locks and {hen take legal action against burglary ism reduce incentive fur homeowners to use sturdy locks. Give reasous. 4.29 A cook can modify a recipe by adding or deleting a few ingredients without getting permission or paying a royalty to the person who developed the re6pe. a) Do you think your examples arising the fair-use guidelines? That is, is it very likely wurts would consider ita, legal fa, ir use? Explain why, c) Copy fight pwtec[S.cookbooks, A courf would likdy find thar selling a cookbook is copyright infringement. Give an example of modifications of a professional song or a piece of software that is analogous to selling such a cookbook Exercises 247 4.30 Thom; i.S Jefferson and several modern writers used fire as an analogy fotwpying intdlecrual propeny: We can light many caridles frbm Oile without diminishing t-he light many caridles frbm Oile without di i.lsing primitive merhods.One person gen.a firesratrcd. Others wanr to srart their fire from hers. Can you think of any L"thica.lor practical reasons why they should be l'XpCCted to trade something, perhaps some wildfrui { hey found, for (he use of the fire? 4.31 In the 1990s, rwa writers suggested { hat sofrware is a "public: good," like public schools and national defense, that we should allow anyone (0 mpy it, and (har the federal governmenrshould subsidize it. 57 Suppme this proposal had hecnadopted then. How well do you think it 'would have Worked? How would it have ~J:lected the quanri~ and quality of software produc:ed?Give reasons. 4.32 Describe one kind ofsofrwarcor techniqueusrii in software that Yol.lminkis inuovativ-c, like an invention, for which parent protectiull might be appropriate. 433 Did you know. before you read this chapter,: that restaunnts p~yfees for the music they play, community th'~,ltc:r!lpay fee;; for thepllIYS they perfurm, arid large cOlilpanlcsroutinelypay large fees to other companies for use of patented inventions and technologies? Does this long tradition of paying for inteHecrual property affect YOllrview oEche legitimacy of sharing entertainment on the Web wimou[am:hofization? Give your reasons. 4,34 Assumeyou arc a professional working in your chosen fidd. Describe spe-eific things you.can do toreduce the impact of any two problems we discussed in this chapter. (If you cannot think of anything related to your professional field, choose anuthertidd rhat might interest rOLI;) 4.35 Think ahead to the next few years and describe a newproblem, relared to issues in this chapter, likely to develop from computingtechnoJogyor the Web. Assignments TIme ~x(r(ius Trquirt somr mtatr:hoT activity. 4.36 Read a licenseagreemem for a software produ 248 Chapter 4 IIltdb.'IUJ.I Property 4.42 Read the articles by £..irher Dyson and Lance Rose- from. Wirnl. (liSced in Books and Articles), Write ashon essay telling which aUd(lf'S viC'NS abouttlie future of intdleuual property 11the "digital age" have proved more accurate has, cd on evenL Class Discussion Exercises Tm.s~ f!Xl'rcises IlreforcUlss diSCUiSi(j]]~ ptrhaps with short presentations prepate in adtlane (or sale (or sale) by smallgroups of studmts. 4.43 Some people argue that digital fights management violart's {he public's right to fair uses. a) Should people or companie that create intellectual. property have. the .right to offer it for sale (or license) in a form protected by cheir choice of digital rights management technology (asslUllilgthe resttktionsare dear (0 potentialcusromers)? Give reasons. 4.44 DelY.lte .whether Congress

should repe-al.the Digital Millennium Copyright Act's anticircum~ vention provisions. 4.45 Which facto! is or will be moreirnporrant for protections (or ndther)? Why? 4.46 With rt.'spccr co copyright issUes for digital media and [he Web, in what ways are entertainmcJH companies vjc{im.~? In what ways are entertainmcnt comprtnicsvillains? 4.47 Debate whether software should he copyright.lud Digital Libr'lri~~," C~mmll"i(im-'m; {~ (lhl' lIeM. JR, (llt Snflw;!'!'e Bootleggers Hir, HC.lInc,~ L4N 7i'"ii'J, 10. nu. 21 (Xu\"crnbc.r 1. 1id, j 9')4: Ruben A. SP,lIHlC"f. ;'Cupyright illfrillb'Crnmt Coe> Hig 'lime," JbrrotimtJ, ~LlTth S, 1')9~, p. .16, S The Pl;lllO roll CI~ h f{!inl('Smi'fI l'ubluhing Co. t: Apl/l1f'. r"p()n~.J in S In Feist PlJbitmlir);u, bu-. /', RumI1i1"p},O>Jt St"I'via J. {:omputers, J,IKi 6, CUUfll,ior\.~ Dafd (:';,h 5'yrffJ1lJ' I'. jS & II GU)UP, rtpontd ill I)')(lht:-n am! Flie,~J~r, ·'Co"yriglu~. (:"lmpIHt'r, C()mpm~)\ Court rukd dl~(R\ltJI Ide-phone dircttllry did not Illeet the IC~llin;'mem fm .:c •• pyrigla plOlCctiun. Crimill.d pcn.titin for .:copyright inl'rin!;.-mellt olf.- in Elk 18 ofthC" C.S. C:oJt. hH exempt!on~, ~Cl: Copyfi~1H Office. Librdty o(Congn:~'. 'Exemptiull l(' I'ro!Jihitiml un C:rcumn'lltiou 01" Copyright f'rowniun ~);~t':lm f'>r)\L'e~' CommJ lcdll\tl!ogics,~ l~·drrol Rf'! In-., the Suplcm~ Tdcplwm~ Stni~c'~ 8, ,), I U. iher lenk !Wlld'an Bllifdin.(Code GJIIgrti! In,", No. ')(),~l)G.u. W\..."w.puhkLl\\.cumI rd/cuumf'/9-40652.html (Jc('(~MXI fdmur)' 18, 20()7). li.S.Cxi.!Tltl ... I:,S«:lionl()7. Son,' CorlWrtlfl!Jll o(-1mrrim 1'. Uml.wSdI City StUt/i..!;, In". -1M U.s. 417(l ')84); Pamda S~mudl'HI1. I', 11/I(l">Idl;"'I((1 II 11. "Computer l'mgnms ,HId Copyright'\ Fair LJs~ [)()('trim:," Cmwmmimii'itIJ I~rrbt- A(f,1, 36. Ill>. (5'1>1cmhet 199.:;). Pl" 19-25, ') 249 No(es tJ. "9th Cin:;uil AHnw~ Dis"",,,,emh!}, in .~" v, Aawl,uir," Cumputa Ltw SrTlltcgiJt, ,), no. 7 (No'o't."mb"r 1992). PI" !, ,3-,5. "C~n You Inli:ingc a Copyright While AnalYling: J Compditor"s Progr;..mt Lrglll if.rl(','. I, no. (\'\imt:t 1992-.1 ')93). p..'; i'lmda Saliluelson "Copyright (\ f'ir U'ie DOI·trille .:md Digiul Delta.' COI!IMIHIj'Jljm/j '11111: AC'M. 37. 110, 1 (]J.IllLUY I') .II. ofDfinkOrDie. ~L.,uler of Internet stI A. Cr", ''' N "I, "Re.willS Les.-on ... fi-om the SDMI www.ll"eni~... 28. Pr/mn to Conspir.lCY,~ 21. 22. .23 1.;. 2'). 26 27 News & lellst", U,S, Dep.lnm U"i"frJIJI City SllIdil SoitW;Ul' f'ir~c,< It:.onklr'g" p. 4. .'i6, 37. 5S. RtiJllm}, "" III ESUflP.ld 2'J41S.D.N,Y. :WO(). 3'). D, IviJ S, >lllufeuky, J (VmpUtcT ,;o:itn.::c p:()ii:>m ,It Carnegie Mdlon University. roJkulxj mfll.i (>f expR"Sliing DtCSS on hi.> W'e/, ,ile. "C.ultl'Y ,.feSS 40. De> e\'C!1111~l!y 1"lllli.,11('o It a (:HtllptJler \ulHil)' (tll(er ill [hI' mJjor nrr".miulionj felf profe.'i, imlu ;uul Ao file Lihral)' ,;:nn.(11mi :!OOOITECH!..:omput ill~iO J I.~ l/johaltiCfi. ihtn,"i~w. iag! ()'L~em"d May 10, 2007). ,'1 /\,s"t>I:iad"n [01 C(nlip.)ting ~hchin u.s.: s,)r\Wan: Pir-.!(y (il'ganilAtlll1 PleAds euilry hNween the Lint'';' ChaHtnge,~ R. \X', BraJf()rd poimed OU! the uniairne.ls of the tadic 'h~.J hi !""~'llt~ tht, Chitl(,~t 10 ."1 (.\by 11)'lrkn" (J'XI.'r.lc, U.S. Ui.luiu COUrt for the bsrnll Di~lrjn uff'tllmyly,mia. !006: [hUM ,'\-tills. ~GO()gl a Comt lhttlto," CNET Nt'ws.cnm, ;\f] reh I (i, !()06, n, 1 (h.4,nl:lfY l:t me 1')9')1 250 ·il. 42, Chaptel' 4 Intellectual Propary Jmlg" Lt,,,n,e Hrinhm:l., 'I,wlt'{I In J,,-,on 1.. Rik y. ~Thc Intnm:r n. the Fir,! Amcndmcllt," mill StratJlJum.t!, Ocwber 1;, 11)91}, p. :\53. '111e Coogle incident is «:porkd in Jack Gnld,mill! alld lim WI", C",;f)-o!, du Into?!t;> (lhfonl Uni"cnilY Pr so. n,C 1 J. "i'", 43. 4,1. 45 46 ·f7 Thi, is ,) brkf _,ummer 24, 2006. p, AJ Luallt hdJillI1.qglf,!' III,: I'. (i"Utu'llY Int. Thi~ ... 'X'""",,~ e\Vcek"mll, F~bru~t)' 23, 2007, W'hVi.t'Wf' {'kmltli anich.,2/0.18?S ,209il063 .O().;up (J.(u:s,wt! July 3, 201)'7). Mi.",,,ji Corp. Ii "'IT&T Curr ... 'X'""",,~ e\Vcek"mll, F~bru~t)' 23, 2007, W'hVi.t'Wf' {'kmltli anich.,2/0.18?S ,209il063 .O().;up (J.(u:s,wt! July 3, 201)'7). Mi.",,,ji Corp. Ii "'IT&T Curr ... 'X'""",~ e\Vcek"mll, F~bru~t)' 23, 2007, W'hVi.t'Wf' {'kmltli anich.,2/0.18?S ,209il063 .O().;up (J.(u:s,wt! July 3, 201)'7). Mi.",,,ji Corp. Ii "'IT&T Curr ... 'X'""",~ e\Vcek"mll, F~bru~t)' 23, 2007, W'hVi.t'Wf' {'kmltli anich.,2/0.18?S ,209il063 .O().;up (J.(u:s,wt! July 3, 201)'7). Mi.",,,ji Corp. Ii "'IT&T Curr ... 'X'""",~ e\Vcek"mll, F~bru~t)' 23, 2007, W'hVi.t'Wf' {'kmltli anich.,2/0.18?S ,209il063 .O().;up (J.(u:s,wt! July 3, 201)'7). Mi.",,,ji Corp. Ii "'IT&T Curr ... 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Thj~ d~~isi()n WJ.\ui,i6tr-d hv mm~ \.:hob,rs.)'l TIlt: ~tllJnm ~lk"u.m Cm;/J, rCf"lfH'd in "SuftwJte C{lpYri!~III,\," w'ila !vrrrt 101171",1. February 27, 1"96,1)_A2_'fl,;; ""un fllh:d thoU C .:/tl)r ..-leAf. 36, tm,]() (O ~"." (_'~U" ~ BOOKS AND ARTICLES • Barlow, John Perry, "The Economy nf Idea.~: A Framework for Rethinking Patents and Copyrights in the Digital Age." WtlYd, March t 994, pp. 84-90, 126-129, • Benkler, Yochai. ~CoJ.se's Penguin, or, Linux and The]\li/Jure ofth{' Firm." The r;& L/w' /ournal, Dt'cemher 2002, pp. .%9-44(;: W\-vw.yalelawjnurnal,orgl I 12/3/3(,9 yoch.ti benkler.html or ww\v.bcllklcr.orrjCoascsPenguin,hnnl. An economic analysis of open"source software and other forms of peer production. • Chesbraugh. He-nr),. Opm BusiTlt'Ss Modl'll. l-iarv,mi Business School Press. 2006. How businesses use intdlcl.-Lltal prapeny, with emphasis on patents. • Dyson, Esther. "Intellectual Value." Win-d, Tuly 1995, pp. 13()~141. 181~185, • l:riedman, David D.l..dw's Orda.' 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ORGANIZATIONS AND WEB SITES • Creative Commons, and organ17..ation that provides a variery of free liccnsing tools for borh prorecring and sharing intellectual property on the Web: creativecomma ns.nrg • The DVD Copy Control Association, an industry organization that provides a variery of free liccnsing tools for borh protecting and sharing intellectual property. (wy,,'W.efEorg/IP) and the Digital 251 I\"lillennium Copyright Act (www.eff.org/IP/DMCA.),. The GNU prajet:t and free software: www.gnu.org/philosophy • National Center for ·I~chnolog)' and Law, George ~hsnn University Schon! of Law: www.law.gmu,edu/ncd • The Recording Industry ,I\ssociarion of America: www.riaa.com ,. The Software & Informanon Industry Association: www.siia.ner CRIME 5.1 INTRODUCTION 5.2 HAC KING 5.3 IDENTITY THEFT AND CREDIT-CARD FRAUD 5.4 SCAMS AND FORGERY 5.5 CRIM E FIGHTING VER:5Ul PRIVACY AND CIVIL LIBERTIES 5.6 WHO SE LAws RULE THE WEB? ExP.RCISES ... ', S~ction 5.1 Introduction 253 5.1 Introduction Nine[eenth~cenrury bank robbers fled the scenes of [heir crimes on horseback. In the 20th-century, they drove getaway cars. In {he 21sr·ccntury, they drove geta [ural StCp. Employees embez7]ed funds from employers by "docroring" the book~. Now they modify or misuse company software. Computers and the Internet make many activities easier for criminals. They pro\'iclc a new environment for fraud. srock manipulation, theft. forgery. indlL';rrial espionage, and many old and new scams. Hacking~inrenrional. unaurhorized access to computer systemsincludes a wide range of aniviries from minor pranks to huge thefts and shutdowns
of imponant services on which lives and livelihoods depend. Crimes committed WIth computers and on the Web arc more devastating and harder to derect than similar crimes commirced wirhom computers. A robber who enters a bank and usc... a gun gets \$2,500-\$5,000 on average. The average loss from a compUf.cr fraud is more rhan \$100.000.! A thief who stole a wallet containing only cash. A hacker \vho breaks inro a retailer's OJ' bank's computer might steal not one OJ' a dozen. but thousands or millions of credit-card numbers. Idenrity theft afteCtS sabotage power and communications systems and other critical infrastrucmre. Global business networks and the Web extend the criminal's reach and make arrests and prosecutions more difficult. Some tools that aid law enforcement conAict with privacy and civillibercics. Just as the \X'eb changes rhe impact of crime. ir changes rhe impact of law. Acriviries that an: legal in some countries are illegal in others. But [he Web is global. Busim.'Sses and individuals arc sued and arrested for violating laws of countries their online business or wriring reaches. Policy makers face the difficult challenge of developing ways to deal with differing national laws and cultures. In this chapter, we l'Xamine many of these prohlems and issues. We examine many approaches devised for addressing them. 'fhe examples \ve include arc rcpn::~sentative of dozens or hundreds more. 5.2 Hacking 5.2.1 WHAT IS HACKING? "rhe term hacker, to many people. means an irresponsible. destructive criminal. Hackers break imo computer systems. They inrentionally release compl1t"er viruses. They steal sensitIve personal, busjJlcs.~) and government information. They steal Ill.oney. crash Web 254 Chapter 5 Crime sites. destroy files, and di,~rupt businesses. But other people who call themselves hackers do none of these things. So our first problem is to figure out what hacker means and what hackers do. To org.Ulize the discussion, we describe three phases of hacking: Phase 1~the early years (1960s and 1970s), when hacking took on its more negative mC Phase 1: The joy of programming In rhe early days of compuring, a 1J,{tker was a crcadye programmer who wrore very deganr or clever programs. A "good hack" was an especially clever piece of code. Hackers were computer systems. They tended to bt- outside the social mainstream, spending many hours learning as much as they could about computer systems and making these systems do nl'\V things. Many hackers were high-school and collt-'gc srudents who "hacked" the computers at their schools. Although they sometimes found a way into systems where they were not authorized uscrs, the early hackers mostly sought knowledge and intellectual challenges~ and, sometimes, the thrill of going v, 'here [hey did not belong. Most had no intention of disruptingsc...rviccs; thl.'}' frowned on doing damage. The New Hlltkers Dictionary describes a hacker as a person "who enjoys exploring the details of programmablc systems and how to stretch their capabilities; ... one who progrdffis enthusiastically {even obsessiveiy)."2 Jude Milhon. one of the relatively fl."\\' women hackers, described hacking as "d('Ver circumvention of imposed limits.":1 The limits of one's skills_ Her definition is a good one in that it stretches over many of rhe usc.."S of rhe term, Steven Levy captured some of the spirit of the early hackers in his book HiUkfri: Heroes of the Compuur i?rvo/ution, when he said "Art, science. and play had merged into the magical activity of programming [hat rrBeers a high level of skill and thar circumvenrs limits. hms of Nintcndo's Wit vidcogame console reprogram its remote colltroller to play music, make a robot hit tennis balls, and perfiHm otht'r rasks Nintendo never imagined. Apple built irs iPhone so that none of irs features would work unles.~ the owner boughr a service contr-acr from AT&T Within a week afrer Apple released rhe phone in 2007, hackers found ways around rhis restriction. They could use rhe phone's Web browser and orher fcarmes without the service contran. Another example. of course. is software to circumvent rhe ------- Section 5.2 Hacking 255 limits of protection schemes for digital intellectual property (discussed in Section 4.3.1). Hacking often has a whiff, at (east. of Ch; lHellge to powerful institutions. Phase 2: From the 1970. to the mid-1990s The meaning, and especially the connotations. of the word bttcker dung('d as more people began abusing them. Comput('rs wert' and still are a mystery t.o most people. and it was easy for the public and the news Uledi'l to lump all young people. who can work magic with these machines in the samc category, nm seeing the distinction between good magic and bad. The word I", cking rook on its most common meaning roday: breaking inco computers on which the hacker docs not. have amhorized access. By the 1980s, hacking also included spreading compmer viruses, then mostly in software traded on floppy disks. Hacking behavior included pranks, thefts (of informacion, software, and, sometimes. money), and phone phreaking (manipulating the tdephone system). Hacking a computer at a big research center, corporation, or government agell{'), was a challenge that brought a sense of accomplishment, a lot of files ro explore, and respect from one's peers. In 1986, one hacker broke imo at least 30 computers all the Sraniurd University campus, several O(her universities, 15 Silicon Valley companit'S, three government laboratories, and several other sites. It appeared that his goal was simply to gel into as many computers as he could. This case was typical of the "trophy" hacking often associated with young hackers.4 Young hackers were especially fond of brC'dking into Defense Depanment computers, and they were very successful a[it. Clifford Stoll described a morc serious case in his book TIN' Ctu:kooj Egg: A German hacker broke into dozens of U.S. computers, including military' sysrems, in the 1980s, looking h)r infDrmation to sell to the Soviet Union. Hackers obtained passwords by sophisticated techniques and by socill engineeing: fooling people into disclosing them. (A popular COVt'l" story, when calling an employee of a large company, is ro pretend to be a coworker from rhe company's computer operations. still U.~e this cactie.) Hackers. spooft>d c-mail f-rom the pre-micr of [he province of Ontario, Canada, sending our unflattering comments about Omario's parliamenr. The Secret Service reported that a I 5-year-old hacked a credit reporting ,~cTYice and the telephone system in a scheme to get \Xfe-stern Union to wire money to him from other people's accounts. He is also believed (0 have hack(~d a McDonald's payroll computer and given raises to his friends. Some hackers became a serious threat ro security analysts estimated thar hackers might haw compromised one million pas-... words in 1994. 5 Adult criminals began to recognize the possibilities of hacking activities in the 1980s and 1990s. For example, ; l Russian man, with a(xompliccs in several countries, used .Holen passwords co steal \$400,000 from Citicorp. \Xfhile unknowingly under compuser 256 Chapter 5 C, ime Since the 1970,. John Draper (wh'; called himself Captain Crunch) di'scovered: thar [2; whisclein -a: cereal box fooled [he relepliblic system i-ino giving free -access to , } on ~,: 4ist; l, nce tdephone lines, phone pq#flIfing (hacking the phone system) has ~ .~. pbpular pastime of young hackerS iil:d: criminals. Hackers in6lcra.ted the', BdlSouth system tor years, exploring aiid :creaung new phone numbers with I~'o", i(::i ' ha~ bills, uridl mey did something overt enough (0 anrae[auention(redirccting calls for ,:serious no a probation office -[0 a phone sl.."'X line). A man mani pwated -tc:l~hone connoctions so char he' would win thousands of dollars in prizes in a radio station confCSL Hackers (tacked private husiness_.networks and voice-mail systems and rhen switched ro outside lines and rhen switched ro outside companies by taking control ofaco!np,any, phone system and preventing icgititn,t calls from getting through. A p"Js attorney said. had the power to j'''I...;eirh phone neework. " difference between ha"i"gtiliel so.mething and with a roat who handled several hacker a revenge pr.mk: Hackers rigged [0 rhink her home telephone surveillance by authorities, he l"ransfcrrt d another 511 million t'O bank accounts in other coumril;.'S . (This im:icicm also iHustralcs lil C imcrrl:l.tionaln:1 mrc of computer crimes and so me of rhe difficulties ie creares for law en forcement, Ex[raditing rhe Russian man from London. where he was Inrerner Worm demonstrated rh e vuln erability of the Inrernet a ~ a whole in 1988. RobertT. Morris. a graduarc s[udem a[Co rn\.'1\ University. wrO[e a worm program Section 5.2 Hacking 257, he 1960\$ and their who sfill like co usc tetin wirh its earlier rcspc and released it onto the Internet. * The worm did nor destroy files or steal passwords, and there was disagreement about whether Morris intended or expected it to cause the dcgrc(' of disruption that it did. Tht' worm, however, sprt:ad quickly to computers on the Internet Ca large ponion of the Net ar the time}.11) It took a fC\v days for systems programmers ro discover, decode, and rid their systems of the worm. The worm disrupted research and other activities and inconvenienced a large number of pcople. This incident raised concern about thl' potential to disrupt critical computer services and cause social disruption. Such disruption can happen by accident, or a terrorist, extortionist, or teenager can cause h. Phase 3, The growth of the Web In this phase, hacking includes "all of the above" plus a variety of llt"\V threat... Beginning roughly in rhe mid-1990s, the inuit'Hc in(crconnccrcdncss of the Increased usc of the communications, for sensitive informadon. and for economic transactions made hacking more dangerous and damaging-and more anracrive to criminal gangs. The kind
of accessible information, and all the other types of information we described in Chapter 2 when \'.'c discllssed threats to privacy. W'ilh basic infrastructure systems (e.g., water and power. ~ A Wtlrll1 i~ J pft;r:1.11 dlJt wries ihdf f(l OIher nlmpmCf:\ Thc l,;!'IKCpr \v~_1 tk".d~lpcd to make U_'it; of iJl, · IC:COUtu-.s hUl wm; 'ldof'!nllw peop!e ming it md!iti(Ju~!y. A worm might dEitmy IiI",., m Just W.lste rc~()Urtc. 258 Chapter 5 Crime "he. no\\' neg'''''' COlltlorarion of the. tenn Ct'h':sc people face crhi(.-aJ dilemmas. Tl1fc.'UO\$t obvious B:JS it ethical to break system without permission, even with1!ood intcnrions? Wc discuss this later. Herc we focus on another question: How can people face crhi(.-aJ dilemmas. Tl1fc.'UO\$t obvious B:JS it ethical to break system without permission, even with1!ood intcnrions? Wc discuss this later. informing malicious hackers who would eXploit these vulnerabilities? Some post details aboUt security weaknesses on the Internet. Some quietly work with software companies. The: first approach is vcry cOhlmon. Most computer professionals arc very critical of this approach. they discover them. They inform the software company Raws [0 or system manager responsible for the software and allow time for them to patdles (corrections) or driscsec:uricy before making a public Kany security professionals when a security researcher hacker a security researcher hacker a security responsible for the software company Raws [0 or system manager responsible for the software and allow time for them to patdles (corrections) or driscsec:uricy before making a public Kany security professionals when a security researcher hacker a security researcher hacker a security researcher hacker a security responsible for the software and allow time for them to patdles (corrections) or driscsec:uricy before making a public Kany security professionals when a security researcher hacker a sec easier fur acStruc[IVC"", to cause serious damage. F"OJgr'", illformation is j',minsic, smUtiOll. Discretion is Many Section 5.2 Hacking 259 repeat «llrwamcompaniesof flaws allow aCCess by h~ckers,bur the cornn,mi,,, ddiri91 hospitals, transportation. emergency services. in addirion to the [elephont' sysrem) accessible on the Nct, the risk increased Hacking h.JT political motives increased. As {he Web spread globally, so did hacking. \X'e describe i; 'Xamplcs ranging fcom new pranks to serious disruptions. Hackers modified the U.S. Department of Jmt!c:e Web page to read" Department of Jmt!c:e Web page tof Read to read" Department (CIA's) sire to read "Central Stupidity Agency" and added links {O pornography sites. In 2001, anrition.org's online archive had copies of more [han 15,000 defaced Web pages. 15 A teenager crippled a computer system (haL handled communications between th~ airport {O\\'er and incoming planes at a small airport. Hackers in England impersonated air-traffic controllers and gave false instructions ro pilots. In 1998, the U.S. deputy defense secretary described a series of atTacks on numerous U.S. milirarycomputers as "the most organized and s} stcmatic attack rhe Pentagon ha.o;; seen to dJte."i'l"I\yo boys, aged 16 and 17, had carried them om. A decade after the Internce \Xlorm, several computer virLL'iC's showL~ that (he lmerner, by [hen much bigger. was still vulnerable. 'fhc Melissa virus of 19~)9 mailed copies of ir.~clf to [hc firsr 50 people in a computer's c-mail address book on systems using popular Microsoft software. Each ne\v copy scnr 50 more copies, and [he virLL'i quickly infected approximately a million coropmcrs] worldwide, including those of individuals, government and military agencies, and hundreds of businesses. Many of (he dogged sysrems shut down. In lOOO, {he "Love Bug." or "ILC)VEYOU" virus, spread around the world in a Jew hours, propaga[ing among compurers using Microsoft's Windows and Outlook programs by mailing itself to people in rhe infected computer's address book and by other means. It destroyed digital image and mll.'iic tiles, modified the computer's 260 Cha~m.·1 5 Crime opcr:Hing syStl~m and Intcrnet browser, and coilcC{cd pl...swords. The virus infected major corporations like Ford and Siemens :U1d 80% of U .S. federal agencies, including rhe 'state Dl~partmclH, rhl' Pemagon. and th script kiddy.](j The purpos Sccrion 5.2 Hacking 261 years in pCisOJI (the JOOgl'S! hacking 5cnf.cnc(' at rhJ[rime) for :l collc('{ion of ofT~nscs related [0 such a virus. He, according [0 prosecuto rs. rook oycr hundreds of thousands of cOllpU(crs (some at military sites', used me infcru:d computers ro commit fraud, and "n.:: ntl-d" (hem (0 others for sending sp:.un and for c riminal schemes. In (he same year, an :lmisp:.un expert f('l) {)r[cd a sophistiGHCd international scam . It involved 20 bilHoll spam messages sent wilhin ;\ two-week }."ICriod from mon: [h an 100,000 computers in more than 100 co untries. The messages direce...d people to I.'. commerce Web sites where the unwary ordered producrs with their crcdir cJ rds and received noching. Credit-card charges well[to a company in Russia. This SGun illuslfat(;'s liu: growing complexity of crime on the Web, combining hacking. spam, phony \'('eb sit'cs, and fraud.!? EarJy hackers exploited security w~aknesses in e-mail systems and guessed or stole passwords. Now ollr computers an: online almost: con~{;.dy. We sl.-arch, hrm'l/sc. and downlnad, using cdl phones and aU sons of new g.ldgcl's and software. Hackers have many more avenues of anack and many ways to pJal\(spywarc. viruscs, and other Jnll/U'llre (software [hal performs malicious acrivily). Hackers pJanrcd password-stealing programs on the Web sircs of (he 2007 Super Bowl teams, A virus spread through MySpace. Silt'S where users post coment (auctions. videos, \'Vikipcdia. for example) arc nL,," urgers for maliciou.~ software. iYJnnt"r ads I.:an con rain viruses. Hackers olntinu(" to l"XeCU[C prank... and revcnge attacks. Had{crs modiEled dll' programnling at an online ga mbli'lg sire so that «:'o'crYOll I' won. The siu: lost \$1.9 millio n. In 2006 after police raided The Pirate Bay. a popul; u pirate music sire in Sweden, The fulW'C The furure is full of surprises. Most of the currelH US1..'S of rhe Web were unplanned and unexpec1ed. Bur using indications from currem dcvclopmcnrs. I suggest two area.'. where hacking will increase. with potentially d:lOgerou.~ :md dcsrrucrivc impact. We already have "things rhat rhink," that is. appliances wirh embedded computer chips-from microw;\\'C ovens to cars to facfOry machinery [Q heart monitors. Manr such appliance,~ ;IIe online. that is, connecred w rh(.' Internet. So, while driving horne from work, YOII can tell your stove to start 262 Chap'' 5 C, ime rIms [0 [hrcate!] national security. Hacking by terrorists and by government organizations is likely [0 increase. The governments of the U.S., China, and other countries arc using or planning such arracks (and working on defenses against rnmcnt trdccd the attack to Russia. compared it to an act of war, and complained to NATO and the European Union. We will sec more hacking for political and military purposes. Countries targeted with such anack'l must determine whether a foreign government or (errorist organization organized rhc attack and how (0 respond. W'hen is a cybcr attack and act of war? Arc chere effective responses rhat do nor severely hurr civilians? Is "harmless hacking" harmless? In many cases, it is the L"Xcitcmcnr and challenge of breaking in that motivates young hackers. Some claim [hat such hacking is harmless, or the military detects an intruder, he or she cannot immediately distinguish a nonmalicious great inconvenience. while investigating and defending against an intruder. Responding [0 nonmalicious or prank hacking uses resources that might be needed to respond to serious threats. Uncertainty about the intruder's intern and acrivities has additional costs for systems that conrain sensitive data. According to the head of (he computer crimeris intern and acrivities has additional costs for systems that conrain sensitive data. unit at the Department of Justice. after a hacker accessed a Boeing Corporation computer, apparemly just to hop to another system, Boeing airplane jf rhey had not done rhis? A group of young [].ancs broke inm National 'X/cather Service computers and computers of numerous other government agencies, businesses, and universities in [he U.S., Japan, Brazil. Israel, and Denmark. Evenrually police caught rhem. It appeared they had done little: damage, But comidcr the risk~. If they had damaged Weather &~rvicc files, for insrancc, rhey could have halted air rratEc that is dependent on weather reports. In Etct, their activities did cause the \{'earher Service computers to slow down. There wa.'I [he po(cnrial [h.lt serious conditions, such as rornadot's, could have gone undetected and unreported. IS Similarly, ifsysr.em administrarors det.ect unamhoril£d access in a medical records system, a credit darabase. payroll data, and others, rhey musr smp the intruders and determine whether they copied or changed any records. Uncertainty causes harm, or expense. even if hackers have no destructive imem. Section 5.2 Hacking 263 Another problem, of course, j.~ that a hacker whh good intentions could make J misr.akc and d o significant damage accidentally. Almost all hacking is: I form of t. r cspa.~.~. H ackers with nonmalicious imcmions must Wldcrstand (har others will oftcil nor vkw them kindly. 5.2.2 HACKfiVISM, OR POLITICAL HACKING Hacktivism is the use of hacking? Should penalties with nonmalicious imcmions must Wldcrstand (har others with nonmalicious imcmions must Wldcrstand to promote a politi cal cause. Wh''t new pmblc:ms docs hacktivism is the use of hacking? for hacktivists difT~r from pcnaltiC! for orh~r hackers? Some Ol.L-adeOlic writers of the Web. Hacktivism quickly became l cover for ordinary prank., and serious crime. In seve-rOll Cilses,
hackers posted polirical mcsSJ.ges on Web pages mey hacked to dircc(smpicio n at o thers or to divcer anemion from their fme mo rives, including rheft of credit card numbers or other data . A more fundamental problem with evaluating political hacking is (haI this kind of hacking can be hard to identify. People who agree wirl [he politica l or social po, sitio ll of t he hackers will rend to see i(a... ordinary c rime (or wor~) . hi posting it pro-drug m c.'i..~ge on a police Web si((,' a polirical S(;lcemcnr against the futility. dishonl..osty. expense, and international imrusions of US, drug policy, or is if the act of a kid showing oil'? To some political activists, an y act. thar shuts down or steals from a large corpor.nion is a political .Kt. To the cusrom crs 264 Chapwf 5 Crime protest a 11CW' housing development, disables J. Web site of a r('aI-esr~re developer. Many of the people who might argue that one of rhese acrs is justifiable hackrivism would argue that. the other is not. Yet it would be extremely difficulr 10 develop a sound ethical hasis fe)r distinguishing between these acrs. disobedience and should not be subjccr (0 felony prosccution.1 9 Civil disobedience has a respected, nonviolent tradition. Henry David T'horeau, lvIaharma Gandhi, .md Manin Lmher King Jr. refused co cooperate with rules [hac viola[ed their fn't'dom. Peaceful protestors have marched, rallied, and boycorred [0 promote their goals. Burning down ski resons and homes because one would prefer to see the land undeveloped is another category of activity. To evaluate incidents of hackrivism, ir is helpful to fit them inro a scale from peaceful resistance (0 desHucrion of other people's property and actions that risk serious harm t.o. innocent people. Denial-of-serviC(' attacks. for example, can imerfere with healrh and emergency services. Freedom of speech does not include the right t.o hang a polirical sign in a neighbor's window or paim one's slogans on someone else" is a group of people organized as a business or corporation. ~/e have che freedom t.o speak but nor the right ro compel ochers (Q listen. Crashing a \\'eb site or defacing a \X/eb page is comparable t.o shouting down a speaker with whom onc disagrcl>S or stealing batches of n'-"\vspapers with articles one docs nol like. The laner activities occur on t~olk'gc campuses, and those who bclic\rc that the specific com:cnt or cause is more important than the principle of freedom of speech defeJld them. It is common for people involved in political causes to see their side as unquestionably morally right. and anyone on the other side as morally evil, nO[simply someone with a different point of view. This often leads to the view that [he frecdom of speech, freedom of choice, and property rights of the other side deserve no respect. Peace, freedom, and civil society require thac \ve respect such basic fights and not impose our views on those we disagn:e with. Anmhcr factor to consider when evaluating hacktivists live. From borh an ethical and social perspective, in free countries where almost anyone can POSt his or her words and video on the Web ft)! free. it is hard to justify hacking someone else's site to prom.ott' a political cause. Activists use the Inrc:rnet to organize mass dcmonstrations against imcrn;tlonal meetings of governmcm leaders. Human rights groups such as Amnesty International use the Web effectively. Groups supporting all kinds of nonmainstream causes, from animal rights to anarchism (() odd religions, have web sitcs. None of this activism requires hacktivism. Some countries have oppressive government.s rhar control the means of communications and prohibir open political discussion, that have secret police who kill dissenters. That ban some religions. that jail people who cxpre.~s opposition views. In such countries, where sponsoring one's own \'(/cb she is impossible or dangerous, therc might Section 5.2 Hacking 265 be good arguments to jll 5.2.3 THE LAW: CATCHING AND PUNISHING HACKERS The law When teenagers started hacking for the challenge of getting into off-limits computers, there was disagreement nor only about whether [he :lCtivity was ~l crime under existing law bur also whether if should be. Gradually. state governments pas:scd laws that specifically addressed computer crimes. and Abuse Act (CFAA), in 1986. As a federal taw, the CFAA covers areas over which the federal government has jurisdiction: government has jurisdiction: government computers, financial systems, and activities thar involve computers in more dun one slatt; (lx-cause the federal government has [he power to regulate interstate commerce]. It co\'crs computers connected to the Internet. Sections of the law address altering, damaging, or desrroying information and interference wirh amhorized usc of a computer viruses and other malicious progl].f1ls. Prosecutors usc mort' than a dozen other federal laws to prosecute people for crimes related to computer and telecommunications systems. Access to computer systems are crimes if done while intentionally accessing a computer to malfunction. These ac[ions are crimes if done while intentionally accessing a computer or cause a computer to malfunction. computer without authorization or when exceeding one's authorization. Other illegal a(tions include accessing a computer to conuni[fraud, disclosing passwords or other acCI.. "Ss (Odes to unauthorized pcople, and il)(crrllpting or impairing government operation, public communication, transportation. or other public lIriitic, light. The USA PATRIOT Act includes amondments to ,he CFAA. The PArRIOT Act expanded the definition of loss to include the cost of responding to a ha Catching hackers The people responsible for almosc all the hacking incidents described in Section 5.2.1 ha.ve been caughr. It [Ook only onc week to carch rh,, author of the Melissa virll:'i. The FBI lracl'1i the donial of t (s('rvicc ana ck.~ in 1000 to mafiaboy and had his rcal nam e within J. witek. Investigators identified the man s llsp~Ctcd ofbll]lchillg the 1LOVEYOU virus and [nur Israeli teenagers who wrote and launched rhe Goner \vorm in abour the same rime. H ow do hacker [ra ~c.:l'jnn 5.2 Hacking 267 coll ect and sav(' inform:uion a.bout everyr.hing wc do on the Internet and to sc.1rch and Illacch n;cords to build consumer profiles. The s..111lC rool~ rhOl(, hrc-alcn privacy aid in c3f.chingcriminals. (m'("Scigalors (race viruses and hacki ng ;)nacks by using Imcrnet servin' provider (IS]» records and rhe logs of rourc.' rs. the mac:hint.'S that route mcssage, dlroUgh the Imcrnct. David Smith, lhc man who rdca Sl-J (he Melissa virus. for example, used som eo n e dsc's AOL aCCOUIH, but AOVs logs c:olltainlxi enough information to cnotbil' iaw enforcement authorilies 10 tl.ICl~ the session t.o Smi(h~'i n:k'phonc line. (Smith pleaded guilty; he got a IO-month sentence in a fcdcraJ pri son,) Tn 2006, [he l-=Bl. working with law entorcement agcncie_ in other coullrics, lllickly traced rhe Zocob worm to young men in Morocco and 'Jurkt'}' (They receivc-d jail sCIHI.' nces.) ~'10s! people are unaware thar word proc ('ssors~ such ;l"~ Microsoft W'ord, include a loe of "invisible informa(lon" in flies-in some case's) unjqul~ identifying nUl11ber.~ ;md rill' :-\tubar's name. \$ecul"iry experts used such illformarion 10 ("race the Melissa virus. The hidden idcmifying information in files appalled priv~lcy advocares-another reminder of the tensio n between privacy and crime fighdllg. Many of th~ [('Chniques we juse d c.~cribe:d worked beca.use ha c k~rs did no!. know about: [hem. \'ifhcn such methods rco:i"c publici ty in big cases, hackers learn what misrakes (0 avoid. Inves tigators of rhe Code Red worm in 2:001. for example. said [he code held no dues to i(s author. Hackers, as wel l as people seeking privacy. learn how to forge such numLx:rs lea rn how to forge such numLx:rs lea rn how to remove idcmifying numb('rs from docwnc::ms. H ac.:k..:rs lea rn how to forge such numLx:rs lea rn how to forge such numLx:rs lea rn how to remove idcmifying numb('rs from docwnc::ms. H ac.:k..:rs lea rn how to forge such numLx:rs lea rn how to forge such numLx:rs lea rn how to remove idcmifying numb('rs from docwnc::ms. H ac.:k..:rs lea rn how to forge such numLx:rs lea rn
how to forge such numLx:r Law cnfon.:em('nI and sec urit y personnel update their skills and rools a~ hackers change theirs. Penalties for YOWlg hackers Many young hackers arc the modern analogue of ot"ht:r gencra(ions of young people who snooped where they did not belong or carried ou"(dever prank.... , sometim..."'S bt"caking a law. In his book The Hacka C'r"clrdown, Bruce Srerling desc ribes the phone phreakers of 1.878. That is nor a rypo. The' new Amaic:tn Bdl ·lcicpholle company hired teen age boys as operators. The boys were also, like many teplaced teen age boys as operators. They disconnected calls and crossed lines on the switchboard. with womOln o~rators. We w ;uH young hackers co mawrc, co Icarn rhe- risk.'. of their actions. and to usc (heir skills in bencr W:ly S. Mosr of rhem in ;ail. This in bencr W:ly S. Mosr of rhem in ;ail. This in bencr W:ly S. Mosr of rhem do grow up and go on to succes.... full set of their actions. and to usc (heir skills in bencr W:ly S. Mosr of rhem in ;ail. This in bencr W:ly S. Mosr of rhem in ;ail. This in bencr W:ly S. Mosr of rhem in ;ail. This is a good job by purting them in ;ail a good job by docs no! m e;m that we should nor punish young hackers if they trt"Spass or cause damage. Kids do nO(m.nure and become responsible without gOOli direction, or if c reward irres ponsi bility. The point is ["hac. we should not oerreaCt" and ovcrpunish. Some young hackers if they trt"Spass or cause damage. Kids do nO(m.nure and become responsible without gOOli direction, or if c reward irres ponsi bility. ro medi cal rcsc: Jrch and other valuable dforts. Before he w~s building Apples., \'V01.ni:tk \.... as building blue hOXl~S. devices rh:H ena bled pt:opk~ to make long-distance phone calls without paying for {hem. Nobel Prizc winner Richard Fcynman used "hacker" tcchni(lUCs when he wal> a young physicist working Oil dlC highly SL''Cfct al'Omje bomb project at. Los Alamos National Laboratory in rhe 19401'. He hacked safes (not c.'omputees) containing classified , ..'ork (>1\ the bomb. He fOlill.d or gucs:. cd the combinations and dclighred in opening the safes at night and leaving messages tor che audlOrized users informing them chat sl."Curiry was not as good as they though(. :!2 lv1any exploits of young hackers arc more like pranh. nespass . and vandalism, They usually do not indude financial gain is often noe significant. ill det....rmining wherher dc,rions arc wrong). Difficuh: penalty issues arise for hackers who are young, hackers who do nor intend {O do d:ullagt.'. and hackers who. through accident, ignorance, or immature irresponsibility. do vastly mort" damage than they can pay for. Clearly, offenses rdared {() unauthorized access vary in degree. and penalties should likewise vary, as (hcy do for trespass. vand, uism, invasion of privdcy. fraud, and rhefe Sentences for hacking, as for Of her crimes. depend on the person's irucnt. rhl~ person's age. and the damage done. How can we distinguish between those who arc 'likely to become.' honest and produclive professionals? \Vhat penalties arc appropriate? In many h',lcking cases ('specially Ihos(~ involving young pcopk the hacker and prOSCC\Hor worked our a pica bargain , Ar firsr. most hackers),ounf:cr (han 18 rl~('('i\'t." and law t'nforcemenr official; in: very clirical ot' (his practi ce of "rewardi ng" hackers with security johs. We do not reduce hacking by encouraging young people (0 think rh at breaking into 01 compurer system is an O1cccptablc alternative (0 sending a resume. Bur in some cases, (he job, and the rcspotlsibilily and. respect that go with it. and me threat of punishment. for luture offenses arc t'lough [,0 rurn the hacke r's energy and skills toward producri\'e uses. Decisions about pe nalties must" depend on rhe Ch:lC3cter of the particular offender. \,(/ith any niminal law, (here is a rrade-off) (:twee n h,wing fixoo penalries (ttl! fdirm.'SS, to avoid favorhism) and Uexibili(y (to consider lhe particular circumst:u11.:cs). With young peo ple. fl ex ibility is prob:lbly more important. Penalries can focus on using the hackers com puter skills in a prod ucTi ve way and 011 paying vicdms tor damage d011 1.' (if possibl e) . Deciding on what is appropriarc fl.)r a particular persoll is delicate, one of the difficulties prosecutors and judges fuce with juvenile critll ~. How can '\'C dissuade young teeltS froll breaking ilUo compu[ers, launching virust's, and shU[ting down Web sites ? \Y/e need a combinarion of appropriate pe nalt ies, education about crhics and risks. and parcm al rt-sponsibility. Parcnrs of many young hackers have no ide.1 what their children to avoid unsafe behavior 0 11 Ihl~ Web, as we discussed in Chapter 3, rhey have some n.-sponsibility for teaching their children to avoid unsafe behavior 0 11 Ihl~ Web, as we discussed in Chapter 3, rhey have some n.-sponsibility for teaching their children to avoid unsafe behavior 0 11 Ihl~ Web, as we discussed in Chapter 3, rhey have some n.-sponsibility for teaching their children to avoid unsafe behavior 0 11 Ihl~ Web, as we discussed in Chapter 3, rhey have some n.-sponsibility for teaching their children to avoid unsafe behavior 0 11 Ihl~ Web, as we discussed in Chapter 3, rhey have some n.-sponsibility for teaching their children to avoid unsafe behavior 0 11 Ihl~ Web, as we discussed in Chapter 3, rhey have some n.-sponsibility for teaching their children to avoid unsafe behavior 0 11 Ihl~ Web, as we discussed in Chapter 3, rhey have some n.-sponsibility for teaching their children to avoid unsafe behavior 0 11 Ihl~ Web, as we discussed in Chapter 3, rhey have some n.-sponsibility for teaching their children to avoid unsafe behavior 0 11 Ihl~ Web, as we discussed in Chapter 3, rhey have some n.-sponsibility for teaching their children to avoid unsafe behavior 0 11 Ihl~ Web, as we discussed in Chapter 3, rhey have some n.-sponsibility for teaching their children to avoid unsafe behavior 0 11 Ihl~ Web, as we discussed in Chapter 3, rhey have some 1, rhey ha for preventing their children from engaging in malicious, desIructive hacking. 5.2.4 SECURITY 1 ~ It's no UU' /111-1'ing flu bam ,io(lr after the hoI'S/' isgoni'. O ld.,.;l'.rowrb, pre-1400 Hacking and [he spread of viruses arc as much a comment on the security of telecom munication sys[~ms. and the Wcb as the)' are on the skills and erhL(...s) of the hackers. H acking is a problem; 50 is poor security weak not he carly 'I nterne t? How weak is ie now? A variety of facto rs contribUle to security weak not he carly 'I nterne t? How weak is ie now? A variety of facto rs contribute to security weak not he carly 'I nterne t? How weak is ie now? A variety of facto rs contribute to security weak not he carly 'I nterne t? How weak is ie now? A variety of facto rs contribute to security weak not he carly 'I nterne t? How weak is ie now? A variety of facto rs contribute to security weak not he carly 'I nterne t? How weak is ie now? A variety of facto rs contribute to security weak not he carly 'I nterne t? How weak is ie now? A variety of facto rs contribute to security weak not he carly 'I nterne t? How weak is ie now? A variety of facto rs contribute to security weak not he carly 'I nterne t? How weak is ie now? A variety of facto rs contribute to security weak not he carly 'I nterne t? How weak is ie now? A variety of facto rs contribute to security weak not he carly 'I nterne t? How weak not he early sysl"ms did nor have passwords. Few C 270 Chaptl'r 5 Crime connected (0 telephone networks. so pr('ltee.cion agaimt inuudcrs was nocan i.~"ilIC. Securi ty depended primarilr on !.rust. "1'ne ~forld \Vide Web developed as cHect. Ir might not be surprising (hac. initially. seCllftty of compul'I.'rs ar universities ;lnd businesses was weak. h is asronishing. IlClwevcr, [har it was so t'asy to invade government' and military systems. The- Defense Information Systems Agem:y esrimu ted (hat t-here were 500.0()O hacker attacks on Defense Departmell(networks in 1996. that 65% of them were succc~ful. and (hat (he Depannee) the content of the content o of rhe computer systems rargeted did nor l.~ontain classified information and {hat the break-ins wefC the modern equivalem of a kid sneaking inlO a P~.ntagon eacurity to b, good enough ('0 keep a kid Out' of its cafeteria. The fact rhat files accessed by hackers arc not "classified" is nor reassuring. An enemy can usc
unclassified information such as payrollInd personnel records dL'strucrivdy. In 1999, (he. Government Accountil)' Office (GAO) reported that compu[cr :iCCUril!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of spac(.'Crafi.. The GAO H.-portoo, in the tracking of space (Curil!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of space (Curil!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of space (Curil!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of space (Curil!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of space (Curil!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of space (Curil!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of space (Curil!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of space (Curil!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of space (Curil!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of space (Curil!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of space (Curil!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of space (Curil!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of space (Curil!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of space (Curil!' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions as the tracking of space (Curil !' at NASA was so weak that hackers could l"rtsily disrupc such crucial functions ill 2000, rhal the Environmemal Prott. (.'rioll Agency (EPA) computers were "riddJed with sccuriry weaknes.'ics." Hackers had aCCL--SS co sensi tive and (ontlcl(.'mial information and Wl'"re ablt. to modify flles. use the EPA's system (0 launch hacking alracks 011 other agcllcit:'s. and set up the, i t own chal m()m on the, EPA system. A judge found that hackers could ("aSily hack into and steal trom the government's Indians. A government stud)' in 2001 found that hackers had raken over 155 federal computt.'r systcl11 \ the previous ycar. A Briti.~h hacker. c;uraditcd to the U.S. in 2007. \\-dS accused of breaking into almost LOO military and NASA systems. (He daimed that he was looking for informarion aboUl unidenrihcd flying objects and that sec ur ity was lax.) B Auirudcs abour security in busines.~es, organizations, ;lnd gove:rnmenr agencies were slow ro catch up with the risk. Security techniques and practice.~s, however, dr.lInarically improved in. the early 2000.11. Many gove rnment agencies and businesses. A have up-w-d, uc. high-quaJiry security threats with improved security technology. Emrcpreneuts and the market n: spondt: d wilh rhe. dcvelopmcm of miln)' securit y firms and consulrants offering a \'ariety of sofrv....uc producrs and secvicc."i. Firs, dcvc\opt"d for insrir.ucions (universities. gowrnmenr, and blL~ines.'ics), many of these cools arc now available for and widely used on pes ar home as well. SecTion S.2 Hacking 271 Fir~lUtJlls arc so(C\varc or separ.He computer.~ that monitor incoming communications (c-mail. fil e.s, rcquc.~rs ror services, ere.) and filter our (hose tholt arc from untrusted sites or fir a profile of suspicious activity. There is sofm1arc W Olonim(informacion (h at leaves a prmccted nc[\\'ork, ro du:ck for leaks. G(x)d system administr'. Hors fi.)r business. government, o r organi1.arion comput'c(s do not rdy on llse rs to sdt'ct good pa~-word s. Onley run program~, hat make sure thal user passwords m('(" SC(uriry specifications. EJlcryprion and antivirus software protect against hackers llsing one's system (ll laundl attacks on ()there , administrators install softw'. ue to monitor thl' volume of outgoing messages {for example. (0 detect deni~\I-of-service attacks). Digim] signarures, biom~trics (,-vhich we Jisc.."Uss in Section 5.33), and. other ne\\" [Ools for identification could replace or augIII(,III passwords and help reduce acces.'; by unaurhoril.cd people. [nsur:mcc companies offer insurance for hacker auacks. So me hot He insurance companies give discoul Hs for antithe ft devices and fire cxringuish(rs in a hOffil. Similarly. some companies providing hacker ill surance require that [heir customers use high-quali r], compurer sel'Urity technology. Some SO fIW, HC and securit ~1 companies hire hach~rs to attack and find flaws in systems {hey arc dt..'Vdoping. Some pay (.~ on suhing fees (0 [ca.ms of studencs and faculty at universities to lind security weaknesses in (heir products so rh.H the companies c..'an fix thc flaws before desrructive hackers exploit (hem. Still. hackers and securit}' profess io nals regularly find g"Jping holes. esp(.'Cially l"J.ch time:.t llew pro duc l) applica rion, or o nlim' phenomenon appears . 51\vo people figured out how to send fake rraffil: and """l': ther informarion ro navigation sysl em.~ in GIIS using simpl\;' ofT-the-shelf hardware. The syst(,ms arc nor sccurt'.14 Web browsers have numerou s security flaws. Microsoft has made a big "JIDrt to improve security in its soflware. bUl crirics continue co assail rhe company for security weaknesses. Thousand~ e)f small businesses usc "shopping &:arc" sofnvarc; some of rhe programs have security Haws. As Gongle grew :111d oficred services beyond searching. hacke-rs found vulne rabilities in irs sofrware. Wireless n((works often lack sufficiem protection. Sofn'o'arc developers arc consf.:mdy finding and patching security Raws. Many of the incidclHs in Figure .2. S of lost and stolen creji r-card numbers and other sen.si tive personal data were the work of h:lcker.~. Although arremion to security has increased to a grear exrent, dearly many banks and large rerailers still lack sufficient protection for che dam and money in their care. "fhc TJX incident is ;) dear example. TJX used a vuln':rahlc. ou r~ of-datc cnct)! [inu system co protect' dat a lr:1mmitted. be(ween cash n:gi s {ers and st(Jfe computers Oil irs wil'c k~s net work. Illvcs r.ig.Hon; bdieve hackers used high-flower amennas to imcrc epr dara . dC'l.:odcd employc(' passwords. and then hacked imo rhe company's CI.~nrral dalabase. Over d J)Criod of about 18 mOlHhs, rhe hac kers sro lc millions 01 crl'XIir- and debit-card n umbt' rs and critical idenrification information for hundreds of thousands of peoplc. T he investigation revealed othe r sec.uriryproblems. Tht 272 CllloPll"1 5 Crime problems included transmission or ocbir-(':ud tC;1llsacrion informa.rion to b3nk!; without encryption and failure to insrall/ppropriarc software paKhcs : Ind firewalls. 25 Responsibility for security issues for prorccting priV'.l.cy (Section 2.3.3). 'fhere arc also similariries with safelY issue, ...'S we d iscuss in Chapler 8 . Principles and t(.'(hniques tordeveloping good SYSH:ms exist. and responsib](.. softwart: de~igners musr It.~rn and li se them . We can design SYSI(,JnS with security rrom illlru.,ion as a major goal. When a cum purer system comains valuable or sensitive dara, or if many p(.ooplc depend on its smooch operation, rhe sysn~m administrators have a professionaJ and ethical obligation, and in many cases a legal obligation, to take reasonabl(.' security precautions co protect the sYSCIo::111. System developers, Uld administrators must stay up to dace about new risks and new security measures. This is ofrell not an easy [ask. bm it is an secueif}' software and procedures are, the complexity of computer systems means lha(thert:. will be unexpected security failure s. \'{1e cannot expect p"rf~(tion, bur we should (""PCC[professionalism. !tv1os[individual PC users have no technical telining. Many do not use firl>walls and antivirus soft.ware because they do not understand [he risks means lha(thert:. will be unexpected security failure s. \'{1e cannot expect p"rf~(tion, bur we should (""PCC[professionalism. !tv1os[individual PC users have no technical telining. Many do not user firl>walls and antivirus soft.ware because they do not understand [he risks means lha(thert:. will be unexpected security failure s. \'{1e cannot expect p"rf~(tion, bur we should (""PCC[professionalism. !tv1os[individual PC users have no technical telining. Many do not user firl>walls and antivirus soft.ware because they do not understand [he risks means lha(thert:. will be unexpected security failure s. \'{1e cannot expect p"rf~(tion, bur we should (""PCC[professionalism. !tv1os[individual PC users have no technical telining. Many do not user firl>walls and antivirus soft.ware because they do not understand [he risks means lha(thert:. will be unexpected security failure s. \'{1e cannot expect p"rf~(tion, bur we should (""PCC[professionalism. !tv1os[individual PC users have no technical telining. Many do not user firl>walls and antivirus soft.ware because they do not understand [he risks means lha(thert:. will be unexpected security failure s. \'{1e cannot expect p"rf~(tion, bur we should (""PCC[professionalism. !tv1os[individual PC users have no technical telining. Many do not user firl>walls and antivirus soft.ware because they do not understand [he risks means have no technical telining.]tv1os[individual PC users have no technical t 01' because th,'}, find rhe security tools too confusing. It docs llor occur to consumers to ask, when rhey bu }' " new cdl phone, if their calls are en crypted or easily intt!rccpcabk Sellers of any widely used consumers to ask, when rhey bu }' " new cdl phone, if their calls are en crypted or easily intt!rccpcabk Sellers of any widely used
consumer product have an ethi cal obligation to build in a level of safety appropriate for (he hO{'neral population. Software (omp:.mies have ;U1 ('thic.. 1 obligation 10 design and implement (h~ir products so [hac rhe)' do not expose users [0 severe security threats. \'(lh~H is th(.. r('sponsibility of individual computer owners? Surdy, it is usually wise (0 install security software, such as an 3.llivirus program, on one's computer to protect OIIC'S data and avoid Ih(' headache of dealing wirh a virus attack. Here is an imriguing quCS(inll . As-ide from p rotecring ourselves , do Wl' have an ethical t'cs pl)IHibiliry ro take over individual compurers to commit c.r.imcs, is usc of antivirus software an erhical responsibilifY, not jU.H a personal ch o ice? Criminalize virus writing and hacker tools~ You can find lucking scriptS and computer cudc for thousands of compmer viruse..'i on rhe Imerner. incemionally or recklessly making such programs available in a comext rhat encourages their dl'Strucrive use is irn. sponsibk. Should the software itsdfbc illegal? Some law eniorement personnel and sc.'t.:ur iry professionals propose making it :I crime to \'\rit Scctinn 5.3 IdclHiry Theft and Credir-C:l.fd Fraud 273 Chapters 2 ,3. and 4 about restricting or banning strong encrypdol1, anonymit). sorfware, and technologies to circumvent copyright prmccrions. We saw in Chapter 3 thac writing abo ut how to make illr..'g31 or destructive devic/;. s" such as bombs, is not (in most cases) illegal. On the other hand . a.' a securicy professional commcmed . "Wilh a compmer virus, the words arc the bomb, 'Il! A federal cOlin ruled that sofi:warc is a for m of spcl'ch (sec Sea ion 2.5.4), so a law against h:'ICking softwar...; or virus software might (onRicr with the hm Amendme'I1t. The First Amendment dOl's nO[protect so me kinds of speech, sudl as inciting a rioe. Would Ih e Supreme Court consider \virus code in (he sa me ca (cgory~ H ow do you think the law should neal vi ru s code and hacking scrip ts: 5.3 Identity Theft and Credit-Card Fraud 5.3.1 STEAlING IDENTITIES We buy products and SCf(~jces from strangers ill stores iln do you think the law should neal vi ru s code and hacking scrip ts: 5.3 Identity Theft and Credit-Card Fraud 5.3.1 STEAlING IDENTITIES We buy products and SCf(~jces from strangers ill stores iln do you think the law should neal vi ru s code and hacking scrip ts: 5.3 Identity Theft and Credit-Card Fraud 5.3.1 STEAlING IDENTITIES We buy products and SCf(~jces from strangers ill stores ill stores ill stores). on the Web. We do o ur banking and investing on the \X'cb wirhoU[sel'ing or knowing the physicallocarion of {he company we d~al with. We- can travel with only a pas..'iporc and a credit or debit card. We can quali fy for a mortgage or a Caf loan in minutcs. All. this depends on networks of computers and databases. All this is convenient and cHicicfiL But it has risks. For many transactions, our idr.:."Iltity has become a series or numbers. Soc:ial Security number [SSN]. dri ve r's license numbers. And account numbers (credit hi story. work history. Ind driving record). Remon..' rr]nsanio ns are fenile ground for many kinds of crime, cspl., "daUy idcmity [heft and, if.!i most co mm on result, cn.'tiir and dehit fraud, JdmlilY theft' dcscrib 274 ehapu. r 5 Crime might sue the viCtim for money borrowed by thl~ criminal. The hmincss. losses increase prices for everyonc. The many solutions developed in response illu:mate the cominualleapfrogging bl~tWCCn increased sophistication of security strategies and increased sophistication of criminal strategies. They also illustrate the value of [he mix of technology, innovative bu.~iness policies, consumer aw areness, ;.md law to .~olw the problcITls. We des.cribe a variety of tactics for oproaches to reducing identity theft and reducing its impact on it. flexible. Haye you received c-mail from PayPal. eBay. Amazon, or a bank asking you to confirm inf{)rmarion ahom your aCCOUJH? Have you received c-mail from rhe lnn:rnal Revenue Service felling you (he agency has a. (ax refund tor you? idemiev theft and then consider many a These are examples of a form of spam called phishing: sending millions of e-mails fishing for information {O use [0 impersonate someone and st]'a] money and goods. The ('-mail message [ells the vicrim ro dick on a link to what purports to be the Web site of a well-known bank or online company. The phony site asks for account numbers. passwords and mher identi(ying inf{)rmarioll. Phishing is an example of social engineering, a m(,thod used by hackers: a thief or hacker directly ash a persoll f{>r sensitive information with some false pretext. Identity thieves take advantag... of our knowledge that there is a lot of online fraud: St:'Veral pretexts that appear frequently in phishing e-mails warn that [here has been a breach in th.e security of your bank or Pay Pal account and you need to respond to derermine whether someone else is misusing your account. Some e-mails tell fl"Cipients that (hey just made a very big purchase on eBay. and if the purchase on eBay. and if the purchase was not really theirs, they should dick a link to cancel the order. In a panic, peopil' doand enter thdr identifying information when asked for it. The first defense againsr phishing is to be extremely wary of clicking on a link in an unsolicited e-mail, especially if the message is 3uchemic and want [0 respond. you should ignore the link in the e-mail. type the company's URL in your browser, and check your account in [he uSllal way. A ... more people learned to be wary of dicking on links in e-mailsthatappearrobefromabank.thicves modified phishing .~cams; the e-mail provides a telephonc number [0 calL Those who call hear a request Ior their account number and other identifYing information. 'rhis variation is sometimes called v;shing, for voice phishing. Of courSl~, Seeriun 5.3 Idcmiry Theft and Credie-Card Fraud 275 computer,~ on rh e Imernet J.ddres~e.~ (strings of numbers ca ll ed Inrerner protocol IIP) addresses). Ph arming involves plantin g false Imerm' [addn, 'sses in (he (ables on a l)NS. (Some software. inadvl."nendy downloaded from a dishow:sr or hacked Web sire, plaurs f:alsc IP addresses in small tables maimained on individual pes.) Thus. typing [h~~ U Ri. of a bank or travd site, for ex:.unplc. mighl lead so m co n~' co a counterteit sice set up by idenrity lhines. Corrupting a DNS is more difficult th :'111 sending it huge number of phishing c-m,lils; hence. it is much i commoll. or Figure 2. S lists many incidems loss or theft of large d atabases containing personal inform:ui(Hl. In many of rhose incidellt s, identity theft and fraud were (he goals. f-:or c~"Imple, short ly :tfter (he retailer 'I]X Companies reported the electronic break-in of it s computer network and rhe rheft ofmilliolls of cusromer records, many of rhe swien credit and debi t-card numbers were II_~ed fraud ult..'IHly in at least cighr co untries. Sophisrica, red crim.inal rings hack into corporate ;llld gO\,l'rn menr computer networks. ste-.J.I computers and disks. or pose as legidma{(, busincsses and buy credit records) and personal dossie rs ro obtain infonna rion [0 usc in idcm iry (heft. Resumes contain a 10] ofpcrso nai info rmat ion. and people pOSt millions of the monline on job hunring sites. Identity thieves love them. Th('y collect addresses. SSNs birth dales. work histories, and :tll the other details that help them convincin gly adopt the identity of rhe job s("Ckcr. To collect the information, some pose : IS employers and post fake job announcements; some respond to job hunters and ask for mo re info rm:uioll. (I complete a background checkn Jobhunting sites are very popular and useful. Now (hal identi £), thievc." misuse rnclll, people must acbpt :.a.ml be more cauriou .~. Th;n 1nt....Jns omittin g sensitive data from a postt.'d resume. not providing sensitive infornu(ion until you have an aemal intervicw. or finding other services to keep scnsirive informacio n private. ~lhen peopl e connect {osome Web si tes. rhesitc plann spywarc on the their com pu rer. Hackers and thievcs hide malicio us sofrwarc in innoccm -appearing programs (hal users willingl)' d ownload . {This type of hidd c.'o maiwl.rc is called a "fmjoT1 bond Such program s track kc~'s [rokt!'i. Thicws usc rhem to collect account num ber.~ and passwords rypcd huer by the user wh en banking or buying online. The SSN has long been the key pi ece of information (0 do so. Srcaling these numbers was easy. A pan-lime English teacher ar II CalifiJrnia junior college used rhe SSNs of seem: of her .~(ud c nl s, p rov ided on h~'r dass li sts, to open fraud ulem CrcuiH.-ard accoums. Rings ofidentit>, rhi('Vcs wilh members working on bospiL11 staffs obtained SSNs ofho.~ pit ali1.e] pat it'nts from (hei r wristba nds o r hospit al charts . ImprovemelHs in policies and pracricl."s ;lbollt use an d display of [he numbers are reduc ing rhis kind of [hefl. 276 Chaprer 5 Crinll' AND ,'DESIT mth,implc ., -individual -,on a or stolen cards. At and individual put« c.rds. (They still do.) . ~~¢t;U,:Ii>J",,, p'''ple '...e,re convicted inone . ~~i¥h"rc NO"Ihwest Airlines employees '\~¥~.;'SW cards from the IDOlil transportoo No:"hl\\~sr'S airplanes. Charges on the stolen cards ran to an estimated \$7~5 miUion. 18 .l'rocedur:U changes helped p,orccr credit or Olgainst theft of new cards from the mail. large nores ;ind To verify that rhcdegirimatc owner received the las, (ow dig!" (he card. credit'" eardissucrs require the law required (his pr:ICII''' ... cuS{omer to caU 1n and provide-ide ntifying Thi me Section 5.3 Idl"llIit}' Thcfr and Crcdil-C:ud Fraud 277 'nrt".rr unusual ATM activity and alert customtrs. -Several comp:mic..; market systems that geiletare 3.. unique crcdi(~card number s and bills all oEone person'.~ charges to one aCCO'l.inr, but once used. ;} number is useless t.O , anyone who steals it. Servicos
like Pay!'al 5.3.2 RESPONSES TO IDENTITYTHEFr Authenticati.ng e~mail and Web sites E-mail programs, Web browsers. search engines, and add-on software (some frcc) can akrr users to likely fraud. Spammers fake lhe appan:nt rerum addrc.ss on e-mail. butsomt.mail programs Ict us.;ocs cbeck the :laual rt.'CUnl address. (I find that e-mail claiming to be from PayPal came from hounaiLcom, yahoo.com, Denmark. Germany. :md a variery of other unlikely pb.(;es.) Some mail programs will a1Crl (he user jf the acrual U RL mar a link will take you to is diffl.'rcm from th~ one displayed in the text of an e-mail message. Whether someone reaches a ~reb sit'e from a link in a.n (·mail or by brm\'sing or searching. various [Ools can help determine whether the sitC" is safe. Sometimes, take Web sites arc casy to spot because of poor grammar and generally low qualiry. Software can reasonably well determine tht~ geographic loc;ttion of;l sire. If a Wch sire claims to he a U.S. bank but is located in Romani:li. it is wise (0 leave. Some browsers (and add-on softwarc used with browsers and si. "3rch engines) will flag Web sires [he]' consider safe or show alerts f'Or sites known [O collccc and misuse pcrmnal inf'Ormation. Although helpful for ,aurjou.~ users , such tools generate porcnr.ial problems. Recall that in Section 3.2.3 we observed thar WI.! might want a filter for pornography to be more restrictive e\'cn if ir meam preventing a child from accessing some nonporn Si ll'S, whereas a spam fiJrcr should be It'ss rcsrric.:tivc so that lcgirim:lr 278 Chapu. [5 Crime a husiness perspective to be caurious when designing and implementing such rating systems. Banks and other businesst.'S that arc Jikdy targets of phishing and pharming have developed techniques to assure customers that they arc at an authomic site before they entn a pa.'isword or orher sensitive identifying information. For example, of rbeir dog) or cboose one from many ar the bank site. Latcr, whenever rhe person begins the log-on process by typing his or her name (or e-mail address or other identifier that is not critical for security), the system displays the im'lge. Thll'i, the site authenticates itself to rhe cuswmer before the cuswmer before the cuswmer before the customer amhemicates himself or herself by typing a password. Hacked and stolen business and government databases Individuals cannot directly protect their account numbers and other personal data in businesses, organizations, and government databases. As we observed in the discussions of privacy and hacking, businesses, organizations, and government databases. Responsible data holders must anticipate risks and prepare for them. Unfortunately, many have nor been doing a good job. In several major thefts of clara from retail", rs, the databases included unencrypted credit-card numbers and other security numbers and other CI1UYPII1.i fimn. ScCtiol15.3 IdemilyThcfl :m] Cred il- Card Fraud 279 Technical pro[cc.tiom, in dude hngcrprinr rcadcr~" Companies ;\rc using more physical prorections. such :l~ cables ro secure laprops ro heavy furniture in offices or hotels. :md rraining employees to bt~ more careful with laprops. Autoenticating customers and preventing use of stolen numbers Financial institutions haw added pmceduf4,"S [0 authenticale! C\.lsromcrs. making it mOrt.' difficult for a thief armed wirh a ,~tolcn ;ICCOIUll number and ocher commonly used idcmifying information [0 withdraw money from an account. Some nnancial institutions \$[Or(' an idcmilicalionnumber for rhl." cuscomcr's home computer or lapeop and the Jl verify [he machine used when rhe customer logs Oil. SOUl": ask the Customer to provide cxrr, informacion at login. Some ask thL' t.Llstomer to select from a group of several images when the account is opened and chen require the custome.r (0 identity (he image ac login. (Nore the latter is similar I'O the Web sirc :.luthentication merht)d described ca rlkr. but ust'd in chis way, it helps to au(henticate the user.) Improved security guidelines and requirem CnL'i from government agencies spurred som(' of th\.~ security improvt:m\:nts for online banking and InVCSUII(;'Ill sites. Some .~ ecurity firms otier more sophisticated authenrication software using artificial intelligence techniques. The softwari call'ulates a risk score ba.~cd on variation from rlie rime of day a customer usually logs in , tht' type of browser regularly u.~J. the l~useomcr's typical bt~ hav ior :lIId teansJClions. and so on. (How \...'ould priV'.u:y advoc:.lrcs and t'he publk react to the disclosure th:u an online bank or brokerage firm stores sur:h information about' each custom~r's visits to [he site?) If you send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company; Ih ~ company; Ih ~ company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company; Ih ~ company will probably send a change-of-address notificarion [0 your cn.:dit-card company will probably send a change-of-address notificarion [0 your cn.:dit-card company will probably send a change-of-address notificarion [0 your cn.:dit-card company will probably send a change-of-address notificarion [0 your cn.:dit-card company will probably send a change-of-addr customer convenience and to speed transactions. some s[Ores do not require a signature for small purchases. Others have self-service checkour. l\1crchants and credit-card companies arc willing to absorb some fraud losses as part of doing business. Such rrade-off!. arc not new. Retail srores keep smail very expensive ilcms in locked cabinets, but most goods are easily accessible [0 cusromers tor convenience and efficiency. Openne's encourages sales. Retail swres haw always accepted some amount' of losses from shoplifting rather than offend and inconvenience customers by keeping everything lnckt>d lip or by scarching customers when they leave the store. \X'hen a company perceives the losses as being too high, it improves security. When arc merchants and credir-card companies irresponsibly ignoring simple aud im.porrJ.m security measures, and when are they making reasonable trade-off.. for convenience, efficiency, and avoiding otTens" to customers? Reducing the damage of identity theft For many years, one of the very frustrating aspects of identity theft was thar victims got litde help from credie bureaus. police, motor vehide dcpartments and Social Security Administration. The motor Vellicle departments and Social Security Administration. expect a person to have the same number all his or her IHe. Their attitude seemed to be thar the t:acr that another person was using rhe number (0 defraud merchants and credit companies was not their problem. In 1998, Congress made it a federal crime to knowingly use another person's identificadon with the intent [Q commit a felony.;}! and government agencies began providing more assistance to victims. Businesses and government agencies that lose personal data 11m\! often arrange for free credit-monitoring services for the people aHected. Mall}' nonprofit organizations and srart-up businesses help people deal with the effects of identity theft. Laws requiring that companie" and government agencies notify people of breaches of their personal infc)flnation give porcuriat victims the opporrunity to tah a variety of protective measure is aftaud {(lat. A fraud alert is a flag on your credit report that tells the credit bureau to call rou for confirmarion when anyone [rics to open a Ilt'\\' credit account (e.g., for a car loan or credit card) in YOllr name. In some stares, you can "freeze" your credit record. This prevents porential creditors from accessing information, creditors from accessing information, creditors will nor approve loans or open new credit accounts. We can monitor our credit-card accounts 10 quickly detect fraudulent charges. We can even gct insurance for idcmity rhefe. Consumer advocarcs argue f()r laws requiring that companies [hat lose sensirivc personal data pay for damages, including costs for credit monitoring and other protections for consumers whose data they lost. Some states are considering .'iUch laws. Identity thieves arc cvcrvigilamfor more opportunities. Some pretend to be legitimate companies providing identity-verification services ;md services to assist idcnmy theft Section 5..3 Identity Thcf, and C rcdi(~ Cml Fr:lud 281 vier.lms. The consumer must always be caUriOlL'i. A few observations Although idenlit)' theft scams are rampant on the Wt.--b, a large chunk ofidenlity [hefr cases rcsu]r from lose or stolen wallets and ch..-ckbooks. Friends and rc:hHiws are [he
culprit... in many cases. It is gOQd to remember (0 be careful with personal informal:ion in low~rcch environmt']Ils as wdl a'i on rheWcb. Aurhencicating customers remorely is inherently difficulr: informacion rh.H is necessary and sufficient to identify someone or aurhorize a rransacrion must be provided to many people, businesses, and Web sites, Evellually, someone will lose, leak, or steal that illforn.lltion, 'ro reduce {he spread and vulnerability of SSN s, many institutions began asking cusromers (for example, on rh l' reicphonc) for only the lase four digirs, Then. of course. the i:m four digirs beCJl1le lhe crirical numbers mirvcs needed [0 impersonarc someone for ac.:c:ss (0 an cxiS[ing acr;;ounr. Reducing (he incidence of fraud by idemiry rhefr-and its monetary and JX'rsona] costs-n.--quirCi conr inually evolving metiu.lds for ~lUrhcn{it'a(ing rhe parties on both sides of a transaction. It requires appropriat e and evolving responses from merchants, financial institutions, cn:dit.-card companies. rhe public, the programmers Olild cmreprcncuf\$ who develop technical protections and .'i.enoia s, and the government agcm:it's whose document s we USI..' for identification. 5.3.3 BIOMETRJCS We have seen that to prort"cr privacy and [0 reduce credit fraud, identity theft. Ind somc kinds of hacking. it is important (() idcutilya person 'l(;curareiy. P.revcnring terrorist access to sensitive facilities also requires accurate identification. Thieves make counterfeit driver's licenses; they can (;,I 282 Chap{c, 5 Crimc over the Nct, reducing accc.~s by hackers or laptop thieves. Some cell phones (especially in Japan) usc fingerprints or other hiometrics ro authenticar.e the O\vner and protecr. against theft of intl.1rmation and funds in '\::lcctronic\vallels'' in rhe phones. 10 reduce the risks of f.crrorism, several airpons usc fingerprint theft of intl.1rmation and funds in '\::lcctronic\vallels'' in rhe phones. 10 reduce the risks of f.crrorism, several airpons usc fingerprint theft of intl.1rmation and funds in '\::lcctronic\vallels'' in rhe phones. 10 reduce the risks of f.crrorism, several airpons usc fingerprint theft of intl.1rmation and funds in '\::lcctronic\vallels'' in rhe phones. 10 reduce the risks of f.crrorism, several airpons usc fingerprint theft of intl.1rmation and funds in '\::lcctronic\vallels'' in rhe phones. 10 reduce the risks of f.crrorism, several airpons usc fingerprint theft of intl.1rmation and funds in '\::lcctronic\vallels'' in rhe phones. 10 reduce the risks of f.crrorism, several airpons usc fingerprint theft of intl.1rmation and funds in '\::lcctronic\vallels'' in rhe phones. 10 reduce the risks of f.crrorism, several airpons usc fingerprint theft of intl.1rmation and funds in '\::lcctronic\vallels'' in rhe phones. 10 reduce the risks of f.crrorism, several airpons usc fingerprint theft of intl.1rmation and funds in '\::lcctronic\vallels'' in rhe phones. 10 reduce the risks of f.crrorism, several airpons usc fingerprint theft of intl.1rmation and funds in '\::lcctronic\vallels'' in rhe phones. 10 reduce the risks of f.crrorism, several airpons usc fingerprint theft of intl.1rmation and funds in '\::lcctronic\vallels'' in rhe phones. 10 reduce the risks of f.crrorism, several airpons usc fingerprint theft of intl.1rmation and funds in '\::lcctronic\vallels'' in rhe phones. 10 reduce the risks of f.crrorism, several airpons usc fingerprint theft of intl.1rmation and funds in '\::lcctronic\vallels'' in rhe phones. 10 reduce the risks of f.crrorism, several airpons u identification sys{t~ms ro ensure that only employees enter restricted areas. It appears that rht, usc ofbiomcuics will increase dramatically. Do biometrics providt' a foolproof identification technology? Jllst as people h;wc always f(lUnd ways around mher security tllccharusms, from picking locks to phishing, they lind ways to thwart biometric identification. SOJUt' methods seen in spy movies or science fiction movies.) few years ago arc seriotl.s concerns. Researchers in the U.S. ilnd Japan fooled fingers they made from gdarin and Play-Doh. Criminals can ,'.'ear contact lemes that fool tyC scanners. J2 When a thief steals a credit-card number, we

can gC[a new account with a new number, bur if a hacker gets a copy of the file with our digitized thumbprint or retina scan, we cannot get a new one. Identity theft might become easier to prevent, bur much worse for a victim when it occurs. Given the weak security of the \Veb, it is likely that hackers will be able to s[cal files ofblomerrics from government agencies and businesses as easily as they steal files with Social Security and cr('dir-card Humbers. Then rh'Y can access mhcr people's biomcrrically protecred acwunts by rigging their machines to rransmit a copy of the file rather than scanning their machines to rransmit a copy of the file rather than scanning their machines to rransmit a copy of the file rather than scanning their machines to rransmit a copy of the file rather than scanning their machines to rransmit a copy of the file rather than scanning their machines to rransmit a copy of the file rather than scanning their machines to rransmit a copy of the file rather than scanning their machines to rransmit a copy of the file rather than scanning their machines to rransmit a copy of the file rather than scanning their machines to rransmit a copy of the file rather than scanning their machines to rransmit a copy of the file rather than scanning their machines to rransmit a copy of the file rather than scanning their machines to reasonable to reasonable the file rather than scanning their machines to reasonable the file rather than scanning their machines to reasonable the file rather than scanning the reasonable to reasonable the file rather than scanning the reasonable to reasonable the file rather than scanning the reasonable the file rather than scanning the reasonable to reasonable the file rather than scanning the reasonable to reasonable the file rather than scanning the reasonable to reasonable the file rather than scanning the reasonable to reasonable the file rather than scanning the reasonable to reasonable the file rather than scanning the reasonable to reasonable the file rather than scanning the reasonable to reasonable the file rather than scanning the reasonable to reasonable the file rather the reasonable to reasonable the reasonable to reasonable Biometrics could find many more applications than SSNs. for example, all of our online purchast-'S and Web surfing. ""ill biometrics make us more secure: Or will they make it easier to build dossiers on people? Like rhe f.ace~ma(ching applicuions described in Section 2.2.3. biometrics increase surveillance and tracking of our activities by government agencies? We have pOlmed out a few rimes thar wC' canno[l'Xpect perfection. The tae(thar criminals can thwart biometrics or rhat biometrics or rhat biometrics can pose priv:lL')' risks docs nor condemn these technologies. As always, we milst have an accurate view of rhe strengths, weaknesses, and risb of new technologies and compare rhem with alternatives (0 determine, carefully, for what applications we should usc them. By anticipating both privacy risks and methods criminals will use [0 get around new security measures, we can design beneT systems. For (.'xample, anricipating that iris scanm'IS can be tricked by a photo of an eye, some scanners Aash a light at rhe eye and dleck thar the pupil contracts, :1\$ a real one would. Similarly, some fingcrprim~matching systems distinguish live tissue from fake fingers. ,,,ill 5.4 Scams and Forgery Con arusts and crooks of many sons have found ample opportunity on the \XTeb to chear unsuspecting people. Some scams are almost unchanged from their prc-Web SI"('[iOII 5A Scams and Forger}) 283 fo rms: pyramid schem es. chain Ie-ners. sales of coullf.c rfci , luxury goods. phony busi ne...." invcnm cfl(opporruniucs-, and SO fonh . Each genera cion of peopk ,\. hah. "Vcr level o f rcchno logy rhe}' usc, needs a reminder rhal . if an invcstm cm or hargain looks (00 good (0 be rrue . it probably is, Other SC"J.m.~ on (he \'(feb arc ncw. o r h~l.V(, evolved [0 take advanlage of (,-hardCteristics of dle Web. and have a bi gger impact {han individual prc-Xlch crimes. I n a particularly offensive example, people Sl' t up Web si res after n: lluroll disOls(("rs or (crroris { a nac k~ to fraudulently collect credit-card donations from people Sl' t up Web si res after n: lluroll disOls(("rs or (crroris { a nac k~ to fraudulently collect credit-card donations from people Sl' t up Web si res after n: lluroll disOls("rs or (crroris { a nac k~ to fraudulently collect credit-card donations from people Sl' t up Web si res after n: lluroll disOls("rs or (crroris { a nac k~ to fraudulently collect credit-card donations from people Sl' t up Web si res after n: lluroll disOls("rs or (crroris { a nac k~ to fraudulently collect credit-card donations from people Sl' t up Web si res after n: lluroll disOls("rs or (crroris { a nac k~ to fraudulently collect credit-card donations from people Sl' t up Web si res after n: lluroll disOls("rs or (crroris { a nac k~ to fraudulently collect credit-card donations from people Sl' t up Web si res after n: lluroll disOls("rs or (crroris { a nac k~ to fraudulently collect credit-card donations from people Sl' t up Web si res after n: lluroll disOls("rs or (crroris { a nac k~ to fraudulently collect credit-card donations from people Sl' t up Web si res after n: lluroll disOls("rs or (crroris { a nac k~ to fraudulently collect credit-card donations from people Sl' t up Web si res after n: lluroll disOls("rs or (crroris { a nac k~ to fraudulently collect credit-card donations from people Sl' t up Web si res after n: lluroll disOls("rs or (crroris { a nac k~ to fraudulently collect credit-card donations from people Sl' t up Web si res after n: lluroll disOls("rs or (crroris { a nac k~ to fraudulently credit-card donations from people Sl' t up Web si res after n: lluroll disOls("rs or (crroris { a nac k~ to fraudulently credit-card donations from people Sl' t up Web si res after n: lluroll disOls("rs or (crroris { a nac k~ to fraudulently cred m:mdy popular. Sel lers list anything rhe}' want to sel l. whl!'(her \.' olk'\.'wr basehall canis. dOlhing. drill bils, or a whole (Own. Buyers bid. and t he auction site gets a pcrccIHage, AUClio n sites illwara rc the basic benefics of the Web: convenient t compilation of a large am o unt o f informuion .and a way for strangers 311 over {he world to communicate and make t rad es. cl~ay, founded in 1995, is the b.rge..~ t and bC.H-known auction si[e. People spend billions of dollars o n eBay l-"ach yL'ar. Problems arose soon after auction sites opened for bu.~incss . Some sellers do not send rhe ih~ms people paid f(:]r, or they send inferior goods th ar: do no[mee[[he posted description. Dishonest sellers engage in shill biddint" lh:u is, bidding on one's own goods to drive up the price. The Federal Trade Commission rcpo n s that' o nline aunions arc one of the lOp sources of fraud complatms. SOInt' products offered for sale arc illegal or sold in i cla.~s ified ads and that it was not responsible for fraud or illegal sales. Eventually ('Bay changed its viewpo int. Solutions In thcofRineworld, consumers know that it. might b~ s;\fcr [0 buy from an establishedsrorc like Ma,-y's or Home Depot (han from someone at a SW.lp mccc Online auctions, where 284 Chapter 5 Crim e one intt'racts wirh invisible strangr ts all over che world, became, like some swap IllCl~ts, places to lind both bargains and rip.oW.... Thus, one of the first solucions was for cusromers to k'arn [0 be camious. la ter. onl ine a uction companies made improvement.s. Recogniling {h ~H their success, lik(." c-comm cn.:c in general , depends on custo m er confidence and a good rl~pu(alion, cHar and ocher il union sites adOptl·d several pracricC's and policies LO address problems and complaims. Bchlre sending a check or a produ ct, mcrs can consider {'ill' reputation of the scHer or buyer by reviewing commCfi(s other usC'rs post on the sire. r~~c rO\\' services, where a trus('cd rhird party holds rhe payml'll(until [he hUyt r n:cei ws and approves (he product. arc available for more expensive items. Aucrion compa.nies have large dep'lfnn e nL~ to address fraud prohibil cercain mhcr items, such as alcohol, firearms. fireworks, animals, srocks . and prescript.ion drugs. Auction companies suspend users who break their rules. cBay fl't)uir~s a acdil~card number fro m bidders as well would help reduce \'S1 sdlers can wri ['c glowing recomm~nd3tions for ('ach other. Fake items still appear. Some users complain chat' auction sin:s require too much proof before removing a suspect item. Rival sel lers. however. could be m aking false 3(Cll',;:ttions, so swifra action by auc.tion houses to re.Jllo ve items might not always he fair. Fraud is illc.:g,ll 'whl"lhcr on or o ff tht' \'Vel>. There have b(.X'n many prosecurions for auction fr.aud . In a highly publicized case, pro.~ecutors charged rhree mcnwirh shill bidding ro raise p rices in hundreds ofarr auctions, induding one for a painting on whidl one of them filfgcd the initials ()[a wcll-knm\,11 pairu er. :H '1-''0'0 pleaded guilty. On\.', of t he men, ;j lawyer, was disbarred. Au ction fraud has hecome as routinc an area for law enforcement] as earlier pre- Web fraud s, We obsl'[vl-tl in C hapter 1 (hal th.e publi c I.."an help with crime investigations on the Web. In one incident. cheated buyers tracked down (\\,0 men who sold thousands of dollars of compurers in o nline auctions hur never scm them . A few more auction issues C ompanies calkd aggrcga[ors use automated sofrwarc.: "boes" or "crawlers " (0 scan largt~ Section 5.4 Scams and Forgery 285 anricompetitive action. A judge ruled that because t-Bay's computers afe eBar's property, it could deny access to Bidder's rAge. He issued an injuncrion ordering Bidder's rAge. block spam (see Section 3.2.3). AOL got injunctions to S[OP the spammers on similar grounds. This case raises inrriguillg legal and socialfcthical issues. Docs a Web site
have a right to exclude cCfwin visitors, induding software visitors? How should the concept of trespass apply m Web sites? 5.4.2 CLICK FRAUD Google has been extraordinarily 10\'enrivc in developing new online advertising mechanisms. The meThods, many now used by other search engine company irself: helping [O support aB of its free services. In newspapers and magazint~s and on television and radio. advertisers pay ad rates based on circulation figures or audience sizt'o On (he Web, an adveniser pays only for each dick on Their ad bringing someone (0 their \X'eb site. People who hose an ad receive a small fcc for each dick from rheir site. Click lraud is an cntirely new kind of fraud, based on these 5.4.3 STOCK FRAUD Old forms of stock fraud included posing as investmcm expens and luring victims [0 invest in worthless companies wiTh promises of quick and easy big profits. This still happens, and now on [he Net. More increasing perhaps are forms of stock fraud included posing as investmcm expens and luring victims [0 invest in worthless companies wiTh promises of quick and easy big profits. fraud thar developed. to take advantage of specific characteristics of cyberspace. The Web reaches a huge audience immediately. Ir is ideal f()r spreading rumors. One can buy a stock. make glowing recommendadons about it in chat rooms, on Web sires, and by spamming. and (hen sell when rhe price briefly and anificially rises. We describe a few cases with variations on rhis {heme. In rhe first criminal case involving Internet srock fraud. a company gave a man 250,000 shares of its stock for promoting [he company in his online stock news/encr. He 286 Chaptl."I 5 CrimI." sold while telling his subscribers {O buy. He and officials of the company received prison term"~. Some 15-year~olds hack, and some commit stock fraud, The first. minor charged with securities fraud made more than S270,000 in profir by flooding the Ne(with hundreds of mt-'SSagcs, under ditTercnt names, touting sr.ocks he had bought.:H An employee of PairGain Technologies neared a fake Web page to look like the sire of the Bloomberg financial news service. It displayed a positive but false announcement about. PairGain. Then he posted a message ahOlu the "news" with a link CO the fake site. Peoplt' copied and e~mailed the link, sprt--"ading the false information quickly and widely, and causing PairGain stock (0 rist~ more than 3 5.4.4 DIGITAL FORGERY Desktop publishingsysrcms, color primers and copiers. and image scanners enable crooks make fakes with relative case-fake checks, currenc}', passports. visas, stock and bond certificates, idcmification cards, and corporale to St:ction 5.5 CrimI." Fighting versus Privacy and Civil Liberties 287 srarioncry. to fUlne a few examples. A group of counterfeitr..-rs made off with \$750.000 from one countc-rfcit check. They produced (he c.heck by scan ning :t rC:11 check from a corporation, changing thr... amounc. and payee. and lhen priming it 00 ~ laser primer. Forgers and counterfeiters used (0 need specialized skills: comput) ~[software and hardware dram Defenses against forgery of printed documclHs illclude thi: usual array of approaches: (echoical tricks that make copying more difficult) education (increased training of derks who process documents, :lnd mall)' mher. The U.S. gm'crnmclU redesigned it checks. 5.5 Crime Fighting versus Privacy and Civil Liberties In scvcml earlier chapters, in the context of various computer technology issUt."S, we discu.~.~ed (em ions between fighting crime, on the nnl.' hand, and privacy and civillibcnies, on rlH: orhef. We discuss a few more such issues h~'rc. 288 Chaprer 5 CrinH.' 5.5.1 SEARCH AND SEIZURE OF COMPUTERS P,'iV'fty ill grout> fluocUrrifm "Uly . . . br iTfdispmsabit: (0 prt'StrufuiOII ofFt'N/om oftUIOri4(i(m . pltrlimMrly WbtTt! 4 group rJp(JU)(f diHidmr hait'fi. - Tht Suprell11.:: Cnun. ruling againllt' tht: state of Alabama's anempt to get the m~mbership li st of tht' National AmKiat.inn for the Advanu'men c. Cu loretl People (NAACP) in rhe 1950s. J8 . or The NAACP's membership lis!' was not 011 a collpurer in the 1950s. lr mos[likdy is now. We considl'r scwral issues about how (he Fourth Amendmcllf applies to searches of computers. How far dOt'S; l search warrant ('xtcnd when searching a computer?' When is a st.... rch warrant needed? DOI's an automated s(...m:h by sofrw'. uc requirc a W'Hr.Ult~ These qUI'SliollS n:main alleCardl warrant for l..."Vidcllce of drug cri mes. an oflicct saw files and found child pornography. An appeals COUf(said [he names of files might he cOllSidered to he in plain view. hut rhe conrents of tht:" files were noc The court overturned {he man's conviction on the pornography charges. 39 Alt'h ough the crimc in this case is a vcry unplcasanronc. (hc principle protC(;(S us front abu.'i\;'s by ,he police. In another case, howc\'t!r, involving a search of a compu(cr wi(h medical files on a large number of people, an appeals court allowed the government to use incriminating Section 5.5 BASEBAll, LAEIORATC)RY Crtme Fighring VCfSW; Privacy and Civil Liberties 289 rJLIO", """U In::ur:investigation of the use of pcrf()rtUat1ce~ethancing drugs by ptof es. oQtairt¢d. a search • warram for computer fil., of laboratory records on drug tests for ten specific players The lab files they seized contained records on many more baseball players, and ordinary people who arc nm athleces. agents found thar more chan 100 informacion from files about pc()pk~ who \\'('rc nor specified in rhe search warrant. (Sec [he box above.) Can law enforcement agcnrs seardl laptops, and view personal files and confidential business files, as part of a general screening rourine ar airports, or do they need specific justification? We do not knO\\I yeL A \].S. Customs and Border Protection officer se-arched tbe laptop of a man arriving by airplane in the U.S. (News reports gave variom reasons; he appeared nervous, he \vas rravdmg alone.) A judge ruled ~hat because laptops cOIHam a large anlOum of personal information, the Fourth Amendment protects them. Searching a iaprop requires reasonable suspicion of a crime. 40 "fhe govcrnml'lU appealed the ruling. Government official.. say they commonly search laptops at airports and that the searches arc reasonable. What hllpprn~d to the Fourth Amrndmmt? Wolf it repclled somehou'? - A judg~, commeming on the seizure of lab rcmrds for drug tcsts. 41 Automated searches Fraud investigamts at the Federal'fradc Commission and rhe SEC surf the Web looking for indications of illegal scams. The SEC announced a plan to usc aUlomared surveillance sofn.v;Irc to crawl through chat rooms and Web sitcs, looking for suspicious activity or phrus 290 C1nptl'1' 5 Crime ir prohibits rh e use of similar software. in order (0 pro hxc the privacy o(its members. We saw rlU! court decisions allowed AOL and eBay [0 ban ." paIn and information-collecdng software from their silc.~ . Should {he} have rhe right co ban government survei]lance software mo? Should rhe govcrlUnt~111 nL'\...d a s\.'arch warrant", which n...'quircs a slX'dJic rcason for a st"'. lrch. before running its automated s ur v,-~ illanc(' sofrwarc on a sitt'? Or should we cXP\..~'t public Web sites to bcopen for all st'arching by law enforcement agents ? How might investigators usc automated s ur v,-~ illanc(' sofrwarc on a sitt'? Or should we cXP\..~'t public Web sites to bcopen for all st'arching by law enforcement agents? co mputer program rhac searches computer hard d..isk.~ for child pornography and sends e-mailmalawcnforcementagencyifi[findsany... This particular program was distributed a.~ a viru.~, Its unauthorized access to rhe computers it. searches is illegal tinder the CrAA. But clearly this type of aurornared search sofO'V'dfC poses a challenge (0 the Fourth Amendmenr in rhe U.S. and to compure a search warrant because a human being is not looking at rhe data. They suggest rhat automated search soft\....arc might develop into a reasonable solution fOf the pfoblem of searching it computer when a judge issues a warrant for specific information, Automated \$Carch systems would have [0 satisfy a number of critcria. Is the software good enough to find what it i..." looking for and dis(inguish files it must not disp!:\y ro [he invcSligawr? M;my people do not rrust, he FBI co sc3C 5.5.2 THE ISSUE OF VENUE Normally, prosecutors file criminal charges and a rrial takes place ncar the locaTion of rhe crime. (\'(lhen compurer Normally, prosecutors file criminal charges and a rrial takes place ncar the locaTion of rhe crime). crimes cro.~s st': lte and international horders, what bws ; lpply and where should rhe trial rake pbce? We di scuss international cases and issues in Section 5.6. Here we brieRy consider the issue of venue (dl , U is, rhe place where the c.: hargcs arc brought or where the trial rake "S plau") with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc
brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the U.S. as our exa mpl e:. Dccisions arc brought or where the trial rake "S plau" with the trial rake "S lbout where (0 file charges ,tnd hold a rrial have significam impacL We saw (in Section 3.2.1) that. for First AnH.'ndmcnt cases involving disrribution of obscene material. Ihe ~rogrdphil..'alloc.atiol1 was a cricical issue. because: commwliry sundards :ue an esscilliJI factor in determiningguilL [11 (:as,-'!; chat do not explicitly involve COIninLUlilY stand:.leds. venue is S[ill important. The gove mmcnr could choose ;l location where prosecutors have marc (;."Xpeni.se in compmcr crime orhcrc juries arc more likely to ~ Sc) ~ ~)li'W3l" /r,l,d(ing '~n !.imply \$~;Uth", 1'1' lilC'Il]emCl; th].1 m?i;e. ((he fi le] might (Un(:tiLl dlil] IklrllOgr.lphy. A l.:.:hni'luc ('IUd Il ui ... kly H'm!';!rC UT!>" llU!nh",., o(im,'gt iile; ag.'!i ll';(kll oWI! im ~gc.•. rThc rBIl\iJ {hi ~ lin a lew yCJr~ wilh J. s)'>tI:m it GI!!eJ C:UUi\'lUc. Sc.-ction 5.S Crime Figh(ing venus PrivalT and Civil Lib.!nics 291 renHn "guil ry" verdi cts. The choice of a locarion f.u from J dcfend:IlH's home ad versd r affects the defendant who must hire disfant b\V}'crs and [ravel a long disf:lnce to a rri:l i. Ddensc anorncys and law professors ~)oint. out t.hat the FBI can choose where to initiate an investigation or set up a sting oper:.uio n, to its own advantage. The FBI argues char. it rna)' and dol.~s sCl~k charges in the district where it discovers the c rime and docs irs investigation. The crime rakl.-s plan' in a n}' stale or disn:ict whl..'rc, for example, olle can pu rchase illegal maIcrial fur sale: on the Internet. Tlm.t; . rhe gOVt~mmclU has tr ied Californians in ICflnc-ssee and Pittsburgh. and a Kentuckian in NC\,-, York. In several cases, courts ruled against reqUt's IS by d efendan rs (0 move rrials co their home slale . Om' judge did grant .~uch a request. Judges make venue decisions at their discrerion. 5.5.3 THE CYBERCRIME TREA1Y The U.S. and European governments parri cipa{cd in drafting (he Council of Europe's COflvemion on Cyben.:rinu:. (\\fc caU il. simply. the cyhercrimG.: (rcaty).1:! The purpo.~e of the cyhercrimJ.: (rcaty) is to fosler inrerna t ional roopcTarion among law enforcement agencies of difTercnr countries in .fighling coprrighr violarions, distribution of chi ld pornography, fraud , hacking, and orher crime oniinl'. 11 requires countrics rhat sign 1111: (rCalY (0 adopt laws to implement its provisions, standardizing 292 01aptcr 5 Crime.' Thus, (he c)'bcccrimc (rcary will likely help law enforcemcilt agcncie~ fighr some serious cybcrcrimes bur pos.sibly ;!! t.he COSI of reducing prorcction for civil liberties in freer countries. 5.6 Whose Laws Rule the Web? 5.6.1 WHEN DIGITAL ACTIONS CROSS BORDERS In 2000, [he ILOVEYOU virtLe; infected tens of millions of com puters worldwide, destroying files, collecting password ... , and snarling computers :u major corporations and government OIgencies. Yet, prosecurors dropped charges again the Philippines man believed to be responsible. The Philippines had no law against releasing a virus at the time. (It passed one soon after.) Should police acrest the man if he \'isirs Canada, (h~ U.S. • Germany, FrancC', or any of {he other countries where ch~. virus did damage? It is tempting [0 sar, Yes, he should face .3rres(in any couorry where rhe virus caused damage and rt'k~ing viruses is illega l. It might also be reasonable that prosccuric) J1s for denial -of-service anacks. chefr, frJ.ud, and .~o on rake place in countries where rhe damage is done, nor solely in the country where the perpertary of arred. But we need to look carefully af the impact of applying rhe S; lime polk)' to allaw.s. Figure 5. 1 lists some of rhe subjcc{ areas in which national laws differ. Section 3.3.3 reminds us of the kinds of content and publishes a blog ahoUi rhe d emocracy movc mem in China. The blog is legal where &.me Art a.~ Where Nafion 31 UW.'i Difft..r St'Clioll 5.6 W'hOSI" Laws Rull" the Web? 2?3 wriucn. hut much o f it s courem i~ illegal in C hina, bet:ame, in rhl... vicw of [he C hinase govcrn menr, discussion of democracy damagc... the ~ocia l order. Would we consider ie right if C hina arrc.'its jo urn:llis(o n a (rip rhe[e:- to visi r rel at ives? If a company sells a producr or sl'ryicc on the Web in a coumry where it is k-gal. should its employee... face :ures(.md jail if they visit a co ullry where if is iIIegJp ~111c L'hmgers me Rt'ipomibility / 0 pr~lJ(llI III.UH It is the responsibility of prov iders of services and information to make sure (heir mart.'rial is !lot acc('ssi bl ~ in countries where it is illegal. They may be sued or jailed in I ho.s~ cou ntries if they d o not prevem access. In the nc)({ few sections. we describe more incidencs al\d discuss argument'i for and against: chis point of vi,,"W. 5.6.2 ARRESTING FOREIGN VISITORS Altho ugh it mighr appaU us when China a.rrcsts a fore ign journalist, governmem.~ of d em ocraric co untric ~ arc pursuin g cases based Oil the same principle. Applying U.S. copyright law to foreign companies Elco mSoh. a Russian company. sold a computer program that ci rewrvents co ntrol s embedded in Adobe Systems lnc 's electronic books (0 prevent co pyright infringe ment . A buyer of {he program could use ir for legal purposes , such 3S making backup copies or n~'J.d i ng an e -book on diHl~ rCnt devicc...-or (0 illegally make copyright ~ illfringing copies. 'f he program itself w.u legal in Russia and in mos.t of (h~ world. bur nO(il\ the United States. Distribution of software [har t hwarts built- in copyright prorection 294 Chaptel' 5 Crime violates the Digital Millennium Copyright Act (DMCA). (We discussed the D.\1CA in Sections 4.2.1, 4.2.3, and 4,3.2.) When rhe program's author, Dmitry Sklyarov, came to the U.S. to present a talk on rhe weaknesses in control software used in ('-hooks, he was arrested, He faced a possible 25-year prison term, After protl~sts in rhe U.S, and sevt.'ral other countries, the U.S. to present a talk on rhe weaknesses in control software used in ('-hooks, he was arrested, He faced a possible 25-year prison term, After protl~sts in rhe U.S. to present a talk on rhe weaknesses in control software used in ('-hooks, he was arrested, He faced a possible 25-year prison term, After protl~sts in rhe U.S. to present a talk on rhe weaknesses in control software used in ('-hooks, he was arrested, He faced a possible 25-year prison term, After protl~sts in rhe U.S. to present a talk on rhe weaknesses in control software used in ('-hooks, he was arrested, He faced a possible 25-year prison term, After protl~sts in rhe U.S. to present a talk on rhe weaknesses in control software used in ('-hooks, he was arrested, He faced a possible 25-year prison term, After protl~sts in rhe U.S. to present a talk on rhe weaknesses in control software used in ('-hooks, he was arrested, He faced a possible 25-year prison term, After protl~sts in rhe U.S. to present a talk on rhe weaknesses in control software used in ('-hooks, he was arrested, He faced a possible 25-year prison term, After protl~sts in rhe U.S. to present a talk on rhe weaknesses in control software used in ('-hooks, he was arrested, He faced a possible 25-year prison term, After protl~sts in rhe U.S. to present a talk on rhe weaknesses in control software used in ('-hooks, he was arrested, He faced a possible 25-year prison term, After protl~sts in rhe U.S. to present a talk on rhe weaknesses in control software used in ('-hooks, he was arrested, He faced a possible 25-year prison term, After protl~sts in rhe U.S. to present a talk on rhe was arrested. Sklyarov rerum hornt' bm pressed a criminal case agaicL'it EJcor!1.-)ofL In 2002, a federal jury acquitted the company of criminal charges, ElcomSoft claimed ir did not know the program was illegal in [he U.S, and it stopped disrribucing [he program was illegal in [he U.S, and it stopped disrribucing
[he program was would be successful against a company for continuing to distribLlte a product that is legal in its own country. A company bast.-d. in Antigua sells a program thiu it claims dl~feats the comrols on high-definidon DVDs and Blll~ray disk~. Anrigua. docs not have a law like the D~1(J\ making sale of such a program thiu it claims dl~feats the company bast.-d. in Antigua sells a product that is legal in its own country. A company bast.-d. in Antigua sells a program thiu it claims dl~feats the company bast.-d. in Antigua sells a program thiu it claims dl~feats the company bast.-d. in Antigua sells a product that is legal in its own country. A company bast.-d. in Antigua sells a program thiu it claims dl~feats the company bast.-d. in Antigua sells a program the U.S ----"&utt'f.\ is.l global ncw~ service dldl fm.:usc~ un nu\inns Sn:tion 5.6 , .• _ • _ .f \. ""~""""~ _ b" _ yO/~ j ust don't '~'_~ mwei ((/ th~ .-.,. ...-.~.~ government or the movie studios rake against this company? What action is jUHified? Arresting executives of online gambling and payment companies The U.S. arrested David Carruthers, -------us. ... ,~·---- Whos!." Laws Rule rhe \Vc.-b? countries Under dcfa m3ri on law, wc(.-ansllca p erso n. business, ororgan iz~r ion for sayings()meriling false and dam;lging w our repuration in prim or in orher medi" such as television or the Web. Libel iswriIIcn defamar.ion ; slander is verbal. A well-known Australian businessm:ln. Joseph Gumick, ci.umcd that an artid: in Barron's. a business magazine, suggcsred [hat he had dcalin~ with a m OJ1L")' launderer and was involvc:d in other shady deals. Gutnick and others in Australi:.!: who subscribe to wsj.com. dlC Wall Strut jOlll'lltl/'s \'(feb sire. read rhe artide onlin('. Mr. Gumick sued Dow J(HICS & Compan.y, tilt.' own\.'r of & rr011J :md the Wtt/I SlTfi'/ j{)uma/. f()f libel. \' u.s. SlIpu:rnc Ct)ufl) gave m.'ws org:wi:l..li/lu, 2006. in .l. ·· LtI1Jm~flt Luling, Ihe Brllih bw t UM (,li nliLu to Ihe protection rrum libel suiu fur respumible jourIL~liu u ttll'Alm: tel Ihe pLLbli.: ']a Dow Jones argued that rhe Gumick case sho uld he moved. ro ,-ht.' U.S. • where {hc}' published (he article and where (he wsj .com ...>crver is. Gurnick argued for l I_rial in Australia. where rhl' article did lhe damage to his rcpu{;trion. The Australian High COlin rulcd that (he uial would be in Australia. EvemuaJly. Dow }0111."5 settled with Mr. Gucnick. paying him a large sum. 46 The G umick case is not an CXHcm t cxampk of the responsibility to prevent aCCC-S5 principle becallse libel is illegal in both COuntril's, and it is concci\abJI." that Gurnick might have won rhe case if (ried in tht' Unil,ed Statl!s. 'rhe implication of ('he case, [hough. like the Yahoo ca...;e described in Section 33.2, is I.har news publishers must block access to articles by people in countries where publication. of the first rime in 2006. It reprogrammed its geolocatioll rools, normally used for targeting advcrriscments, CO block people in England from reading a new'S article. The article described the investig, (jon of SU!ipeL'1:S arrested in the alleged plot to carry liquid explosives omo airplanes lnd blow them up. Publishing information d States. i f Any sol ution (0 (he problem of differing nati()naiiaws among frct. counuies ill\olvC's some compromiSC'. The N~", lurk Ti mt'!. in explaining its decision ro block the rerror-plm a rticle . said that although England docs not h~we J First Amendmenr protoning freedom of (he press (0 the exfent the U.S. docs. England docs have. a fn.-c press.. alld it is f(.'asonablc (0 respect irs laws. The N~w York 7ime! action shows that major IL' WS pub.lishers have rht. legalstaRs ;md (he r.... hnical rools to h:llldle differences in England. Suppose a U.S. blogger wirh readers in England r('p~a[s some of the information in the article. \'(that happens to these: individuals. who do nor havf.. a kgal staff and gcolocation tools, who might nor know the article is illegal ill another country? libcllawas a threat to free speech In U.S. libel cases where [he panics : u c in different sr:HCS, court~ may rule thar rhe Itbel (and hence the (rial) takes place where rhe damage happens. The Australian court'S dccision {o hold rhe Gurnick ca.'ic trial in Ausu"Jlia is consislclH with fhar approach. Jr ror make.'i sense, ar lC.lst rca.'ionably free coulliries like rhe U.S., Ausrralia, and England. Bm what happens if we generalize to oppressive government.,> that. usc SHier libel laws tor political purposes? Saudi Ardbia bans "anything damagi ng to rht~ dignity ofhcads stare. ,,4NRussia made it a crime (0 slander government officials. GOVI'rnmCnl o fficials. GOVI'rnmCnl o fficials. GOVI'rnmCnl o fficials in Singapore and his father. the former prem ier, demanded (hat the Hong Kong-based Fflr Ett]I('Yn Economic !Ut]i~with a crime (0 slander government officials. GOVI'rnmCnl o fficials. GOVI'rnmCnl o fficials. remove from ir.s 'X'cb site an interview wirh a political opponent who crilicized them. They sued rhe publisher and editor for libel. A lawsuit or criminal or SeClon 5.6 \V'hose Laws Rule tht: \X'cb? 297 chI.rgC'.~ in th('se countries again~t a foreign newspaper or a visiting journalist or blogger is more rhreatening ro hOnC5(, critical news coverac rhan holding a libel [rial for a U.S. publisher in Australia. Commercial law The European Union bans ads for medical drugs directed to consumers. Such ads arc legal and com mOil on cclt-'vision and on the Web in rhe United States. Some European Concrises have orher restrictive laws about marketing. For example, rhey prohibil or restrict direct price comparisons, product giveaways, and advertising ullconditional-rerurn policies or that a business gives a contribution to charity for (.'(lch sale. {The jusri6carion for these laws was [hat such practices and adwnisemenrs confm.: or trick consluners.)49 Should commercial Web sires WIth drug ads or price comparisons have (0 screen out shoppers from counceies where they are illegal? Enforcing such laws on foreign granbling sires to exclude U.S. cidzens. 5.6.4 CULTURE, LAW; AND ETHICS If publications and Web sitL'S must comply with the laws of roughly 200 countries. would the), protect themselves by avoiding anYlhing controversial? Will the exuaordinarr bene/irs ofimernational news blogging shrink under the burden ofie-J.rning every olh"'r country's laws, (he need to block potentially illegal articles, and [he chilling effect of uncertainty? Some fear this would destroyed a strong every olh "'r country's laws, (he need to block potentially illegal articles, and [he chilling effect of uncertainty? Some fear this would destroyed a strong every olh "'r country's laws, (he need to block potentially illegal articles, and [he chilling effect of uncertainty? Some fear this would destroyed a strong every olh "'r country's laws, (he need to block potentially illegal articles, and [he chilling effect of uncertainty? Some fear this would destroyed a strong every olh "'r country's laws, (he need to block potentially illegal articles, and [he chilling effect of uncertainty? Some fear this would destroyed a strong every olh "'r country's laws, (he need to block potentially illegal articles, and [he chilling effect of uncertainty? Some fear this would destroyed a strong every olh "'r country's laws, (he need to block potentially illegal articles, and [he chilling effect of uncertainty? Some fear this would destroyed a strong every olh "'r country's laws, (he need to block potentially illegal articles, and [he chilling effect of uncertainty? Some fear this would destroyed a strong every olh "'r country's laws, (he need to block potentially illegal articles, and [he chilling effect of uncertainty? Some fear this would destroyed a strong every olh "'r country's laws, (he need to block potentially illegal articles, and [he chilling effect of uncertainty? Some fear this would destroyed a strong every olh "'r country's laws, (he need to block potentially illegal articles, and [he chilling effect of uncertainty? Some fear this would destroyed a strong every olh "'r country's laws, (he need to block potentially illegal articles, and [he chilling eff [he openness and global information Row of the Web, that (he \X'eb ""'QuId come to reflec[some combination of Muslim restrictions on discussion of religion, U.S. opposidon to online gambling. and Chinese censorship, Others argue (hat companies would adapt and acquire software to handle th:: appropriate screening. Jack Goldsmith and Tim \'(/U, in {heir book Who Controls the iNternet?, argue that the "global network is becoming a collection of nation-stare nerworks"So and that this is a good thing. The Nct, Goldsmith and \'(/u believe, will be more peaceful and productive if each coulHry controls contenr \",i[hin irs borders according [Q its own history, culture, and values. Goldsmith and Wucks "So and that this is a good thing." point E>lforriTl~ om that many p~'Opk' and governments (in both totalitarian "",mill/mIt coumries and democracies) consider the freedom of speech enjoyed ~'s 298 ChapIl'r 5 Crime between law :IOd ethics in Chapter 1, h:wc many ign oble IIOurCCS. Who want~ censors hip of political discussion on the Incrncr in C hina-the people or the Communist Party, which is rrying to maimain political control? The U.S. defends its ban on offshore gambling .~i lcs with tht, argument that it has the right (0 ban morally objectionable activities. C l:rl ain ly. therr... arc many valid c.riticisms of gambling on social and ethical grounru. bur (his argll lllcnr from [he government is not convincing. T ht' fede ral :md Slate government[s allow a nd lax many forms of legal g-ambling 'Web .- ites. Consider Canada's and Fran cc'!; rcsffit.-rions 011 showing U.S. {eh.."Vision progralns. Somc defenders of tht'Sc laws emphasize pco{ccting (heir cullurc from being overrun by U .S, culture. Othe rs (e.g. • in Canada) arc frank about (he purpose being
w provide jobs for Ca nadialls and [0 protect the financial health of the small domestic broadcasting industry. Within each COUNIry (hat has similar protectionist laws (including [he U.S.). (here are snongly opposing opinion s abou t whether such laws 5.6.5 POTENTIAL SOLUTIONS International C:1\$CS among [he couOlrics that sig n them. Coumrics in rhc World 'ltade O rganiz.a ti on (WI O) agree not to prevent their ci tizens from buying cerrain services from ocher countries if those servicl.:s arc leg.!.l in rhcirown .51 1'his is a good Slep. a gcnt'r'Jliurion o f the principle in rhe U.S. that the individual st.ares ca nnor. discriminate ag:tinst sellers (oflegal products) from orher ,.;rare-s. (Rcclll rhe wine sh ipment and real ('srare s;tk~s cas ~~,s in Section 3.2.4.) Bur (hi s WTO agree ment docs not help when a product. service. or information is legal in one t:ou nny and not another, T he cybercrime treaty (Section 5.5.3) another, T he cybercrime treaty (Section 5.5.3) another treaty (Section laws we discuss in t his secliol), es pecially t.hose that rt.--guLue the co n(ent o f sl,eech. II doc~ no r add ress [he problem thaI. s.ome coumries outlaw common activi ties that peoplt: in other COUntrics strongly believe should be legal. Secrion 5.6 Whose Laws Rule rhe Weh? 299 An alternative principle An aicernarivc to the responsibility fO prevent access principle-call it the au thority to prevent cnur principle-says the following: Authority 10 prl'VCfII miry The government of Co untry A to (ry to block the entranc(, of m aterial that is illegal. there, but may not apply its laws to the people who creact: and publish thL" material, or provid",. a service. in Counay B ifi r is legal there. For l'xamplc. the Soviet Union jam med radio broadcasts from \VeS{CfI roullrics during (he Cold War. It did nO(haw an interna donally respected right' ro ord er the broad casters ro stop broadcasting. This principle might be particularly useful fc)r services such as gambling, which is a prominent pare of [he culture in some countries. illegal in ochers. a nd rL--gufated and tax,L-d in still others. Wil"hill [heir borders. uarional government 300 ClupII"1 5 C rime EXERCISES Review Exercises 5.2 Whardid Ih~ word bllc/UT -mean in the carly d:z.)'S of compuling? Is it Icg:z.1 to release a com-puree \'irus thar pUts a funny message on (>Cop lis screens bur dOC'.1 nm dam:tgC' files'? 5.3 5,4 5'.5 5.'6 5.7 What is phishing? Describe one method financial Web sire; ~ ro convince a consumer the s.i(~ is aurhenric. 'Wlut is one "problem withusingbiomeuics 'for , idendtii:ation? ·What is onc techniquc used to reduce online auction fr'~ud? For , what ' Wch basedservice didche U.S. government arrest several busille5S executives from 5.1 Engl:l~d~ General EXerCises 5.8 Chri.slogso'n to YDurcOmpU(Cf .Ole nighrwhile}'Ol!slerp and uscssomeofyoursoftware. Robin rakes your Clr at night while you sleep and drivcs it around for a while. (Nci{ht'r has:your permission: neither does d.1n\age.), List several cha.racrerisrics of Ihe two events that are similar (characreristics .rdared ro the effects of the events.- ('dues. legality. risks. etc.). list several char:tcteristics of rhe two events that are ditTt~nc. WhiCh would off('nd you mord Why? 5.9 Young. ~ni'-"'311)' orienie.d hackers .ugued rhac~ if rhe: owners of .. compuler system wam '-0 keep ouuld('rs o_ur, it is -[heir responsibili])' to provide ben« 5ecurity. Ken Thompson. onc of (he in\ent) of UNIX, said, "The ace of breaking inro a computer system has:to_have: (he \$afl1e social !.tigma as breaking infO a neighbor's house:. It should nOf lOaner that the J\dghbor's door is unlockcd.,.:51 Which poshion do you agree with more? Give your reoaons. 5.10 Some peuple 11Cguclhat a hacker whodefacei It Web page of a government entity such as me White House. Congress, or Parliamenrshotild be punishro more harshly than a hacker who defaces a Web p~ge (If-a private company or organization. Give S()me arguments lor and against rhi.o;, view. 5.11 Some people argued (har anrition.org'~ \'(!eb sire archive ' of defaced \X'eb pages indirecrly encouraged ha(;;k,crs to vandalize sites by publiciz.ing cheir successes; What do you rhink? What arc rhc"\'alues or beneficial USt'S ofchc sire? Considering, the tmdr;--ofls between good tisesand bad ones. do you think it wa.~ a good idea for amirion.olg co maintain the public archive? 5.12 Om' g 'f OU)1 hacks a German government Web sire to protest the ban:on the disnibution of Nui material in Germany. Ano(hergroup hacks a German government sire to prorest the construction of multinational dia'in stores such as \Val-Mart, McDonald's, arid Srarb'ucks in Germany. Whidl would), ou mn!>ider .m example -uf hackri\-ism? Explain. 5. 13 Consickr , he ...logy """= tKc";on,] downlime on , he Web" ...,"''' of vin,,,,.. worn". or denial-oF-servia' attacks-ana vrhide lr.Jfi:c slowdown.~ on road.~ dwing rush -hour -o r bad w'eather. Describe similarities; then c;valuatc. All! both side effects of modern civilitation mat we have (0 gCI u.~d m? How can indh.. iduais-aoo busineSSC'l reduce. the negative impacu: on themselvcs? 5.14 .suppose a l(>-year-old hacker usa ;luromatjc dialing software ro Aoo4 -the emer!,'t:nC)' 911 telephollt' s;'ltetn with caUs;'knocking OUt 911 service:. What penalty do you chink is appropriarc ? 5.15 Evaluarc argu«ien-ts-in favor of and against~.liagt: uf a Jaw making the writing and puhJiurinn of a cumputer virus a crime. (Se:e Section 5.2.4'.) Would }'OU support ,s uchalaw?Why: Exercises 301 5.16 Gas stations. some grocery s.tores, and othei stores do not requil'(' a signature for crroir card pun:ha.'ies. Give arguments f{)(and against this practke. Do y(tU think retailers should always requite a signature? Why or why not! 5.17 To reduce scam... thatsreal from. people banking online. S(lme people suggest creating a new luternerdomain ".bank." available only to chartertd banks. Consider the idemity theft and fraud rechniquenvc discussed; Which lln~v."ould thh: new domain help prevent? For which would it be inefkctivt? OveraU. do youtbink it is good idea? W'hy or why not? 5.18 I'n Section 53.2, we gave an analogy between. retailers accepting some amount of shoplifting. on the one hand and.rerailersand crcdit~card companies accepting some amoUlit.of credit-card fraud, on the QtherhanJ. Identify a strength and ;I. weakness oOhis analogy. 5.19 We saw that hackers and identity thieves use many techniques and continually develop neW ones. Think up a new scheme for obTaining passwords or some type of personal informacion that mighr be u.~t'fuJ in identity theft. Then dCKrihe a possible response 10 protect ilgainst your scheme. 5.20 In Secrion 5.3.2. we described a customer authentication method, the site must stort' many details of acustometer a customer authentication method that calculates a risk score based on Olally details of acustometer authentication method that calculates a risk score based on Olally details of acustometer authentication method that calculates a risk score based on Olally details of acustometer authentication method that calculates a risk score based on Olally details of acustometer authentication method that calculates a risk score based on Olally details of acustometer authentication method that calculates a risk score based on Olally details of acustometer authentication method that calculates a risk score based on Olally details of acustometer authentication method that calculates a risk score based on Olally details of acustometer authentication method that calculates a risk score based on Olally details of acustometer authentication method that calculates a risk score based on Olally details of acustometer authentication method that calculates a risk score based on Olally details of acustometer authentication method that calculates a risk score based on Olally details of acustometer authentication method that calculates a risk score based on Olally details of acustometer authentication method. cusmmer's visits to me liirc. DOt,S this violate the privacy principles in Figure 1:1 of colle.cting only the data. needed aconot storing data longer than lleeded~ ...E..'{plain your an!.v.'ec. 5.21 To n3.ckpotential counterfeit currency, checks; and so on, some copying machines automatically print their serial numberon all copies they make. What arc some privacy implications, or possible dangers to privacy, of chis technique? 5.22 Contllenting on constitutional objecriotl.. to the SEC's plan to use surveillance sorrware to monitor the Web forpO\$sible fraud {Section ;.5.1}, an SEC officialsaid "'th~C()mtitUrion d0e.511't give people the right to usc theIntcmet {O commit fraud;,,5j Evaluate this response. Is it a good argument? 5.23 Suppose fingc1prim readers are a standard feature of PCs and an [SP requires a match (0 log in. Wouldr~.q1Jiring a passy.urd in addition to the fingerprim be redundant and pointless. or is there a good securily reason to require both? Explain. 5.24 Idencifysever.il issues raised by this scenario: Someoilcin CaJif(Irnia posts on amazon.COnl a very critical reviewofa new book wtittenbya Briti..h author. The review says the, wrjter is an incompetent fool without a sUlgiegood idea; hecan't even express the bad ideas dearly and probably did not gruduate from grade ~chbol; he should be washingdishe.'i instead of wasting paper and the reader's time, Theorem 2014 and probably did not gruduate from grade ~chbol; he should be washingdishe.'i instead of wasting paper and the reader's time, Theorem 2014 and probably did not gruduate from grade ~chbol; he should be washingdishe.'i instead of wasting paper and the reader's time, Theorem 2014 and probably did not gruduate from grade ~chbol; he should be washingdishe.'i instead of wasting paper and the reader's time, Theorem 2014 and probably did not gruduate from grade ~chbol; he should be washingdishe.'i instead of wasting paper and the reader's time, Theorem 2014 and
probably did not gruduate from grade ~chbol; he should be washingdishe.'i instead of wasting paper and the reader's time, Theorem 2014 and probably did not gruduate from grade ~chbol; he should be washingdishe.'i instead of wasting paper and the reader's time, Theorem 2014 and probably did not gruduate from grade ~chbol; he should be washingdishe.'i instead of wasting paper and the reader's time, Theorem 2014 and probably did not gruduate from grade ~chbol; he should be washingdishe.'i instead of wasting paper and the reader's time, Theorem 2014 and probably did not gruduate from grade ~chbol; he should be wasting paper and the reader's time, Theorem 2014 and probably did not gruduate from grade ~chbol; he should be wasting paper and the reader's time, Theorem 2014 and probably did not gruduate from grade ~chbol; he should be wasting paper and the reader's time, Theorem 2014 and probably did not gruduate from grade ~chbol; he should be wasting paper and the reader's time, author sues the reviewer and Amazon fOr libel. 5.25 If U.S. law enfOrcement agenu in the U.S; ('aught the leader of a South American drug gang that smuggles drugsimo the U.S., they would arrest him. Is this .comparable to arresting Dmitr)' Sklyarov or David Carrumers? (See Secrion 5.6,2.) Explain similarities and dit1-erences. 5.26 Using some of the ethical principles in Chapter 1, analyLe the ethics .of the action of the U.S. hiogger who posted details about the Canadian trial (se(: Section 5.£,.1), Do),ou think he should have done it? 5.27 Asswne you are it professional working in your chosen field. Describe specific things you can do to reduce the imp;l.ct of any two problems we dis(;ussed in this chapter. (Ifyou cannot think of anything rdared to your profe~ional field .. choose another field that mightinterl!st you.) 5.28 Think ahead to the nexrfew years and describe a new problem, related toi~suc\$ in this chapter, likdyrodevdop from computing technology or the Web. 302 Chapu:r) C rime Assignments Tht'u t-xm:isd rtquiIY S(im~ rrJ~llrch or dCliilitj. 5.29 Firid a dOl-en new"i; and/or maga:7.ine articles ab'out hackersftom niai'riscream media from the past few ye;m:, How;lt(' hackers de.scl'ibcd, as 'riminal.s or heCOC'S? Give examples. 5.30 Hnd ;In article". abom compU[.(,r forens ics. SummariZe [he ((:chniques d('ser-i~d in the.article . 5.31 Find-a"US(' ofbiomeuia. in your city. Describe the application and in bcne6n and risks. 5.32 Fi.nd-the final decision ' or currtnt status of the caS('...dcsaibed in the box "BASEBALL. LABORATORY FILES. AND THE FOURTI AMENDMENT' (Scction 5.5.1). 5.33 This exercise', ~~I, ~H:s whC"thathe Fuunh Amendthen ptotcas 61c:s: io n ,,:I computer during ,\$ervicing< "Whn~ :K;rvicing aquromers comp~ter. a tedmician found marcrial that he thought, illegaL He,'caUed police y,'ho eXainined Stl~leof the fileS without a search V\ was. Class Discussion Exercises T/jes~ exa-cUes are for clasl JisotlJion, pabnpi wirh shorl pmmrurioll.iprrpnrrd in advance by Jmallgroups o/!tudmti. 5.34 Suppose a dc:ni;jJ.:of'':service anack s~1,lt;S' down},V"o dozen major Web sites. indudingrIJdem who aaivated the virus program and relcaseclit £Into the1nrerner. •. The pr~ iden.t .of checollege~ • The presiden t of thccollege~ • The president t of thccollege~ • The preside deaths of the cwo patients. Divide rhe class into rcn. rt!"Ams: five (one for .each person) to present ddl:nse argument.... Notes 303 After the presentations. use a class vote or discussion to decide: which, if any, of the: characters should nor be considered gtiih:y at all; which, if any, should bear a high dL"gn"e of resp analogies from s~ral.other rechllo1ogie~or areas, 5.38 Suppose a local community C('nter has invited you, a group of coHegestudenrs, to make a I5-minute prt"Senration abour pcott.'Ctlng against identity theft. man and give [he pn.'sent:ltion. 539 Suppose you are on a.wil. 5.40 Discuss· prm and coils of law cnforcemenruse of aurornated sear~h software (de..~cribed in Section 5S (ofiod evidence of crimes on Web sites, in chat rooms, andoll PC.... n 1. I h, IV: ~t"t"n c:;timJt;, Eilgiil, 'niill, li'liIn; J.UlUM~· 15. 19'16, 1'1'.20, 22; J~red :;Jlldht;rg, ~AOL TightcM Senrily "Iter lhcl.;ct" foil th~ Servi..:e with hke A(UlUm~, "Widl SIT jUl/mill, S~ple!IJbt'"t 8, 19')';, p. B3; Marc L SOl1gini, "Hv,;p1(ll Confirm., C{'f'yiug ofPatiem Fi1(.\1 lly HJ.cl.;n,- C()fltpu/t'nt'vrld, Del'cmber 1),1000, archiven:ru)'C{11J.:r2000rrECHh1)mpIHingi I?,i I '/11' 'pial. kllhddg.iiudn.lurnl (....·le.;~eJ Sep{~lllht;r 7, 2(MFL U. W. W"Yl Gillh" "Profik DMI Eum':-l: SdrlltiJit Amrrkan. April 1997, pp. 32, 34; lll~l S,Illdbag, "Hob III tbe Net," ,\'rW!'UNrK, hbruMY 21, lOOn, pp. 46--4'); ;l.ltrition_org 304 lA, J:> 16 17. l8. Cluprel 5 Crime "\'itluh"w,ll Ort!~,,,,d fot U.s. l'~nw.gon HMkt {S. " S..mJa.ef. "ice I'ft,;;;it.iem of Sy)llJnI~(Security Re"ponS, lUll! Slreet jwm(Ji, 2>1 Mm:h 21. 200? p. H·lB. B.uhJr~ C~mm. "Arl Unsolv~ John J. Fiatb, "Tht LJ.t 19...\hrk ~hni"tl .. nd Abb" GtKldrum. ""lcm,ri,m or Ci\'il1X..ol.>(;dicIKc-: liw••ud ~ H;n;h,vi~l EtL,i(," irl 20 12 23. lD, 1';)')5,1" AI, AS. Nt.ulings in (Jib(rEthi,~. ed. Rid\J.N A. Spinello lnd }-krm~l T. IJ.vJ.ni UOlle, ~nd lhnlen, 200]) 29. S;l.ui Ihn~dL ·tJ.S. Wot~!" SmJ... DJtl nn 11,000. Agent)' SJ.ys," IVi'1I' y",k lima, Ap~i1 (" 1']96, p. (,. pp.46J-·47J. 30. .Iohn Pnrv fLu]!,,,,, "CrimI' lm.11'llukmem," n,('o'('/>(Ii,' Strrh H.-vim'. flll ! 990, pp. 44-57. (This atti~le ,jes(rir...~s;Uld (ummems on M'Vt'l-:aJ e~rly hJ(·k.'1 -.-~>;(' ,.) 51. W'ilh, "In the Arc~nl' Culture of Cum put a t-iKkl:'t" 31.. Kw Doon 21 S:!~y Cio;1/l 199("W. \ti~Yl Gil,I". Bidding Oil Ha(:kjng>,~ S.1II [)iCf//' fight Lo~t in Computer D;II\io::1 K.ldlc JII) Mi."lullinor~," TiWt. C;\.\ t\; Pairt:~aln and ~EI \X'ebworld:' US D~pMtm ,yhel1,:rimdu-\.J.m~y2001_:thltl\ (;lC("C~M:J Scplcmtx::r 2. in EnmJ...x Ho~x Se!llclln~d,~ U.S. Sc-curiti...; ~tld E)(duilgt C()IIII\li~si()n, Augll>t 8, 100l. w'_.L"C_g()\'/liligJli()n/litrde~'A:j;Jlr 1:094 Jam (J.,cc~>td 20(7); "Def(:!\d~m Septt"mber 2. 10(7), _3 .>8. 59. 40. April 4, 2007, p_MI. Jeu;" Evers, "O'lrI't L':I Your N""itplion Sy~t("" Fu,)1 You." CNET :\cWU'OJll. April 30,:!I)07)]8, ::001. OC1 {fbn 2. :WO(), pp_ 52-54. J'i. Clui!;(nplicr M. E. P,dtHtr. "lh_dng in lllf ... rucl halld [-"nutl."] Sdo-mji, ,14; Rubt'n Fox, "New;; Umon~Frihllflt, nr R April IX. 2001J. .14. ~l'n:)fik, Dilh tho(i;lted I'r ~H:.Iy,-' ""-W_l hCf ilf 22. Lax.~ CiJI/lmlwic,liimr; ('j"fiJrACl'.!. July 1')99, p" 10; \X/aut" Roush, ··Halk.:rs,' h,h,w!"JV Rrl'>'(,II', April I " T.:Ut;~'1 Dthlt-C~tJ RCJ.den: WJI! SIIYrljmlrnd/, h-brdl !t lOOt, pp BL B2. 'Inc Idemi!')' Thdi and :\~umpt!()n Defcrrence An of I ']'IX, I fi IJ .S. C § I021i, wwW.~>O!lMIIIltt,g,,¥/ldf"cfl WiUillm M. Bulkd;:;.', "Huw Biometric Se(urit)' h F:J.r frull FuolpmoC \XMl Strrttj 1006, p. In. :U. Li'I.!'1 I-hrr;mn. "US L.."'yJb Jadi(.tcd tiu ShiH AmaicA'I, April 11)97. pp ..n, li:4Ck: NASA CompUtt"f S.:ouity 24. J"'''ph Percir", "How Crt'dit-C"-f 41. SEC 1/. CIIlt. Nu. ()o425, \hrel. 1, 2000 Rohert Lel1lth, ';Swck S.... mmer Ctl, C{)Jll~Jr (h" H"lid~y,: Tlv R''giitfr. fb:l"lllher lX, .!O()('. voww. 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Ma nufacturing p roductiviC)' in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productiviC)' in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. more: [han doubled bt.,twl'Cn 1980 and 2002. 4 During the recession of 100 1. overall productivic)] in {he U.S. ;1111111>1.d'.I.e wlllillr, ;on.l 'wi lluire h"lf til!: 'Hlull ptlp u1.uiuu uflbe L"IU' tr y ~J lel"pll hirillf, c\)mp~n;"~ or tml'!\)yt"t\~ ill miter cnuntri~. 320 Chaptel 6 Work fOreigttc.ompanic\$ AmeriCans.· 'used.·to import cars from Japan. Now Japanese car makers build cars in the United States. Otte> Bock Health Care, a German company that makes sophisticated ervi('c jobs rhat could be performed a[distant placcscandida(t'S for offshoring in (hc;.o ncar future.17 He estimated (hat 28-42 million people currently work in such jobs in rbe United States. Thus he St. 'CS o(fshoring 4lS po(cnrially very disrupeivc. However, Blinder etnp illsizes ,hat offshoring means massive rr:msirioll, nor massive wlcmploymenc The 10s(jobs arc obvious. The discussion in Sect"ion 6.2.1 about jobs eliminated and crear.ed by com purer ,Uld communications technology in general. suggests how of[~horing crc;ncs nl;'\\' johs. Lower labl'r ('osts and incre,lscd e(ficiency rcdUi.T prices for consumers. Ll'wCC prices cncoumgc mOfl' usc and make ne\Y producu and scrvi.ce~ feasible. Manufacturing of computer hardware wenr of[\;hore l-arly. The u.S. is an exporttOr of services (banking. engineering. accounting. for example). The same rechnologies rhat facilitate olfshodng make it ca.'iicr and cheaper for O.S. service companies to sell more ()f their services 1'0 other countries. Oflshoring creall; ~ jobs foc both low~ and high-skilled workers in less \.... ealrh}, coumtries. Oflshoring creall; ~ jobs foc both low~ and high-skilled workers in less \.... ealrh}. customers and compank"S arc finding, offshoring has prob.lems. Consumer is a. 322 Chapu'r 6 Work workers in India work at nighr. Some find rheign accents arc diffic ult to undersfilnd. Service personnel arc not familiar wirh the product or service call centers in toreign accents arc diffic ult to undersfilnd. rclariwly high pay worch (he di~nlp (ion to their lives; others quit. Problems of clLo; ro mer sarisfaction , training, and Icss-rhanexpected savings led some companies (0 conclude that off of U.S. salaries {O 75% within {WO ycar.~. Hiring (hem is no longer worrhwhi k for his company. Tht: probl~ms of offshoring sho uld nor surprise us . A theme running through this book is (hac new things ofren have unexpected problems. We discover chern and fin d solUlions, adapc (0 changes. or da'ide noc to use cer~in opriolls. Simple economi cs (dis us {hat salaries \\'ill rise in oHshoring destinations. When rhe gap betweell salaries in rh(! home and destination countries is 110 longer big enough (0 cove r the olher expenses of oHshoring, the trend will decline. When products crou burdt'r]. bul/t't! don'r. - U nknow n Ethics of hiring foreign workers There is much mntrovcrsy aboU1 both che economics and erllks of offshoring. rn this section we apply so me of the chied theories wc prescnted. in Chapter 1 [0 analyze (he practice from :Ul ethical perspective. T hi s is a good. example for trying m distinguish economic adva ntage from elhical argument s. \\c consider Kanlian and ueilil)' approaches in the analysis. Scvt.'faJ counni es h; lVc!' pas.o; cd legislation to rcsu il.:"t the hiring of fi::m:ign workers for some industrics. The discussion here might provide in:->ighc inco the ethics of such legislarion. H ere is the scen:Hio WI..' examine: You arc a manager at a software company about ro begin a large sofrv. arc proj cct. YOli will necd to hire d OZI'IIS of new programmers. Using rh,' Internet for communication and soft wan: delivery, you can hi re p wgrammers in another cOllnrry at a lower .- abr)' (han progr.unm{'rs in your counrry!' (han progr.unm Should you d o lhis?!!? For the disl..'ussion. we assume [h e software company is tht: U.S. and rhe manager is choosing' betwl>t:11 U.S. and Indian programmers you might hire. Before we coll."iider other people, we will use utilitarianism and Kant's principle about treating people a'i ends in themselves (0 generate some ideas. questions. and observations about these two groups. How can we compare the impact on urilit>, from the two choices? The number of people hired will be about treating people a'i ends in themselves (0 generate some ideas. questions. and observations about these two groups. How can we compare the impact on urilit>, from the two choices? The number of people hired will be about treating people a'i ends in themselves (0 generate some ideas. questions. and observations about these two groups. How can we compare the impact on urilit>, from the two choices? The number of people hired will be about treating people a'i ends in the some ideas. appear TO be any reason, from an ethical poim of view. for placing a higher value on the utility of one group of programmers merely because of [heir nationality: Shall we weigh the' utilities of the programmers merely because of [heir nationality: Shall we weigh utility by compa.ring the pay ro rhe average salary in each coumry? That favors hiring the Indians. The utility obtained from a job for an individual programmer depends on the availability of other jobs. Are there more opportunities to earn a comparable income in the U.S. or in India? We see that a calculation of net uriliey for the programmers depends on how one evaluates the miliry of ehe job for ('deh group of programmers. What happens when we apply Kane's principle? When we hire people for a job. \\'e arc making a trade, money tor work. The programmers are a means to an end: producing a markeTable product at a reasonable price. Kant docs not say that people must not be treated as a mC' employees. We can argue that treating the Indian programmers as end..'i: in themselves includes respecting to their own jlldgmenr, in panicular in offering to work for lower wages than U.S. programmers. But there are special ca."'es itl which we might decide otherwise. First, suppose your company is lobbying for import restrictions on software produced by Indian firms, for example, thus decreasing the availability of other programming jobs in India, then YOLI are manipulating the programmers into a situation where they have few or no other choices. In that CfISC, you arc not respecting their freedom and allowing them to compete fairly. You arc, then, tlor {rcating them as ends in themscive..., \X'e will assume for the rest of the discussion thar your company is not doing anything like this. 324 Chapt!.':I 6 Work Another reason we might decide that the Indian programmers are nor being tre:.m:-d as ends in themselves, or with respect for their human dignity. is that their working conditions chat U.S. fL"(luires). The programmers might not gl~t medical insurance. ThLl' might work in rundown, crowded offices. ladcing air-conditioning. Is hiring rhem to work in such conditions in their country? Whether or not if is elhically required. there 'lre sl'veral reasons why you might pay more (or provide bener working conditions) than market conditions in India require: a sense of shared humanity {hac motivates you [0 \'lant (0 provide conditions you consider desirable. a sense of
generosiry (i.c., willingness to contribute to the improvemem of rhe standard of living of people in a coumry less rich chan your own) and economic benefit; paying more than L"Xpecredmight get you high morale, productivity, and company loyalty. ,~o Governments have passed many laws to require that the same salary be paid to all workers when a large group of porenfiai workers. Historically. of e of (he cHens of these laws is thar rh(' rraditionally higher-paid group gets most of the jobs. (Often thar has been the intent of rh(' law.) In this case, the almos[certain result would be hiring the U.S. programmers. The law, or an. ethical requirement that the pay of the Indian programmers and the U.S. programmers. The law, or an. ethical requirement that the pay of the Indian programmers. inwmcs of programmers in the U.S. and the profits of companies that pay higher salaries. New workers or businesses that are trying to compete by lowering prices generally oppose such requirements. Your decision meers other people besides the programmers; your customers, the owners or stockholders of your company, and indirectly and to a smaller degree, peopk in Olher businesses. Hiring rhe Indian programmers increases the utility of your company and customers. 'rhe customers benefit from the pro/irs. If the product is successful, rhe company might pay tlH advertising:. distribution, and so on, providing jobs for others in [he United Stares. On rhe other hand, if you hire U.S. programmers, they will spend more of their earnings in the U.S. {han thc Indian programmers, generating jobs and income for others in the U.S. for others in the U.S. {han thc Indian programmers, they will spend more of their earnings in the U.S. for others in the U.S. f on all its employees and suppliers. To which of all these people do you have rcsponsibilitics or obligations? As a manager of [he company, you have an obligation to help make [he product and the company successful. to manager the project (() maximize profit (not in a manner independent of cthical considerations, as we noted in Chapter 1, but consistre (wirh them), Unlcs.~ the owners of the company have a policy to improve [he standard of living of people in other countries or to "Buy American," your obligation to them includes hiring competent workers at rhe best price. You have some responsibility for the fate of other company employees who might lose their jobs if you do a poor job of managing the project. You do not havl' all)' special obligation Sl'Clioll 6.2 The Impacr un Employment 325 ro orher service providl'rs you wuld hire, nor ro pi.:oplc seeking johs 3S programmers in either countries is often dc...;;crih..-d as eebically sus(X'(;t. ellis discussion suggests (l1:u (here is no strong ('rhieal argument tor tha(view. 6.2.4 GETI1NG A]OB So me ofehe same technologies that eliminate jobs mak(new olles easier t'O find. Computi.:r tl"(nnolog)" and the Web have chillgcd much alloU[t'he process of gcning a job, whether replacing one lost to technology, or finding one's first joh, or fm any other reason. Learning about jobs and companies Thc Web ha.~ made it much easier to find information about jobs and employees. We can learn about companies and nonprofit organizations from the many forums and m:rworks on sircs like jobsrer. Yahoo , :md so 011, where employees discus.~ a company. d ('~crihc what i[is like ro work (here. and anSwer questions rrom job seekers. Companies SC I up rccruiring pages on social-networking sires. Since Momlcr.com appcan:d, many more sires have spruns up co provide.' advice and fO send resumes to employers wirh relevant job openings. Such s itc.~ include specialized job search engines to help find job openings. You c'] n c; lsiJy search for jobs (hal. have, or do nor have, rcalUres you want, or wall{ to avoid. such a.~ "overtime," "dress code," or "night. work." Web sites with job lisrings arlO popular in many coumrics. (China has several compeling Sill S.) 'fhcse sires help p1..'Opll' find good jobs in O[he[towns and cities if jobs It home arc declining. We can learn about chmate, schools, emCf[alnm('nr and religiolls faciliric.~ in distant (owns on r.he Weh hefore spending time and moncy for r.ravd to Learning about applicants and employees C ompanies (,hat developed some of rht' first sea rch eng ines for the Web collened rhe :Hchi vcs ofUscnl.'' { Ill.....'S groups (IntL'"rncr forum s from rhl' 1980s) and made tht.~m available {(1 d(.'fnonst'rat'c the power of their search tools. ParricipalHs in [he groups had [houghr their S.:crion 6.3 Tht: Work Ellvimnmenr 327 posrings were as ephemeral :1.!'i :l cOII\'ersation. Many people wcre stunned and horrified that some employers reviewed the old posdngsofiob applicant,~. Now people pose perso nal profiles on social-networking .~ites; they bing on personal and polirical topics. They shan.' silly or offensi ve videos. Prospective- and current employers look at. all this. Somt' do (luitc extensive In {l:rner searching lor background information on applicams. Some read appliGlius' blogs to learn how well they write. Some people, about 10 seck a job, try to dean up their online persona. They remO\(.. raunchy m ~Heria l . change their "favorite book" to Olll~ [hat appears intclk~lual, and so on . Some craft online profiles as carefu lly.'IS people craft resumes. Of course. [his means th at some profiles as carefu lly.'IS people craft online persona. They remO\(.. raunchy m ~Heria l . change their "favorite book" to Olll~ [hat appears intclk~lual, and so on . Some craft online persona. the heuer, in others fof the worse. We look at 1 fl...w of [hest' changes: tdeCommUIIng :and the impact of computer technology on business structufe, in rhis sl.x:rion, and monitoring of employees' work, physicaIIOI ation. e-mail, and \X'eb activity in Section 6.5. 6.3.1 JOB DISPERSAL AND TELECOMMUTING The .internet makes i1 possible (or companies to locate in small fowns and work with dispe fS("d (.70nsU klfll S instead of having hundreds or thousands of employees in larger popul:nion cemcr~. Millions of people work without. "going to (heir I.'mployees in larger popul:nion cemcr~. Millions of people work for several variations of sudl work paradigms. The most common me-.ming 328 Ch apter 6 Work is working for ;~n ('mployer ar ~ computer-equipped space in rhe employee's home. So me definitions include running o ne's own busines.~ from home usi ng computeu and rcci(ommunica.{ions. In some jobs, such as sales and rcchnical support, tJ1C office is mobile: The employee travels wirh CI. i:tprop com puter and works in a car or at customer sires. M:my people work on a laptop in a eofree shop. outdoors in a park. and on airplanes. In UlCl.ny u.dds. profess ional people, or knowledge workers, no longer have ro live in the same ciry or state as their employer. Defini tions of rc:lework vary comidcrably; so do estimated numbers. A University of M:uyland study in 2006 found that 2% of all working adults cd c.'Commuted fullim e, 9% t:(.'lecommutl.-d at Ie"Jsr one day per week, and 8% had home businesses. Forry pcrcem of IB~\1.'s 330,(}00 employees work 3WilY from the co mpany othec cadI day..\3 Lo("-a.1 govcrnmenIS and unio]].~ iniriallyopposed telecommuting. Although it bcnd irs rdcworkcrs-, [he-ir employers, and society in some y.rays, it also h a .-; the employers and, in some casc..'S, increases produ criviry. Product ivity srudic.'s in area.-; where work is easy to measure (e.g., data cnll')') showed productivil}' gains of I S%. Repl:tci ng or shrinking large downrown offices. where rca! csr:HC and office rcmals are ('xpensive. can generaTe significant savings. Many employees report [hat rl'icc()Inmuring has mad\..., them more productive, mon: satisfied with their jobs, and more loya l to their emplo), ers. One survey ftlUnd [hat a large majorit]' of workers whose jobs muld permi t tdcworking would prefer to do so 1t leaH once a wcek.:H Telccommunications gen~rally. makc it. easier [0 work, "'irh diems. CUSIOmeu, and employees in other co untries: At home. one can more easily wo rk a few hours at night [hat arc compatible with foreign rime zones. IClccommuting reduces rush-hour traffic congestion and the associa tcd pollution, gasoline usc, and stress. "ICicco mmuting reduces expenses for commuting reduces expenses for commuting reduces expenses for commuting reduces expenses for commuting reduces rush-hour traffic congestion and the associa tcd pollution, gasoline usc, and stress. "ICicco mmuting reduces expenses for commuting reduces expenses expenses expenses expenses expenses exp for so me elderly or disabled people for whom commuting is physically diffi culr and expensive. It allows work to continue after bl iz.z.-arcis. hurrican,-'s, or other disa.~t'CTS dose roads or discourage (ravel. Roughly 5;% of woman-owned businesses arc home-blsed busi n cssc.~. Telecommuring, and the fl exible hours if. permits, can help [educe child-care expenses and giw parents more time with their children. Employees and employers ocndir when a person can accept a job with a company in a distant state \... irhou[having [0 moVl...'. They (an live in rural areas inscead of big cities and suburbs if they prefer (in "electro ni c cottages," t'o use futurist' Alvin Tomer's words). lwo-catl'cr coupll!s ca n work for co mpanies hundreds or thousands of miles aparr. ScClion (d The Work Environment 329 Problems Many early rek"Commurcrs were volu nteers, people who wanted ro work af home. They \....ere more likely [0 be independent workers. (Many were compuler programmers.) As more bwill.cssl'S began to require cmploy {'cs to movi..' thdr offlccs t'O their homes, problem s arose, for bmh ('mplo}, ('cs and em plo), crs. SOlne emplo)'ers sec rcscnrmcnr among c mplo)'ers sec rcscnrmcnr among c mplo)'e and roo lo ng.. The ease of working with pe()pk' around liu: world leads some [0 work odd hours to match (he time 'lones of clients. Some I.'rnployces need better din.'Clion
about what work and how much work their employer expects them to do at' hOl11 e. Being at home with children is 311 advantage for some [decommut~rs, but a distraction for others. In genel'. Il. reducing the boundary between home : II1d work cau.'::es stress for some workcr.~ and rhltir families. Some employees complain that have been reduced for (he employees complain that ha t thar the company used to maintain, and so OIL Some employees believe that by wo r kill~ ~u home they miss memoring rdmionships and oppor runicies for adv'Allcement. For many pr.'ople, [he social inre]"].crio ns and camar:lderic at \lork arc a significant pan of picasanr working condili o ns, so social isoiat'ioll and low morale can b(: problell). Tdecommuu:rs are likely [0 ust' rheir home (om purer fm both personal and work anivi dcs. This Discs a security is.~ ue. Tnc.' c. mployer might have a sophistica too firewall , antivirus so hw, l!e, and ocher security is.~ ue. works with sensitive business information or personal information about employees or customers, rhe employee must develop appro priate security practices and apply {hem conscientiously. Problem.. led some companies (0 CUE back tdccommuring programs. Like man~' o f tile oprions provid ed by new techno logi es (o r social trends), reicx om muring m:ly be very desi cable for soille employees and employers and of no use (0 o chers. Bur it is poss ihle to reduce many problems related (0 tdccommu dng. 'Iclcwo rkns usc c-mail and ins.tant. mess aging to sray in touch with coworkers , Employers address rhe sociOl.I-isobrion problem by holdillg regular !Tlectings and encouraging other activities .~ uch as I.'mploycl.' SPOrt S lcagues, where employees interact in pcr.~on. Some companies set" up scat(l,"'1cd offices in suburbs where u:leconmlUting cmploye~s can meet and usc suppOrt services and office t'quipmt:'nt they do nor have at home:.'. l ·clccommuters reduce isolation by panicipadng in activities of the services and office t'quipmt:'nt they do nor have at home:.'. l ·clccommuters reduce isolation by panicipadng in activities of the services and office t'quipmt:'nt they do nor have at home:.'. l ·clccommuters reduce isolation by panicipadng in activities of the services and office t'quipmt:'nt they do nor have at home:.'. l ·clccommuters reduce isolation by panicipadng in activities of the services and office t'quipmt:'nt they do nor have at home:.'. l ·clccommuters reduce isolation by panicipadng in activities of the services and office t'quipmt:'nt they do nor have at home:.'. l ·clccommuters reduce isolation by panicipadng in activities of the services and office t'quipmt:'nt they do nor have at home:.'. l ·clccommuters reduce isolation by panicipadng in activities of the services and office t'quipmt:'nt the services and office t'qu professional association in and orher !tOcial ncrwork.s. Some companies found significam improvements in emplo)'ce satisfaction with (heir Ielecommuting jobs when (hey jmplementi...d such remedies. 330 Chaptl"I' 6 \'(t'ork Side effects Aside from (he dir(yt advanrages and dis.advancag(.s. tdcworking has several side cHeelS {hal might changt~ \a rious business and soci,ll aspects of how W(' live and work. How docs. tclcwork afft:ct our sellse of (ommuniIY? The Industrial Revol utio n. most pt'ople worked at. or dose to . home. Even in Ihe past few centuries, working at hom e has not' been uncommon. Writers rraditionallr work in the fidds. bUl' the farm offices in their medical offices in their medical offices in their medical offices in their homes. Shopkeepers often had an apartment behind or above the store. Perhaps writers arc closest LO mod('[Il inf.onn4ltiol] workers who tclccornmutc in chat (hey tend to work in isolation. Is that why we have an image of writers spending rht: evenings at coffee houses or at intdlecrual "salon~" l'alking with other imellectuals? 'In The pa.I;t, social isolation was nor considered .a problem for people who worked in or near their homes. They lived, worked. and socializ(.d in L'Ommunities. They had the grange. the churl.:.~h . and the community cemer. Urban policy researcher Joel Kotkin observes thar telecommuting may ('noourage a retum (0 involvemelU in one's local community), j5 Is he correct? Will being there all day. doing errands locally, eat ing in local restaurants , and so on , genCrdtl' an interest in (he safety, bcaury. and vitaliry of the community rhal is less likely (0 devdop when one returns home afrer dark, dred from a day at rhe oH'i:cc? On Ihe o ther hand, now that we can commuli carc with people .. II over rhe world on ,he Internee, wilt home worhrs stay inside, communicating with unseen business and social acquaintanc(':,>. and be just as unlikely (0 know their neighbors as many commuters are ? Resultions on telecommuting Tdl:L'X)IllOluting is very common now. so it miglH hI.' surprising that local goVt:rnments and labor unions attempted [Q stop ie in the: 1980s and that Ihe Occupational HC' ! "...., " •• "" ... " ... u V •••• Sccrion 6.3 The Work EnvilOunlent 331 Some kinds of home work havoC been oUtright illegal for a long rime. For example , labor laws argue that rhc women ofren get less than minimum wage. and it is diffi culr f()r the. ' government' ro makl' sure that working conditions arc safe: and thar children are not working in violation of child labor laws. Critics of such Jaws argue that they deny the women a choicl'. and thac unions. r.he mailt s uppom.~rs of the Jaws, arc primarily {'lUlcerncd with the difficulty of organizing the workers. In Ihe 1980s vl.riou.~ unions extended the CJmpaign ag'Jinst home work to compu[,c r work. The Vi l,\V ar rhe time sc!:mcd [0 be that most compurcr at-home work to compu[,c r work. The Vi l,\V ar rhe time sc!:mcd [0 be that most compurcr at-home work to compu[,c r work. The Vi l,\V ar rhe time sc!:mcd [0 be that most compuct at-home work to compute sc!:mcd [0 be that most computer hom e...' work for its mcmhers. The AFL-CIO ad voca(C'd a government ban on all co mputer ar-hom(' work. An AFL-C IO official warned (h al (dCCOmmUlcIs mighe EKe working con.ditions like chose o f (he 19 th-centu ry. A 1983 article tided "Home Computer Sweatshops" in Tht' Nation reflected the s;}mc worries. The AFL-CIO official also co mmellted that "It's vcr)' difficult (0 organize wo.rh'rs dispersed over a wide geographical area. ";) 6 Perhaps because telecommu[crs rend [() be indcpCtldcnt. middle-class workers, and perha.ps bt:c.1use their numbcrs grew so la. 6.3.2 CHANGING BUSINESS STRUCTURES Therl' is much specularion about the impact of com purer and Idecommunicarions llcrworks on Ihe size and struCture of husim's. 332 Chapu;'r 6 Work sell music, :md so on. Smail numbers of pl..'o ple scarf small companies cOII!>uncly. Some quickly bcconll~ huge successes, such as cBay. Google, Craigsli..sc, and MySpacc. Some obs,,'rvcrs sec computcrizal'ioJ1 and {he Web contriburing ro the growth oflargc. multinational corporations, with mergers between giant companics--communicarions and entcnainmellt companies such as AOL \\'irh '11me Warner, tor instance. There haw bet:'11 many big Olcrgcrs and buy outs (~...g., P... yPal. Skypc-, MySpacc, and YouTubc), and more arc ncgotiarcd regularly. Al the sa me (ime. SOInt' large companies arc splitting up into smaller units. A tremendous amount of business reorgani1. :uiofl is taking plan,'. TJu £:0JlomiJt reported that [he average number of employees per firm has been declining sincl~ the lace 196(k A study of a large sample of U.S. busi nesses found rhat between hig.h "'ompm'er use and small 6rm si:LC. The rcason was nor rh:H co m pUlers were purring penpl r 0111 of work, but r:uh er char, hrms Harrowed rhe focus of rht'ir aCliv jries, purchasing mono: components and se rvices from ocher fi rms. Th e study argued rh a(computers and informa[ion netwo rks reduced the (OS (and uncerraimics of finding and

relying on suppliers and (onsuit;wrs; hence hu sinesscs did more of it. lor trend toward srnaHer companies cominucd. Between 1991 and 1995 comr.l11ics wich mort' (han 5000 employees eliminated 3,.377.000 jobs, bur companies with fe\~'e r [ha n 500 employees eliminated 3,.377.000 jobs, bur companies with fe\~'e r [ha n 500 employees eliminated 3,.377.000 jobs, bur companies with fe\~'e r [ha n 500 employees added almost 11 million employces ...F The legal , tax, and regulau)f), Frami. in which busines."ics operate has enormous impacts. som(.'limcs quitt' indirect'. sometimes unidentified. 011 business size. SlrtlClllfl'. and l'mployn, on l panerns. Such ('If,,cls might provent or slow c.: h,mges that compul ers would othen,, isc (,ause. Complex regularory laws. fO[L'xampk {end (0 favor large firms, because (hey can spread rhe cost of a largl! legal dcpanml' IH O\,~1" a large sa les volume- and discourage [iny firms (which arc exempt from most regulations) from growing above th~ threshold where the regulations apply. "empowering workers ." Manufacturing plant worl(ers have' access (0 onlin e invcnrory and purch3...~ing inform::aion and make decisions about production scht"Ctulcs. C n.'dir-c.1rd companr sl'rvicc rcprescO(alivc.s. with immedi ace acct....'iS to account inform ation, can make decisions co caned a late cha rge or finance c harg 6.4 Employee Crime (Q whom i(. ha..~ hcen clltrllstcd."3H With the lise of computers. In a few speclJt.1.ilar Embl'wenltm is "' fi-auduJcO{ appropriation of property by a person cases. losses were in [he hundreds of millions. (Volkswagen m j.y have lost morc chan \$200 million in a foreign exchange fraud pcrpccrared by high-level Ctnployces ..~9) Some frauds require specialized kno'\vledgc or programming skills. Others do nOl; ('mployc("S taking advantage of poor security on their company's computer SYS{Cnl5 C.U1 commit {hem. The complexities of modnn fina nc ial transactions increase the opportunities for cmbczzlemcnl. The- complexi[y and ano n ymity of computers add [() [he problem and help hide scams, Tile victims of so me of the most costly sc:lrns arc b:lnks. hrokerAge houses. insurance (ompank-s. ilnd brge fill]l/ciaJ insliturions. Employees of insurance companies set up phony insur. Hlcc policics and make claims un {hem Employees transfer large sums I.o Swiss bank accounts and then disappear. EmploYl'cs create fake purdla.SC' orders for purchases from phony companies and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc] l j[to competitors. crooks, spammers , :lnd others. Employee.. of sC'veraJ b:tnk~ sold aCCounts and sc n~~:~I.~~: ootlld be rigged co give incorr ccr c\$S'ults.>"It is easy ro modify a, computer progc.un to do so. How do you know, when a clerk scans your groceries 'a t the supermarker checkout counter. that the prkc;s :ch argt.-ct arc the samt: as the ones POs[~ -on thc supermarket shelves? How doyou know tha.'{ your computer~gencratcd credit C'.ud bill :is: 'accuratc? How do), ou know -no one: is robbing you~ Her12. Corporation allegedly pro- .• grammed its computers to pc'rtOrrn t:~ (;.-a'tculacions of the COS[of repairs to cars th:u rentcrs daOl.p.ged: thc actual Cost [he company' 'and a higher cost ch.arg>4. (0 the cus(Om~r.42 On the orner Walgreen. a large drugstore chain implementation or a new inventory because the checkout software generated thewrongprice. Some '~i~::I~.~~ in large impersonal inscicurions i(is o[(c n foolish (0 sunned :i1F trade sCt:uriry for convenience or increalOcd efficiency. Many people who cmbczzlt: from employers ha\"(: no criminal hisrory. Some haVe" a gripe against the employer Some bave tln'Ulcial problems. Some just cannOl resiS(the temptatio n. Cue-tul screening and background checks on prospc:ctivc employee Monitoring "it , uc'hno/ogy now dllolL's emp/~1J 10 \ TlUmitoring Ih(II)or/ur. ,70JJ th~ 1i1J~ ji'IJTll monitoring lil(work 10 -Cindia Camerun, Naric)nal Association of Working Women 6.5.1 BACKGROUND Supervisors and managers have alw'l}"S monitored rh eir employees. The degree of detail and frequency of the monitoring lil(work 10 -Cindia Camerun, Naric)nal Association of Working Women 6.5.1 BACKGROUND Supervisors and managers have alw'l}"S monitored rh eir employees. The degree of detail and frequency of the monitoring lil(work 10 -Cindia Camerun, Naric)nal Association of Working Women 6.5.1 BACKGROUND Supervisors and managers have alw'l}"S monitored rh eir employees. The degree of detail and frequency of the monitoring lil(work 10 -Cindia Camerun, Naric)nal Association of Working Women 6.5.1 BACKGROUND Supervisors and managers have alw'l}"S monitored rh eir employees. The degree of detail and frequency of the monitoring lil(work 10 -Cindia Camerun, Naric)nal Association of Working Women 6.5.1 BACKGROUND Supervisors and managers have alw'l}"S monitored rh eir employees. The degree of detail and frequency of the monitoring lil(work 10 -Cindia Camerun, Naric)nal Association of Working Women 6.5.1 BACKGROUND Supervisors and managers have alw'l}"S monitored rh eir employees. The degree of detail and frequency of the monitoring lil(work 10 -Cindia Camerun, Naric)nal Association of Working Women 6.5.1 BACKGROUND Supervisors and managers have alw'l}"S monitored rh eir employees. The degree of detail and frequency of the monitoring lil(work 10 -Cindia Camerun, Naric)nal Association of Working Women 6.5.1 BACKGROUND Supervisors and managers have alw'l}"S monitored rh eir employees. The degree of detail and frequency of the monitoring lil(work 10 -Cindia Camerun, Naric)nal Association of Working Women 6.5.1 BACKGROUND Supervisors and managers have alw'l}"S monitored rh eir employees. The degree of detail and frequency of the monitoring lil(work 10 -Cindia Camerun, Naric)nal Association of Working Women 6.5.1 BACKGROUND Supervisors and managers have alw'l}"S mon available tcchnologr Computers havl" made new kinds of monirorillg possible and old me rhods more efficient. Befon.: we look at rhe new iSSU I'S raist'u by computers. 1'Oral hours worked have lo ng been monhol\." 336 Chapu;,1' 6 Work ('-mail, voicemail.Webacrivitylogs.:Indphysicalsur\.clilancc information mort' C"asily, with che potential of making (be Illoniwfed derails pari of lhe cmploy('c's permanenl record. We discuss ex.unples and issu\;."S in three areas of dectronic monitoring: details of performance. such as keystrokes cusmmer-scr."ice calls. and reta.il-derk operations; • location and performance • e-mail.voice ma.il . and Web surfing. t"lf se 6.5.2 DATA ENTRY, PHONE WORK, AND RETAIL Monitoring systems .: an ;lurolllaticaJly count ewr)" kcysrroke of dat, Hmuy and dat; 1 processing derks. Some employers set h'Ys[fokc quotas. Some make the rc(ords of employees' performance pub.!i c in thl:: workplace to encourage compcddon among workers. l ermin4lis beep if the employces and ro measure and increase productivity, When the quotas arc unreasonable and the pace rdt"ntiess, rhl' stress can be inrense. The management style th; J.t indudes c005tant watching. vcry demanding work quma5. and mreats of being fired is olt, h... r than co mpurces. People call the mool.:rn, cumputerized version of such workplaces "clectronk swearsh(lps." Simib.r1y, workers w ho answer relephont' calls all day an: moniwred in dt, tail. The exact number and durarion of each call. and the idle eitll(.' b'.(Wt"'Cll calls, !..--an go into an Juroma[ic log fix analysis. The log becomes pan of the employee's r\;.'cord. (Wc discuss the sep:lfatc issue of listening in on caJls below.) \X'ork ...'rs complain thal such cons(aUl, detailed surveillance dimillisfu:s lheir Sl'llSC of digniry and incicpcncit'ncc and destroys confidence. It trealS them like machines, not people, the surve:ill..llCi..' causes stress, boredom, and low morale. Crilics point our that the sness in cn.:a.scs health COSts for (he employer. Crirics also r; ise guest ions about the dfcctivcnes.s of such monitoring, arguing char it puts too much emphasis on guantity instead of guality. It rl'd uees workers' cOllunitmcm ro doing a good joh. Pressure on telephone informarion oper-Hors to reduce Ihe. amoum of time spent on each call. according co one critic, caused operators to cut CUStomers ofrby claiming the
co mpucer was down. 4j Telephone cU.'l:[omcr-sen'ice workers include :lirlin...~ and car~ rcn111 rescrvation derks. car.alog m ail-order operators, t"lemarkc("(,~rs, CfC'dir -card and bank service representatives, :md invcstUl ... "nt company rcprcsl:ntalivcs-m list just a few examples. Almost .mycime Wl' call custom('r~service numbers, we h('at an announc(,lllenr that the call mar h moniwred Ot recordt.'d. The employer has a sHong interesr in ensuring thol(their sen 'iet: personnel handle (UScomcr calls a.ccurately. efficiently, and. cOllncous.iy. Access to rhe recording Or;1 call ca n help set tle a dispure with a customer over the content of rh e call. Man" companit'S with large customer-service operations have a regular program in St.x-cion ('.5 EmploYI"C Monitoring 337 which supervisor.~ lis (en to calls pe riodicJ.lly (0 train and evaluate new workers and co check on the performance of more experienced workers. Some advocJl..)t groups argue that chen: is no privacy issue: 1r infringes on the privacy issue: 1r infringes on the privacy issue: 1r infringes on the customer is talking tu a cOInplc(e that chen: is no privacy issue: 1r infringes on the pri stranger. Complaints aboul 11 loniwri ng (particularly of [clephonl: and dara-eony workers) led many large firm s and i ndustril" ~ (t.g., fimUlci;: ll servicl"S) m t"stablish clear and d, raiJed monitoring policies. Ct~rtailly, cmployC'fs should full y cxpbin (0 employees rheir monitori]l g and evaluation procedun:,S. In retail ell vironmeIHs, another purpose of employee monim ring (besides training and measuring or increasing productivity) is to reduce [heft. Theft h y ri.~tail-sf()rc employees amounr s m 47% ofrectaillosscs (SI 7.6 billion in 1(05). mort." {han losses from shoplifring (33%, or \$12 3 biUion).44 Some stores u.~e software thar monitors transactions at the cash registers, looking tor suspicious panc rns-for example. a large numbn of refunds, voids. or sales of ch ~ap items. (In one scam, an employee scans and char~l,' s for cheap items, but bags expensive ones for the customer who is an a({ompticc.},t. Docs this kind o t' moniroring violate employee pri\'acy? Monitoring provides a good (.OUR' XI for thinking about' t'he distinction betINn'l} policies and !flW. Advocates of regularion argue thar it will benefi r employers ("a blessing in disguise" fc)r employers, according to L, wis Maltby of the American Civil Libertl:s Union 4{,). Wrim.:n procedurcs for mo nimring and for use of [he collected data will make: mo niroring morc useful to the em p loyer. Giving mo re freedom and rcspc'({ 1'0 longtime employees will maimai n cheir loyalty and make [hem more productive. Counting keystrokes is coumcrproductive. Counting keystrokes is coumcrproductive. CluS(' jt inaeasf.'s stress , reduces wo rker prooucdviry, and causes health problems and costs. guidelines arc bcucficiallO their company can adopt them . (Many, in fact, have.) What if somc employers arc not convincLxl.? If du: issue is whe ther specific pracrices an:: "good husiness." rarher than 3 question of privac)' rights or safe-IY. who shou ld make rh e dcc i.~ ions: Icgisia[Ors or thl' pl"Ople responsible for a particular bus iness? Whar mon iroril'g guid elines involve issues of rights char should have lega l pro(cction . and which should be m :mcrs of inrernal oomp.my policy? 6.5.3 LOCATION MONITORING In the nt'arby box. ,,,'e illustrate smm; issues ofiocation surveillanl'c with one cxamplelong-haul rruckers. Electronic identification badges that st'rvc: as door keys raise similar issues They provide incrc:ased security for a bu si IlCSS. hut mey allo w moniming of (he movements of employees. N urSt.'S ill some hospitals wt"3.r hadges th;n wKk their Im.:a[i on ; 3. supervisor a(a (erminal can sec wherl' l!';:\ch nurse is. That means supe rvisors can sex- who someone cats lunch with and when they go to (he barhroom. On [he orher hand. {hey 338 Chaplci (, Work I~,¥I~~r I980s shippcrsbeg;u>jnsral)i~~ r~'i:lCi~: ,; systemsin ; theirlong~haul rruc~ Now-t--[J1,?S[uucks ,have such devices. They ~~~.tl;iunici(c -by 5arcllitcand can reporrthe 4>p.~?n . and spceq of [he [ruck. as well as Qdie(d,etail such as when the driver rurns on ';cbe-- headlights. Dri~ers communicate with, disp,Cltchers or automated syS[ems ~(ill:adqu:arte'rs via a keyboard. these ~-y~[trru hOIVC a number of advantages. Th~ enable Illoreprecise p'l anning of ,pickups and deliverjcs. inc.rea..~il1g efficiency and saving money. Qrivers no longer W.ISte rime searching for a ,public telephone to check in. Dispat,h~rs can inicia(e commullic.uion wi[h drivers. Communicadon-in gencraf. abuut schedule changes. road conditions, [(.'quiring a mechanic, and so on. immo", A,' Companies carilise data on speed periods to ensure tha,t drivers follow rules. Trucks loaded wi th valu"bl'e! art' a targer for thieves. Owners can l lso IOGI{(" nurses quickly in emergcncies. \'(!ould a call on a publi c~ j un a.'i well? The Monrreal cit)' governmem amhorized usc of g10baJ positioning s), srcms (GPS) so thac supervisors gave: I..':dl phones with G PS [0 building inspect.ors. More than a d021~n inspectors rcfu~cd the phones, calling them an invasioll of privacy. Is it rea.'ionablc for a nurse or a ci ry employee working om in (he field £0 expcc r his or her iocarion, while working, to be private? Should employees co turn off IOGHing devices when [he)' arc on a break? A c-Ompany mar provides vid eo surveillance services requires employt" es who access secure areas of [he comf]; lny's f'Ki liY {O have an identificari on chip implanted in theif arm. Impl anting chips differs in imporr, Section (j.5 Emplo)'ce Monitoring 339 6.5.4 E-MAIL, BLOGGING. AND WEB USE ; ·/E--;'~i];'::;tinK~J;i'~:;-/ a lot ofpounriu'for tmbllmming thl' ot/ur sit/to !¥ - Allan B. Taylor, a {(orney~8, ...)} ~The usc of e-mail -and access to the Web at work Illlkcs a lor of work more efficient Ind more pleasanr, benefiting both cmp loyces usc e-mail and thc Web. business policies about their usc :md about moniroring by employees, and the issue of employee privacy. \'(lhy do employers read employee e-mail? When should rhey? Wh:u are reasonable policies J()r personal use of rile \Veb ;.I.{ work ~nd for monimring of Web ac-tiviry by ("mployecs? E-mail and voice mail at work Billions of e-mail messages travel wirhin and among businesses ('aeh year. At first people rhollghl that bL",(";lu ~ rhey used a password to fO sometimes listen (0 voicc-mai l messages or n..'a d e-mail or files 011 an employees computer. Some businesses illStall filtering softv.'an.' to review all (}](going messages for comenr. (hat violates laws or company policy. (.'ould damage relation with customers, or could expose (he company to law5uirs. "I'he box on page 341 describes oneappiica[ion of such e-mail fill.ering. The mos(common ('-mail problem reponed by one company was harassmenr (including sl'xuaJ harJ.ssmcnt, cases with pending divorces. and love rriangles). Ocher problems include 340 Chapter 6 \'(Iork mailingjokc.s «) thousands of people. running a business using (he company's address. personal communications, and running bening pools on football and basketball games. Th one mrvcy. 26% of employees for misming company e-mail. Several large companies, including the Ntw York Timrl'. Dow Chemical, Compaq (now pan ofHcwit'tt-Packard). and Xerox, madL~ headlines by flring dozens of employees for violations ofcompanr ,,-mail and \'qcb usc policies. in mast GISCS bc(:ausc of sexually explicit or violations of company comp i\cccs.'iary to pro(cct the company ITom lawsuil:s for a "hnsriie workplace environment." Employce e-mail led (0 lawsuits against more than 15% of cump~lIIics surveyed in 200(,. 41) Most cOJ11p:J.ni~s [hat read empio)'cl' e~mail do it infrequent dy, primarily when there is a complaiJil or som~ orher reaso n (0 .mspc({ a problem. At" the other l'Xtrcmc. s()m~ employees arc s-. Jying about them or rhe company sjre. Some supervisors snoop (0 flnd out what employees arc s-. Jying about them or rhe company sjre. Some supervisors snoop (0 flnd out what employees arc s-. Jying about them or rhe company. Some supervisors snoop (0 flnd out what employees arc s-. Jying about them or rhe company sjre. Some supervisors snoop (0 flnd out what employees arc s-. 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Communic.1rions [)rivacy Act (ECPA) prohibits inreKeprion of e-mail and readin g of stored e-mail without a court order. but the ECPA makes arl cXI.."Cption for hu.~incss systems. It docs not prohibit employees from rc..~ding employees ('-mail on company systems. Some privacy advocaTes and computer ethicists adVOI..";tTI." a ---_-- St"ction 6.5 Employee f..,1onitoring 341 off.nj,ivee.mail~s:en:'~;b,:y~I~::;;.~~~~I~""i are nor supposed to exaggerate the: prospccrs of inYcsrrnenrs, downplay the risks. or pressure dients to buy or selL Filters searchfofkeywords such revision of rhe EC I'A to prohibit or rcsrrin employers from reading employee t:-mail. ---asrisk-ftu, vulg.uitics 1 and sexist or racist terms. They US¢AI techniques for more sophistic.'atcd allalysisof messages. 50 Is this an example of monitoring made possible technology? Not entirely. Te} public, he New York Stock previously required that : I SI:ID"rvisor' In one case, a company fired two employees after a supervisor read their c-mail messages Olpl:iti.U)': empI0Yccs about wheth cr 'It pcrmns ,v(lum2.2.2 employer will acccs.~ employee messages and files. Some largt> companies have explicit policies that employee e-mail IS private and rhe em.ployer will noc read ir. Ochers provide a notice to employees evcry time they log on. reminding them chat thc ,.ys{cm is fl.)r business, not personal, usc and that rbe compan}' resci'YC's the righr [0 monhor messages. A clear statement of monitoring policy by the employeer removC'.~ some of the guesswork about expectations of privat'-y. Such a s{atcmcm is essential from an erhical 342 Chapter 6 \X'ork perspective. Re . . pect for an employee's privacy includes warning the employee will usc an employee's privacy includes warning the employee solution. Giving or accepting a job in which an employee will usc an employer's equipment carries an ethical obligation on both panics to abide by the policy established fi.)r thar usc. From a practical perspective, a dear policy GUl rl'ducc disputes and by supervisors who might snoop in ways that violate the company policy), Employees do not give up aU privacy when [hey enter an employer's premises. The bathrooms belong to the employee too, but cam('fa surveillance in barhrooms is generally not acceptable. Where else is rhere protection for privacy at a workplac('~ Some courtS ruled chat, if employees to use their own locks on {heir lockers, the employee has an expectation of privacy for the contenrs of the locker. An employee fired by Microsoft slled [he company, using the locker analogy. He cbimed Microsoft invaded his privacy by acce.~sing e-mail he had S(ored on his compliler at work in personal folders, so, [he employee argued, rhc folders should have remained private. The court ruled against him. Onc of {he arguments was (hat lockers arc a discreet physica.l space provided for storing personal itcms, but the computer was for work and the messages were part of dle work environment. The court also commeilled rhat "the company's interest in proventing inappropriate and unprofessional comments, or even illeg.:!l actiyiry. over its e-mail system would outweigh [lh,' employt'C's] claimed privacy interest in [hose communications. "_51 The National Labor Rdations Board (NLRB) sets rules and decides cases about worker-employer relations. Ir has been a focus of controversy between unions and employers since its crearion more than 60 yC'ars ago. Workers have a legal right to communicate wilh each other aboU[work conditions, and [he NLRB ruled in some cases that (hey may do so Oil company ('~mail.s}'S[ems. 'rhus, employers may nor prohibit all nonbusiness e-mail. The NLRB required rhar a company rehire and give back pay to an employee fired for sending an c-mail message to all employees criticizing a change in the company's vacation plan. 52 1n the past, the NLRB ruled rhar companies must discuss policies ahom usc of surveillance cameras, drug testing, and lie-derccror rcsrswith a union if the company has one. Some argue thar it should require companies to negoriarc e-mail policies with (he union as well. Many of {he union if the company has one. Some argue thar it should require companies to negoriarc e-mail policies with (he union as well. Many of {he union if the company has one. Some argue thar it should require companies to negoriarc e-mail policies with (he union as well. Many of {he union if the company has one. Some argue thar it should require companies to negoriarc e-mail policies with (he union as well. Many of {he union if the company has one. 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Some argue that the negoriarc e-mail policies with (he union as well. Many of {he union if the company has one. Some argue that the negoriarc e-mail policies with (he union as well. Many of {he union if the company has one. Some argue that the negoriarc e-mail policies with (he union as well. Many of {he uni arguments nude in legal cases are rdevam ro ethical decisions as well. The problem, for both ethics and law, consists of defining a reasonable boundary between, on [he one hand, actions to protect the righrs and ne-eds of [he employer (properry rights, protecti~)fl of c()mpany assets, access to businL'ss infonnarioll, and monitoring for possible legal and liability problems) and, on the other hand, actions that: invade personal privacy. The most reasonable policy is not always dear when new situations arise. Section 65 Employee Monitoring 343 Using the Web at work You probably first used the \X'eb ar home or at school. Ten or 1., years ago, most people who used the Web did so first at work. Employees quickly discovered rhey could do much more than work on the Web. One study counted 12,823 visits to Pf!mhome magazine's Web site in one month in 1996 from compmcrs at IBM, Apple, and AT&T (That was a large number at: that lime.) Various surveys found high percentage'S of employees at businesses and government agencies using (he \X'cb for nonwork purposes (e.g., 79.8%. 90%). Visits to "adult" and pornography sites soon gave way to visits to chat rooms and spons, shopping, gambling, and srock-investment sites. Later, workers watched videos and nt tworked with friends on social-networking sites. Some companies found rhat employees spent more than two hours a week on nonwork Web activity. One found that 3% of its Web traBle was to an online investme than two hours a week on nonwork Web activity. Many major companies use soft/vare tools that pmvide reports of the filtering software products originally developed for parcnrs to limit Web access by their children. 1'ht"'}' block access to social-nenvorking and video sites. The American Management Association said 76~() of 526 companies it surveyed rcpon monitoring Internet use by employees an unreasonable invasion of privacy? Is nonworkWcb surfing a serious prohlem for employers. or is if a high-tech cquivalenr of reading a newspaper or listening to the radio at one's desk? Employers report a number of concerns about nonwork Web activity. The obvious one is that employees arc not working the hours they arc paid to work. When the employees arc not working the hours they arc paid to work. resources. (On the other hand, a company found that one of its t()p~performing employees spent more than an hour a day managing his own stocks on the Web. The company did nor care because his performance was good.) Web sires can determine where a visitor is coming from. Some companies wam fO avoid rhl~ embarrassment of havillg their employees reponed {() be visiting pornographic sites, or even job-hunting site.-;;: A major concern ahoU[Web usc in general is security ducats such as viruses and diems. \X'e saw in Chapter 1 that businesses that srorc personal information about employees. custOmers, patients, or the public must be vigilant to prmen against leaks and theft of such data. A.. we saw in Chapter), hackers exploit security Haws in \X'eb applications. They targer employees of companies whose systems rhey want to hack into. Thus control of employee \X'cb activity i~ part of essential security f(u many companies. Some companies restrin or prohibit a variety of Internet 344 Chap[er 6 \V'ork services (ar work), such as insrant messaging, file sharing, blogging, Internet adopted policies about blogging and instant messaging, The lack of policies muJd lead ro major problems for employees who nuse damage inadvertently or gee into trouble bee, lUst? of misunderstandings about what is acceptable. Ie can also calise huge problems for employees. Employees blogs, like unmonitored e-mail, can expose a company (0 liability for harassment, copyright infringement, or libel. An offensive blog can damage the company's reputation. Companies also worry aboU(leaks of product information and financial information. This is one more area, like so many others, where employees are aware of them and understand the reasons for them, EXERCISES Review. Exercises 6.1 6.2 6.3 6.4 65 6.6 List two job categories where the number of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job
categories where the number of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories where the number of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: thenumber of jobs dedineddrasricallya~ aresul! of C()inputeri7.ation, List [\Vo job categories when: t or dilninate jobs. Tell spt. "CiJicatlywhaI jobs they reduce or dirriinate. 6.8 Why is it djfficult to determine the number of jobs diminated and created by computers? 6.9 Jeremy Rifkin argueithar the abilicy of Japanese auro mobile makers to produce a car in Jess than eight ho~rs illustates the threat of massive unemployment from computertcchnology and automation. h How cloche darain figures 6.1 and 6.2 help to support or refi.tteRifkin's poim of view? Can you cite other data 011 either side of this issue? 6.10 Discuss the issue? 6.10 Discuss the issue? 6.10 Discuss the issue? 6.10 Discuss the issue? 1.4.3). 6,11 How difficult wotildit be to enforce a law against oftshoring some kinds of knowledge-based jobs? 6.12 Should there be: laVo'S banning some kinds." of home-based. work and not others (e.g., sewing vs. office wOrkjr Why or why not? lfyOu think there should be soine r Exercises 345 6.13 Read Exerdse 2.310 In rcsponsero pan (h). many of my students suggested. among other things, surveillance cameras in the workroom to make sure nothing wa~ coplett or removed. InChaptc-r 2, we focuse on privacy of the worken. Do you think cameras are appropriate? Wby? If you think cameras are appropriate in the vorken. some-workplaces and notorhers, give exampJc\$ and formulate criteria for deciding which. 6.14 Some unions proposefederallt:gislation to prohibit monitoring of customer-service or dara-emry cmplo}'«5with more than fiv1= y~n; of experience. Give· tearons fur and -againsr monitoring experience. Give· tearons fur and -againsr monitoring of customer-service or dara-emry cmplo}'. An employtear an investment firm reponed rna supervisor that some employees have unlicensed software onmeir office computers. Over. a wedtend. without infilrming.tbt employees in advance. rhecompany haY(: taken? For. each •why it would havebccnhetter mail (or not -as good as) doing the search. Do you think [he search was reasonable? 6.20 Assume you area professional working in yuurchosen field, Desedhespecific things YOllcan do to reduce the i]npact of any ['1.'0 problems we discu.s.sed in this chapter.. (If you .canllot think of rdated myour professional field, choose anothet6dd rhatlttight interest you.) 6.21 Think ahead toche next few years arid describe a newpnjbkm. relaredro issues in this chapter. that is likely ro develop from computing technology onhe Web. AsSignments 17wi' ~xerciSt'J r~quj~ JQm~ rrs4Jrrh or arriviry. 6.21 The ECPA does nor prohibit universities from reading srudent c'-mail OJI if\$COmpUters. juS(aSI!: does not prohibie businesses from reading employee e-mail on computers) by profes.~orsand university's policy. abou[:u:ce\$S co· student computers. Find your· university's policy. Tell what parts you think ar~ good and what should change. 346 Chapu. I (, Work Class Discussion Exercises Tlm~ exm;;gs are for class Jisclwian. prmaps with shorr pmmtfltiom pre-par~d;n advance by small groUpi afstudents, 6.23 If someonc discovers a cure for the common coid, should he or she hide it to prot("(:r the jobs of all the people who work in the huge cold-medicine industry? If there is little COlltn; wcrsy ahout the' answer mq1., esrion above (lisT suspect will bnhe case), try to idemify rcasonswhy so many people react negarively to advances in tethllOltW that eliminatc some jobs. 6.24 One erhical argumenf agaill\$t NOTES I. CPt; 'X!"tkill!; in lill: Cmnputrr Industry, ComptIttt I'ro!fi~ionJb f')r S()(i~! Rt'\$pon,ibiiiIY. FebruAry 15, I ']''i,H in (;'''m fm't'miotl.\ 7/"li C;',m,rpl rh(Wh!d (Ameli.::''n Heriuge. I,)~).1. Iu.md .. ted Pre''', "fj,"t:tn)liic D",,]ings Will SI.(..,h B;;tnk t{)h~, Study hnd~." '.tXlll Srrertji]/IYJUII. Augml14, 19'15. p. A~D; \Xi. Mlch~d Cox .md Ridmd ;\Im, A{,tl" nf /(kf, alid fh",-- WI!)' W,-Tt" B(/fn fl]Ihali It} 71,il1)''' (Rl~i, Boob, 1,),9), p. (here) (I, I'') (I'') (I''') (I 129: C; {';aKa! l...:Kh'lry. '-S"·Ivi.:.~ IX-ftlf Strrt1./mmldl.June 8, 1')9:; p. AI. Th~' qt1 No(es fi (A'X 3:n .,. " Hjgh -l~d, 4. p. ·.6. Ailtl t"ll :!UO,OOO Job\ L,h' Yaf," WIU JNrl Jmm",l, M" y 19. 1S.h un ;&III:l St.,,,, ww"\\'_hkgu"/ocu/l l\:u 1{X11, llt11; JII(nrmal;l>n ·!c.-.hnnlugy As~i:.t !;" IL of Amd ;, .L, "'Add ill!; \.;J!uc ... Crowing Care:en ." Aunu...1 \'('urkftm:.;· Dtvelopment Sur"cy, s.: p.cmh~t 100-4. i"l-l.urgtworkio n:c-fdrx , /1J4workl(me:uuJY'I'.1f; Rul ~r'I N . CI"'rrU'::. ~W")' Sof,w"f" r .lik" IEEE S/,llit ., I. 1006. p. A9. 10. l)~tlid E. HI"'C k... r. '.On:updtiun:.!! EmploYllcn t l'mjcdiun.~ l\) 201 1,· ."'luffliJI, LaJ,,.! Rrt,i"I,;. f .. h ru: .. ty 1004, pp. 80- 105 (.re " . SO). wlY\",,.I,;.go.IV!"l'uhl rnid2 f) ()4/011an)full. pJf (.lc'('I;'~~11 April n , 1 007), "SL.'i Kd t".r.. W\\"A·.hkguw' ncws.reJr:-ne{ctupw.llfO.l1t!\} (.1('-.:10:.1:.1 Sc:pt:c'llh(r 4. 2(1071. II . Th ~ "I.U01C ",...; U. TI1WtlOrc C.lpluw. I.ouj ~ Hj t k.~, and B~n}. \'(fmt nbcrg. Tj] ... Fim MM/ll rrd elllfl] })': All /llImHrd (;/Id... w 1r,m/.; /11 Am 347 16. 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[)t(tfllber I,) ~ Ti-dm,'v RI'I'Ii-rr. O nher 1~1). s . p r . I; ~-(J ') . 21 ['hillip J. /.')" gm:.tll. - T h" l ~ "iwr Stu]': Myl"h:' U S IVi'II'! 0- \'(!qrlrl Rq"m. [)t(tfllber I,) ~ Ti-dm,'v RI'I'Ii-rr. O nher 1~1). s . p r . I; ~-(J ') . 21 ['hillip J. /.']" gm:.tll. - T h" l ~ "iwr Stu]': Myl"h:' U S IVi'II'! 0- \'(!qrlrl Rq"m. [)t(tfllber I,) ~ Ti-dm,'v RI'I'Ii-rr. O nher 1~1). s . p r . I; ~-(J ') . 21 ['hillip J. /.']" gm:.tll. - T h" l ~ "iwr Stu]': Myl"h:' U S IVi'II'! 0- \'(!qrlrl Rq"m. [)t(tfllber I,) ~ Ti-dm,'v RI'I'Ii-rr. O nher 1~1). s . p r . I; ~-(J ') . 21 ['hillip J. /.']" gm:.tll. - T h" l ~ "iwr Stu]': Myl"h:' U S IVi'II'! 0- \'(!qrlrl Rq"m. [)t(tfllber I,) ~ Ti-dm,'v RI'I'Ii-rr. O nher 1~1). s . p r . I; ~-(J ') . 21 ['hillip J. /.']" gm:.tll. - T h" l ~ "iwr Stu]': Myl"h:' U S IVi'II'! 0- \'(!qrlrl Rq"m. [)t(tfllber I, ...) ~ Ti-dm,'v RI'I'Ii-rr. O nher 1~1). s . p r . 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SlUllmJIY: Bun'o1U of L1bol' SW iSlic).,)Ull ... I(), 1004, ~t;&t.\.hb.); \lvfll~w.\,rd\'".L .•~/ n.: ! {K. Ilrl).hun (JlClc.\.SC'! Aug u'l 17, :!on6); ;\!.Ln S. 1\!il1d, " "OHsllI)rillg: The 1\',...", I r1tl u~tri al Rn'uI Uliul\ ~" nm:iy. n :\fli ir>. l\-brchiAp ril 1006. ..W\\ '.fOfY l g n l tf& i l ~, (Jrr.J::0060 }O I f~e\'\:l ~~ -) !.o'JI alan-s-hli.o"k,ioll"'''nr,ng-Ih"-on, indll'" r;al.":"ul,, t,,' 01 hlml (3) >:~'t'§SC, I.-'l]I, 1, 20(7). 1M Hlinu("f, ~')jl'J, ori n g: 'll,~ Not I mlu~l r;, u J{rvo luli" n?" 348 2 3(l. Chap[er 6 Work \\1)' lh"llh tu Iny ~ul work!> ~~t()% 1II"le 11];sti, Cmpkly':-I". 31 32. 53 2f1~j5% 40. \Villiarn M, Carl ..')" "A, 0]]111"11 41. rfl[t'\$lcr ~l1.1 M 42 H 4J. ·1.1. more Smm,:b for thi> hox inclum:- Glh'CTlUT)(;ut An:uum~bility Oni(e, [I11111igl'atiol\ EnfOlttlll~nt: ~b.knc;s>-~ Hindt'l Elllplu)'In(;!lt \-'criiiccltion and 'W'orhitc Enli.)rn·Illell(E!rurl~," CAO..o)·813, August 2.005. www.I.Ju.g pp. 1&-28. QUtltt-tl in .Joe Lhvi.;h;.:m, ~Hou,t Pand lhck~ Tc-ie)}htJll(; ['HICC&~ ttl V,'dl}' AuthOl'~ti(}j; of N~-w Hir~',," W;lfJ Sh'n}IIJWI#/, Septemuer 22. I 'J')S. pp, :\2, AI4 Rockbridge A,MXiJIC,/, "10uS12006 Nl[ioll p,D!. 54 Ro.;kbridgc A.,\OciJ.tc,', "200511006 NatiOlLJ! 55. Tt'dllloingy Rl'~d'Jl David Rubiw:, "TdtCOll!!Jutillr,; Will the- Plug Be J'ullnP" R(dJdll. Cktoher 1'}84, pr. 24-Jl.TII ()f Rich in CompUTing 2ml ~d. (MIT Pws_" 19(4), p.}t p. B~. Ridw(j C Hulling"r and Lynn Langwl\, ~2()O" N.tion"l Re!;iil Seclirity Sury~y," Uni\'Cr\lty or F\oritb, 20116, Pl'. 6.. -8, www.nim.ull.edu/Tt~~c.. r~'IL/up!f:i11~lrcrorl~2()O).p(lf (JCt:CS\(;J April 11. 200T). Th.ry. i'qlOri lh:lt mt' p"n:tnu,ge, fuw n'llu;l1ed fairly,\le.ldy jor ~"H't;L1 4)'t'ar,. Rkh,mt C. HoUin~t!, NJ.\ioll;i.! Rt:lAil S~'\;uri\y Survey 2002, t~r"nni in 'RctJil·l1ldi afld JrwtnwL'Y Shliukagc," IClailinJustTy.,ll>oLlt .• um oJ/sLltllliuJm»_preveIHion!lfal102 J 12(ia.htl11 ("cces~d Augon 17, 2()06); Calm 46 47. 48 Will! Slruf.!Iumilf, ~Jltemb;1-t!ol1 with L"o"i,\ M:Jlhy- (.Jirecwr, Jf th~ ACI.U's T~,k l~or(t-' on evil Uheni,~ in tilt: Wwkpll.d i'riwuy flJld Am~Ti{Jltl Hminr,J, Sept(,LLLh...r 1994. pr. f), 12. Stuart F. Brown, "'Jrut.king G~tS Suphisli(JlcJ," hJrlUIit', July 24, :WOO pp. nOB--170R. QuO!,~1 ill C(}Jlflfiliml LJU' TTiIJU'If', Uc~cmi>CI t8. I,)')'. 49. Amerlcll1 Management ASSIJLial;OU and ePulicy In.\tilu:~, "'2006 Wmkpl;i,e E--mOliJ. Ifht;lnt Me,s;Lging ;md Bing Surwy,¥ www,,lnr,,nel.orglpreli.\! ~nlrl'i: Y;-mrkupu ..E.;\'h,il L,w EXPJII(h,~ luly If}, .,~)'jiom, :'2J NLRB 50 (I :V,uimli/l LII !')'}l), www.wt:mirle~h.wJII ~rtidcM:mJ.ilIawc)(pJ.ILJ~.!ltm (.1(;{ ZOO?). 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An early article rhat fi.lre-saw many of rht, advantages of [eie-work. • Rifkin, JCl'emy The };iJd ofWorlr. Tm:her, 1996 (updated edition 2004). • Sumon, Jeffrey M" and Kathryn R Sram. The 1/iiib/r [:;npl!)yee: Using \Xin'k- PUleI:' lvloniroring dnd Surveillm/a to Pralret information 'Today, Jne., 2006. ", i .. ii i EVALUATING AND CONTROLLING TECHNOLOGY questions a.~, Does rhe openness and "democracy" of the Web increase [he disrribution of useful information? --T S. Eliot, "Choruses and Judgment Wnere is fht' wist/om wt I)IIVe lost in }m()wlt:d.~e? Where is the Imow/edgt U't have lost ill injormt]tion? --T S. Eliot, "Choruses and "democracy" of the Web increase [he disrribution of useful information? How can we evaluate 7.1 Information? How can we evaluate 7.1 Information? How can we evaluate 7.1 Information? from 'the R{)(k,'" 1934 1 7.1.1 EVALUATING INFORMATION ON THE WEB Expert information or the "msdo m of the crowd"? There is a daunting amoum of information, bad financial advice-it is all available un the W'cb. Search engines arc replacing librarians and professionally prepared indexes TO arcides. but seardl engines rank Web pages by popularity, nor hy an experr evaluation of their worth. Search engines give prominenr display [0 con rent providers who pay rhem; libraries do nm. To g sire_~ are ,ires 111'11 (:Jllphasiu ~1h1.ri!l); III' ill/('rtmllion. ()pinion and t"fW:H;limm;lll by WUillUY people 352 Chaptl."I 7 Evaluating and Controlling Technology Marketers and public relations firms post unlabeled adverriseme-nts as hlogs and on ,~odal-nctworking and video sites. How do we know when someone is manipulating us? While Web enthusiasts ddiglu in the access to huge amounts of information and opinions and rhe easy access to audiences, some people find [he huge quantity of junk, the inaccurate informati(m, (he poslings by people of wlknown expertise and motives, and the lack of edjrorial control on rheWcb to be serious problems. Take blogs as :111 ex.: lmplc. MiJlions of people write blogs. Some arc excellcm: some arc atrocious. Sorm.~ provide news and insights; SOIne provide gossip and nonsense. Staggers arc opinionatl'd, biased. The nature of blogging (and (he Internet a, ~ a whole) encourages bloggers have rather warped views of the worki. and some arc JUSt dull. B10ggers arc nor trained. objec.-rive journalists. Example: Wtkipedia To explore some of these issues of (lua1iry, objectivity, and accuracy, we usc \'Vikipcdia a,'i. an example, The English edition of Wikipcdia biographies of their candidates to make their bosses look better. The staff of a federal agency removed criticisms of the agency from its \Vikipedia article. Discredited theories about historic events such as the terrorist attacks on September 11,2001 and the assassination of John E Kennedy appear regularly. Anonymity of writers encourages dishonesty. Removing false information, hoaxes, and thl' like rcquir('s constant effort, according ro \x'ikipedia is, perhaps surprisingly, of high quality and extraordinarily valuable. Why? What proR"CtS quality in large, open, volunteer projects? First, although anyone can write and edit Wikipedia articles, most people do no[.1'housand\$ write and edic regularly, nor millions."" Most arc educated and have expcrri.,c in the subjects they write about. They correct ;.uticlcs prompdy. (Wtkipcdia saves old versions, so it is easy to resmre an article ----------'" About 4,000 t:xpnt~ writl; {he otrtidl;S /(lr the EII{-ydopOI:JiJ Briunnic .: a. Swim, 7.1 Infmm"inn, Knnwledge, ,nd Judgment 353 someone has vand.1.lized.) After {he mantpulation of Wikipcdia articles by polirical sraff"fs. the people who manage Wikipcdia. ThlJr are not edimrs in the traditional sense, bur they do exert some control. How important is the formal sdection role played by editors and cxpcns who produce traditional works like the En(.-ydopxdia Britannica? The Encydoptedia Britannica? The Encydoptedia Britannica? The Encydoptedia Britannica? The Encydoptedia Britannica? a.,.;; easily as publishers of primed boob. We. as users, can (and must) learn to appropriarely deal with side rHcct~ or weaknesses of new paradigms. Even though so much of\Vikipedia is t'Xcdlenr. we learn thac someone might have wrecked the accuracy and objectivity of any mdividual article at any hour. We Jearn tha[aerides 011 technology sciellce. history~ and literature :trc more likely to be reliable that those on politics and scnsirive current events. \XI'e learn to use 'X'ikipcdia for background, bur ro check cssenrial facts. As the weaknesses of new innovations ~lppear. ere-ative people find solutions. Recognizing the problems that re.mlt from [Orally open, anonymous access [0 wridng and editing articles, one of Wikipcdia's founders began a varianr called Citizcndium. Reflecting the ambitious and optimistic spirit of [he \X'eb, ir describes itself as a "citizens' compendium of everything." I\:1 ore accurately, it is a "project thar combines public participation with gentle expert guidance." J It is much like Wikipedia but with nvc new levels of protection fDr the integrity of articles. Writers and editors must register with (heir real names. and chief subject edimr.'> (whose expertise is described to n:aders) oversee specific subject areas. Citizendium did llot have to stan from scratch. Anyone who wants to provide free information online may use Wikipedia articles. Thus Citiundium can begin with what has already been LTe; }ted, then revise and com~ct as necessary, and, it is hoped, bettcr protect the results. If Cilizenciiull!'S level of control is in faa valuable and effective, perhaps when you read this book everyone will be using it instead of Wikipedia. The "wisdom of the crowd" People ask all sores of questions on Yahoo! Am; wcrs aboU[dating, makeup. food. college ("Arc online college classes as good as c1a...sroom classes?"), and wide-ranging social. economic, and political iss.ues ("If we produce enough food to feed everyone in [he world, why don't we?") Of course a lor of answers arc ill informed. M, my arc biased, or full of opinion, nor fact. The questioner designates the posted answer he or she deems the best. What qualifies the questioner, presumably a prostl who docs not know the answer, [0 judge the worthiness of the replies? To what extent docs the ea.'Ie of posting a question reduce the likelihood that a person will seek out well-researched srudit."S or
books on (he subject? 'Iller(' arc obvioLL'II) questions for which chis kind of forum would nor provide the best results. An example might be "Are mediCines safe to use past {heir expiration dates?" The firsr £\0;.'0 sample questions I quored above, however, arc likely fO gt.'nerarc a lor of Ideas and perspeaiv('s. Sometimes. that IS exactly what rhe questions I quored above, however, arc likely fO gt.'nerarc a lor of Ideas and perspeaiv('s. Sometimes. that IS exactly what rhe questions I quored above, however, arc likely fO gt.'nerarc a lor of Ideas and perspeaiv('s. Sometimes. that IS exactly what rhe questions I quored above, however, arc likely fO gt.'nerarc a lor of Ideas and perspeaiv('s. Sometimes. that IS exactly what rhe questions I quored above, however, arc likely fO gt.'nerarc a lor of Ideas and perspeaiv('s. Sometimes. that IS exactly what rhe questions I quored above, however, arc likely fO gt.'nerarc a lor of Ideas and perspeaiv('s. Sometimes. that IS exactly what rhe questions I quored above, however, arc likely fO gt.'nerarc a lor of Ideas and perspeaiv('s. Sometimes. that IS exactly what rhe questions I quored above, however, arc likely fO gt.'nerarc a lor of Ideas and perspeaiv('s. Sometimes. that IS exactly what rhe questions I quored above, however, arc likely fO gt.'nerarc a lor of Ideas and perspeaiv('s. Sometimes. that IS exactly what rhe questions I quored above, however, arc likely fO gt.'nerarc a lor of Ideas and perspecies.'' COlltf() ling Technology wants. Without the Web, if someone asked que.~tions like thO'iC of only a t~v friends, [he answers might he less v~\fied and less usct'ul. Some health sites on the Web encourage the public to ratl~ doctors, hospitals, and medical treatments. Arc such ratings valuable or dangerous? Will they motivate doctors and hospitals to dldnge their practices to achieve higher ratings at the expense of good medical care? S(CVI~ Ca.';,;e, cofounder ofAOL and fl)undcr of health site [hat emphasizes ratings hy the public, argues that if millions of people participate, the results will lx' very useful. Orhl~rs arc exuemciy smpicious of "the wisdom of the crowd." And there is always concern for manipularioll. We have seell auction fraud and vandalism of Wikipcdia articles. NC'\v Web sin:'s have sprung up to buy and sell votcs to get prominenr display for articles on social medical treatmeilis generate fake favorable revie-s and votc.t;? How can docmrs respond [0 specific cridcism from a patient wirhour violating the patient's privacy? Let's pause briefly to pm the problems of incorrect, distorted. and manipulated information in perspective. Quack medical curl"S and manipulated information in perspective. back hundreds of years. Eighteenth-century opera stars paid people to anced performances and cheer for them or boo their rivals. HatdJd jobs in the form of news articles, books, ads. and campaign flyers have dishonestly attacked politicians long ocfore rhe Web existed. There are plenty of poorly written and inaccurate books. Historical movic'S merge truth and fiction, some for dramatic purposes. some for political purposes. They leave us with a distorted idea of what rcally happened. Two hundred years ago, cities had many more newspapers than they do today. Most were opinionated and partisan. At supermarket counters we can buy newspapers with stories as outlandish as any in blogs The fl(w York Tima is a prime example of a respected newspaper, staffed by trained journalists, with an edilOrial board in charge. Yct one of its reporters fabricated many stories. Numerous other incidents of plagiarism. fabrkation, and insufficient faC[~checking have embarrassed newspapers and television networks in the past decade. OK, the problerm of unreliable information are not new. Bur they arc problems, and thl' W'ch magnifies them. How can we distinguish good sources of information on [he Web? Search engines and bloggers b]' the number of people who visir them. A varicry of people and services review and rate sites and bloggers b]' the number of people who visir them. A varicry of people who visir them. A varicry of people and services review and rate sites and bloggers b]' the number of people who visir them. quality ofiniormarion on (he Web and the bekofeditori: ll control disdain such rarings .15 merely popularity contests. The Internee gravities the "mediocrity of the m: 1.\$ses." Section 7.1 Information, KnowlL'tlge, and Judgment 355 the blog equivalents of responsible journalism .and supermarker tabloid" becomes cleaf. Good reputations dt. 'Vdop, just as rhey have for decol.des orAine. Many university libraries provide guides for evaluating \X1eb si tes and information on rhose .sites. CURLs for tWO arc al (he end of this chaprer.) One good sn.'p is to determine who sponsors th(' sire. If you cannot determine the sponsor of a sj{(~, you can consider its information as reliable as [he infonnadon on a flyer pm might find undcryour car's windshield wiper when you park in a busy parking lot. Ulrimately we must find sites, reviewers. ratings. editors, expens, and other s(}urces we trust. Good judgment and skepticism arc always useful. Writtm b.y fools for the mlding of imbrciles. -An evaluation of newspapers, not blogs. by a character in Joseph Conmd's novd The Secret Agent (1907) Vulnerable viewers Because you arc reading [his book, you probably arc a student', a reasonably well-educated person who is learning how to analyze arguments. You can develop skills to evaluart' ma(crial you read on the Web. What about people who have less education or ability' What risks does bad information pose (0 children who find it on the Web? Some critics of the Web worry most about the impact of inaccurate information on such vulnerable people. 'n1e fears of some seem {O edge toward a belief chat we (or expcrrs, or the government) should somehow prevent such information from appearing. 'rhe many strong arguments for freedom of speech are arguments against any centralizedor legally mandated way of accomplishing (his. What can we do to improve the quality of information? Basic social and legal forces help (ro a degree); freedom of speech (to provide responses, corrections, alternativC' viewpoints. erc.) , teachers and parents, competition, fraud ;md lihcllaws-and people who carc, who volunteer (0 wrirC', review, and correct online information? Responsibilities of site operators 'X'har arc [he ethical responsibilities (If sponsors of infi)nnarion ,~ires? Obviously, [hey should take reasonable care to ensure that (he information they provide is accurate. If the site covers a topic for \.... hich mistakes can have significant risks and includes a large amOUIH of user-supplied conrent, the site should have a mechanism to review comcm and filter out or remove dangerous material. A site should make dear which informar.ion is supplied by users and what has, or has not, been verified. Responsible operators of sites {hat display material based on ran kings or votes should 3IUicipatc manipulation and prepare to protect against it. 356 Chapter 7 Evaluating and Controlling 1edmology Manipulation of images 'st:l'ing is bl'lil'lling r1wy S(f()rl beaJtiu (ttl an,tchrrmisTII o/the pl'~compllttr era. -Sanford Sherizcn 'j Forresr Gump chats wirh John F. Kennedy in a movie. CCline Diol1 sings a duet with Elvis Presley. These ~Uld many more impossible events reslit from digital manipulation of photographs and video. We know that Elvis died decades before Dion's performance. We know that Elvis died decades before Dion's performance. We know that Elvis died decades before Dion's performance. have long added to the crearivit)' and enjoyment of entenainment. Where is {he problem? People can usc (he same tcdlOOlogy for decep[ion and fraud. The ease with which we can modify digital images and \'id('o raist'S ethical and social issues about deception. Video~manipulation tools (and increased bandwidth) provide the opporrunity for "forging" people. A company developed an animation system (hat modifies video images of a real person to produce a new video in whill the person is speaking wharever \vords the user of the system provides. Another .1), S[(m analyzes recordings of a person's voice and synthesizes speech with [he voice. inflections, and tones of that perSOL Combined. these systems will likely have many uses. including contertainment and advertising, but dearly people can also use them to deecive. 6 Should news organizations ever modify images and video? Many have. but have apologized and, in some cases, tired people for doing so. During the conflict between Israel and Lebanon in 2006, a freelance news photographer who had worked for Remers news agency fat' many years, admitted [() digitally adding and darkening smoke in photos to make damage caused by rockers look worse. ReUters withdrew hundreds of the photographer's pictures from its l'ollection of phows for sale and said company policy was stricdy against altering pho(Os. The Los Angeles Timts fired a stafl reporter after learning that he had manipulated an Iraq war photo the newspaper had run on the front page. 'fhe Nt'U) York Ji'mes has a policy against altering news photograph... The Narional Press Photographers Association ha\$ a policy' rhar considers any alteration of a phow's 7 editorial coment ro be a breach of ethical standards. Altered images have become a problem in science resC"J.rch. For example. an editor of the Journall of cours for publication. I < h it acceptable to alter images jf (he purpose is arristic. or ro enhance or improve the image Ofyideo without changing the meaning? Where is the line berweell edirorial content .and aesrhe[jcs~ Some mag.cines treat rheir covers as advenisemcms tor (he magazine and arc morc likely to manipulate cover phoros [han rhe pho[Os inside. (/'v'alionai Gt'ogntphic generated one of the !lrsr compU('er~era controversies about faked photos when it moved tWO pyramids closer togerhor to fir them both
on the cover.) Some editors realize that a repuration for manipulating phoros and video. like any form of deception, makes Seerion 7.1 Inform"ion. Knowledge. "nd Judgment 357 all of ol1e's work suspect. The art director of 1~X.{t.f A40flthly commented, "The ahcred photographs we had done were really hurting the integrity of the magazine's cover ro the point [har when we had a great photograph, nobody believed it." A new director of photography at National GrogTtlphic said irs manipulated cover was a mistake. The editor of Audubon. also citing the credibility problem, announced in an editorial that Auduhon would not print any manipulated photos. 9 faking phot.os is nO[new. Photographers have long staged scenes, used props, and altered photos in dark rooms. Thus, [he ('chical issues arc not new, but now many more people fal"e (hem because image manipulation has become so easy. Image manipulation is no longer reserved [0 the sp{""Cialis[with a darkroom and a lot of lime. Many more faked photos and video arc likely to appear on the Web for many ditlerem purposes. The public must become more .).ware of the possibility of fakery and mlL"[develop a reasonable skepticism. 7.1.2 WRITING, THINKING, AND DECIDING I /.Im'e n spa/iug c/m:/m: II alnle with m)' PC It plainly marks fiJur my reL'ur, tHiss steaks tly~ am knot sea. Eyt: rail tbispot'm tiJr('w it, fin stJrt' your plt,ued tOf) 110. It's letln pelfirt il1 it's weigh, My cllt'l1Ur to/led me sew. -Jerrold H. Z.lr. Computers, like other tools and technologies, encourage certain uses and activities by making them easier. The new tools have displaced sOllle skills that were important' before. We look at some examples of the ways computers and other technologies affect' the way we do things. The spelling-checker verse above humorously illustrates the problem of doing what the tool makes easy and ignoring other important tasks. A computer can check rhe spelling-checker verse above humorously illustrates the problem of doing what the tool makes easy and ignoring other important tasks. flipping d1l'ough the pages of a printed dinionary. But a simple spell checker looks up each word only to discover whether it is in its dictionary. It does not check whether it is in its dictionary. It does not check whether it is in its dictionary. It does not check whether it is in its dictionary. writing, correct grammar, word usage, correct information, and cditing-thc parts that "Gr;unm;u dlet:k... n \\'cre (rror, 11m common wh ... n {h... poem iir,t tiKUbw..! Ull the l11(cm ... l. 11lt'Y would ulch ~I!nc "FdiC 358 Chapter 7 Evaluating and Controlling 1edmology still require hard mental dron. '['he convenience of using a computer can encourage mental laziness, which can sometimes have serious consequent's. A newspaper editor in Pakistan received a leuer to the editor by c-mail and inserted it inw the newspaper office. Several ,'diwfs were Some cdries of computers see the loss of skills a.'i part of a long trend of skill losses du,~ co technology. "laking their cue from Socrates {tbrough Plato's Phaedrusl. the critics find tault with (he invention of writing. It destroyed memory and oral skill and obscured the distinction between wisdom and kllowledge. With CC'J.ding and writing. It destroyed memory and oral skill and obscured the distinction between wisdom and kllowledge. With CC'J.ding and writing. argues, a presentation tends to be more one sided, more dogmatic, because there is no dialogue, no one to question arguments and conclusions. 12 It is valuable co observe the changes in social patterns that occur because of (he invention of a new rool or technology: Thl~SC observations help LIS understand how human beings behave and how society evolves. Although it is valuable to be aware of changes in the rdative importance of various skills, it is not obvious. as some critics suggest, that all the changes arc bad. Better skills replace some old ones. Hmv much more poctry is available to us now in book.. than we could have memorized? Although most of us no longer develop strong 111t'll1orizariort skill, this skill has not been lost to those who need it. such as an actor in a one-person play that lasts two hours. Some (,)1111es(' people worry that word processors are dcs {foying d1e ability (0 write Chinese characters by hand. A Chinese scholar, Ping Xu, reported [hat a similar conrroVt'rsy arose when pens began to replace calligraphy brushes. He argued that, if the computer is easier to use and helps people learn the Chinese language, it will prevail Language scholar Walter Ong pointed out that the old skills are not lost. They arc enhanced but not used \'I:her(' the new ones function bener. He argued that writing made oral communication much more effective. U Computers, critics argued in the 19805 and 199{)s. emphasize thinking based on data, numbers, and quantifiable entities. They discourage focus on judgment and values. They discourage focus on judgment and values. me.ming of the data. They discourage discussion with others and the ability to defend a point of view in conversation. Th, \'.(.'ch has countered some of these problems bur generated others. It enhances communication. Anyone \vho reads blogs or participates in online discussions knows that dialogue and argument survive. We can find both deep and superficial analysis of all sorts of subjects. Critics charge lhat a vast amoum ofinf{lrmation is available. but it comes without wisdom. 'fne Web encourages surfing, looking for facts, without evaluation. Reading book'i and long articles. We need to carefully evaluate the changes and identify those that truly are problems. We should be alert to the tendency- to overemphasize [asks that compmers can do well, Swion 7.1 Infonnarion. Knowledge., md Judgment 359 of ... skills are unintcll.dt-.u j! • ~~:t';f1&~~~:r'~1i~~s~Microsoft Word 2000 (and I. lists "trick" as the only tneaning for "fool." It omits synonyms ~'cl()wn," "blockhead," "idiot," "ninny," "du:nderhead," "ignoramus," and othersaU present in earlier versions. Because of the popularity "f Word and the ease of ",eo"le its referclice utilities. levve,' C while ignoring other important tasks-that is, the tendency to mental iazinL'SS. \\'c need to resist the temptation to emphasize data rather than analysis, fans rarher than understanding and evaluation. \'{Ie need to distinguish between cuning and pasting from Web ~itcs, on (he one hand, and real research and \vriting. Abdication of responsibility to exercise judgmem, and, sometimes, a reasonable amount of skepticism, has serious consequences. Busin('~ses make decisions about loan and insurance~policy approvals with the help of software- that analyzes risks. School districts make decisions about the progress of students and the carecr.~ of administrators on the basis of compmergraded and -calibrated tests. They sometimes make bad decisions because of ignorance of the kinds of errors that limitations of the system can cause. Law enforcement agents arrested people when a check of an FBI database showed an arrest warrant fi) f someone wi[h a similar name. Do ofticers think chat because the compurer displayed the warrant, che system has decided (hat the person [hey arc checking is (he wanted person? Or does an oHiccr know {har [hc system simply displays au]' dose marches and [hat rhe responsibility for che arrest decision lies with chc officer? Somerimes, reliance on a computer system can exert strong pressure on individual professionals or employees (0 do what rhe computer says. In bureaucracics, a decision-maker might feel that there is lcs, " personal risk (and less borhcr) in just accepting a computer says. In bureaucracics, a decision-maker might feel that there is lcs, " personal risk (and less borhcr) in just accepting a computer says. w.t '- (:ALVIN AND HOBBES «;; 1995 '\?mt"t"m. DiH, br Ul'IVERSAL PRESS SYNDICATE R~prim ... J with p making a decision rhe software docs not support. Computer systems might provide valuable information and ideas bur might not be good enough to subsri[ll[c for an experienced professional's judgment. In environmems where. when sOfTIcthing gocs wrong. "I did what rhe program recommended." there is pressure on doctors and other professionals to abdicate personal rL'Sponsibility. 7.1.3 COMPUTER MODELS Like-fUIS to truth l~' not the ...tUm -Peter Evaluating Model. Computer~generat('d predicdons based on mathematical model is a collccrion of data and equations describing, or simulating, characteristics and hehavior of rhe ching studied. The models and simulations of rhe ching studied. The models and simulations of rhe ching studied for a new car or the Hm.v of water in a river, and intangible systems, such as pans of lhe economy. Models allow us (0 simulate and investigate rhe possible t~fr1.."C{s of different designs. scenarios, and policies. They have obvious social and economic benefits: They have obvious social and economic benefits: alrernarives and make better dccisions. reducing waste, cost, and risk. They enable us to project trends and plan bener for (he future. Sccti{)O 7.} Information, Knowledge, and Judgmcnr 361 ... Yopulation growrh. ... The cost of a proposed governmmt program. -> The dfects of second-hand smoke. ... \Xfhen we will run om of a critical natural rL"Source. (0 'rhe effects of a tax cut on (he economy. ... The chreat ofg]obal wanning, ... When a big eanhquake IS likely to occur. W,l"!,, Some Problems Studied with Computer Models Although rhe model airplane. i\fodels are simplificarions. Model airplanes generally do nor have an engine, and {he wing flaps might not move. In a chemistcy class. we could use sticks and balls to build models of molecules, to help us understand their properties. The molecules, to help us understand their properties. equations for every factor that could inlluence the outcome. They often include equations that arc simplified because the correct ones are unknown or (00 complicated. Foc example, we
use a constant knO\vn as (he acceleration of gravity in a simple equation) we ignore the effen of wind in the equation, bu£. on some days, wind could make a difference. Physical models usually an: not the same size as the real thing. Modd planes arc smaller; the molecule model is larger. In mathematical models, it is time rarher than physical size char often difference. physical proces, ~ in derail ofrem take more time than the actual process takes. For models oflong-range phenomena, such as population growth and climate change, rhe computers and complex computers programs impress people, but models vary enormously in quality. Some arc woflhles...~. Others arc very reliable. Politicians and special imerest groups lL~e model predictions to justify multibillion-dollar government programs and laws that restrict peoplc's freedom, with significant impact on rhe economy and dIC stand...ud of living of millions of peoplc. Ir is impon: Im tt) to both computer professionals 362 Chapler 7 Evaluating and Controlling 'rechnology The following questions help us detennine rhe accuracy and llsefulness of a model. 1. How well do the modelers understand rhe underlying science or theory (be it physics. chemistf)" economics, or whatever) of rhe system they are studying? How well understand rhe underlying science or theory (be it physics. chemistf)" economics, or whatever) of rhe system they are studying? How well understand rhe underlying science or theory (be it physics. chemistf)" economics, or whatever) of rhe system they are studying? relevant properries of rhe materials involved? How accurate and complete arc the dara: 1. Modd~ necessarily involve assumptions and simplifications in th(;.~ model? 3. How closely do the results or predictions of rhe model correspond wirh results from physical experiments or real experience? After considering a few examples brieHy, we will look at two L"Xamples in more depth: car crash models. Among three models. Among three models. Among three models. Among three models developed to predict rhe change in health care COStS [hM would result if [he U.S. adopted a Canadian style national health plan, the predictions varied by \$279 billion. Iwo of (he models. Among three models. Among three models. Among three models. Among three models. predicted large increases and one predicted a dra. aic decrease in health care costs, IG Why-was {here such a difference? 111crc arc boch political reasons, especially for this example. arc probably obvious, Among rhe technical reasons why models might not have complete knO\...ledge of the system we are modeling. In other words, we might not fully understand the basic physical or social science involved. + 'rhe data describing current conditions or characterisrlcs might be incomplete or inaccurat(.'. Compuring power could be inadequate for the number of compurations needed moded refully complexity of [he system. + It is difficulr, if not impossible, to to numerically quantify variables that represent human values and choices. Arc reusable (washable doth) diapers? When environment than disposable diapers? When environment than disposable diapers? When environmentalisrs proposed bans and taxes on disposable diapers. manufacturing. Several modelers developed computer models to .Hudy the question. We call rhis particular kind of model a life-cyde analysis. It another the resource use and environmental cffects of all aspects of the product, induding manufacture, usc, and disposal. To illustrat.e how difficult such a study might be. Figure 7.2 list~ a few of the questions abour which rhe modelers made assumptions. Dcpt~nding on rhe assumptions. the conclusions dittered. 17 It. is worth noting also that the models {()(used on one quality-environmental impact. To make a personal decision, we might also consider other factors such as COSI, aesthetics, convenience, comfort. and healrh risks. The U.S. Army Corps of Engineers uses mathematical models [Q predict how long an artificially constructed or replenished beach will lase before waves wash ic away, Scc(iOII 7. 1.. How many rimes do parcnrs ranged from 90 to 167.) -40- Information. KnowkJgL". aml .ludgmcnt rCU5C a 363 clorh diaper hcforc discarding it~ (Va lues Should rhe model give crcdh for energy recovered from incineration of waste? Or docs polludon & om incille r~\(ion counterbalance the benent? v What value should (he model assign for [he labor COSt of washing diapers? ... How m.:lny do[h diapers do pafl!OIS use each (illle they ~ha ngc a baby? (Many parents USt' two at once for increased prorecrion.) Numbers in [he models fanged from 1. 72 to 1. 9. * How 5hould thi: model coum pesricides used in growing cotton? W'iiiUa Facro rs: in Diaper Lifc-Cyd t: Modeling Two geologis(s l!xplain weaknesses in (hese nlode.lsYi Among orher simpli fy ing assumptions. the models 3..o.;SUIIIC that all waws have {he same wavelength. (har all waves come from rh\' S:1nl\' direction. and ,h:lt :111 gra ins of sand arc th e SJme size. A model US I'S only six of 49 parameters rhat migh t :'lffecf (h e amoum of sand washed away. EVt."11 if the se six arc the most important (or if the model included ExampJe: Modeling car crash-analysis programs use- a tech.nique called {he fini[c-i...lemcnr method. These programs superimpose:1 grid on rhe frame of a car, dividing the car inm a finite number of small pieces, or cl\m(.'nts. The grid is entered into the program. along with data describing the specifications of the materials making up each dcml!nt (".g., density, strength, and elasticity). Suppose we arc studying the eHects on the structure ofrhc car from a head-on collision. Engineers in itial ile data to reprt"Scllr a Cf; lSh into a wall :, I[a specified speed . 'rh\' program compu(t;'s [he torce, acceleratiol] , :1mi displacement at each grid poi n(and Iht' stress and srrJin within cach cll'melle It ft;'pe:1tS rnese calculat ions ro show what happens .: l.\: time pa.'~se... in small increments . These programs require inrensivc computation to simulate 40-1 00 milli.~econds of real time: from thc impacr. A real cr:lsh [cst can cosr s.cveral hundred thousand dollars. It includes building and testing a un ique prototype for a new car design. The crash-analysis programs allow engineers to consider aln:rnatives, for ~xamplc, to vary (he chi(kness of steel for selected component.~, or change materials altoge ther, and discover the cfii..'Ct wirhout building :mother prototype for each alternative. But how good arc the programs? "An c:l riici vt'1'i.ion 'If Lh i~ s\'C twn "-PI)(:;ut'ting. \X'C\$(l'uhli.hing Co. , 19 .~" mr(' 364 Chapter 7 Evaluating and Controlling Technology How well is thf p/~ysics ~r l'ltr cmshl!s unrkrstood? How accuratt> and complete lire the daw? Force and acceleration are basic principles. The physic.~ involved in these programs is straightforward. Engineers know rhe rck" Vant properties of steel, plastics. allUninlltn, glass, and other materials in a car fairly well. Although they understand the behavior of the materials \...hen force is applied gradually, they know less about the behavior ncar or at breaking point. "I'here arc good data 011 the dcnsity, elasticity, and other characteristics of materials llSL'ti in the model. WhiZ! simplificatiow d() the programs make? The grid pattern is the most obvious. A car is smooth, noc made up oflittle blocb. Also. rime is continuous. Ir does not pass in discrere steps. The accuracy of a simulacion depends in part on how fine rhe grid is and how small rhe time intervals are. Currenc l;ompurcr speeds allow updating the l;alculations on fine grids wirh small rime incerv"lls (e.g., one millionth of a second). How do 'he (omputed resuits compart to actual crash tests. Engineers attach sensors to rhe car and mark reference points on the frame. They compare the values rhc sensors record with values the program computes. They physically measure the distortion or displacement of the physical crash. the engineers use elementary physics to calculate backward and determine rhe deceleration and other forces aCting on rhe car. They compare these with [he values computed in the simulation. ... nle conclusion? Crash-analysis programs do an extremely good job. Engineers who work with the crash-analysis programs do an extremely good job. happens that the program designers simply did not consider. The crash-analysis programs art' (:xcdlcm design tools that enable increases in safct~1 with far less development coS[. The physical crash tcSt is confirmation. In part because of the confidence that has developed over time in the validity of the results, engineers use variations of the same cra.~h-analysis modeling programs in a large variety of other impact applications, including those in Figure 7.3. Example: Modeling climate dlange is a very complex scientific phenomenon with potentially large social and economic impact. The second programs in a large variety of other impact applications, including those in Figure 7.3. Example: Modeling climate dlange is a very complex scientific phenomenon with potentially large social and economic impact. 1970s, aher global temperamers had been dropping for about 30 years, some sciemis[s warned [hat we faced serious problems from global cooling. including the possibility of a new Icc Age. Then r('mperarures began to rise again. The threat of excess global warming. possibly caused by human-induced incrca.o; c of carbon dioxide (C(h) and other greenhouse gases ill the atmosphere, replaced global cooling in the headlines and sciemific journals. From {he larc 1800s to the la((' 1900s, {he average global air temperarure rose roughly 0.6°C. It is generally cxpt"/Cted to cominuc to rise through the 21 s[-cemury. Sciemists usc Scctinu 7.1 • (to Information, Knowledge, and Judgnll'llt 365 Predict damage to a hazardous wasre comainer if dropped. Predict damage ro an airplane wind.. hield or nacelle (engine covering) if hit by a bird. 0) Determine whether beer cans would
get denIed if an assembly line were speeded up . .. Simulate a medical procedure called balloon angioplasty. where doctors insert a balloon in a blocked arter} and inflate it ro open the anery. The computer program helps researchers determine how to perform the procedure with less damage to the arterial wall. .. Predict the action of airbags and ehe proper location for sensors that inflate them . .. Design interior part.. of cars to reduce injuries during cra.; hcs (e.g. • from the impact of a steering wheel on a human

chest). v Design bicycle and motorcycle hdmcrs +> Design cameras to reduce head injuries. if dropped . .,. Forecast efleets of earthquakes on bridgt."S and buildings. Wi''iUJ Orher Uses of Crash-Analysis Program.~ climate models to try to determine how much temperaturt"S will rise, what is causing ('he fisc (e.g.. natural q'dic changes or human industrial activity), and what other climate change opeC), sponsored by the United Nations and the X'orld Meteorological Organi lation, has published comprehensive ccports on the science of climate change roughly every five years. Much of the infi)frnation in this section comes from rhose repons.!') Climate models, like the car~crash analysis models, calculate relevant variables for grid points and elements (grid boxes) for specified simulated time intervals. The grid circles the earth. rises cluough thl' amlosphere, and goes dm....n imo [he ocean, Equations simulate atmospheric pressure] temperature, incoming solar energy, outgoing radiant energy, wind speed and direction. moisture, precipitation, ocean currents, and so fonh. Clima(e models used in rhe 1980s and early 1990s v. 'ere limited. Hecc is a brief sampling of simplifications, assumptions. and factors modelers did nor fully understand: The models did nor distinguish day and nighr.20 111tj used a fairly coarse grid (with points roughly 50D kilometers apart). They did not include {he El Nino phenomenon. They made assumptions about. methane (a greenhouse gas) {hat scientisrs later determined were incorrect. They did not include aerosoL~ (small particles in the air) 366 Chapter 7 Evaluating and Controlling Tedmology that have a cooling dfen. Clouds are extremely imporrant to dimate. bur m; UlY proces...e.; involved wirh rhe formation, effects. and dissipation of clouds are nor particularly wen understood. "['he IPCC summarized in 2001: ''A. has bl'cn the case since rhe firs(IPCC A.~scssmctH Report in 1990, probably the greatest uncertainty in future projections of climate arise from douds Clouds represent a significant weakness. Computing power was insufficient to do the many calculations [(.) simulate ocean behavior. When run on past data, some of Ihe early climate models predicted temperature increases three to five limes as high as what actually occurred over rhe pre\'iow. century. Tb us, it should nO(be surprising that there was much skepticism about. the climate models and their projections. Current models arc more derailed and computer speeds allow the usc of finer grids. (That is, rhe models can compute variables at more poims. spaced roughly 200 kilomerers apart.) Increased data collection and basic science research have been improving rhe understanding of the behavior and interactions of dim.ue system components. Many models now predict air (cmperamre ncar the surface of {he earch well. [hat is, dose to observed temperatures, fur the recem past. It is reasonable [hat confidence in the models had increasly.] Based on the calculations of the models and on comparing previous model projections with actual data from (he n:ccnt past, the 2007 JPCC reports thar many calculations of the models and on comparing previous model projections with actual data from (he n:ccnt past, the 2007 JPCC reports thar many calculations of the models and on comparing previous model projections with actual data from (he n:ccnt past, the 2007 JPCC reports thar many calculations of the models and on comparing previous model projections with actual data from (he n:ccnt past, the 2007 JPCC reports thar many calculations of the models and on comparing previous model projections with actual data from (he n:ccnt past, the 2007 JPCC reports thar many calculations) and the models and on comparing previous model projections with actual data from (he n:ccnt past, the 2007 JPCC reports thar many calculations) and the models and on comparing previous model projections with actual data from (he n:ccnt past, the 2007 JPCC reports) and the models are calculated by the second projections with actual data from (he n:ccnt past, the 2007 JPCC reports) are calculated by the second project of the negative project of the negative project (he n:ccnt past, the 2007 JPCC reports) are calculated by the negative project of the negative project (he n:ccnt past, the 2007 JPCC reports) are calculated by the negative project (he n:ccnt past, the 2007 JPCC reports) are calculated by the negative project (he n:ccnt past, the 2007 JPCC reports) are calculated by the negative project (he n:ccnt past, the 2007 JPCC reports) are calculated by the negative project (he n:ccnt past, the 2007 JPCC reports) are calculated by the negative project (he n:ccnt past, the 2007 JPCC reports) are calculated by the negative project (he n:ccnt past, the 2007 JPCC reports) are calculated by the negative project (he n:ccnt past, the 2007 JPCC reports) are calculated by the negative project (he n:ccnt past, the 2007 JPCC reports) are calculated by the negative project (he n:ccnt past, the 2007 JPCC reports) uncertainties remain. Models project that doubling the concentrarion of greenhouse gases in the atmosphere from its ll...vel at the beginning of the 20th-century will l."aUSC a global tcmperaturc increase within the range 2°C-4.5~C. Much of the variation in the model results comes from the still troublesome lack of full understanding of some of the effects of douds.l.J 'fhere arc still weaknesses in understanding variations. in ourpllt from the sun, sources and behavior of methane, connections between C02 emissions and C02 concentration. The [pee report lists among "h'y uncertainties" insufficient data [0 draw wnclmiol1s about trends in the thickness of Anrarctic sea ICC. The report indicates that the accuracy of projections for future climate change i,~ still hampered by rhe complexity of rhe problem. That is, even {he extrcmely powerful computers of coday are not suffidem ro achieve an ideall('Vd of resolution (grid size) and ro include simulation of more processes {hat affect climate. 24 Some climate scientists who arc nor part oflPCC argue that the models have more fundamental weaknesses, f(J] example, not full considering long-term natural crdes. A variety of studies are underway w sec bow sensitive the results of the climate models ;uc to minor changes in technical assumptions. Modelers are also developing merhods [0 quantif]' the uncertainty in rhe models. S Computers and Community 367 The projections of the 21 sr-o::ntury). *25 Why do science ficrion movies about global warming show [he buildings of cities underwater? The entertainment industry dramatizes, of course. Why docs a science-museum exhibit show warer up (0 the middle of the Statue of Liberty (about 200 feer above sea level)? A climate scient.ist once said that "w capture rhe public's imagination," "we have to offer up scary scenarios, make simplified drama[ic statemenrs."16 Is rhis agood idea? A 20-inch rise in sea level would be an enormous disaster. Exaggeration might lead people [0 take constructive action. On the other hand, exaggeration might lead to overreaction and counterproductive actions. Jf we hope to solve real potential problems (such as flooding in low-lying areas), we must first idemity (hem accurately. 7.2 Computers and Community V?hill' all tins 'L1.ZZle-dazzil' (Omu:ctJ tJi cl~ctmtJiat!1y, it diJC01JIlt'Cf\$ us/ron! each other. hdlJing us "intel/ruing" more with (OmputerJ fllid 7V sal'em tlHlli l(Joking in the/aCt' ofourjeJ/ot/) hronart be;ngs. Is this prtJ}!;ress? ~Jim lrightower~7 :-;omething got's on among IJlWJ.11JS that is definitely not pn·)(rJt in human-machine reltlionshipJ. Many people spend hours online instead of with their families and in-person friends. lecnagers and young adults stay up all night in front of their computer screens, playing games, exploring systems, or surfing (he \Veb. Some virtually eliminate direct contact with their families and orher people. Some who arc already socially awkward find computers easier co deal with [han people: the computer provides an excuse nm [0 overcome the social awkwardness. In an ('Xtreme cast:, a mother neglected her children and Iefr rhem in filth while she surfed the Internet. 29 Critics of the Internet worry that computers reduce filCe-to-facc gathering and that the Web hurrs local community vibrancy. Neil Postman says that voting. shopping, banking, and gerring information af home is a "catasrrophe," There arc fewer opportunities for people to be "copresent," resulting in isolation from ncighbor.~. Technology, he worries. purs a much greater emphasis on the individual and down plays (he importance of ~Th~ pnljc...:lion> "J.ry Ix-.;~usc of dijrer~nt l_\~Umplt"n\ tfl lit.' grtX'11110u~t' l'I"~ l'rni~,illns, dift-.'renl mode!,; lnd ~lilh:n'm ,\u:ouiv, ~b 368 Chapter 7 Evaluating and Controlling Technology community. Richard Sclovc and Jeffrey Scheuer argue that electronic communication will erode family and community life ro the point than people will mourn {he loss of depth and meaning in {heir lives. 50 How st~riotIS arc {hese problems?DOI~s the Internet make people will mourn {he loss of depth and meaning in {heir lives. 50 How st~riotIS arc {hese problems?DOI~s the Internet make people will mourn {he loss of depth and meaning in {heir lives. 50 How st~riotIS arc {hese problems?DOI~s the Internet make people will mourn {he loss of depth and meaning in {heir lives. 50 How st~riotIS arc {hese problems?DOI~s the Internet make people will mourn {he loss of depth and meaning in {heir lives. 50 How st~riotIS arc {hese problems?DOI~s the Internet make people will mourn {he loss of depth and meaning in {heir lives. 50 How st~riotIS arc {hese problems?DOI~s the Internet make people will mourn {he loss of depth and meaning in {heir lives. 50 How st~riotIS arc {hese problems?DOI~s the Internet make people will mourn {he loss of depth and meaning in {heir lives. 50 How st~riotIS arc {he loss of depth and meaning in {he loss of depth and
than reading a book, an activi ry that is usually applauded? Is the Internet destroying communities? Social scienrists offer various (heories about wha[makes a strong community. Roben Putnam arguL'S that onc impormnr factor is the number of dubs and other organizations people join and arc active in.:~1 As Alexis de Tocqucvillc observed more than 150 years ago, "Americans of all ages, all stations in life. and all types of disposition are forever forming associadons." 32 WI..' join hobby dubs. religious congregations, sen icc dubs, hiking iUld running dubs, and myriad ochers. Such memherships creace informal personal and wrlUld,-" 1 an.logyOf. Wll-Mart from downtoVJ:n shop~, :~[J~ ' bllSiness. the decline of the downtown c:~~,~d~:~Y;It:an"~res:'d.:ult that no consumcr~ ..." They gen~rali'z.e from scenario and warn (har, as cyberspace bl!came cornmcrciaJj~ and we con:ducted .more economic rransacrions e1ectronidlly, we would lose mOT(, local smrc~, JOcaI professional and social seivices. and 'COiWlv,ial pl!blic spaces like th~ down,tOwlu:.'o f small to.~Vn s. Consumers would bc ""cmnpdled" to usc cleccronk services, "like it or nor." Other strong (.:cirics of rcdlnelogy share rbe, underlying point of viC\v. l oSdove and Scheuer's article, so it is woITh c:x~ining their argument. The Wal-Mar analogy is a good .one. The: ~ccnari() is ,useful for illustrating : Ind Y / :r":', ./." clarifying some issues alx.1u[{he impact e- Computers i.llld Community 369 370 Ch"p(l'r 7 [valu.uing and COlli rolling] "Wharever:: price; ¥foi",, ~ Jur to Will-Iv"" thq wC're: not 'g etting rhat Again there is a market work hut nota perverse on C': "- benefit:, before., at dynamic' ~01~ritiQn:. The second issue about the Wal-Martf ~~1>111", C'rcc scenario is whether the change Is ,an "involunrdry" transformation . Sclove and. \$cheuer say thal. as local bu.~ine..~~s dedine., people will be compelled (0 use electronic services, like it or not. Is this acCtirate ~ No more so chan Wat·Man oJ Sh6p there. The impact on (he involunrdry" transformation . Sclove and. \$cheuer say thal. as local bu.~ine..~~s dedine., people will be compelled (0 use electronic services, like it or not. Is this acCtirate ~ No more so chan Wat·Man oJ Sh6p there. The impact on (he involue services, like it or not. Is this acCtirate ~ No more so chan Wat·Man oJ Sh6p there. The impact on (he involue services, like it or not. Is this acCtirate ~ No more so chan Wat·Man oJ Sh6p there. The impact on (he involue services, like it or not. Is this acCtirate ~ No more so chan Wat·Man oJ Sh6p there. The impact on (he involue services, like it or not. Is this acCtirate ~ No more so chan Wat·Man oJ Sh6p there. The impact on (he involue services, like it or not. Is this acCtirate ~ No more so chan Wat·Man oJ Sh6p there. The impact on (he involue services, like it or not. Is this acCtirate ~ No more so chan Wat·Man oJ Sh6p there. The impact on (he involue services, like it or not. Is this acCtirate ~ No more so chan Wat·Man oJ Sh6p there. The impact on (he involue services, like it or not. Is this acCtirate ~ No more so chan Wat·Man oJ Sh6p there. The impact on (he involue services, like it or not. Is this acCtirate ~ No more so chan Wat·Man oJ Sh6p there. The impact on (he involue services, like it or not. Is this acCtirate ~ No more so chan Wat·Man oJ Sh6p there. The impact on (he involue services, like it or not. Is this acCtirate ~ No more so chan wat·Man oJ Sh6p there. The impact on (he involue services, like it or not. Is this acCtirate ~ No more services, like it or not. Is the impact on (he involue services, like it or not. Is the impact on (he involue services, like it or not. Is the impact on (he involue services, downtown Stores might not have been obvious to-all the townspeople at the bcginning(alcl.ough now ic is common enough thar Ihey might anticipate it). bur an unexpected or unintended result is nor lhe same a.~ a coerced result. In a free society. individuals make mi11ions of decisions bast." pactrcn of scores, ~rvicc.~, and (not co memion - social and patterns). No one cm provitt what the result will be. and Senion 7.2 Comput\!rs and Community 371 In:r'~~-~~Ii:6h: &1o, ~daYCvening, that j~ ' i:h~ _ only :evening you are off job. Like it or not, you ha~ ;ro.subsidi7.c community activhies you do not panicipaec in. because you preft:r :y6Ur. ' ~tauranr eJoc!JX)nkshopl'ing. Selovc and Schoucrdo seem to see coercion when practiced people whose prefer -a lose option. sec it as Those who prefer -a lose option. sec it as Those who prefer -a lose option. sec it as Those who prefer -a lose option. sec it as Those who prefer -a lose option. sec it as Those who prefer -a lose option. sec it as Those who prefer -a lose option. sec it as Those who prefer -a lose option. sec it as Those who prefer -a lose option. sec it as Those who prefer -a lose option. sec it as Those who prefer -a lose option. sec it as Those who prefer -a lose option. sec it as Those who prefer -a lose option. remOle voices. It actually expanded and deepened social relationships for isolated people: women in general (farm wives, in particular) and .he elderly, lor ~xamplc.:U(Todar. the JmcflH.'t. provkk-s community. Some people who an: so~iall)' awkward communicate more be.:.'ause of ,,-mail (han the)' would without if. f rom its ea rly ycars, according to (he CEO nf Ameri ca Online, more people used AOL for .'community" ehan for informacion rcerieval. To (he ("Xtcnr [hat , he lrucrncr conrribulcs to the formaxion ofdcclronic rdalionships wirh people scattered around rhe COUIHry and the world, it might further weaken local community bonds. The dcgn...'c of change, however, seems smal! compared ro the effects on communities for pCTSol1al interaction \virh local merchanes and neighbors in the course of ordinary daily a'ri\'itje.~. bue [hL)' free dOle (hat wt.' can fill with activities shared with people we know well and associate with by choice. Many richly developed virtual communities. simui; uions. and altcfl 372 Chaprl'r 7 Ev alu ~ujng and COll lrolling Technology interviews on Second Life. Your avarar can run around a virtu:l) track in a fundraisingcvem f.h:lr l'Ji ses real moner for a TC3J ~world charity. Wh:u arc the impa.cts of such communities? W iU th1.'Y attract social misfits who do not have a rcallif"."? Will people find innovati vl~ and beneficial ways to us~ (hcm ~ Wbat guesses or projectjolls can we make has('d on what we have seen of the Inrcrnet so J~IC? 7.3 The Digital Divide The term digital divid " refers to the fan that some groups of people h;1VC access ro and regularly u.~ com puu." r. inform:.uion. and c.:ommu nicatio ns technology. while others do nOlo Tht' focus of di~cussion about rhe digital divid " refers to the fan that some groups of people h;1VC access ro and regularly u.~ com puu." r. inform:.uion. and c.:ommu nicatio ns technology. while others do nOlo Tht' focus of di~cussion about rhe digital divid " refers to the fan that some groups of people h;1VC access ro and regularly u.~ com puu." r. inform:.uion. and c.:ommu nicatio ns technology. while others do nOlo Tht' focus of di~cussion about rhe digital divid " refers to the fan that some groups of people h;1VC access ro and regularly u.~ com puu." r. inform:.uion. and c.:ommu nicatio ns technology. while others do nOlo Tht' focus of di~cussion about rhe digital divid " refers to the fan that some groups of people h;1VC access ro and regularly u.~ com puu." r. inform:.uion. and c.:ommu nicatio ns technology. while others do nOlo Tht' focus of di~cussion about rhe digital divid " refers to the fan that some groups of people h;1VC access ro and regularly u.~ com puu." r. inform:.uion. and c.:ommu nicatio ns technology. while others do nOlo Tht' focus of di~cussion about rhe digital divid " refers to the fan that some groups of people h;1VC access ro and regularly u.~ com put." r. inform:.uion. and c.:ommu nicatio ns technology. while others do nOlo Tht' focus of di~cussion about rhe digital divid " refers to the fan that some groups of people h;1VC access ro and regularly u.~ com put." r. inform:.uion. and c.:ommu nicatio ns technology. while others do nOlo Tht' focus of di~cussion about rhe digital divid " refers to the fan that some groups of the fan that s the world had equal 3 CC~SS to PCs and rhe Imcmet. T hey did 11m exist, and we all had no ne. La cer, a small . di(~ minorit y enjoyed tht.'S~ new. expensive rools. IU rhe technology began 1.0 spread and its valu e became dearer, people became mo re co ncernoo about th,,' gap in access. In 1994. ac(:ord ing m a Times Mirror survey, a F.~mil)' in the U.S. with a con(' gc~ gr adua rt' parent and famil y income over \$50,000 was five rimes more likely to have a home co m p urcr and tcn rimes more likely to have a home co m p urcr and tcn rimes more likely to have a home co m p urcr and tcn rimes more likely (0 have : 1 modem than the bmily of a nongraduate earning Ie.~s than 530.000, Almost half the children of college graduates used a computer at home. Only 17% of children. of parents with high school education or 11!s.~ did.; \/' Poor children and children of some eth nic minorities had less access to compurers bmh in schools and at home. In the early 19905. only abo ut 10% of Ner users were women. By 1997. the gender gap among users had vanish ed. "'o but ocher gaps rem ained ." Black , Ind Hispanic households were aboUt half as likely a... rhe gelleral populario[1 to own a compu rer.]\cce ~s in rural and rem ote region s tagged the ci des. Advocatcs of unh'ersal access to rhe Net argued {har access might give some people such a large advf... » ionall ,II davi I''''' rcentagc] helWt.,, "1004 ~n] 1{}(6, C~ I) you Ihink of 1'1.';1.114'11> fOl Ih Irop? St'Ction 7.3 The Digit access to rhe Net argued {har access might give some people such a large advf... » ionall ,II davi I''''' rcentagc] helWt., "1004 ~n] 1{}(6, C~ I) you Ihink of 1'1.';1.114'11> fOl Ih
Irop? St'Ction 7.3 The Digit access to rhe Net argued {har access might give some people such a large advf... » ionall ,II davi I'''' rcentagc] helWt., "1004 ~n] 1{}(7, 1004 ~n] 1 ral Divide 373 have access ro the Net; (hat hardware and sofr.o:are muS[be easy to usc and fit the necd~ of all users, including rhe disabled; that [raining must be 3vailable; and rh; u pricing mU!'r be structured so that everyo ne can afford the sc.:rvicc. 41 Various organizations ucfined universal access to include c~ mail, 'X!cb browsers, and inrcracr.ive" multimedia equipment and software. Advoca{t:s of universal aCCesS sec access a.... a right- i n particular. a posid\lt' right (i .e., a claim right, in the terminology of ScCtion 1,43)-so01cthing that socil'ry must provide finevcryonc who cannot afford it rhcmsdvcs. They ,ldvocaled requirements (hal Inrcrne{ companies subsldize access for poor JX~ple. Others argued that the gap would shrink without subsidies. Those who emphasize negative rights (liberties) ovcr daim rights ralsed objcx:riom (0 mandatory and (ax~funded program...: such programs violarc the Hberrics of busine~s owners and t~txparcr.~ who musr pay for [hem. Virtually all [cchno]ogic.:al innovatio n is first available. w the rich (or others willing 1.0 pay th e initially high price). The carly purcha.!':. (h(~" 'l "f di~k SWI;q;I~ leI! frum h u nL!re"\]. "f Julhh I>('r m'1!;~b)', 11)80.. In S;':!.1) X"T 11\I.·g-. . h)1C' ill 1991 (() In, dun;t p~;nnr a m~abyt~ by 2001 .''') The l'O'l ,;or\(lnu,,~ (0 fJII, I bought 111)' fir,1 mtnl'ut~r in !~IB. h h:!n ilt.>r. fl.) IllvtIrm or);r.. phi..~;md ... drip ~ 1> t WIt,, "n I .ried w find ffil)j't I «COl iigurcs., I (oun.1 d:it'i un th,' p!.:rc~'luge of homes wir]' bro~Jh.l!wJ or wild!..., 4"~'C~'. Thu~. the fut;Ul of .lle divide ~htftc""d frum b:bi(: (:'.~. insidiously embeds infO {he user th e values and thought processes of the socit:'ty rhal m.1kes (hc rcchnolog}, C; I The argumclll [ha, capitalists or t(..'dlllologics manipularc pt"oplc ro bur thing:> they do not. really want, like,: the argument thar, usc of comp uters has an in... idiously corrupting effect on ClJmplI(Cr IIscrs, displays a low view of [he judgml·nt and auronomy of ordinary people.] r is olle thillg (0 differ with another person's values and choices. It is anorher (0 conclude thar. because of rhe diAl-rence, 111' othc r fK'cson is WCilk and incapable o(making his or her own decisions. Thl' Luddite view of {he appropriate way of ljfe puts litde yalue on mode rn comforrs and conveniences or on the availabilir.y of a large variety of goods and services. Perh.aps m ost people: valu.: rhcsc rhings more highly (h an the Luddites do. 'I() get a dt!arcr understanding of (he Luddite view of;'l proper life sryle, we consider some of their com ments on the rdarionship of humans and nature. Nature and human life styles Luddiu:s argue chal ll..."Chnology Ius made no improvement in lif~. O[ac best im of which he disdains. Sale says thar although indi viduals might feel their lives art:' bener b~ 382 ChaptC"1 7 Evaluating and Cuntrolling T~chnol"g)' society, a.~ well as ro our bank accoum), and how well ir co mpare~ fO aircrnati vc\$. Criric\$ of modern rechnologics POill(out the-ir \ ... 'eakncssc~ but ofren ignore {he weakne~ses of ahcrnarivcs, fo r (..."Xamplc, rhL" millions of Olcres once needed ro grow feed for horses and rhe hundreds of tons of horse man un.: d ro pped o n che street'S of cities cadl day, a century ago. (15 Mander's co.nmcnl about automobilL's again raises the issllcs of our Slandard of valuc and our nc.:cd for : J prod.ucr or servi ce. D o we need dcct ricity and hor water on rap ? Do we need movi es and symphony OrcllL"Slras? O r do we lu.'cd nmhing more than food :lnd shelter? Do we need an :lVCf .? T/J(\f/rb iJ a/ill. nl'llrly (/. J ('() mp/~x and, 1 {If/l, 1]Ifumll]] It. lh prim()ydiill fWilmp. fo. ~ -John r'err)' Barlow66 ~---- 7.4.2 ACCOMPLISHMENTS OFTECHNOWGY Some aSpL'l'ts of [he nco-Luddite .. • "~.--- ScnioJl 7.4 E...aluariom of the Impact of Compmer 'J ~dlllol ogy 383 malaria in most of rhe world. Dear.hs a { work. during rr;)vd. and by ;.\ccidefl(s declined dram:ltically. Simon summa.ril.ed hy saying, "just ~bom every single measure of the qualiry of the Impact of Compmer 'J ~dlllol ogy 383 malaria in most of rhe world. Dear.hs a { work. during rr;)vd. and by ;.\ccidefl(s declined dram:ltically. Simon summa.ril.ed hy saying, "just ~bom every single measure of the qualiry of the function of the declined dram:ltically. Simon summa.ril.ed hy saying, "just ~bom every single measure of the qualiry of the function of the declined dram:ltically. Simon summa.ril.ed hy saying, "just ~bom every single measure of the qualiry of the function of the declined dram:ltically. Simon summa.ril.ed hy saying, "just ~bom every single measure of the qualiry of the function of the declined dram:ltically. Simon summa.ril.ed hy saying, "just ~bom every single measure of the qualiry of the function of the declined dram:ltically. Simon summa.ril.ed hy saying, "just ~bom every single measure of the qualiry of the function of the declined dram:ltically. Simon summa.ril.ed hy saying, "just ~bom every single measure of the qualiry of the function of the declined dram:ltically. Simon summa.ril.ed hy saying, "just ~bom every single measure of the quality of the function of the declined dram:ltically. Simon summa.ril.ed hy saying, "just ~bom every single measure of the quality of the function of the declined dram:ltically. Simon summa.ril.ed hy saying, "just ~bom every single measure of the quality of the function of the declined dram:ltically. Simon summa.ril.ed hy saying, "just ~bom every single measure of the quality of the function of the declined dram:ltically. Simon summa.ril.ed hy saying, "just ~bom every single measure of the quality of the function of the declined dram.ril.ed hy saying, "just ~bom every single measure of the quality of the function of the declined dram.ril.ed hy saying, "just ~bom every single measure doomsayers claim has occurred. "(,7 Il'chnology and the fndustrial Revoluuon have had a dramatic iml':il:ct on lift' expect.mey. A study in 1662 estimated rh'H only 25% of people in London lived to age 26, Records from'} 8t.iH:entufY fren ch villages showed {hal ehe mt'dian age of marriage, Vmjl recent generations, P;:UCIHS had w endure rhe deaths of most of their children. St .. n~ation was common . In rhe U.S .. life expt.'Clancy ar hirch incrl'ascd from about 33 in 1900 to 73.1 in 2004 for black people, Worldwide awra*e life expecraney increased from approximately 3.0 in 1900 to approximately 64 in 2006.)1': Technology certainly is nor (he only factor in improving quality oElife. Progrc.se clara suggCS(thar I.cchnology critics recognize that m any people consider computers to be useful. Mander explains one of the reasons why. i 1\ spire of this, he still considers them to be. over::t11. neg.HIVe: Peo ple have {hem at home and find (h em empowering for th em selves and their organizations. They are helpfu l in many ways and t'"lfler considerable perso nal conrrol. unlikl! nonyicldillg tcchnologil'S. like tdc\'i.'~i ()n . Small social and polirical groups find computers valuable for infi)rma[ion sfOrage~ n('(working, processing mailing li~ (s ..., a nd so on. Yet all this hegs rhe qUi!.uion. The real iss ue is not whecher computers in society?69 Mander belit':vcs rhe anS\\'Cf to his quC'srion is multinational corporation s and centrali'ICd corporate power. "In capitalist society. rhe bendi[s arc disproportionately allo[(cd £0 the peopl~ who own rhe- machines." Our level of empowerment. he says, is patheric hy compari son ...'-.fander says char "small businesses would acrually be bencr off if compmers had not. been invented, since they arc essentially one more tool char large businesses can use bctter: !tJ The subrirk of Jobn Naishitt ... book G1ob,d P'Irlldox: The Bigg~r fhi' lflurld Ecollomy. 1"1.' IV/ore POfl.'ufollts Smallest Plfl)'rYS contrasts with Nbndcr's vil...... thilt computers arc bad for small businl..'S.'>Cs, Naisbin sees rcleollnmunications as (he- dri\,jng hm:c in nearing a roh usT global economy and reducing [he size of hmh political and business] uni1s. The \X-'eb and tile value of information serv ices hl.-Ip small (even tin y) busines!:es form and fl o urish. The 384 Chapter 7 Evaluating and CUlHruUing '[~dlno logy hendit5 of teleco mmunications 3.nd inform:uion rechnology arc enormous in developing coulHri c...~. A report of a United Nations Conference on Tr;lde and Dcvclopmcnc. observes that developing economics CUI make producriviry gains worth billions of dollars by encouraging rh(~ growth of electronic commen:c. The report said ,har ir is because (he imc.mct revolurion is rdevanr not just (0 rhe high-tech, informarion-imcnsive se-ewrs but also (0 the whole organisarjon of economic li fe [hac ... " developing CO Ulltric..;; stand a better chance of sharing in irs ben efit~ {'arller (han in prc..'Vious (cchnological revolu tions.7 ! Postman acknowledges thai computers arc very bcnc1icial to disabled people. He sees ("onvcnicllI access to online information as a tremendous advantage for scholars and sc il·nrists. But he.." sees rhe In "'The standard of living of common~rs is higher (Uclay rhan [hat of royahy only tWO lite cenruries ago-especially [heir hcalth and expectallcy.', n Mich .. d Cox and Richard AIm pre-sem data showing that the poor in rhe U.S. had at least' [he same II"Vci of many appli:.ances and luxuri~ Ihac {he awrage Ameri('an had only 2.1)'t:'.lfS ('aelicr. Sce Figure 7.5 for a few examples. (Luddi[Cs would probably argue thar we do nor m-cd these machines.) Washing machine: % ~f P~~; -H~~s~h~fd~----%;;rAlfH~;;;;hol;(; with Item in 1994 with Ifem in 1994 with Ifem in 1994 with Ifem in 1971 "Iekphone 71.7 19.6 97.9 97.7 GO.O 91.5 76.7 Air-conditioner 4~).(-i Ar I~\ st' one car 71.8 Dishwasher Refrigtamr Sro\'c Microwave ovell Color
(ell'vision WhiliA' "lechnology B~n 71.3 18.8 83.3 87.0 43.3 93.0 3 1.8 79.5 7 .1 and .00Jnl el.:pbill Irnu the)'\lour nn ; irunl thcse itrm ~ 1)«:~uSl:" the price of ne.:e~iir jN. dediucd [cb.tivc III iUlu me Ioduw , he Jl ! ... ~~ ,,-... . Section 7.5 Making Decisions about le~hn(lJogy 385 The number of labor-~aving and cntcrrainmcnr appliances Wl' c.1n buy is only onc way of measuring well-being. Consider J.lso who benctits more from a spech-aniv, ;jij :: f pity, hI! poor, Iwd should 11Irdly think 7f~}1(!lfinll(JC(m iflmy man/at m()u t for rlxm tban 1 do ; but t"~ rmud] for their gri~1ffI/U:s, lits thr ,Irstruction ~ oflyfachiTwy. Thq opprmC'd t.wcrdingly, but by M({d}J·n~ry. TbtJJe 1 AffIChintry Ofi'iifJir,g part ofthofthr poor, hal!t Vt'ry llot ill 11ot fJl'l' wIN) (1fCIJSt TI (11/Y dismJsl's (olltractt'tlvit'lVs and nllrrOl/J minlh. IlJld!u bur a llrtlr way. They dtJ not sum to 1\ consider tbitt alnwJJ etlt':.y tbing WrlS nrll) i"huhinaJ OTW', Thn t was d timl': mhen , torn was groulld by rI t hand: mlt whm Com Milts ami Wz-"d Af;f/r 1('O'r,lim i~ imltnt('{1 thry Wrrt: Nm' ,\fncbinry; find t/)rn:jou why]lor brent.. and burn thest 1 111 .!!lon liS d n} (u/la kind of MIIt him,,; for iIThey wt'rl' n!!]lOppu/, and tom dqltin ~ grou f]d by th~ 1]",~d. th(~r w{]u/d be plml) u! t'tnployme]ITflr. m"t~ hilluis..1 A1"ch r rht' lamt obstrwlTlolI] rfllqht bt mm/~ rt'Spt'u mg t'va] l[ti](r kllul oj /\1i/t/nnuy, '~ amI ~ I]IIII~ askt'd ,J.,is qutfltOfJ ill ort/tr to j'buw tlu silli1tess oltl}I' !g pr4Cf1u. ,IIJ -George Be;lUnlOm (from "Reflections on Luddism," 1812)7) 7.5 Making Decisions about Technology No one I'utl!d for thi1 f{'(..h llo/ugy (Jr trll} ofth~ l'Ilriuus machinn and proCt'u('}, bat make it up. - Kirkpatrick Sale?lI I' ~.-. .. -- -- ..., 386 Ch'l't Evaluating and COlHmlling Technology 7.5.1 QUESnONS We saw, in Section 7.4.1, [hat rhe determination of whar are rrue nCt"d.. depends on. our l..~ hoicc of values_ Throughout {his book. we saw controversil~S acom specific products. services, and applj("ations of computer reehnology (('.g., personalized advertising, anon ymous \'('eb surfing. and fao,:-rccognil ion systems). How should decisions be: made /\hour the basic queslion of whether m U5(' a whole technology, or majm segmellts ofic ~t am Who v.;ould make such dl'cisio n s~ Most people in scie nct'. cngin(,"(~ring. ,tnd business accepl. alm()~{ \.... ithout question, che viC\v chat pcopk can choose to use a technology for good or ill. Some criti cs of (cc.hnology disagree. They argue thar compurers, and tl'Chnology in gellCr-JI. are not "nemral." Neil Posrman says, "Once a tt."chnology is admitted [to our culture], it plays out irs hand; it does what it is desig ned IO do. " 77 In a sense, this view SCL'S rhe: [cchnologil;"s rhemsdvcs as being in comrol. In rhe vicw of some cride... of computing rcchnology ~ big corporations and governments make decisions abOUt uscs of rh(' technology wilhout sufficieru inpm or conrrol by ordinary pcopk. Kirkp.1 rrick Sale's lament :n the beginning of '[his secrio n expresses chis view: There was neVer a VO IC on whc.:ther we should h:IVC computers Jnd the Imcrnet. Some people argue I'hal we should nor usc a new rechuology ,n all umil we haw studied it. figured our irs consequences, and made a determination thar (he consequences are acceptable. The idea is that if the tcc hnology docs not meet certain specific desirable modern inventions while prohibiting others or prohibiting whole rechnologies? How well can we predict {he consequences of a new technologies beta consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can decisions? We consider [he first question here and the others in [he next sc(: (ion. How find]' can deci made? In response to a criticism (har (h e- nihallifc he C'Xlolied would have no pianos, no violins, no tel escope, no M01.an, Sale replied, "if your chm thought char the violin was a useful; hd nonnarmful tool. YOLI could choose ro invent that."; 8 Perhaps critics of co mputers who recogni7.e the value of co mputing technology {O disabled people would permit the dcvdopmem of such applica tions. The question is whether it is po\$..'\iblc for a clan or sociC'ty LO choose to invent a violin or a hook reader for bl ind people withOUt" the {l'chnologiCII and economic base on which rhe dc"dnpmcllI of rhese products depends. That ba.~e includes the fr('edom (0 innovate, J. I:\rgl~ enough economy produ(.,t!O (e.g., perhaps, a photocopy machine). S(:"(:rion 7.5 In~apt,ei l, we described M aking Decisiom about Technology 387 l"n'g~f1lStaoS' relci1icdidne, as technology_ Computer and cO'WLunicati6nsneiWorks make possible ciiminadon otparielllS and mc~. d l4.afu,"O; and they make 'possibl¢ m,!~C,~1~1~~~ ren.otely controlled mediCII procedures It reading Chapters 2 and 8,)'OU should, be Clblt!-: [0 think of porentlal prlv~u;::y -and , £afei:y problems with such system.~. objections You might think of other as wd!. Should - we ban rcleme'didne? SeverAl states passed laws prohibiding (he practice of tdemedicine by doctors who arc nor licensl." 11L< laWl> wilL "keep out the and snake-oil salesmen," acciOr, iing Olle supponer. 79-- Also , tcllcnlcttkine 7.5,2 THE D1FFICULIY OF PREDICTION A brief look ac rhc dC'Vclopmem of communicaions of 3 new technology. C ompucers were dt.'signcd co c.llcul:ue balliscics crajcc[Orics for the milirary. The 'PC was originally a tool for doing co m putatio n and writing documents. N o one but a t;'~ w visionaries imagined most of rheir currcm usC'S. OpTical scanners., speech rccognilion systems. rouch screens, and c~ mail were dcvdopcd for a variery of research, business, and consumer uses, bur they are major umUt.:~!sI(rJ as ti}(y dr(dmg(YOII!. -Thomas Edison. 1899 • 1 think thrrt is a world miJrk~".lbr mllJbr Jive compuuYi. -ThomasJ. Wal CQ»JpWtrf ill ,hr fiau" ml~Y ... on(v w(igb 1.5 (om. -Popu/Jlr J11efhllllicJ. 1949 • 11Jfr!' is '10 muon for fill) ilJdividwrilo h,tvr /I (Omp"ter ill tkir home. -Ken Olson, president of Digical .Equipment Corp .. 1977 ~ Th, U.S rvill hdV(220.0()O I'Omp111m by rhe yMr lOOO. -Official fon.>Ca5t by RCA COff)ora[ion . 1.966. (The actual number wa...;; d ose to 100 million.) Predi"1 ionsll1 of new uses, unt."'Xpcae] f onscquenl.:cs. and social action (0 encourage or discourage or d technology does not drive human bdngs ro adopt new praclic~.s. it shapes t he space of possibilit(.'S in whic..-h rhey can act: pcnplc arc drawn to rcchnologit."S that give them more choices. Norc Ihat he docs nor say more choices of consumer products. but more actions and rebtionships. Don Norman also suggests that s()cicfY influenct.'S the role of a (.ochnology when he says. "The tailun.' (0 predict rhe computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original
norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society \vould modify (he original norion of a computer n:voiu[ion Wl\$ Ihc failure [0 underscand how society government committee, a think tank. or a computer-inclusrr)' executive pledi ce lhe consequences of a new technology? The history of cechnology is full of wildly wrong prediniolH-solTlC' overly o ptimisfic. !lome overly pcs!limistic. Consider the quotations in Figure 7.6, Some scientists were skeptical of air rravel, space tra....d , and cven railroads. (They belic"vt'd (hat passt:ngers would not be able to hreathe 011 highspel.:'d trains.) The qumations in Figure 7_6 refleci a lack of imagination about (he myriad lL~CS people would find for each new tel..-hnology. about what tht' public would like. and about whoa (hey would pay for. T11CY humorously demonstrare (hat m any experts can be urterly wrong. "X'I." examine the ptcdicrion problem more seriously and in more dcpr.h by considering arguments made by computer technology: speechrecognition sys.rcms_Sq Here arc Weiz.enbaum s objection.o;, accompanied by comments from our pencerive today. or to "1'hr problem is so m flrrtlOflJ tl]lzt 0110' the largesJ possiblr comput~rJ will (l,'a hr (lbl, to ml1nllgt it. .. Specch-recognidon software runs o n p es. We can buy pocker-sized personal organizers that take spoken commands. + "(A) speech-recognition machinr is bound to br mormouJiy expemiv(, . . . only g()vanml'nts and possibly n "rq j t-w w ry fnrg~ forpomtiollS will /f,("lore hr able 10 ttffird ie. " Some computers w me with simple speech -recognition sofr....nl"c as a free bonus. The pocket org-.Ulilcrs cosr a few hundr{-'(I doil:J.rs. Big ~ompanies provid e voiceilct ivatt.,d services powered by speech-rlxogni rion so ftw~re to millions of cOllSumers. Somt' voice -acriV3tt.'d se:rvices on cdl phone by speaking \vhat we wam ins tead of typing. \Vlc can call a business, speak (he name of the person we ..'...am to rl"ach , and aU[oOlaticaIly be conl1ccfcd to that person's o tension. Other customer-lic rvice appli catio n.s in clude checking airline Hight schedules, geuing sto(;k quotes and we-.nher info rmarion, conducti ng b;mking transa.ctions, and buyin g movic ricker~ on th~ phone by speaking narurll1y insfead of pushing burcons. Recall some of [he applic;uions] described in Scctions [,2.5 and 1.2.6 : [raining sysrcms (c.g., for air fr!]ffi c concrollers and for foreign languages) and fools that help d isabled people USc computers and comrol application is transcription of dicrate. People who suffe r frolll repctitive !;train injury usc speech- recognition input inslead of a keyboard. IBM ad\'1..~rrised speech-input software fo r pocts. so the}' can concelHrat.c on poetry instead of typing. People with dyslexia usc spt.'Cch-n:cognilion softwa re so thcy can wrilc by di ctation . A company d eveloped a device that recognizes speech and rranslares it into other languages. F ull rransiollion is still a diflic1,.llr problem, bur tourists, business people. sociaJ-s('f\'icc workers. and many oth ers will surely find many 11.~S fnr spc-ciali7...c d VerSlons_ Voit:c-accivared, hands-free opcl.I(lon of cdl phones, car S[crcos, and o th er appli ances in automobiles ciiminares some of the safety hazard of using these devices while Jriving. Thl! • rnark~t for sIX"'ch-rccognition technology toppt:d \$] b illion by 2006. 8~ lhe mili/iJr.v pLumed to tontrol wrapons by I-'oice command, ',1 long Step toward II fiJ/~y 'l1t1ommed baulLjirfd " Some argue that we should have: [he b l"5 f po....siblc WC-dJXJIIS [0 ddend ou rselves. Others argue that. ifw,us arc ea..~icr to fight, governments figh t more [hem. 1f counni~ fight wars wirh remmc/y controlled aurollulcd weapons or (h~ 1\ 3() rC'.m of hilll'|'1\hl li ru.:c: \'('("j'U 'nbl UIII \VIII~' JIK"«I. fC"COI?-IIilinll, hU\Y(""\'Cf. lud ~l tl"l J ~ "ppc:m.·d hy thr c:~r!r 1') 'w", 'lOW hJn' 11l0t'" t,i 5 h 390 ChapleI 7 Evaluaring and Controlling Tedmology and no humam on tile bauldjdd, i... thar an improvement over wars in which people onl}' one side has rhe higb-rech weapons? Would r.holt cause more wars of aggres... ion? Is cben: any technology that the military cannot or do,-'s nor usc? Should we decline to develop strong fabrics because the military cannot or do,-'s nor usc? Should r.holt cause more wars of aggres... ion? Is cben: any technology that the military cannot or do,-'s nor usc? Should we decline to develop strong fabrics because the military cannot or do,-'s nor usc? Should r.holt cause more wars of aggres... ion? Is cben: any technology that the military cannot or do,-'s nor usc? Should we decline to develop strong fabrics because the military cannot or do,-'s nor usc? Should r.holt cause more wars of aggres... ion? Is cben: any technology that the military cannot or do,-'s nor usc? Should we decline to develop strong fabrics because the military cannot or do,-'s nor usc? Should r.holt cause more wars of aggres... ion? Is cben: any technology that the military cannot or do,-'s nor usc? Should r.holt cause more wars of aggres... ion? Is cben: any technology that the military cannot or do,-'s nor usc? Should r.holt cause more wars of aggres... ion? Is cben: any technology that the military cannot or do,-'s nor usc? Should r.holt cause more wars of aggres... ion? Is cben: any technology that the military cannot or do,-'s nor usc? Should r.holt cause more wars of aggres... ion? Is cben: any technology that the military cannot or do,-'s nor usc? Should r.holt cause more wars of aggres... ion? Is cben: any technology that the military cannot or do,-'s nor usc? Should r.holt cause more wars of aggres... ion? Is cben: any technology that the military cannot or do,-'s nor usc? Should r.holt cause more wars of aggres... ion? Is cben: any technology that the military cannot or do,-'s nor usc? Should r.holt cause more wars of aggres... ion? Is cben: any technology that the military cannot or do,-'s nor usc? Should r.holt cause more wars of aggres... ion? Is cben: any technology raises serious ethical and policy questions. Arc (heS(.' questions sufficient re'iS arc sJaughrerce? W'hat ~ Go"annuts fflll ir use rprerh rf'cogtlizioll to inertarr til(cfjhitnq find e.Utrlillentss of lUirt'lappillg. (Abuses of \\'irerapping concerned Weizellbaum. for I.:xample. lapping done by oppressive gO\'l'rnmellfs_ He does nor explicitly memion wiretapping of criminal suspects.) One can argue [hat' governmenLS can use the same tool bencfici;:tlly in legal wiretapping of sllspi.*cred terrorists. but. it is rrue thal speech recognition, like many other technological roots. can bt' a dang..-r in rhe hands of goVt"rnmenf.'i. Prorection from such abuses depc..'nds in part on the ft.'cognition of the importann' of strictly controlling government power and in parr on the appropriate bws and enforcement' mechanisms to do so. Discussion of \X/eizcnbau[\1's objections is imponant for several reasons.fir.~t. although \Vcizenbaum is an expert in arci]l cial intelligence. of which speech recognition is a 5ubJidJ, he was mistaken in his expecr~Hions abour rhl' t:Usts and bendits. sIX'ond. his object mology might ehrear. ('n fbe survival the human race? w~ consider such an t'xample in the next sc(cion. Ir or lu"....]" •• ~ "~ ... - "....... -" u _. SccrinJ1 7.5 Making Decision" abolit 'ledmology 391 7.5.3 INTELLIGENT MACHINES AND SUPERINTELLIGENT HUMANS -OR THE END OF THE HUMAN RACE? Prominent technologists such as Hans Moravec, Ray Kurzwcil. and Vernor Vingc describe a nor-very-distanr future in which imd ligcnace. and intelligent ma directly. \'Vhy wail for a s(foke? Once the technology is developed and tested, healthy people willlikdy buy and install such implants. MassachusC'tts Inst itute ofTl."chnology (Mn') robolics rcSC".ucilcr Rodm'Y Bronks. for example. suggeSts thal' by 2020 we might be JUSt 35 comfortable with them as they are now getting laser eye surgery at a mall. 86 Will such implants make someone less human than a heart transplam or pacemaker docs~ What social pro blems will imcllig The technological singularity The. term lerJmoiogiCtII singularity The. advances ~ o far [hat we ('; lnoor comprehend what lies on [he other side. It is plausible. says computer sciemist Vinge, thar "we can. in the fairly ncar fUfun:, create or become crC']tuf1."S who surpass humans in cvery imdleC(ual and cn.'; trivc dimensitm. Events beyond sllch a singular cvcm arc as unimaginable ro us as open! is to a flatworm. "~7 Some cechnologists sex (he human race transforming imo an unrecognizable race of superintelligent. generically engineered (features within this cen tut),. Some sec this as a welcome advance. Others find it horrifying-and others unlikely. Som(' technologists see potential thrcals [0 tht: slltvi'.",1 of the human race. Tfa(.,), see rhe possibility of tht' machines achieving human~ levcl intelligence and th en rapidly improving themselves to a superhuman level. Once robors call improve their design and build bett er robots, \....ill rhey "ou rcompctc" humans? ~lill they replan: the human race, jusr as various species of animals displac~ others? And will it happ~n soon. say wirhin (he: next 20 YC - ----- WI indude .\OUll' rr(l'u:m:o: ~I die end o(, fir .. 1 lOl I'l l'r. !'-, 392 Chapter 7 Evaluating and COlltl'Ullillg l hardw:ue power conrinue.o; at this rare, rhen by roughly 2030, compm L'r hardw:1rc will be about as powerful as a human br.l in, sufficiendy powerful to support the compur:ulon requirelUcnu of inrelligent robot s. Both those who think an extreme advance in machine intelligence or human- machine intelligence is likely. in the nCilC f\uuce and those who criticize th ese ideas provide sen-roll reasons why it might nor he able 10 develop the l1l'Ccssary
softwan: in the next fe w decades or af al L DL"Veiopments in AI. panic.ularly in rh e area of genera] imcll igencc, h(· been much slower than (esearchers ~xp ectl'd when l.he field began. Third, the esti mates of rhe "hardware" computi ng power of rhe: human brain (rile soph isricacion of ehe compuring power of neHrol1s) might be drastically roo low. Lasdy, some philosophers argue rha.r robots programmed with Ai software t:annor duplicate ri ll' full capahility of the human mind. Responding to the threats of inteillgent machines Wilt., ther rhe singulariry occurs within a few decades. or later, or nOf at all. many in dte re!evlnr fields foresee general-purpose inr~lligenr machines? cannot pn.'parc for rht? aftermalh of {he singula rity, hut \w can prepare for more gradual de"clopmclHs. Many of t he issues ,c t?xplorcd in previous chapters are relevant to ('nhaJlC(xi imciLigcncc. W ill software bugs or otber malfunctions kill dlOu..;;ands of" people? Will hackers hack brains? Will a large division opt:n up bcc\....cen the supc rinidligelH and the mecely humanly intelligent? We saw rh Section 7. 5 Making Dcci s ion~ about Tt'chnoiogy 393 or (he techn ologies rha t arc tOO da ngerous, by limi ti ng o ur pursuit of certain kind s of knowledge. "He cires, a.'i ca rlic... r examples) Ireatic.~ to limir the devdopntent of ce Ha in kinds of wcalXHIS and the U.S:s unil:ttcr.tl decision to abandon the development of biological weapons. O neealulcss of Joy's analysis is thar he docs n o r apply rhe saIne crirerio n lO rdin {IU ish mcnt as (0 ,he approaches he rejeers: They arc "either undt.~i rahlc or unach ievable o r brh. Enfo rcing relinquish me nt would hc extraordinarily di(fit.u)t. if nor impossible. As Jo)' r('cognizes, illtclligcnt robo ts and the other techno logies rhat concern him have huge numbers of porent ially henefi chll applications, many of which will save lives and improve quality or litc-. AI \"'hal point would government L~ sto p pursu ir o fknowkd gc..' and dc.'. vdopment ? E.thical pro(essionals will refuse to participate in the development of some Al applications, bur they too face the difficult prohlcm of where to draw rhe line. If we dt......c get controlled, useful applications, how will we p revent \'isionary o r insane scienrists. hackers. (t. "Cnagcrs, aggressi\,(, goernments. o r terrorists from ci rcumventi ng tilt' con[rols and going beyo nd tht: prohibiled level? Jo y secs a relinquishment verification program on an unp rcl~edentcd scale, in cyberspace and in ph ysical facilities, with privac)" civil liberties, business auto nomy. and frce markets seriously curtailed. Thus.. relinquishment means no! only that we might lose dl...'vd o pmc fH of inllova rive, beneficial produ cts and services. We would lose many basic lib(..rties as w(.' 11. H, ----"I; > rrdic(ion is Iliff/mit. erptfutl(r abo"f the fomft'.')0 - --...... 7.5.4 A FEW OBSERVATIONS We have preSt"nted arguments ag.:ainsr the view rh: H IH. W rechnologies should be c\'alu3tcd and perhaps banned at the start. D ocs (h is mea n that no onc should make dec isioru abom wht. ther it is good to dc:vdop a pardcular applicat ion of a IH..'W technology? No. The arguments and examplt"S suggest tWO things: (1) that Wc' limi[the scope of decisions abom dcvelopm enr of new rl."'Chnology, perhaps ro parricular prod ucts . and (2) that the- deC iSion-making process be d eccmral ized and no n cocrc iv{', (0 reduce (h e impacr of m Lnlkes, avoid manipula tion by cmren(;hcd companies who fcar competit ion. and prevent violations ()f liberty. W 394 ChaptC'r 7 Evaluating and Controlling Tet:hnnlogy EXERCISES Review Exercises 7.6 Describe a scenario in which bi3.~d or incorr«:tinfofITl.arion a child finds on-the \Veb might harm hiin or her. What. if anything.. might have prevented rh~ child; froo1 finding similar information befUtl"the \Vtb (lCistoo? SuggeSt and evaluate one medlani\$nl for prC\~oting :I.'U(..'h harm (fcom .-he 7.7 Consider a ~SQcial media" :Web sire on which display of news seories dependS on rhe VOtes of readers. Is it an, ethiOl:l '9bligarion ohhe site operators: ro en's-me, that votes are not boughr and Web). sold, oris i(incrdy a good bus.incss policy? Or is' it 'both? Someold~rpe{lple- himcm the: fact that mon Chit4rcn--now-i'h -dc:ntentary .schc)Qlwill never read a (prinfC'd) new!lp:l_per, What will .thq mk~? Is anythin,g of s_ ignificant, .p rewit ofincreas't d communication;mo rransponation.,of globalization ofbu... iness~nd trade. and sQ,on...-all side dfeccs of increased technology-in gmt-rOll and of the -Interne-r in parrie.ular. What arc the advamagt'S .and disaci\'allt3.gL'S offosing languages? Overall. is it:i, signi,fiL--anr problem? 7.12 SOmc' pcoplelamcD[me fact that young sale.li derks-cannot :add up'bills, romput~r (or look up) sales tax, and c:ticulate change wh.:::n the sales terminahaTC not functiq(ling. To what extent have dccrronit: caJcuhUOiS and computer s}'Sl_ems -cIeSuoyro our :thilitY:to doarirhmc:uc oundves? What are ,the- advantage, of using-a ca!cuiaror?Whn3TC, thedisadvamagcsof"reduce-d arith~etie skills? Should elemenrary ~ools allow childn:n _to lise calculators? Should they teach children [0 we calculators? Why~ 7.13 Writt. three questions whose answcrs you would)It. 'Cd for a lifc- 1---' - Excr~iscs 395 7.15 Suppose a computer program uses_the following dat run outQrthe rew9J'cc. 7.16 7,)7 7.18 7.19 7.20 7;2] 7.22 7.23 7.24 b) In 1972. :3::gro\lp called 1he Club of Rome pttblished a study using ' computer program uses_the following dat run outQrthe rew9J'cc. 7.16 7,)7 7.18 7.19 7.20 7;2] 7.22 7.23 7.24 b) In 1972. :3::gro\lp called 1he Club of Rome pttblished a study using ' computer program uses_the following dat run outQrthe rew9J'cc. 7.16 7,)7 7.18 7.19 7.20 7;2] 7.22 7.23 7.24 b) In 1972. :3::gro\lp called 1he Club of Rome pttblished a study using ' computer program uses_the following dat run outQrthe rew9J'cc. 7.16 7,)7 7.18 7.19 7.20 7;2] 7.22 7.23 7.24 b) In 1972. :3::gro\lp called 1he Club of Rome pttblished a study using ' computer program uses_the following dat run outQrthe rew9J'cc. 7.16 7,)7 7.18 7.19 7.20 7;2] 7.22 7.23 7.24 b) In 1972. :3::gro\lp called 1he Club of Rome pttblished a study using ' computer program uses_the following dat run outQrthe rew9J'cc. 7.16 7,)7 7.18 7.19 7.20 7;2] 7.22 7.23 7.24 b) In 1972. :3::gro\lp called 1he Club of Rome pttblished a study using ' computer program uses_the following dat run outQrthe rew9J'cc. 7.16 7,)7 7.18 7.19 7.20 7;2] 7.22 7.23 7.24 b) In 1972. :3::gro\lp called 1he Club of Rome pttblished a study using ' computer program uses_the following dat run outQrthe rew9J'cc. 7.16 7,)7 7.18 7.19 7.20 7;2] 7.22 7.23 7.24 b) In 1972. :3::gro\lp called 1he Club of Rome pttblished a study using ' computer program uses_the following dat run outQrthe rew9J'cc. 7.16 7,)7 7.18 7.19 7.20 7;2] 7.22 7.23 7.24 b) In 1972. :3::gro\lp called 1he Club of Rome pttblished a study using ' computer program uses_the following dat run outQrthe rew9J'cc. 7.16 7,)7 7.18 7.19 7.20 7;2] 7.22 7.23 7.24 b) In 1972. :3::gro\lp called 1he Club of Rome pttblished a study using ' computer pto following dat run outQrthe rew9J'cc. 7.16 7,)7 7.18 modds thac implied thar. the-world would rUD OUt uf SCVt!ra-1 impC1rram n-aturJJ n:sources:in the 1980s.Today. even "'irhthe; enormously increased 4emand from China a,n~fothc:r devdoping countries. "\''C' luvc. not run: ou(. Why_do you think manY prop_lc '3ccepttd the prcdicrions in [he study? How do the opportunities for:"co-presem."cidIl.pers'on; social iluC!t:lctions'tooay compare, with (hOstof2()(1~250- y('3cS ago? (If you think it is rdevanr. commenroD-rhe fac(chatThomasJc:fferson wrote ,approximacci y 1.8,000 lerters in his lifetime and [h"'t Voltaire ~()te -abou[21,000.'l) A large num~'r_o f coUc:ge sfudelUs ilre_enrotkd_ill online degrt:e progr.mlS. DisctiSssome ad¥~nragc!i and djsad\'~ntages (to the students and to society in gc n('~1) of stud.ents getting degreea online: instead of at tra.4itional collegeswhere (heracc co-present with facull)' and Qther S(ude:ms. The number of small Mighborhood bookstores is dedining because of-competition from: both large ch:tin rncgabook.~tores · ana onll ne store'; :ljke Amiw.on.C9rn; Should a law have prohibi red Amazon.com from .opening? If not, sho:uJd we 'PJ"Ohibir i(from selling used books. {O hdp preserve small 11cighbo,rhood , uscd~bo()k storC'\$? Give rcason,s. Suppo~c you like to -shop in your neighhQrhood booksroi'eand feafir _might go olltofhusiness. What can you 'do? Some religion·bmd" edl phone service'S charge Jess £Or -c-alls (0_9rhcrs jn-rhe s.aO'u~ netv.nrk of rdigion bau:d phonc:~. I.s'this a posirivi=- Yo-at of reinforcing a community or an encouragenlenr for insubrity? Give reasons for your answer. Rec.uI ,hedis~usston i,11 the-~ in Se~{iOh 7.2 and consi 396 Chapter 7 Evalu:uing and Controlling T~dmologr 7.25 Analp~ the following argument about the ni:ces,~ity ot cdlphones. Is it convi:ndng? Some people du nor wane (0 0"(11 a cdl phone b«,;aUS('. among ocher re-.asoru. -cdl phones art: imrU\$ivc. difficult to usc. and expensive. Technology advocates say if you don'r wane one. you don'(have ro buy one . .Bur rhi); is nOt crue. We' have to hav Assignments Thd(e.urcUel'rl!quirt' lome rm-arch tiT llfti'1iry. 7.32 Find an ,artide in W'lkipedia. {or Citizenrlium)on a subject that you alre~dy kn9w a lot ab-oi.1t; Read and review [he-article. Is it accurate, well done. complete? 7.33 Find Web sires choat I>cuvidetecommmdarionsabou[how-much vir.mun C a penon should consume each da.y., Find at lea~t one site (har is extreme' in some way and at iC':l:s{ one thar you consider rc-",so,_,ably reliable. _Describi the silt'S :md explain the b~is ror your charactt:"riz:nion of them. 7.34 Withopcn,spccdr (:onununiCOltioll on (he Web. there is no easy way to pr(.~venr rumors- from .~p reading quickly. Some urban Icgend~ per";Lu and sh()W up repeatedly,
. Find a Web site rhat regularly reports on myths -and researches the faea about Wtb nunors. 7.35 R«:ent pred1cti~rufor'population growth in ,[he -21st: 1.."Clltliryhavl:, "hanged quire ,a hitfronl predictions :made 3 few decades a~ . Find .reports: of older populations models (say. from the 1960~.) 97th, or J 98Ch). and-lind rep(lftS of (ec~(popul;uiom; mcidek How do they differ? How have (hc'assumptions in/the models cl1anged? 7.36 Find _a ~ mall. nonq,3in boob-tore or a smaU (ravel agen~y: (a physical bu~iriess. nor:t Web ~ire). Interview theo'Vner abo\!(the impacr of cheWeb on - hi~ or her busineu A~k if other similar scores in your ci£Y:have dosed because of competition frome- comm~rce. Exerci~>; 397 7;37 Arrange {ovis'inn dementaty school where t.hechild~n use computers. evalu:;ue- mem. What are m e advanrage-sand 'disadv.mt'.lge\$ nf U\$ing a cofllP!J.rer 'for,each a(.,tivity you nbservcO. Arc computers ne Class Discussion Exel'{;ises ThNr (XJ!l'(iJ(I IJ" for diU! dil(Imioh. p'rrhap; with short p"unll.ltiom prepared'ill adv4tUt' by ;moll groUpI o'Illltknll. 7.41 Some people Who considt'r themsdycs capable of disringuishins ,reliable from unreliable inf.ormation on rhe Web are concerned that most ordinary people are.1ikely ~o bdit.-ve liel" they might follow d;U'lgCtous medical or financial :ldvicc. :;I;Ild _so on, How serious a problem do yuubelil"Ve thjs is? How m.ight it be ~dn:s.~? 7042 Consider the following qUQt.uiotl frQm :Edward R. .Murrow, 3 renowned (adin (and later 'J'V) journali.n in the 19305-19_5 05. Do you JGree with it? Why? An:-dlCre some. J!Io'P-'"'CIS of diffi.rent kinds of communication systems that influence the killd. and quality of coment they :uc likely to have:? A, rommunicatio]!'. system is wtally neutral. It has no ,(:onscicm:e. nO motion systems that influence the killd. and quality of communicatio]. system is wtally neutral. It has only a false:hood. h is. in sum no more or nQ Ids rhanthe ,mcnarid. WOOlen whoU5c' ir.n (mIll 7.43 A numbet of peop:l~ -3dv()c:ite a law- tCC)ulri ng Goqgle (0 make public the algorithm.. it uses ro rank Webs-ices for dUplay in :r('sponsc rosearch qUC'ries. Conside~ingiss':lesin rhi.~ chapter. and any other rdcv;Int iss u~ , disclL'iS argumem~ in f.1Vor of:mch a requircmcll{ and argumelH:noagaills[it. 7.44 Google.has been pursuin~ :m '3mbitious goal (If coUecting-and providing vaS{ amounts ofhum:m knowledge. Google'sprojects have-taced a variery of\riricisms, some' centered on the Jact." that it is a prl\'ate c:ompany::md dut it 1\$ an-Atncricau company.' For l:X3mple. Coogle's dat'.mases and the wide-use ufiu search engioes give i[mon: power over information dun J. private corporation should have._Googk's project ofscanning millions ofbqoks contributes to American and English-Ianguage domination-of world culture be(...ausc it is scJ.nninghooks in:-EngliSh. G ivc ar~m('nu , insupport of these criricisnu and arguments against them. 398 Chapter 7 Evaluating Olnd ComrolJi ng 'li:chnolngr 7 AS Wha{2(C',:some skills. {~adi tion~. and/or 50cm cQ nvC'nrionS that h.ve been. or m ight loon be. lost beca~ of computer:and :l'nterJl([technology? h.ldude uleasronc m~r you think will be a real loss (i.e.; -3 nq;;itiVt: c:onseqw=oce) ;and include .at leasc-one wheI"C you think the los... is nor :i _problem. G ive rt'asons~ 7.46 Wbat_form \Viii the digital dividesdiffcl' from sodal divisions m :.lt occurred. when omcr ihrotmacion and co mmunication technologies were iocwduct:d? 7A-7 In th~ ProrriCmeus myth; ht1.~. thC':-king of We gods.was furiolLs afPromemeus foneaching science ,and t ech nological skill~ tomankind -bec3use mad.e prop,le: ll1ore, ,p:]i", "D igi u] ~ o,ll'lwll>{"-loo!,) Rc-J l i.'m, ~ Ill. II ~A ('ill\H'/VC:: rs~' (a'-" C>~i,.1 Fdlru;.or)' 18.1f)()7l; HallY rJrid, Uni>" '-~," Ip u l c r M-k-' KC !, mJi:S5tU ~ I D~tlm'..u" I-'ho(o)p m~ PI' !OR.. · 113~ M ich:ld \XI. Rl! bbin~, ~Tlu' Apple ufVj\u~] Ti:t'illu,jug."... Ihullt lttm. Jul yfAu);lll ' 19')-4, 1'. 4. \r'l"". Ma)' t'}')l). I'i" .4. 15 Nrll' Yu,t Tn"", F.. br\j~ry I, :!OO I; Waiter J. Ong, Im,.,i/ ",'iJ ilml eUlllm· (Ctltndl Un iH·" il)" Prt"S.~. C""Hi Notes 14. 15. From Mi'-'m""li '~ '.'l'bl1:.uim\ "f iu p.,li.)'. 'tuCJl",1 i.n Mark Goldhltlt. "Bowdk-rilt d hy Microwli," Nrw v,n* Jim ..f. () I'}. JO I~ ('rc'ottll '. iuJi vitlua! a.• til Ridl~, J Sd·c and pp, TH. B9. }dl're)' Stheul'!. "01'1 the Road .-\g-Jin: If Illt"urnwinll HighwJy~ Art· AnYlhing Lih I"temale Orrin H . ['ilkcy ..." d Lilld~ Pilk.:y.JaJ'\vis, - ~,'hr '\hrhcm:11i ...~d M "dd1 Ju...-t [.H'! ,\;IJ Up, · '(hi Ommidr flfHI~J!rr tiluratilm , Mar 2.), 1007. .'hrouid.: .null /w~ klyi v5 3/i3MI 38 bO 120 I.hun (;Kc", s.:,1 J uly 21 , 2(07). The II'CC r,:po'h (l'ubliJa',j hy C:.lJnhri,j~ Uu ivfni lr I'r('~~): S. Sololnun et ;,[., .: H;gl.....,lrS-\\'~I;:h Out!· in C~mpuf(fuRli,m n...j C" ...,ror,..-ry: I'll!." C""jlio-t (//ul.~-i,,1 Cllf!k'-'J, In.1L-J .. cJ. R. Kling IAc:nkrn il' I'rll in hb ."IK "Nclwurkillf; in th.· J. T. Jul y)1. cd s.. Clmullr Clml:.~" J. T. H"" gll1on ct ~ L, «I ~ .. Ojtn.," GN"if," 199.'-' Tbr Seima oj'Oim.rf(ClIl/.r. 1') Hl)u~hlOn el 2fK!}: TJ.'' 5;'."itl1liji{ HiI.ii, 1001; }I C,mlmlluit(~I the .'1.1.11 Diegu AC~I dupt ~'r m~ til\g. J.11111 ry ~4 . t9'lci. 31. AJ.ri~ dcTol:qllt\.]rr;~, ., "b y I '}94. 1'1', S-7; Jon K:m" · T h(Oigiul Ci t ilt"ll .~ \\':;",1. De:C"'ll" [)CI 1,),)7.1'1" G/l.-S2. 274"' .! 7 ~; (j", Gue rnsc.~.. (:rh~r" pJ.((: Im'!, So Londy Aftel All." t·i.:U' Y",k lim6. n-l... elm"'ft Ch.1IJX'_ Th.'j)'Ce S.-i July 2:6. 2:001. 1'1'. O J, D'i; j:Ulld E.lGf1. an.1 Philip 1')90. I JJ.>t. II.'iCJ a $M_{1,1'}$ -.a nt ly of 'H ht'f l}t.oi.:l' .lld A~I""('11. ~." allid..:~ for bad,!~I"un J. ()IIt' H:.!.UI' W,k lim6. n-l... elm"'ft Ch.1IJX'_ Th.'ji.tiu(tiun) ~ impOlUItL j, tlut (,c .~ m pVl'.1 ~hrlll lci t lf;. D. L Alurimll1 et JI.. "T~-.:h l\i...:r.1 \$uJU1 mr)':' in CJi""'il' Ou",,,, 2001, ('(I.) . T H'IU:;i'Ul}n et ~L, PI'. .11-1'1:3 (see p. "?). 12. Eyk "Nn Till'" Lilu: 11'0: with Ndl Pmtn",n) . ,\hGuif/... , lui)' 1')'). ('I" 12 [-\ 22. Chef Bower•. .uu)th cr d;\ic .u~1 conol'bin~ mal I:OUlpulcn u IIIu i\>uu: 10 the vi.-... uf tin' f'J'Jfioll S;:i'lIIiji.- /lmiJ, 2007. Ttdwi,,~i Sumlll 21. A l t'l\~ n(h:l: (intCf~icV\' Ben~t t. i l>(.~: vgl. u";H..alulwg. l / ",gl.rtl r'-"lIrLl (.al\.'c~ cJ 20. S.,rfing ;\!Oll Charb'"Cd wi,h 1911m;,,); Ki,ts:' CNi\ 16. 19,)7,-w(i.t.:nn.(o o,/lJSlS/70t,l 16/h, ~e[, pm/int~rnL'I . nt.,;lc~'t! (:&,(·~s..~1 O('to\.lr, 2'). lOtI I). ··Su;mg.: 'Sdt'm:c': i'rnli('tillr, H C':Ilth' (.al\.'c~ cJ 20. S.,rfing ;\!Oll Charb'''Cd wi,h 1911m;,,); Ki,ts:' CNi\ 16. 19,)7,-w(i.t.:nn.(o o,/lJSlS/70t,l 16/h, ~e[, pm/int~rnL'I . nt.,;lc~'t! (:&,(·~s..~1 O('to\.lr, 2'). lOtI I). ··Su;mg.: 'Sdt'm:c': i'rnli('tillr, H C':Ilth'-w(i.t.:nn.(o o,/lJSlS/70t,l 16/h, ~e[, pm/int~rnL'I . nt.,;lc~'t! (:&,(·~s..~1 O('to\.lr, 2'). lOtI I). ··Su;mg.: 'Sdt'm:c': i'rnli('tillr, H C':Ilth'-w(i.t.:nn.(o o,/lJSlS/70t,l 16/h, ~e[, pm/int~rnL'I . nt.,;lc~'t! (:&,(·~s..~1 O('to\.lr, 2'). lOtI I). ··Su;mg.: 'Sdt'm:c': i'rnli('tillr, H C':Ilth'-w(i.t.:nn.(o o,/lJSlS/70t,l 16/h, ~e[, pm/int~rnL'I . nt.,;lc~'t! (:&,(·~s..~1 O('to\.lr, 2'). lOtI I). ··Su;mg.: 'Sdt'm:c': i'rnli('tillr, H C':Ilth'-w(i.t.:nn.(o o,/lJSlS/70t,l 16/h, ~e[, pm/int~rnL'I-w(i.t.:nn.(o o,/lJSlS/70t,l 16/h, ~e[, pm/int~rnL'I+w(i.t.:nn.(o o,/lJSlS/70t,l 16/h, ~e[, pm/int~rnL'I+w(i.t.:nn.(o o,/lJSlS/70t,l 16/h, ~e[, pm/int~rnL'I+w(i.t.:nn.(o o,/lJSlS/70t,l 16/h, ~e[, pm/int~rnL'I+w(i.t.:.. ..C'U Arn3n.L " N~. Int (."r~ l:t;\"c.lun 1M (~."': TL.,. R,tllllna(,fr .\IDI:r DfRisk Uob. Wikr & SOliS, 19%). p. 1(•. Hi 29. 399 NaliOll or Slr~nf.e(,,?- COIIWIUlli,;)/unIJ oj',br ACM.-iO.ll0. II (Dcctlllbcr 1997). pp. 8 1- '16; Pew Rc~t'ud, Ccntt" Novcmbtr .WOO. .H. fJi:1~ Aho.'Uj.KHldC' ~ \ .I1.. '1', "cntj~1 ~hrIu:I'; fflr Probltfl]; lic Inttrnet Ul("; .-\ "iCkrl,olll SU I\'("Y of 151 .\ Atlull ~," CNS S/, rlurum: TJ;" }mrrlU/sitlmd j. .jl,,,,J..' ill h'tU""pJ)',/.i.ttrll At~/iptululn • ., nm/J.sp... f~ ltid."\.lt ("i l. a.'lu::,IIuck i,I,.64X (.In"t">SI'. MN •.".~Tr..ck: Diull r Cummunit};- 0;IIt/PIIII'(> 6S"r iN)" 27. no. 38. 'vi/1101' C~lljfia .1IId S" dni Omim . 2nd t'lL (iu":Hltllli:: I'r.. ~ 19"-)(i), I'l'. (006-6 1.!. f-rfnll ~ ~lu]}" b~ sou~~or, in G au.i t Fi~lwr. '~portl.'d iu Stl["muli. lcdlOiL';11 SIIIUlIUr. O llllllr (:hllflKr l(}(F. p. gl 2.1 Ihid" p. 70 2, j. Ibi.1.. TS.6: "Robu"t rilljitlg,t; IOml Kt:y UII;;': pp. gl-9 1. 2';. Ibid" "1"5.6, ".;'0. 26. St.>phtll Schnl'ider. quilted ill Junalilln St'hen. "Our flJgik EoIrtb," Dhomt'(, (kW~r 11)81), PI" ·l ·i·· ~(). 27. Hlglnowcr is 11 r~ ill Wrtlme nl~tt)r. '1U')lrJ in Rolx-n flox. " ~nYliuJck." CtJlllmu1linmIJIIJ u/IIN A C,U . J~ . OU . g (Al1 b'll~t [~15). pp. 11 - 12. lR JI:"), .\-Ia!I(I,'r, I., II... A!J,;,',ej' til thl' Sil,~~·d:]"I" r;II'/UTt' CI,a rk~ l':lul Frl'llIIJ. ~Th", Gl'ut.;r:1phy llf SmneWi1t:"fl': RJ'{/)(m. ~hy 2:(K) I . " . ! 2. l'). "lfi.:ImoluKI in thi;' AmtTlun Hc.u,;chQi]," Ti m",; Minnr C CO'tt I..r tb.: t>tnl'It J.IIa IIIt f'rC, ()-by 1') "f'/f'dmo/nJ:Y, md, I,, S"rv;I' A&M 1.1";\'e.,, ity Pre 198 I 1. fl. 24·,:!;. Mi. In "l; f'll rg~ eikler ~nd H i~ Clifia: I~rlm AX..!/'. O~'I()l'".f? 19'J), I'I~' 165-181 m. Opl lc-JI libe;: Ron~ld Bl,lcy. (",I.. E.,,.,lf & pofl_,lJO(): k";\$/IIl/.~ I;'' Tu,,' Sftl/r 01,1)(l'Ian(I (McGf3 H ill. 1 OtIO) . p. 5 \; MtlOr~, "'II,t"' Coming ,-'\ge {)(Abund,)n't",~ p. I I'J, Nidwi.;" El~tslOlJ (, - l'oi'uLuiun, Foud. ~ml Imufilc: C IJllrclld~ in the "fv.'C'ntic(h Cemury, " in 11.... lmr S,.III' (lfd". PI,fllrt . ..d. Roo:lkl B.ltltj, (Fr("~' P'C.h , I ~N5i . p ...J4. F,unily 'neo ll/(.' ~1'C"nI OII lOud: SI("Pf,I:'U M')(III: :lnJ Julian L Simtln. It i Gt"trilfJ: linin' All 11K Timr; nit" 100 Gmlt"" 1',.../IN "f,bl" 20lh Cnu u.,r (Cuo IJl.!itu(... 2000), p. 1J; U.S. Dcpanlfli.'llt of
Agri"ul\un: E('/IIom;.: R"MOOIrdl Sn\'kc. - hKX\ C1'1, Prin:~ "'flU r.l!il~J, di\Utt"s; hn..:1 b:r":ndjtu.~ T~hks." ·li.lh ll.' 7. www.C-(... IU.u.I;c:ndBridi llJ!.lCI.IFo(KIAndf..xpc...l!uJrl ID~ ...I (a.·~'\$)t(1 t...h r.:h 1 1. 20(7): HOR~kl n.Ja~-y. ~ Bil l ioJl~ Sen'Clr {i nl(n i-n-' wit h Norman Hotbn&!. R(,bIJI I. Al'f il 1000, 11J'. JO-.' 7;)uiiJn l.. SiUHln , -Th, · StalC ofHulIl.lllit)': SleOldilf Jm pIUYi l1g, ~ Wl/) 1't>1't C, l mputcu: A SYNlcmic Critiqlle. ' 71. 72. 7... ?S. 76. "', 78 80 8 .. (H ti1(U ll il •.J Nati."li'. "E·C"1nIl\~I"'· ~nd O~\"d"PIIlt:lH Ref"''1 1001, - tjuolro in F,;oA(·c:.i W'iUi:.lJll~, ~ l rll~rn;J.tion ~ 1 f"':tlflomy &: , he Amni Gi.\: UN t:'['\[]) Spdh out BCI1d11 ufi merncl CmnmC K(, "fi"mlnfja/7hll fl• N1111.1n, 1ir/lrJIJJW/Y' p. 10. J"li~n L Sirmm, "Tlu: SUt . . flf H UTlunify: SH,~dily Inrp«.)\'iJlg,~ G II/J 1'01i0' R(~ I·I. 17. ntHtlIIJ lt, ThIoJIOI'IJ~r, p. 7. ~ II H cf"iC"w "" ill, , lIt: LlLtl.li,,,: Bill R ich ~IJI. " I)., CIUD u n Di:ll"u",~ Jlloa.>cs LUll'; Oi\$lolll(~_To Ihe: Dii!my u(&;,mc:: 1'-t:111 Strm}uknnd.]:tlluOirr 17.I')')(i. l'p.AI.AIO. Ibi,l. ji:kphollC". D"'fI~ IJ A. 1'\u"n;m. TI.oin~? 7l~t(M u.. SmilTI: llt-j;71dlli.'!, flNlllim A"rllomr.t i!lh. A}: r"fh.. Mlldt;II" (A,ldj~.mWe"ky. PJ ~H), p. 191; EJi~JI\ ~ml ~!41,;o:m: Clui, M"rgall llnU I)~"id bllijt,]]"J, P'i(·/.J tlll, (£ 1""..io -.t1 & olr "IDt/i..itivr Mill"I", ,",,1 M iJSNirird l'rMiaftltJ (~I. M:IIrtiu's PII.'M, 1'18 I) f\V~I!,o)n: \'. -44}. l~p"I.'r MuINIni.'s (M.trd, 19.-,~ Arurian, jnhn. "Spiricual and Cultural Perils on~hnological Progres..~." nit, S(/riod C;l'ili!'. \'(.'inrcr 1998, pp, 10-18. • Bailry-. Ronald, ed. £trlh Report 10()O: (U!1\..:UlWtl (If ,I,c \'(Iorlo.l f"UIIIU' s..ci,'1Y. ItC;\: Thom~' J':';l1iilg, "The InletllC'l; Ihn .30 YUI~, ~ in 1'1'1 Ittfr", rl Rni"!, rr/,~. [)uwlh~ (~. DCllui'lg .. ull P 82. J,)So,'r1h Wti,. '-'Ul"th 15. :W07, (.K~·d~til 86. m()ney.cIHl .w rflimJ.!}llin, s/bu>i n~".Q Jt.lly 18. 2007). R(..lney "BIOI,b. u·Ii-.lRl J. BrJ.in· Ill lem .:e l ie)k," 7i-"/"/{J{,lgy Raim·. Nuvcmi"> 87. ~ Su,'("fhl.imn ,~ ImC: I'-;cw ",,,, h V"rnor VIII!,.'\: hy Mih· G.Jwin, /ltdllm, ;\by lUll], W'iJ'n/, Aprill()OO, pp. ~i2 Birhns; SVt'I1, 11JI' (,'ulmwrg BegiN: T1Ji' f"tlt/! $o!Rmtlittg in An E/rrtTuni(Agl>, Faber -: F. ", ww.witl...J.t'Olll/wiH-ill:i.1.:hiw:lR,04lj"y.hr.mJ (;t.,.::ts,;cd 7. 100?), Viegi nia P,>md, "J ...y. w the World ,~ R.'iJ.lO'l, JUl'~ 2000.~pl cmM '9. wwv'.,.:a:inJl.~tll\' Ilt'''':;.'~h(!w! 1.77 2 5. hUlll (,,~,':t"!..,'>Cd Scrs/; Vullaire: V"h~ilt fOlindal i... II . wv.iw.v l!~jlc. '}".Jcuk, Q uulnl in O"\'iu D:lfY, 7V N~'/II$ H;mk my mi,lc!II t...: f11~n /l.kr, Jum for linJiut: Ihis'lu,!e", and f.1ber. 1994. Birkerrs i.~ a cri ric of com purers; he writes on a typewriter. 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1996. 0 R G A N I Z A TI 0 N SAN 0 / Trlvc·N(Jfj in the infonualwn Agi'. Rutgers Univers ity Prt'ss. 1996. 0 R G A N I Z A TI 0 N SAN 0 / Trlvc·N(Jfj in the infonualwn Agi'. Rutgers Univers I / Trlvc·N(Jfj in the info WEB SIT E S • John" H(}pk in.~ Un iversiry library, "EV"J.luJfing Web Pages: 'Jt-chniques ro Apply & Questi()ns ro A~k": wv.w.lih .bcrkdt"'}'.t'dul °leaching Lih/Gu ides/Inrernc{/ Evalu.u c.html ERRORS, FAILURES, AND RISK 8.1 FAILURES AND ERRORS IN COMPUTER SY~'TEMS 8 ~2 CASE STUDY: THETHERAC- 2 5 8.3 INCREASING RELIABILITY AND SAFIITY 8.4 DEPENDENCII. RISK, AND PROGRESS ExERCISES S"cri. How much risk must or should we accept? If the inherent complexity of computer sys tems mean they will not be perfect, how COIO we distinguish lx'lween errors we should accept as trade-oJTs for the benefits of the system and emus [hat :ue due [0 inexcusOIblc cardesSII('"'Ss. incompelCIIC('. or dishoncsty? How good. is good enough? When should we, or the governmcm, or a business dccidc thar a computer is too risky to use? \x''hy do mul(imillion-dollar systems tail so mis play: ~ A computer USt'T. Whether ,\"'c usc a personal compU(cr or a sophisricIIcd. specialized system at work. we should understand the limirations of computers and the need for proper train in!,!: and responsible usc We must recognize thal, as in other areas. then: arc good products and bad products and bad products. 00- A computer projtSJionnl. Studying computer failun:.s should help you beconll' a beal'r computer professional (syslem designer, programmer. or quality assurance man ager, for l'Xamplc) if (hat i.s: your career direction . Understanding chl' source .,. An l·duWll!d m~tnberofsociely. Then:- an: many personal decisions and social, legal. and political decisions that depend on OUI understanding of the risks of computer system failures . We could be on a jury. 'We could be an acrive memher of an organi7.ati on lobbying for it.'gi.\larion. We could be d('ciding wherher or not to lr~' an experim en ral compU(cr-comrollcd medical device. Also we can apply some of lhe problem-solving approaches and principles in thL~ chapter [0 prates..,ional areas other than computer systems. We can ca regorize computer errors lnci failures in sever; ll v. 1---' - Se Failures and Errors in Comput"r Sysrcnu 407 or Haws Ihat resulted in the deaths of several parients. In Section 8.3 :tnd 8.4, we try ro make some .sense of rhe jumble of examples. Section 8.3 :tnd 8.4, we try ro make some .sense of rhe jumble of examples. problems. Section 8.4 puts rhe ri,~ks of computers. The incidents described here an: a s:unpling of rhe many that occur. Roben Charenc, an expcrl on so frware risk managemelH. emphasizes rhac computer system errors and failures occur in all cou IHr it-s, in syS11'It1S developed for husinl'sses, government s. and nonprofit organizations (large and small) "without' regard to slams or penduas . I do not mean to si ngle those out as unusual ofFenders. One can find many similar swries in news n: ports. in software engineering journals. and especially in [he Ri]/t.>' Digl'u organized by Petcr Ncumann.:: N eumann collects thousands or rcpons describing a wide range of compurcr.rd;,ucd problems. 8.1.2 PROBLEMS FOR INDMDUALS Many people are inconvenienced and/or suffer losses from errors in hilling systems and be containing p 8illing a wide range of computer.rd; and especially in [he Ri]/t.>' Digl'u organized by Petcr Ncumann.:: N eumann collects thousands or rcpons describing a wide range of computer.rd; and especially in [he Ri]/t.>' Digl'u organized by Petcr Ncumann.:: N eumann collects thousands or rcpons describing a wide range of computer.rd; and especially in [he Ri]/t.>' Digl'u organized by Petcr Ncumann.:: N eumann collects thousands or rcpons describing a wide range of computer.rd; and especially in [he Ri]/t.>' Digl'u organized by Petcr Ncumann.:: N eumann collects thousands or rcpons describing a wide range of computer.rd; and especially in [he Ri]/t.>' Digl'u organized by Petcr Ncumann.:: N eumann collects thousands or rcpons describing a wide range of computer.rd; and especially in [he Ri]/t.>' Digl'u organized by Petcr Ncumann.:: N eumann collects thousands or rcpons describing a wide range of computer.rd; and especially in [he Ri]/t.>' Digl'u organized by Petcr Ncumann.:: N eumann collects thousands or rcpons describing a wide range of computer.rd; and especially in [he Ri]/t.>' Digl'u organized by Petcr Ncumann.:: N eumann collects thousands or rcpons describing a wide range of computer.rd; and especially in [he Ri]/t.>' Digl'u organized by Petcr Ncumann.:: N eumann collects thousands or rcpons describing a wide range of computer.rd; and especially in [he Ri]/t.>' Digl'u organized by Petcr Ncumann.:: N eumann collects thousands or rcpons describing a wide range of computer.rd; and especially in [he Ri]/t.>' Digl'u organized by Petcr Ncumanns.': N eumann collects thousands or rcpons describing a wide range of computer.rd; and especially in [he Ri]/t.>' Digl'u organized by Petcr Ncumanns.': N eumann c errors The firS[few errors we look at arc rchtrivcly simple ones whose negative consequences were undone relatively eas ily. J., A wom; ll received a \$(,3 million bill for electricity. The correa anioutl[was \$63. The cause was an input error made by someone using a new (omputer system . ~ The fRS is a connant source of major hloopers. When if modified its programs m avoid hilling victims of a MidwC'sl' Aood, (he computer generated erroneous bills for almost 5,000 people. One Illinois couple received hills from the cit)' tor tailun: 10 register dachshunds. which the), did not own. The city used computer matching with twO d:lfahascs r.o try to find unlicensed pets. One t.i .uahase used DHC as [he code for d.achshund. Programmers and users could have avoided some nf lhese errors. For example. programmers can include reSTS (0 determine whether a billing amounr is outside som f 408 Chapca 8 ErroIS. Failures. and Risk reasonable range or changed significantly from previo us bills. In other words, because pmgr.lms can contain errors, good systems havt..~ provisions for checking (heir results. If),ou have some pwgramming experience, you know how easy it would be 1,0 indudl' such resrs and make a list of casC's for somC'om' ro rC'vi('w, These errors arC' perh aps more humorom rhan serious. Big mistakes arc obvious. They u, 'iU:lUy get fixed quickly. They arc wonh srudying hecause the same kinds of design and programming error.; can hav(' more serious consequences in diftcn:m applicat ions. In ,he Th...rd.c.25 case (Sccrion 8.2) we will see (ha t including tesrs for inconsistent or inapproprian: inpllt could have saved lives. Inaccurate and misinterpreted data in databases C redir bureau records incorrectly Ij ~ re d rhous'lnds of New England r('s.id~ nrs as nor having paid [heir local propat)' taxes. An input error r appeared (0 be the cause of the problem. People were denied loans before someone identified (he scop~ of Ihe problem and rhe credit bureau company paid damages to many of rhe pe-opic affe-cred.) Like \$40-billion tax bills. a systematic error affecting tho usands of people is likely to get nociced . The rclt... "van t company or agency is likely to get nociced it. (The credit bureau company paid damages to many of rhe pe-opic affe-cred.) Like \$40-billion tax bills. a systematic error affecting tho usands of people is likely to get nociced . pcopk.'s records. Critics of cr(~dil bureaus argue that inm rrect information in credit records cause pcopli.' to lose homes. can;;, jobs, or insur.lncc. In o nt;.. cas e, a country agency used the wrong middle name in :l report to a (fcdil bureau about a farher who did not make his child-support paymems. Another m * Sc(:tion S.I F:lilures and Errors in Computer Systt'ms 409 dauha. 410 Chaptci 8 Errors. Failurcs. and Ri~k {he license, number of a mall who had killed a 5r:1tC trooper. The com pUler record did not [ell the recipients.; (hus many clltries became obsoletc. 6 ACt'ording co (he Transponation Security Adminiscr.uion. more [han ,10,000 people have bcen mistakenly matched to names on tt?rrorist w.l.[(h lists at airports and border crossings. (The agency established a procedure CO crcarc a "dearcd list" for such people so that they will not be slopped rejX'.J.((.-dly in the future.)? Several factors contribure to the frequelK), and scverity of the problems people suHcr because of errors in d;uabases and misimerpr('tatio n of their comcllt'i: ~ J. large population (many people have idenrical or similar namlts, and most, of our interac tions are, with strangers) • aumm3ted processing wirhoU(human common seme or the power special cases -0- overconfidence in the accuracy of dam slOrcd on com p uters ~ errors (some bl.'cause of t ardessiless) in data • failure to (0 recognize enrr)' update informacion and currect errors sol udons in Section 8., I ---- - Sc..'Cti()fI 8.1 Failures and Erron: in Com puler Systt"nI.li It is Trpugnam 10 rhe' princip/6 of a fi-ct! society that a prmm should n'Cr b~ tdkm into po/iet cUftot] brtaU]~ of 11 cOn/puttr uror pucipittltrtl ~'I govr:mmmt (IITl'/rsmcfS. As 4'Ut01ndtion incmuingiy invades modun 4ft, ,hi' porent; al for OfWt'lIil1U mischiefgrOlUl. -Arizona Suprt'nle COUrtS ((}'(}U'rr fT)'i1lg to typr (I W,n amI Pt' ' {'II)'fJr/re gfJirJg to !J1ll1C problem. -Alan Hedge. diret:tor of the Human Factors and Ergonomics L:lb, CO rllt'11 U niversi l); l play smali,;.l.,uo;!tk de,-m,uk.. checkers (who move products ~U'~"" I a bar-code SCUllcr for hours) w,,."nlt' braces. called splims-a common 411 1---' - 412 C hapc(', lot ErmIS. Failures. and R.i~k llay tot '; 1101< and dama ces to clie vict ims. '... ' M:~nJ(oftl, e, sui", resuh:ro in di5mi!O...~aJs or defendanrs, In afcw cases where I'L,inltif[, won large awards, higher c~i. '~•.'''''TurrlCd rh¢ deci,ions on appeal. 'uncertainty of causation (defccts coin the devices or improper use) made: it difficult to
win such suits. Some judges and orhers-sompare.the complaints (0 'Ordinary aCn~s,' ~, palnser ergonomic design of keyboards and workstations reduced RSt problems for keyboard users. -Laptop

computer makers redesignc.d the [IUIIOCr ma,,-bincs to 'include a -wrist rest. We can '£~qn. now buy spUt. twisted. nonrradi[iona1lysh~ped ke)'boardl>--each one implementing some id,,,, of whar willbc more cOlnto,rtable:lll! reduce strain:.,Modifying cquil"ncnra _ ~ _ . _ - ~ docs nor solve the problem. RSI stress the importance of train ing in techn ique (incl uding the iimlPoltarlce, Baumcr is wry i"mportom for hand anrtjim" lim 11 bi' JU rpn"l"l.'d at how quick your :\ Ull'Ur- will ache ilr!J(' kllijr is 110t bnlallud prtlperly. ;; ~ -Gcorge McNt:i11. Exc(,'uti..."c Chef. Royal York Hotd, -Iownro (o n an , advertisement for fi ne cuder)') " Section 8.1 Failures and Errors in Compuu'r Systr-ms 413 8.1.3 SYSTEM FAILURES Modern com munic. Hions. power. m edical, fin ancial. rerail, and u:11Hportarion systems depend hCOiVily o n eompuccr syuc ms. 11\ey do not always fun c tion as planned. We describe a lor of failures, some with indi catiom of the causes. For compun:' (science students and olhers who mighl' comran f(H or manage custom software. one ai m is to S('('rlll~ serious impacts of adcq u3 (C planni ng, of making backup plans in iC of failures. and of responsibility apply to large projects in other profess ions as well. Communications. business, and u2.flsportation C U510nlCrS of AT&T los! tdl~phonc service for voice and dara for nill c hl)Urs because of a soflWarccrror in a fo ur-million linc teleco mmu nications SWitching program. caused a fa ilure of rdepholle networks in several major £an Coast and \'Vest Coast cities. Although the program underwem 13 weeks tCSling. it was not retested. after the change-which contained a rypo. A glitch in a routine software upgrade at'. America O nline prevented subscribers from logg ing in allover rhe U.S. for ,St. vera! hows. American Expn:ss Comp:.1.11}'s ccedit-card verification system b.il ed during rhe Chr iscllas shopping season. Merchants had ro call ill for verifi cation. ovcnvhdming the call center. A ma jority of Skypc's Internct phont.~ users cnuid not log in for two days in 2007. Its pccr-to-pccr nelwo rk system had become: overloadl'd by log-ins when a huge number of people rebooted the ir compun:rs aft('(installing routine Wi ndows upda tes. or (Sky!", has roughly 220 million users.) 'X'h,m a Gaia."(y IV satelli te computer fai led. manysysreOls we rake tor granted stopped for all estimated 85% of users in t he U.S. • including hospitals and police dcparlllents. 'rhe t"J.i1UfC inter rupted rad io and television broadcasts. Airlines that got [heir wea cher informacion from the satellite had to delay Rights. 'rhe gas na rions of a major chain could nm veri fy c redit cud ... Some services we-rc quickly swi(ched [0 o ther sa tellites or backup systems. It rook days (Q restore odH."rs. 11 Every few years. [he com puter sysrem of on e of rhe world's largi,. sr slock exchanges o r brokerag(Os fails. An error in a softwa re upgrade shut down trading o n rhe 'tokyo Stock exchange for (""''' and ahalfhours. A glitch in an upg rade in [h e complHcr system at C h.1rlcs Schwab Co rp or::nion crashed [he sy.m"m for more (h an tWO ho urs ;tnd caused i]l(crmiuctH problems for severa} days. Cw;:wffiers could nor access their accounts or (mde online. A computer malfunction froze the London Srock Exchange for ahnosr cigh[ho urs--on rh e l:m day of rhe lax year, affecting m a ny people's tax bills. I:! A fa ilure of Amtrak's reservation and ticket.ing systcm during Th~U\ksgiving weekend caused dcl:IYS because agcms had no printed schedules or fare lis(s. 'Two large travd rcs("rvation s),s(enlS that handle rl'Sen';ltJOnS for airlines , Col r reIHal companies. and hotels shut down (or 1113ny hours because o(computer problems. American Airlines could n tH 414 Chapter 8 Erron. Failures. and Ri!k verify clecrronic ricket.s; it delayed 100 Righrs. A failure of the computer rhat prepares Aighr plans for America \"'esr Airlines d eJared thous.mds of passengers. AirTran inst.llJed a new system ('0 handle Hight check-in on the Inn:rn e{.;n airpon self-service kiosks, and at airport check-in counters. h faih:d on its firs(cbr. Passengers and tick/(agents could not prim boarding pa.~c...; Olany pt.'Ople- missed flights. Sometimes systems fail bccausl.' they :mcmpr something radically new. The AirTran failure. however, occurred in 2006, aflcr ;lir travelers had bl.'cn checking in ()/lline and at self-service kiosks for several yeo.us. The S125-million Mars Oimatc Orbiter disappeared when it should have gone inro orbit around Mars. One team working on the navig.uion software used English measure unilS while the error itself was the immediate cause. [he fundamental problem was the lack of procedures that would have detected the error. U Destroying businesses Several companies have gone bankrupt after spending : I huge amoum of money on compure, r systems that failed to work. \Ve d cscrihe one Gase of a system that seriously strained so me businesses. A few dOlcn (.'o mpanic:s tha r bO\lght an invl..'mory system called Warehouse Manager blamed the system for disastrous losses. One pr Sc.."C(ion 8. 1 Failun.-s and Errors: in Compute:r Systems 415 llUUJ COr.rect scor~-ill several stares. In Ne", York City, school principals ""d su~jritenderts ,lost rheirjobs because th~if schools appc;lfl:a, to be doing a poor job: of teaching students ro read. Educamrs endured pusonaJ and professional disgrace. One: man said he applied for 30 other supeiImende:nr jobs, in .he sra[e but did not g~ one. Parents were upser. Ne-.ariy 9iOOO swdenrs had [0 attend summer school because, .of the incorrect scores. :;yentually, CTS corrected (he error. New ¥orkCiry's reading scores had actuall), risen .fi\le,percemagc points. :W hy was the problem not detected soon!!!, soon enough IO avoid firings and ,mmml':r school? School resring ofncial~ in scveral srar('S w~reskcptical of the scores showing sudden, : unexpected drops. They said eta nor tell them (hat other states cXI~eldelnq ~imilar problems and also When CTS, but CTB told nothing 'was wrong. They said eta nor tell them (hat other states cXI~eldelnq ~imilar problems and also When CTS, but CTB told nothing 'was wrong. They said eta nor tell them (hat other states cXI~eldelnq ~imilar problems and also When CTS, but CTB told nothing 'was wrong. They said eta nor tell them (hat other states cXI~eldelnq ~imilar problems and also When CTS, but CTB told nothing 'was wrong. They said eta nor tell them (hat other states cXI~eldelnq ~imilar problems and also When CTS, but CTB told nothing 'was wrong. They said eta nor tell them (hat other states cXI~eldelnq ~imilar problems and also When CTS, but CTB told nothing 'was wrong. They said eta nor tell them (hat other states cXI~eldelnq ~imilar problems and also When CTS, but CTB told nothing 'was wrong. They said eta nor tell them (hat other states cXI~eldelnq ~imilar problems and also When CTS, but CTB told nothing 'was wrong. They said eta nor tell them (hat other states cXI~eldelnq ~imilar problems and also When CTS, but CTB told nothing 'was wrong. They said eta nor tell them (hat other states cXI~eldelnq ~imilar problems and also When CTS, but CTB told nothing 'was wrong. They said eta nor tell them (hat other states cXI~eldelnq ~imilar problems and also When CTS, but CTB told nothing 'was wrong. They said eta nor tell them (hat other states cXI~eldelnq ~imilar problems and also When CTS, but CTB told nothing 'was wrong. They said eta nor tell them (hat other states cXI~eldelnq ~imilar problems and also When CTS, but CTB told nothing 'was wrong. They said eta nor tell them (hat other states cXI~eldelnq ~imilar problems and also When CTS, but cTB told nothing 'was wrong. The states cXI~eldelnq ~imilar problems and also When CTS, but cTB told nothing 'was wrong. The states cXI~eldelnq ~ {hem the problems {hey were having were uni'lue. NCR blamed rhe problems on the company that developed Warehouse Manager and modified it for ITX. E\'cmuaJly. NCR agreed it "did nor service customers well" and (he program should have undergone more extensive {(,sting. The company sCfth. d most of rhe few dozen lawm ils out of court, with confidentiality agrCCI])('IltS about .he terms. ' l'he sources of the-problems in [his ca S/." included technical difficIlhic.~ (convening sofrwarc ro a different system), poor management decisions (inadeguat.c res ting), and. according to the Cll:~ {Omers, dishon,.-'sty in promoting the system and responding to the problems. 416 Chap[I:'r 8 ErmIS] F:.lilures, and Risk Votmg systems The U .S. presidential electi on nf 1000 demonstrated so mc of the problem s of oldfas hioned election machines and paper or punch-card baJIOI.'i .VOle countres fo und these ballol.'i sometimes difficu lt to [l'ad or am biguo us. Recouming was a slow rooious process. In 2002, Congress passed tht~ Help Americ~ Von:: Act and authori:t.ed \$3.8 billion to improve ,'oling SYSH." IlS. Many saw eicc(fonil: systerru;, some using LOuch screens, as the solut ion. By the 2006 elections, a very small percent of Americans stilt voted with paper ballots. The rush to electronic voting ma':" hines ucmollStr:IIed that lhey toO could have numerous fauhs. ~'e consider some of the problems in d ecrio ns of 2002-2006. Som e electronic voting systems just crashed-voters wert' unable to vote. M me o Senion 8.1 Failures and frec of inremional vote manipulation, we need procedures to ensure £luI rhe actual machines used in rhe voring process do not have different software installed. Long before we voted on computers, Chicago and parts ofTcxa.. were infamolls for vore fraud. In some ciries, dccrion officials fOllnd boxes full of uncoumed paper ballots after an election was over. Reasonable accuracy and authenticity of vote coums arc essemial in a healthy demouacy. Electronic systems have {he porcmial for reducing soml' kinds of fraud. and accidentallos:'i ofballors. but they have: not yet reached [he level of security to ellsure a
reasonable degree of [rust. Stalled airports, Denver, Hong Kong. and Malay.ia In 1994, I Hew over the huge Denver Internarional Airport and the miles of wide high\'.,'ay ie + iUnl-world frob/nm. Some scannel's got dirty or knocked our of alignment and could not dClect carts going by. Faulty latch('S on rhe carts caused luggage to f~\11 011£0 the tracks between stops. (> .. Problems in orha spurns. The air1'o£['s electrical system could not handle rhe power surges associated with the baggage system. The first full-scale test blew so many circuits chat rhe test had. to be halted SOfiWftr~ errors. A software error they were actually needed. calL~ed the roming of carts to wairing pens when 418 Chaprer 8 Emm. Failures, and h:1.rdwarc of this complexiry to work perfectly whentlrsr tested. lnrcal-tim(' systems,* especially, there are Ilumerous interactions and conditions that designers might not anticipate. Mangling a suitcasc is nor embarrassing if it occurs during an early (es[and if (he probk~m is fixed. It is embarrassing if it: occurs after the system is in operation or if it takes a year (0 fix. What led ro [he extraordinary delay in the Denver baggage system? There seem to have been two main causes: iI1S1~tJicient~ The only other baggage system of comparable size- was at Frankfurt Airport in Germany. The company that built the Denver system, was asked to do it in two years testing and debugging. BAE Automated Systems, the company that built the Denver system, was asked to do it in two years testing and debugging. airport, there were only six \\'ecks for testing. + The timl! allowed for delle/opmen! llnd testing of thr s)'Stl'l'lI fDas within Lime conSfraim~. S('nion 8.1 Failures and Errors in Computer Systems 419 rile system p:ual}7..cd if. "There's norhing wrong with {ht, systems' S;l.id a spokesman ;n Malaysia's airport. A spoke.~man It Hong Kong made a sj milar statemclU. They arc deeply mistaken, One il1corn."C{ gate numbt:! would nut havt: caused the problems experienced at Hong Kong. Any system that the systems arc so fundamenai that the systems are so fundamena. spent' mort: than \$500 million on an 3momar\;'d supply manage-mene system: it did nm work. The Ford Motor Company ab, mdoncd a S400-million purchasing sysfem. The California and Washington srate motor "chicle dcpanmems each spcnr more than \$40 million on computer systems before abandoning titem because rhey never worked properly A (onsorrium of hords and a r('mal car business spent \$12') million on a comprehensive travel-industry reservation sYS(I'm, then I. 420 Chapter 8 • Errors. Failures. and Risk Lack of clear, wdl-thought-our goals and specifications ... Poor management and poor communication among customers. designers, programmers, and so on .. institutional or political pressures that encourage unrealisrically low bids, unrealisrically low bids, unrealisrically low budget mqucsrs, and underestimates of rime requirements 0} Use of very new technology, with unknown reliability and problems, perhaps for \\'hich software developers have insufficient experience and expensive 0(- Refusal to reL''Ognize or admit that a project is in trouble Wil"!:,, Some High~le\'d CauSt's of Computer-System FJ.ilurcs problems are common. Bm this incident illuscran:"s another factor. According (O a vice president of US Airways, most airline systems date from the 1960s and 1970s. Designed for the mainframe computers of that era, they. in some cases. replaced reservations on 3 x '5 paper cards. These old systems "arc wry reliable, but very inflexible," the airline executive said.!2 These arc examples of "legal), syslcms"-our-of-datc ~ystcms (hardware, or peripheral equipment) still in usc, often with special imerfaces, conversion software, and other adaptations to make them intCf SeCiion 8.1 F!lilun:i !Iud Errors in Computer Systems 421 computations use ' software'', deSigned for ~oinpi.i{ers with: vCl"y.liin.lccd sco:rage space, typically wed two digits. [0 rcprescnc the year (".g., 78, 95). Milly computer systems experienced p~blCtnsjn the 1990s when they began usi~g, d ("Y2K" in , the j"gon of the time fvr 'For cx3liple. some ccedi't wYear 20.00·)0). cards. ..yfi:li:"expirarion datcs in 2000 would not work. The :Sc.>frwart" imcrpr('t!!d (he ~imcion date as 1900. Sofl"ware to cilk,1'Jlatepaymems onlo3ns due after iooo &ilcd. dis:lsrers ~'. Some propeily, but prclbl 'jI.l..ltltilYuJiatiul) Ju :;e~. It ~ tJn di 10f " r~dialimt l.bwm.:d don:: 426 ChOilpter 8 [rmrs. FaiiuIC!t, and Ril'k 8,2.2 SOFlWARE AND DESIGI PROBLEMS Design Raws: The Thel'ac-25 followed earlier ma, hillt'S called rhe Thcr'Jc-6 and Thcrac-20. I(dillercd from rhem in char it was fully wmpwcf controlled. The older machines had hardware sa fety interlock mechanisms, independent of [he computer, thar prc\'clHcd rhe beam rrom firing in unsafe conditions. 'flte design of {he lherac· 25 eliminated many of rhese hardware safer), fC3IUrt's. The Therac-25 rcusl-x1 some software from the Therac-20 and Therae-6. The software from the Therac-20 thl'fC wel'e frequent shutdowns and blown fmcs. bur no overdoses. 'rh" ThcrJ.c-20 software had bugs. but rht: hardware safety mechanisms wt,'re doing (heir job. Eirher [he manufi:u:rurers did not know of the problems with rhe Thcl'ac-20 or they completely missed [he serious impliC>Hions. The Therac-25 malfunctioncd fn. quendy. One facility s:lid there were sometimes 40 dose rare malfunClions in a day. generally underdoses. Thus, opeurors became used to error mcssIge.c; appearing often, with no indic:uion that there might be safecy hazards. There were a number of weaknesses in the design of the operator interface. The error messages [hat appeared on the display were simply error numbe, rs or obscure messages ("Malfunction 54" or "H-tilt"). This was nor unusual for early compucer programs when computers had much less memory and. mass storage (han [hey have now. One had to look lip each erfOr number in a manual for rhe Therac-15. however, did not explanation. The operator's manual for rhe Therac-15. machine distinguished bCl/vcen errors by [he amOUfl(of effort needed to conrinuc operation. For certain error conditions. rhe machine paused. and {he operator could proceed (turn 011 rhe dectron beam) by pressing one key. For other kinds of errors, (he machine suspended operation and had co be complexity ft.'set. One would presume that [he machine would allow one-key resumption only afccr minor. nor safety-related, crrors. Yer one-kt-y rcsullfHion occurred in. som(' of rhe accidems in which parients rei..~ei\'ed multiple overdoses. t\romic Energy of Canada Limited (AECL). a C,U13d.i:10 government corporarioll . manufacrured ,he Tltcrac-2S. Illvcsligawrs studying the accidc.fl(s found (hat AEel produced very little docullentariol] co ncerning the software SIXcific Bugs Invesr.igators were able [0 trace smuc of (he overdoses (() t"\YO !i.p(.'cific software l'rrors. Because many readers of this book arc compilit'.r science students, I will dc~rihc tht" bugs. These students, I will dc~rihc tht" bugs. These students of this book arc compilit'.r science students, I will dc~rihc tht" bugs. These students, I will dc~rihc tht "bugs. These students, I will dc~rihc tht" bugs. These students, I will dc~rihc tht "bugs. These students, I will dc~rihc tht" bugs. These students, I will dc~rihc tht" bugs. These students, I will dc~rihc tht "bugs. These students, I will dc~rihc tht" bugs. These students, I will dc~rihc tht "bugs. These students, I will dc~rihc tht" bugs. These students, I will dc~rihc tht "bugs. These students, I will dc~rihc tht" bugs. These students, I will dc~rihc tht "bugs. These students, I will dc~rihc tht" bugs. These students, I will dc~rihc tht "bugs. These students, I will dc~rihc tht" bugs. These students, I will dc~rihc tht "bugs. These students, I will dc~rihc tht" bugs. T tcchniqul.s. However, some readers h;\vc little o r no programming knO\\'lcdge, SO 1 will simplify rhc descriptions. After the operator emered rrC~Hmenf p:lramelcrs at a control co n501e, a sofiware procedure called Set.Up lest performed a variety of (hl~ck s ro be sure [he machine waS in {he correcr. posicion, and so on. [f ;m~'(hing W3.-'1 not ready, this pmccciurc scheduled itself (0 rerun the chccks. (The syst'cm miglu simply have t'O wolie for the turntable [0 move into pbcc.) The Set-Up Test proct.~durc can run several hundred rimes while selling up for one Ircalmcnr. A flag variable indicared whether a specific dcviCt:." 011 the machine was in the t.:orrcc(posirion. A ZI.'[O Yillut' Jm'ant the device was re-J.dy; a nonzero , 'alue meant it must be checkC\--t. "To ensure (ha((h~ device was dlt"Ckcd, (deh rime (he Set-Up Tc..'St procedure fall, it incremenred the variable to make it nonzero. The problem was that. the flag "lriable w;} s stored in on~ byte. After the 25Gth caU w rhe rourine, the flag overflowed and showed a value of zero. (If YOll arc not familiar with programming, chink of rhis as an :lulol11.obilc-'s odomch:r rolling over to zero aft.er reaching the highc.'1r numb,"~r it can show.) If everything else happ 8.2.3 WHY SO MANY INCIDENTS? Then: were six known Therac-25 overdmes. You may wonder why hospirals and clinics continued to use [he machine afi:cr {hI. first' onc. 428 Chap(cr 8 Errors. F: J.ilurcs:. anJ Ri ~k The T herac-2 5 h1d beC11 in service tor up [0 rwo yC.1r.~: If some clinics. The}' did. nO[immediarcly pull it from service after the fir.H few accidents because they did nor kn ow imml--diareiy [hOlt if caused the injllries. Medical .~tatf members considered. various other explanations. '1,1\c scaff at the site of the first incident said that (lne reason thtj were nOt certain of the source of rhe patient's injuri es wa'i {hat they had never seen such a m:L~si vl' l'adiadon overdose before. Th(·y 'Iut:'stioned the manufacturer about the possibility o(overdosl's, bUI (he company responde:d {after (he first, third, and fnunh accidents) thaT the machine co
uJd nor have Cluscd (he par,icm injuries. According to the lcvcson and Turner investigative report. (hey also !Old the facilities rhar I'hert.' had been no similar C1S~S of injuries. After rhe second accident, AECL invcsrigated and found several probJems related to rhe rurnrabl" (not' including any ohhe ones Wl~ described). They made some changes in {'he sysrem and ft.-commended operational ,ha nges. They had improved the safety or (he machine by fiv e orders of magni[ude. alrhough thl',)" told the FDA thar [hey were nor cenain of lhe. cxact ca we of [he accident . That is. du.,,)' did not know whether (he~- had found (he probkm due ,ausl~d tht' accidem or JUSt ocher problem s. In making decisions abour cominuc:d use t.he machines, the hospitals an", i dinics had to consider the costs of removing {he expensive machine was the caliSe of the injuries, and, bter. when [hat was dear, the ma,] lufactllrcr's assuranc\:s that they had solved the problem. A canadian govcrnmenl agenl.)' and some hospitals ming rhe Therac-25 mad e recommendations for many more changes {() enhance safC'lY; they were not implement.'d. Afrer rhe fit accident, [he FDA declared rhe machine ddl."Ctive and ordl'red AECL ro inform users of the problems. Th.: FDA ;dud AECL spent abour :1 year (during which the sixth accident occurred) negotiating aboU[changes in the machine. The !ina.! plan included more than (WO dozen changes. They eventually inslall or Overconfidence In the first overdose incideO(, whl'n (he Il Seclioll 8.2 Cas~ Study: Thl." 111t'rac:-2S 429 {h.H they should have avmded For example, opcracofs ignored error mcssag('s became the machine produced so many of [hem. A camera in {he rrearmc.nr room .: 'md an inr.c ream sy.s lcm enabled the operator USC'S a console oU{sidc the shielded Uca(mcnt room.) On rhe day of an accident at one f:laHey neither the "\'ideo monitor nor the intercom was functioning. The operatoc djd nOl. sec oc hear the patient try ('0 gC{ up after ;Ul overdose. He received :-I second overdose before he ft.';, IChed {he door and pounded on ie This facili ty had successfully m:an:d more than 500 patients with rhe machine bcfort.' this incident. 8.2.4 OBSERVATIONS AND PERSPECTIVE From design decisions all the way ro responding ro the overdose ;lccid...~ms. the manufacmrer of thc Thcrac-25 did a poor job. Minor design and implementarion crrors usua.lly occur in a compkx syst . . m. bur rhe numb"r and pattCIn of probJems in [his case, and (he: way thcy we:rc handled, sugg u.s. 430 Chaptt:, 8 ErrOIs. Failures. and Ri~k The u nderlying prohlcm.!~ were carel essness, lack of appreciation for (he risk invo lved , poor [raining, and lack of sufficient pcn;llry to encourage beller pra({icc.~. In most cases, (be medical facilitics paid small fines or none a (all. J4 Mosl of dH.' incidelHs we just dcscribl.."(.1 occurred in systems without compurers. tor some, a good computer system might hav(;.' prevented dlC problem. Many could ha v 8.3 Increasing Reliability and Safety i. ~ .(;UCCt'iJ drttwll;' r('quirrs fll -'1n d illg mnny srparnu pOSJibl~ m ? UirS offoilurt'. -Jared Diamond 3,) 8.3.1 WHAT GOES WRONG? Computer SYSTems fail for two gen eral reasons: The job chey arc doing is inhcrcnd), diflicuh. and the job is often done poorly. Several factors combine to make (he {a.... k diffic ult . Early computer programs were fed some numbers. did mathema cIell computer systems now in[eract wuh (he rcal wodd (including both machinery and unpredictable humans), include complex comm uni cations nerworks, have num ('roU5 fC:H.urcs and imcrconnccrcd su bsystems, and arc extremely large. A cdl phone has several millions of lillcs of cum purer code. General Mmors estimated (har. i[~ cars would have 100 million lines of code hy 2010. J6 Compuler software is "nonlinea r" in rhe sense lilat, whereas a small errOl' in an engineering pmjl."Ct might came a SIII.'1H degradation in pe rfo rmance, a single typo in a computer program can GlIISC a dram ~Hic differeIlce in behavior. The job can be done poorl)' at any of many stages. from system di'Sign and impicment alion to system manageml'nt and USt'. (This characteriseic is not uniqul! HI comput!!'r systems, of course. We, an say the same about: building a bridge, a 5pac~' shuttle, a car. or any complex ~ysle m in [he Illndern world.] Figure 8.1 (in Section 8.1.3) summarized high~lC'vd. management. The examples we described illuslrJh: most of them. \Y/C'. co mment on a few. Ovenonfidence, or an unreali.~tic or inadCtluare understanding of Ihe ris:k~ in iI complex compucr.;;r system, is a core issue, When system developers and USI' rs appreciate (he ri sk.~, 432 Chapu..!' k Errors. Failures, and Ri!;k u:'nd to make (h~ same kinds ofc-rrocs, Cspci... jally itrhcrc i ~ an (" emc, ambiguity, or omission in rhe progrJILJ specifications.37 UnrcJlistic reliability or sate ry C'stimat(,'.'i can ,vme from gelluine lack of understanding. frolll carc1C'S..~ness. or from intclHion;t1 misrepresentation. People wirhour a high regard for hOllestysomcrimes give in 10 busines..~ or politic-dl prCisurc to cxaggCfalt safety, (0 hide Haws. (0 avoid unfavomblc publidt)" or (0 avoid chI.' expense of corn..'.crioll.S or lawsuits. Reuse of software: the Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No Fly" lists Less (han 40 seconds afrer the launch of (he Jl rst Ariane 5 rocket and "No \$500 million. A software error caused the failure ..\8 The Arianc ') used some software designed for the earlier, successful Ariane 4. The software includ~d a module that ran for ahom a minute after initiati on of a launch on the Arianc 4. h did not have to run after takeofF of the Ariane S. bur a decision was made to avoid imcod u(ing new errors by makingchanges in a module rharopeta(cd well in Ariane 4 afi:cr (akrulT. The calculations related [0 -velocity. Tht' Ariane 5 travels fa.'itcr than the Arian people with first initial J and last fl:.IJIIC Adams, wen.: Hagged as possible tcrmriMs when they uied (0 board an airplane. The Ilame 'tl education about responsi ble usc (i.c.• rhl." C"J.JJIpaign agaillsl drunk driving). Another is devices that proteCT pt'ople when the system fails (scat belts and lirbags). Ve[another is systems that hdp avoid accidelll~ (many of which. like airbags. usc microprocessors). Examples of the latter include rc:U'~vil..,\'Ii' cameras (har help drivers avoid hiuinga child when backing up and "nighr visio n" s}'s{cms thac de(("Ct obstacles and project 01\(0 Ihc windshidd an image or diagram of objects in {he car's path. Y.;:t another is electronic stabi lity systems, These systems haw sensors (ha c detect a likely rollover, before the driver i.~ aware of the problem, and dec.tronically slov.. the engine. A~ usc of technology, auromation , :tnd computC'r systems has increased in virtualIrall work places, the risk of dying in an on-the-job accident dropiXd from .39 among 100,000 wo rkers (i n 1934) to four in 100.000 in 2004 ..S(, Risk is not restricted (0 technology and machines. It is a part of life. Sharp tools are risky. Somconc- living in a jungle faces danger from an imals. A dcsen hiker flCes ranlcsna.kcs. We arc safer if we know (he risks and take rca.«>nablc p rccHuions. \'(Ie arC' never 100% sate. There arc some imponant dil-Tcrcnccs between computers and olhcr tedlllologics. Com puters make decisions; dccuicicy docs not. The pown and flexibility of computers cl11.;ouragcs us ro build more comp lex sYHems-wherc: failures have morc serious cOIISc-QUCIICC5. The pace of change in computer tcchnology is much fast'r than thar in other r.c chnologics. Software is Ilot built from standard, trusted parts as is the Clse in many e ngineering fields. These differences aff.:ct rhe kind and SCOpt~ of the risks we Exercises 44S face, They O{'cd our aU.c ntion as computer protc.~sioni1]s . as workers and pl;lnncfs in other fidd.~, and :t'i, members of the public. Observations We hal'(' made s("verai points: 1. MallY of tht' issles related to reliability and s;l.fct}' for (.omput('rs systems have ariSI'n before with other technologies. 2, Perfee, rion is nor an option. The complexity of cOl11pmcr systems makes errors, oversights, and so on likely. 3. 'fhere is a l'Ilming runIC for new technologies. By studying failures, we can reduce (heir occurrence. 4. We should compare risks of using compu('l'rs with risks of other mc(hods and with bcndics obrainl-d. This dot'S nor mean that we should excuse 01' ignore
(" omputer errors and failures because failures because accidents as pan of the learning process, and it does nor lHean we- should cx('use accidt'nrs bCI..":ause, on ball nee. rhe: comribUlion of compmcr [cchnology is positive. The potential for serious disruption of normal :.]cti\'irit..-s and danger to people's lives and health because of flaws in computer s~'s[(.' n IS should always n.mind the computer so bell nee. rhe: comribUlion of compmcr [cchnology is positive.] ~ys{em developers and orher professionals responsible flU planning and choosing systems must as.~ t.::ss risks carefully and honl.."Srly, include safety procf;."Ct ions, and make appropriate pbns fi)r shutdown of a system when it fails, for b;Kkup systt'ms where appropriare, and for recovery liable for the damag(. s one causes is strong incentive ro find improvements and increa~e safety. When ev'lluadng a specific instance of a failure, we call look for those responsible and try to ensure thai Ihey bear the costs of the damage rhey caused, Jc is when ev'lluating computer w..c in a parrieular application area or when evalu ating [he tcchnology as a whole that we should look at {he balance ben, veen risks and bcncl1(S and compare the risks and henchrs with (hosc of alternative rechnologies. EXERCISES Review Exercises 8.1 8".2 B.3 Lin rwo ~l de3cribed in (his diap.rer in which insufficient tcsting was :1 factor in a progr:a.m, e rror or s)'Stcm f.tilllrc. What are cwo kinds 'of computer usage . (hat can cau.'OC rcpt'"tiriyc: ~rrain ' injury? 'W hat are rwo' occu, pations where repetitive nuin injury OCCllU, bur workers art: nut wing computers? List twp c:a.s~, dcKribed in thischaprer in whiCh {he provider did an inadcqua~job ofinforming cust6m:~rs Raws irithe system. 446 8A 8.5 8.6 Chapter 8 Errors. Failures. and Risk What was One cause of the delay in complctin:gthe Denver airport? What isorie ca.~e in which reuse of software causccia serious problem? Des:cribeone principle of human~imerfacc design that ispatticularly important in safety-critical appli(' General Exercises 8.7 8.8 8.9 8.10 8.11 8.12 8.13 8.14 a:) Suppose you write a computer program to add two illtt.'gefs. Assume that each integer and their Slim willf { in the standard memory unit the 'omputeI uses tOr integers. How likely do you think it is that the sum Will be correct? (If you run the program a million rimes on different pairs of integers, how many times do you think it would give mecorrect amwcr?) b) Suppose a utiHtycompany has a million customers and it runs a program toderermine whether any customers have overdue hilts. How likely do you think it i.~ that the results of he reasons whyrhe likely number of errQfS would be different in rhese two. examples. Consider the case described in Section 8.1.2 in whkhaschool assunu: d a boy was a drug abuser becalL'it': two schools used different disdplinary codes in tlldr computerized records. Describe some policies or practices { hartan help prevent such problems. A man applied for jobs at several retail stores. They all turned him down. EVt'lltually, he learned that the store wed adatab Ext·n,; iscs 447 8.15 In Section, a: '3.1,, ~e gave examples of problems mar occur when 'd arain a database. (If you dO'" not know of an;; icluai incident, describe a reasonilhlc,' hypothetical one.) 8.16 Many collcg~ students attendstveral 'colleges: hdore rheyevenmalJy gradlJatc. It would he a convenience for srudents: if they could order a complete transcript (say. for job applications) (rom the.' fed.c-ral stutJcm I.btaksc_discus~d in Section 2.2.1 - . Oescnbc several ways in whidi getting nanSclipts rrom rhe databaSe might ~ riskier than getung f.h em from lh~ individual for the several ways in whidi getting nanSclipts rrom rhe databaSe might ~ riskier than getung f.h em from lh~ individual for the several ways in which getting nanSclipts rrom rhe databaSe might ~ riskier than getung f.h em from lh~ individual for the several ways in which getting nanSclipts rrom rhe databaSe might ~ riskier than getung f.h em from lh~ individual for the several ways in which getting nanSclipts rrom rhe databaSe might ~ riskier than getung f.h em from lh~ individual for the several ways in which getting nanSclipts rrom rhe databaSe might ~ riskier than getung f.h em from lh~ individual for the several ways in which getting nanSclipts rrom rhe databaSe might ~ riskier than getung f.h em from lh~ individual for the several ways in which getting nanSclipts rrom rhe databaSe might ~ riskier than getung f.h em from lh~ individual for the several ways in which getting nanSclipts rrom rhe databaSe might ~ riskier than getung f.h em from lh~ individual for the several ways in which getting nanSclipts rrom rhe databaSe might ~ riskier than getting nanSclipts rrom rhe databaSe might ~ riskier than getting nanSclipts rrom rhe databaSe might ~ riskier than getting nanSclipts rrom rhe databaSe might ~ riskier than getting nanSclipts rrom rhe databaSe might ~ riskier than getting nanSclipts rrom rhe databaSe might ~ riskier than getting nanSclipts rrom rhe databaSe might ~ riskier than getting nanSclipts rrom rhe databaSe might colleges. 8. J7 Suppose_you are on a ("onniItfng_tcam (0 design a compurerittd voting sys(C'm for your stare. People will vott- on c.:ompucersac me voting _pl:I.(.:r:-(not over me Jnccrnet; we considered _Web·basro voting in an -exercillc in C hapter 5). What arc '\$Ome imporrantdCsigncomideracio (ls? 8.18 You are-the ~ffic nu:nager for.3. ,small city. The,City Council has direc~ed' you to buy and install a compu(ersysrem ro control [he traffic lishrs. Ju main purpose isro ,adjUST. [he timing of th ... lighu improve r'r ~f6c flow' at rush hours and for s]>i=cial events. a} l.istsome pou:ntia] risk~ of {he system . b} List some tt'chnica] requirements andlor spc:"illcations you would PUt in the proposal for sarety. Find sc'vcrv p rovisions of the Software Engin«Ting C oJe_'of E(hics and Professional Prac[il.'t: (Appendi" A.) that WcrC' vioialro in cbe TherOlc-25 case. Several modds of iI. medical-infusion pump in use worldwide ha\"e a defcct caJled lrry-bolJlJu. \'(lhe,n a user type,~ the: dosage on the keypad. -a kq pmscd once could bpunce a nd cetuS(the digit ro record twice. Thull, fdo\$e of two units might beconth::22 units. Tht:' pump couldgive a patient an overdose of dNgs', Thc company wall warned of problems with the pumps in the late 1990s. The Food and Drug Ad tn inhmaioillieized .11 \$upply of (he pumps from the manufacturer in 200(, and i,s,sued a rec:all notice. 58 Identify .~evcral things-that. various peop.le did. Of pro bably did . mal were wrong. Suppose-you are cesporuible fO[the design and do-dopni6ttof;t com pu tet synem -w _control 3n amusement-park tide. Sen sors in me-seats will dcu:rmioe-which sr:alll are occupied,- so [he software Gin consider weight and balance; The system wiU control the speed and time of the ride. The amusement park wanu a system where, once {he ride stares, a person is not neoocdro opcrare iI. List some impc)ri:ant things thit(rou ~"31 1 01' should ciD to enllure the safcryofthe system. Consider all aspeers' pfdcvei-opment, te'chnical ismes, operating instructions; and so on. After making a progt~l'11ming change in :1 major hank'& computer system, :tn employee forgot to enter certain commands. As 3. result. appro"jmardy 800.000 diKcr deposits:received by the bank Wcrcnot posted [0 [he Cilitomeraccounu until me next day. Whu .arc sOIUC.'poccncial COll~uellc.:es of theerro,? If you werc {be bank -p rcsic:knt, what would you iay in a .uouemenr to me newsmec:li.a. or your cwromers? Who are rhe "good guys"? Pick two people or organil.; uions mmrionoo. in thill chaptc=r whose work bdpc:d. make- systems safer or reduced the negativc corucquencc\$ of erron:. Tell why you picked chem; We mention~ thoU , some cell phones cOIU:1in :1 fe w Illillion lines of cam purer rode. Estimate" how many pages one milliOn lines of cam purer rode. medicinl': 'ithe patient is raking. Doctors ,somt'd'\cs do not log om ,after using a terminal. [be: system assigns drugs ordered by mcsrcond doctOf fa the ,f irstdol;tor', patient. Describe (wo fe.,a twes that such system ~ could include to reduce this kind of errOt~ 8.26 Alcchnician on a Navy guidcd.missilcship cmucd-azcro in dicwfong plac~ in a comp uter progf: lffi c; ilibraong fuel valve. The program divides another number_by the c.me r~ nwnber. It t:T2shed becau.u= divis, ion hy ze ro i:S _an i nvalKi uperalion. The value comp uter progf: lffi c; ilibraong fuel valve. The program divides another number_by the c.me r~ nwnber. It t:T2shed becau.u= divis, ion hy ze ro i:S _an i nvalKi uperalion. The value comp uter progf: lffi c; ilibraong fuel valve. The program divides another number_by the c.me r~ nwnber. It t:T2shed becau.u= divis, ion hy ze ro i:S _an i nvalKi uperalion. The value comp uter progf: lffi c; ilibraong fuel valve. The program divides another number_by the c.me r~ nwnber. It t:T2shed becau.u= divis, ion hy ze ro i:S _an i nvalKi uperalion. The value comp uter progf: lffi c; ilibraong fuel valve. The program divides another number_by the c.me r~ nwnber. It t:T2shed becau.u= divis, ion hy ze ro i:S _an i nvalKi uperalion. The value comp uter progf: lffi c; ilibraong fuel valve. The program divides another number_by the c.me r~ nwnber. It t:T2shed becau.u= divis, ion hy ze ro i:S _an i nvalKi uperalion. The value comp uter progf: lffi c; ilibraong fuel value comp uter progf: lffi c; ilibraong fuel value comp uter program divides another number_by the c.me r~ nwnber. It t:T2shed becau.u= divis, ion hy ze ro i:S _an i nvalKi uperalion. The value comp uter program divides another number_by the c.me r~ nwnber. It t:T2shed becau.u= divis, ion hy ze ro i:S _an i nvalKi uperalion. The value comp uter program divides another number_by the c.me r~ nwnber. It t:T2shed becau.u= divis, ion hy ze ro i:S _an i nvalKi uperalion. The value comp uter
program divides another number_by the c.me r~ nwnber. It t:T2shed becau.u= divis, ion hy ze ro i:S _an i nvalKi uperalion. The value comp uter program divides another number_by the c.me r~ nwnber. It t:T2shed becau.u= divis, ion hy ze ro i:S _an i nvalKi uperalion. The value comp uter program divides another number_ wrote the f~d·valve' c';ilihradonprogram. {hi: ,person who selected an~ ll!Jrchased the ship's Local Area Netw()rk •.-the: software company that sdls me ,networksoftWare.,thc c.lpra,in of the ship? What. if anything., di.~ c;ach do wrong. and wh'ar; could rcdu you nen! and how 'it would 3JJi:.cr yOUl aruwcr.) 8.27 A compuu:r ermr in j contC'S_l sponwrtd h}' a muhinational beverage company c;mfed distribution of800.000 winning numbers- ioste-adof the intended 'l8-. The face 'valuc of me winnings amounted to \$32 billion. SU ppQ~cyouart'all employee- on a tcam given me task of dedclinghow to respond to this problem. Make, some sUggestions. ~.28 ThtFood and Drug' Administrarion ,maintains a~gi\$try of more t.\l,a n 120.000 drugs. A~ iu\'eS[igaoon by the ,Dq-tarunent of HeaJ th an.d Human Services found chat .rhc information on abour34.000 dru~ 'WOIS i ncorr~cr oi our nf dare. Ninethomand drugs were missing from rhe dirc,-t.ory.."S? Descri~ several possible risks of the database king so OUt of date; Givt" as many pOSsiblc reasons OlS you can think of why the databasc \\~.u -our of dare. 8.29 Thl,"!'e is a SlOt)' m;l{ a major retail -company "Iou" a warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehouse from its inventory c.:omputl!'r systC:lll for _three -years. The: warehous wharextent is thil a com purer failure? Witan)thcr ii lxHtaIU 'f:u;:rors are paft of the problem? 8:30 Choose a rioricompu~cractivity mat you arc familiar with and .that , ha.~ some risks {e.g. • skateboaroing,:sc,:uha diving. or worlcing in a restaurant). Describe ~t)me of the risks and .some safety practices. DI:scribeanaiogies with rish rdatt dto related to your professional' fidd ! choose'another field that might intere.u you.) 8.33 Think ahead ,to ,he n~{ few yeats and dl!sctihe a newprobJem, related to is.~ lle5 in rhi5 chapter, likely to devdop fronl computing tethnology n:r the Web. Assignments Thrre exrll'iMs ",!uire some mrardior activity. 8.34 Read a -few items. in [he curnot issue of the Risks Dixesl (....ww.csl.sri.comlusc'tSlrisko/rishrxt). WritC' a summary of twO items. No(cs 449 8.35 Find out, whic~ (if cithcir) of the following viC'\vs is comml)narnl)ng:eyc doct"'rs: (1) \X/orking,in a computei' Ki'e Cla\$sDiscussion Exercises Tlw~ 0.;:rrciin lITe jor CMss dUCJlHion, !,rlJapl with Jwr, pme1U4Iio-,-,s prqutud in adva1U:e by JIIUJllgroup _8.36 Assume -t'har the familyof' one of the vicfim\$ of the "fh.eta:c':25 -has filed rhrC't' lawsuits. They are suing a hospital that used the machine (AECL), and (he programmer who wrote the Thcrac~25 sofiwarc. ,Divide students into, siigroups: anornC}'s for the family against each of therhree respondents'and artorneys for each of the three respondents. F..3ch group is to presc;,nr a five-minute summation of arguments for its cisco Then,let the das~ rus cuu all aspccrsof the case and vote on the degtee of responsibility of each of the 'respondents; 8., } rharopcrates (he factory; and the worker? Why? What changes, if any. should the factory operJ [o~ mlkc fO reduce the likelihood of more deaths? NOTES 1. R,:,hetl N. Clu r~ tI "\"'11)' Soti w~n: P~ik" IEI:'E '}/uamm, SqJ1 .:mh~r 20()5. W\\,\"",pe('!lum .ie~'C .•ugfs..:p,O)i I (i8:; (Jcc.:,.,d Dl·(.cmbn 8, 2(06). 2. r/;" Ri&s DiK - ----Thc D.ly !I,e Sufiwll\.' Cr.1.hed," 1-,,,-/.,,,, ! 53, nn. 9 (April.!;. !'J!)4), pp, 142~15(j; I'~:ler G. Ncum~lln. "Imide Rj~k...: (''u""mwictiliulU u!d~ ACC [HUH:" \ (IJ"'I; Huald. Fd.rual) J 7. 2001. 450 'i, Chapll"1' 8 Erron. Failures. and Risk ().~IIJ"Y"" · III~.ll ofl(';\I K""Jemr. "'-hy 17, 1996 (d ,,' .11lllrl iull cue). S wI.·S>'II""... rq)oIIH-d in Nmhl"lk • lilip1"",- TI... N."iflll, i'pcil 1')83. p. d)'11 Ri,h .. rds. "Prol)(lft'd rill C. iml· Cvmpuh'r Sri1r:ill Ri,j;:s QucMious tHI A~':tUal"y, l'ril'''9',~ W~/liIJt.{(m P!>Jr, r cbrwry I.l I'JH9, p. 1\6; "'«-'UUig Su.'flC(I Sc.tit":S HI~ c ...~ ufSSS,oOO: Iv',1/' }"rk Titnfl, MUTh 6, I')')~. C. NeUI11J Illl, "Ri,J"o; Ito Ihe: i'uhli~ in COIUI'UIt'f .111.1 Kchlln(Srs trm~.~ SO/iU'/I' FII,t.JIJrtrin.({V'lfI'), 13, 1"111. 1 (Aprill')HRj. p. II. SeVCI':.t.l simiLH ':;I.e,~~r..,cl'oll.,,1 by P,'lel G. Ncum~nn in ;'Imide Risk~. " C,,,,,,,",,,,,('.uillfU n/li,r ACM,)allu;1fY 19')l, p. 18Ci: Her\; C~ CI1, ,Slin Fmm:i.;f/I (:hr,mi..!c, July 2'i. 1')91. (,. Ann I)~,' i~, " PI)\$l-StclJl. 11 W.i,J;,h Li.l Al \~~,If S,rurj.",rI/.tl. j:mu;u y 11. 1,)~14, p. BI: Mi lo C", din. 11"..... an :-';CR Sy~l cm filt In~n\iJfy ("mlllli TUflleJ into ~ \'irtu~1 SJ.b.lleUf." Willi .lilT"' j .mm.,/, AU~\bll'l. 1994 ' 111" AI. A); l\hry BrJodd:111d Th(m1J.~ Hllfl·man. HE.;,.., LI\\'~'Uils Drag (In (Of t";CR,-~{I. r COUlfu1(t''"nM. f\ugusl]'i. 1994,1'_ I l ~. l~ c(lut"~ Stc;l1bc'l\ ,lnJ lJid l1.l. B. Htnri l!u ... , "'Wl\cC1I ~ 'Jt~l bil~ th e Sd\(''JI~, Cu~"Cr.1 ~I\d RepUUliotb ~uH~r," I(j. Nr«' }~ •.t Jim"" M:;~' 21. 2001, pp. A I, A 10-:\ II. Ed Felton. "Hold Minihal' Kty.~ Optll Dkbol.l Voting ,'. {achilles, ' SI,'ptembcl' IS.10!}(). \\'.......flUi1p¥ lOCH (.lc lh'nmbr r 6. lOO(,) 17. The- DIA deb~' 1'0".1> iJdr n:l'0rted ill ht lleWi mcJiJ., A fl'w "I' du: "'J\111.'l'~ I u.rtI 11 the dj.\CtI~5ioli here ,Ill' ~ l i:r((IOSI \\I.1n:I, Li., &:rctning: rJlofU 10 Helf' I~J IK~ Kifk JolII\~n. ~rkrl\-Cf :\irport Saw tlu' FUlur~. Ie I"h"·r,... fJr....'1 ~, HI the rtJ!ll ic.~ (J\O'()()- IO ~11. nid,,', \V()rk. ~ NtH" 1"'* Ji",." .\ub"J>t 27, 100I, w'~w.g:w. go.:!r.II"i/'ll", 171. Il,). •' (Scv((mb.:r J')94). ri" 116---95: Lt"f_bf ln,h.'.:urut" C.:mll)ulc t It... conu,H EI'/CAkrr. Ri.hcrf I. .';, I1, ·; ':r. ~ SoiiwatC' SII.J'U Glllolld.(OCJ IV":~ I\'lar;; h').)? 1:""lbc: &c~'J M~It'ililili N,Wi.. April jO. (~ c':~'l*c'd 1)c1.l'lllbcr 11. 2OQ() j l 'n 4,1" ~}A: Sin... Hi!\J:im, "D en"er Airport: An()tiarr 7;1k u(G""er(lr',ltlll Hi!; h. T~(h Run Am{)k.~ bll}/VT:' EJ JIJ F"lstnl\u.I, "All f11iJ.'mi(Of ,I F.l.d? Tht Debate He~IS up ,,,'cr 1~"1>Cliti\'\! SncsI.Y Widl Sirut j", uwll, B" lltlM o., Ily. 1\.hy 23, I ')~, p, :\4, Julie Schmit, "Ti ny July 14 . 19')4, I). AI; R. L Lin Kheij J.lld 1. 11 DDbrm, COtILp'U1)' Is Btu'n ed lil < O"., Vel Dtl'"Ys.~ U~. A jij·/Iofi. July 15. 11')8, p. H2. Allf!(,j,lliM. 267. nl.'>. (j (Fdm..lll r I!. Jf)'):!), IO. C:h~n·I\4". "\'t'hy SufrwM'l' Fails"; Vilgitli~ £Ih~. "StIJ.dcd I'P !I ,}~ - M2. Chi W SUPI" II! ,:mnpilicr l'mjt' A llj:.rld Frtderic;\1, Siddle, John Lippm.Ul, uKI Srcphani., li'w/O'J, 1\('1\''}7. 11. 1(.0; Harr y It.:\ltt,~, MChKh CI....n l ttkyu Sux k Ex,h~II!!C. ~ fIJI' G "I(l~ICill , ··WII.. Kilk" l lhe Vi rt ual Cow: FiIc~ H IEEE Ntu' Z,.I1m"l liuuJd. Non-mw I. 100';. n"Jl,,/JH ro.112 .~>N ;r~l11. \$cpI" llIm r 20U';,'\\ sl...::""m. k:l·....0[~ II. A I. I , H. ~ 10. 11. 11.. $(J.(.''-c_{,,,,j} f > ettm o..r 12. 200(.); l);!!'itl waif.. '.N.'.'TJAQ Bbrkuul kJ.uks 1 11,,~.... It!;'~.''' IISA l iNb.r. j~{118. 1'})'4. p. 2B: A~~nc iaU'II I'rn.'. · SASDAQ [kfrnd~ h~ S1'Mt"111~f(4'f Scock. P rki ng f.rmrs,~ Stu.- York TiTHn. Scp,emhc:r U , 1994, 1'. D I'' : ''Note til lkuien, MHt]flm (;/06r, (kwhcr 15. I QQ-1.1" :'i!: Ju liJ. Fly nn. S.II;!)$ Cl.!ian. l lHI .\.lic/I';ll'l lt Sc:.\il, "COmrUlH S!l~g Hah., /.muJ" " M;.Irk"l X H.)ur~, · 111.111 Strrtj"llnl"/, April (" 2000. p..'\ I·i. st p05! J ..5'" (l. quoted in lr l1J~ Rmel1crance. " US Ai r"";).~ I'~rtl)' Shill':" t .. g;;...·y Sy.m·nu ror .\-breh Cli'..!I," CIIf'lplI"'II'tlrM, .\hKh 29. 2(1)7; Lin.h j. {(~'lc r~ n Ll:, "Clil.:h ;u LJ .S. Air~'Olr- Caml':\ Dd~j',I," ((.mp'Hrrf'.'n rU. 1\-\ar.:h ;, 2007, www.cmnput l'fw..,I.l.cofII ('M: (;)W",Uf . " Wh)' S Notes 23. .. Cl;, im t-:',,"," 1St: p",,,,,J : ' A'm' SdrJlli". 1.\1. m), 178.'; (Scl" tlllOCr 7, 1991), \$" J O; Ituber! MOI(~U Jr.. nitb fc"rum V~~r, 16, no. ~O "Airhu:> 5.,1'." S' atwl; u,i., u nJ 1{"htiom,W in (J,:)rk" Dunlo[' .u.J It,,!, Uuly 6 . 1994); ~ Ti-.lining · h,.uf."!w:c S.:IpA.UO Crn,h Kli ng, c.k , ('''''f'I'ITfi::'1 /i!I' ', "Ifl
C,,"t.n~'IW ~Ac.l lkroft," ftiXht 1"""""" II {1 !lIurr/(/ffJ]I,t/. January 1 I. I·YH . 2'1 . A("n [.(:vin. " fAA f"in~II~' Unv~iJ.; :-;;"w R tdolf Sym:'III, " liSA 1,j,I.I,I. ..I,unury 10.1999, p. OJ. A; Al1n~ \'(ii],le' ~bth~w~ '11111 Susan C:;.I.f('), ...\irl'thrt., H~\'l' lkhy;;, Callcdbil>l''Il Due \0 Prohbm in \il'IlJilic C':UlI!o!... I.fUI SmrljfJ IIHII/!. hlay 7.1bert Fm....,w,; Tr...::: Air r. i" t:('mmuni c~li(J 1) Bf~.u. ' ! OWII." C"mmmuinJivnJ d'~r'll(T i~ 110. X (AuplJ; I::!OQO). p. 10. 2; . Rilju N~riIrtlmHf, J~ AC'I, Drnlllbc,'r 1')97', p. 160. 16, J" I~ 11 1...!Vih, -:\ il\...... ~'j;\r (' till' s'\bt f:"d,~ US," ToJ...,l\ I"",,, 3(... Ch~rc!I", P ".~ irbll' :\8. ~ FDA SI,u" mC"11 1 on ll&dlJliou ()"·crnpo.;;urt-s in r J II ..II\.I,· wW'w.lib. ~uvh:,hllju"IIPJoI"'1 n",uJdC'l:p. hUf\1 .~ I. (J~4t'jM't1 J.l.U UM)" ~ . 2007j; DdlOraJ, G agl.' ami John !l.kCuflllio;k, "We Did N11hit'l; Wronr~' Basdine, M,ln:h 4. 1001. \1'lw.J)oI,...:lin rmJg.conJJn i(k2! 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"Aill>us I" Lw ('.tImpull:ls til! '\ \'QiJill!: 4(!' c..IUi,.;'III). ~ \I'.;,u Sm-rf.ltluf'lrRI f.icrorr, May 1.1, 2(l(1h. ".~. fn;'1I) IA.....'¥......m.I 'l\,," n. 32. C'J!1"~rut iQn WIth N~ rn:y Lev~m. };tnu.uy 19, 199;. Jl JadlY. "S:.l(.,y.Cri Liu l C"rup,tling," p. (,Ij ; f\", rG. Neumann, "Rhk) 10 tire l'ubl!L in {::ompultrt amI Rd~I\'d .Ii~lIcm.;, ".S¢:liwnTr E~I"i!ltaiJ/,t', !Iibm, 16. un. 2 (Al'rilll),) I). 1" 4. 3'1 . Tc..l WcuJl i"b' "l- ,Itddt: III '11~' 111C.l1ioll.) .~;. GUn•. (;, fllII.•md St,,,!: l'br hun i~fHr/ilUill SO{'Jiii,,,, (W. \'(I, Nlllllm. 1')'J7), p. 157. $(j'tJ \sim AC \land f, 13, 10 451 1(; 10/){i. p. A? J:rolll.1II}, m; i i l d ~ "i.'iC m ~ 1II (,) f N.IIl(J G . lnC"'MJIL .o;.tjrtr'JIIV. SfJt"" .~ ifrry ,md (j,mpMlrTJ iA.ldi5t > n W'6Jl:)" 1 ?9~".' p"ld.:ub ,l ~ g.:...d ltl id" discllising hutllJII iaCtof) ;.Iu.l thte ("U~~ of IILL: .:t~h i~ Stepht'll]"bncs. ~A Elta! O\ll(~)U\t' f":I1I\ Mi~i'hLCd Tru~! in . DJ!'\' ... Ntw ~;" J limo, Septembe$ 17. l'J')(i, \'. B II, K3l1towit/" "('illt WOlk lo~J .md Fligllldn:l AUto.)nuLilm." I'p. lll-123. Pqtnm.m. \'t'f., u Dt) 11 ..; H:'11 Clift' U:btff Orha /'/'111'/1> ninl' The l ~llutlt wa. II')! iUHllune from pwblcm~. l)i1:(" jnc1uut,s rcpum of .:omputa f.lilurc, cJ.u.>l, d h~.; l. !tM):\(: 11; «(' "f ioldcr, subtle liU\ in~ enl)r~, and other f~.'II>f.\, ~AT~T Cmsh. I:) J~n ')0; Tht' Ollir.:ilJ RrP(!rt .~ F"rumall , WI {"11 IJ")1m Crrr It''hf/t Otf.'",-r l'mpL- Thillkf 1'1'. 1'0-1')4,2.12- 236. ,o\t;ronOl ut in ;mJ Sl''''~ EngillC'1.'r ing ~tJl'\l. N:.ti.m.l.! 1k" ,,;lr~'11 Cuull.:it An ,~,)~mml "j'Sp'Nr SlJlutlr H i!." / So/ilnur lR'_ 'I'tuP'III'I.t F r(/(I',IJI"I (N~ li(H,al !\~.I.Jtnl)' "I\'S.'. 1" 'n). 47. M;lr~'HUl" ld Jud T hQIII;lI Huflillall, ~Ul't.'r l.;lW~tJ il ~ D/.l.g lin fIJI' NCR. ~ (,'q,,,/,u;trl4 'fIbI• .'\U~U5t IS, I ~'i, p. I. 'lit. 1 · I rc:.~or f' hili!, KIIll pILJn .. fCarn(,,,ld •..J 'll.lliv.·uc in ~r!id.·_\ fn'r~d Olt hili W .. h, itC',·ww, t'"1; . ': m " .c..ltt/~· k()opn1JtI/ucira , 452 C hapter 8 4'). '1'1,..,>(· I'I''III.I.,OI\., AnJ I'(·f."ia,ion Errors. Failures, and Risk 1r.1 "I' II'''W ''''L''' ..ftcll with maJ.iul " " ..,i::&'>:, H:r,Ubli"lI QfpolluliOlIl, :l nd v.o ri"... kim\.; nfl.:lftly n:cub rilHl, 'l'IICY .\oI:d prinilirily in jOJurnali on Ih" regublim., "0. ' ''' \'(')110 and limier, ~An IIJ"e~liplion Oflh" TI..:rac'-.!S ,'-ccidt'on,- p. 40, 51, 5«, fo r c.uml'k. \X'"h.n Wil!ialll~, TIl(St,flr Agolillil 11/.10-111 ~M tCfJ ...'HiU. l'IH2), C]',lprl'rs 'i-7, One ycu during" ('OIUUUL1iUI1 lu ll. J mile iallt'd "'-tryonc wlln 1(X,iI rh~· hui1dilj; (:omr.!('Ior ~ ti, ~n" t {"(3111, It i, iU..-g:11 ill~!I ~ tr.]ill'' tl-inetr \ 10 call d~In>c:I\'o:.~ Sf.!'rw;m, engineer. ht...,.III,~ oflkt-n,ing \., ~ Ii." '''!:illlX'tlI. One (UmpAlly hAd w sp,;ud dlt' o.Wiml. (.f Jr,lhr. dl.Illgingjob tille~. bu"ill~\.S t"Jl d. , ~II\I malkl'lillg liler"-llUc '.t r.ginC'l:r." [Ju li ~ Kiog, [0 ttll'l" til'::1 {,)), ... 2;00(. 'fratii, \? 1'. D.t "HU p,,,...>!.:, ({uln I..., Drut Il..'gisuy; \\"';,Ii, VIITf }tmTn" I • ..'ugmt 2-1. ~fJ()(" ". Dtl, I)(·~jgh () \vnl! S"(('I (f~rfiill. '\Ugu~l 1'1. 1006, K BOOKS AND ARTICLES '17'::" • Collins, W, Roht'rt, Keirh \X'. i\-tiller, Bethany J. Spielmall, and Ph.illip Wht'rry. "'Huw C{Kld l~ Good Enough?' Since the set of the set o C01lmlJllliauiom ()/the ACl:l, 57, no. 1 (January 1')94): 81 - 91. A dil>cussion of ethical i.'iSU~.~ ahout quality ti)T sofcv.'are devdupcrs. • :on,1)(11'11' L Mi,,: t...J1. ~ h", Di ~rupt~ L A. I'hul\-. -EK:lpc! Rc.~usc A. '.::idcncs H "'pJ' Ri~hatd I ~ WIbtlt /)0 You GIII' \I;'har Othn PtOp/f" Tbinlr? W. W. Norco n & C o., 198H Indudcs h:)'nm an: with many ins.igh Di aOOm hnw ro, and how noc w. ilwesrigatt' a ~rs tem failure, • Jacky. 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Grdphics Press, 1990. • '[uEre, Edward. Visual Explanation. GrJ.phi(..\ Press, 1997. • Wildavsky. Aaron 5;e,zl'chiTlgjiJl'S'ief]. Transaction Books, 1988. On [he role of risk in making us sater. ORGANIZATIONS AND WEB SITES 1:ter C. Neumann, moderator, The Risks to dlc Pub/ic ill 453 Compult'r! lim! Rdltnl's)ucnlS: (ariess.nd,ac.ukJrisks 9 PROFESSIONAL ETHICS AND RESPONSIBILITIES 9.1 WHATISPROFESSIONAL ETHICS 9.2 ETHICAL GUIDELINES 9.3 SCENARIOS EXERCISES Secrion 9.1 Wh., u Is Pmf~!iSional Ethics? 455 9.1 What Is Professional Ethics! The scope of (he term "computers on employment. the environmental impact of computers. whether or not (0 sell computers [0 {Oralirarian governments. usc ofcompu[crs by the military. and [he consequences of the technological and rhus cconomic divisions bC'[Wcen developed coumries and poor countries. Ie can include personal dilemmas acom what to pose on (he internct and whar to download. In rhis chaplerwe focu.~ more narrowly on a category of professional ethics, similar to medit.--al. legal, and accounting e[hies. for example. We musider ethical issues a person mighr encounter as a compmer professional. on {he job. Professional ethics includes relationships with and responsibilities toward CUSIOmers. dients. coworkers. employers. others who use one's produc {s and services a person mighr encounter as a compmer professional ethics includes relationships with and responsibilities toward CUSIOmers. dients. coworkers. employers. others who use one's produc {s and services a person mighr encounter as a compmer professional ethics includes relationships with and responsibilities toward CUSIOmers. dients. coworkers. employers. others who use one's produc {s and services a person mighr encounter as a compmer professional ethics. a compare the product of the product and others whom rhey aAcCl. We examine ethical dilemmas and guidelines related to aaions and dccisions. situations where significant consequences for you and orhers could result. Extreme examples of lapsl.'S in ethics in many fields regularly appear in the news, In business, we had Enron. for example, In journalism, we have had numerous incidents of journalists at l'HomineO { news organi7.. Jrions plagiarizing or inveming stories. In science. a famed and respected researcher published falsified stem cell researcher published not
achieved, A writer invemed dramatic events in what he promoted as a factual memoir of his experienct.'S. These examples involve blatant dishonesry. which is almost always wrong. Honesty is one of rhe most fundamental ethical values. We all make hundreds of decisions all day long. The consequences of some decisions are minor. Others are huge and afTt."Ct people we never mcet. We base decisions. partly. on {he information we have. {It rakes ten minutes w drive to work. This software has serious SI.'Curiry vulnerabilities. What you post on a social-network sire is available only (0 your designated friends.) We pick up bits and pieces of information from explicit research, from conversations. and from our surroundings and regular activities. Of course. not all of it is accurate. But Wl~ must base our choices and acrivit>, of being human: absorbing and processing information and malcing choices (0 pursue our goals. Lics arc often aHempts to manipulate people. As lum would say. a lie rreat~ people as merdy means to ends. not ends in (hemsclves. Licscan have many negative consequencl.'S. In some circumsrances, lying Cl\$rS doubt on the word of people the lie cOl11tadicts. Falsifying rl.'search Of mher forms of work is In indirect form of theft of research funds and salary. Ir was {es fesources [hat others could have used producrivcly. It contributl.'S to incorrect choices and do much harm. 456 C])"ptt'f 9 rrofc~\i(lnal Erhic.'i and Respon ..ibilitiCli Many ethical prohlcm~ arc morc ~uhtle than the choice of heing honeu or dishonest. In healrh care, for example, doctors and researchers must decide how to se[priorities for organ transplant recipients. Responsible cumputer professionals controm issues such as, How much risk (to privacy, security, safety is acceptable in a system? 'Wh:.u uses of anorher company's iIHelk'ctual property arc acceptable? SUPPOSI' a priva{c company asks your software company asks your software company to develop a database of information obtained from government records. perhaps to generate lists of convicred shoplifters or child molesters or marketing lists of n\.'W home buyers, afAuenr hoat owners. or divorced parents with young children. The people who will be on thi lists did not have a choice aboU[whether the information \\oudd occept the contract? You could accept on the grounds that the records arc already public and available to anyone. You could refuse in opposition to secondar), usC'S of informa[ion that people did not provide voluntarily. You could up to determine whether the benefits of the lists oucweigh the privacy invasions or inconveniences th\.}' might cause tor some people. You could refuse (0 make marketing lists. but agree (0 make lis[s of people convicted of certain crimes. using Posner's principle [hat negarive information, such as convictions, should be in the public domain (sec Section 2.4.2). The cridcal first stcp. however, is recognizing mat you face an ethical issue. The decision to distribute solwan:, to conven files from formats with built-in copy protl'Ction to formats that can be copied more easily has an ethical component. So (00 docs the decision about how much money and effort to allocate to training employees in the usc of a new computer system. We have seen that many of the related social and legal issues arc controversial. Some ethical issues arc also. There arc special aspects to making cthic.: 11 decisions in a professional context. but the decisions an: based on general chical principles and th'orit. s. Section 1.4 describes these general principles. It would he good (0 reread or review it now. In Section 9.2 we consider ethical guidelines for computer professionals. In Section 9.3, we consider sample scenarios. 9.2 Ethical Guidelines for Computer Professionals 9.2.1 SPECIAL ASPECTS OF PROFESSIONAL ETHICS Professional is an ~xpert in a field. be it compuler science or medicine. that most customers know lilde about. Most the people: affected by the dc.'VicC'S, systems. and services of profc:ssionals do not understand how they work and cannot easily judge their quality and safety. This creates special responsibilitil'S for the professional. A professional. A professional. A professional advertises his or her expertise and thus has an obligation (0 provide it. Second, the produces of prof. and how they work and cannot easily judge their quality and safety. of many profl, 'ssionals {e.g.. high'... ay or Section 9.2 Ethical Guiddines for Computer systems) profoundly affect large numbers of people. A computer profC'Ssional's work can affect the life. health. finances. freedom. and future of a cliem or members of the public:. A professiona..! em C 9.2.2 PROFESSIONAL CODES OF ETHICS Many professional organiz.1tions havl- codcs of profC\$..~ional conduct. They provide a general statement of ('{hical values and remind people in [he professional responsibilities. They provide valuable guidance for nc:w or young mcmben of the professional Erhics and Resronsibilitio (I EEI'. CS). I They developed th,' Software Engin,,,ting Code of Ethic. and Professional Practice (adopted jointly by ,he ACM and IEEE CS) and the ACM Code of Ethie < and Professional Conduct (both in App("ndix A). We refer [0 sections of the Codes in the following discussion and in Seclion 9.3, wing the shortened names SE Code and ACM Code. The Codes emphasize the bas ic ethical values of honesty and fairness." They cover many asPCCIS of professional behavior. including the responsibility (0 rcspect confidemiaJi(y.t maintain professional compctcllo... 1 be aWolre of relevant laws.~ and ho nor (omracts :md agrc..-cmcnts. ' In addition . the Codes put special emphasis on areas that arc particularly (but not uniquely) vulnerable from computer syst(, 'ms. They suess the responsibility to respect and protect privacy, II avoid harm to mhl·rs,. " and respect prope-ny fights {with intclk'C[uai property and co mputer systems themselves as the most relevant examples).tt The SE Code covers m any sp~citi(points about sofcware development. h is Ifansl~[(.'d infO,~ evcral languages. and various organizations have adopted if as meir internal professional siandard. Managers have speci~1 responsibility because they oversee projects and set the ('mical standards for employces. Principle) of ,he SI: C..ode indude~ many specifi(.: guidelines for managers. 9.2.3 GUIDEUNES AND PROFESSIONAL RESPONSIBIUTIES We highlight a few prin(iples for produci ng good systems. Most conct-'m software developers. programmers. and consultant s. A few arc for professionals in other areas who mak(. dt. 6sions about acquiring (,' omputer systems for large organizations. Many more specifi (guidelines appear in the 51:: Code and in the AC.M Code. and we introduce a nd explain mor~ in the scenarios in \$ccrio n 9... UnduStand ",.hat SUCCNJ nUINIJ. After the uner foul-up on opening day at Kuala Lumpur's airpore. blamed on clerks ryping incorrect commands. an airport official said. "There's nothing wrong with [he systems that will fail. The otlicial defined the role of the airpo" system narrowly: 10 do ceflain dara manipubtio n correctly, as.... uming all inpUl is correct. hs true role was to get passengers. crews, planes. luggage. and cargo (0 the correct gates on schl..aule. It did nOf succeed. Developers and institutional users of cOlnJ)U(er systems must yicw the s)'uem's role and Iheir responsibility in a wide enough con{(,'X(. ~SI" 1-:".uo:, 1.06, .!.Ol. (, .07, 7.0'1, ~.rJ.l:t\(~M C"..l.:: 1..\. 1.4 I Sf: Ct.uo:: !.o"S: ACM ('.o] e: I.K -1. [CLue: RIII - M.O'> : .", eM C".k l.! ~ SE CoJ e: 11.0\: -"e M GJ c.,], ~ I .! 11SE C...uc: l.O.!, l.IH: ..'.C~I G", k 1.'1 . 1.6.1.1; Section 9.2 EthicaJ Guidelines for Computer Professionals 459 Includt UHYS (such IIS m~dictll Jtaj]. uchniciam. pilon. offia workers) in tk tksign and /esting J/.Ilg~\$ to prot'ide Jafia1ld useful sYJums. Recall the discll~ion of compU[cr controls for airplanes (Sections 8.1.4 and 82). where confusing uscr interfaces and system behavior increased (he risk of accidents. lberc arc numerous "horror slOries" in which technical people dt.--vcloped systems without sufficient knowlc...dge of what was important to users. For example, a system for a newborn nursery at a hospital rounded each baby's weight (0 the nearest pound. for prematun: babies. the difference of a fLOW ounces is crucial information. 1 The responsibility of developers (0 talk ro users is not limited [() systems that affect safety and health. Systems designed [0 manage stories for:.l news Web site. (0 manage inventory in a toy store. or to organize documents and video on:.l Web site could ca~ frustration, wa~{e a diem's money. and end up in the trash heap ifdesigned without sufficient consideration of the needs of actual users. The box on the next page illustrates moe(' ways [0 think abom your users. Do II thorough, Cd"fuljob when planning andscb~duling II proj~ct dnd when writing bids or contraclJ. This includes. among manyoch('r things. allocating sufficient time and budgct for testing and other important steps in the development process. Inadequate planning is likely to lead to pressure to cut corners later. (Sec SE Code 3.02 •.1.09. and .UO.) D~sign for "al useTS. We have seen several cases where computers crashed because som('one typed inpw incorrectly. In one case. an entire pager system shut down becaus(' a tcchnici:.ln did nO[pn..."SS {he Enter key (or did not hit it hard enough). Real people make typos, get confused. or arc m.'W at their job. Ir is rh(' r('sponsibiliry of tht.' system design('rs and programmers (Q provide clear user interfaces and include appropriate checking of input. It is impossible for computers to detect all incorrect input. but there are techniques for catching many kinds of errors and for reducing the damage that errors causC', Don't assum~ aiJting Joftwarc is Jllft or corrtCI. If you use sof[Warc from another application, verify its suitability for Iht.> current
project. If the software was dcsignc..'tl for an application where the degree of harm from a failure was small, the quality :.lnd testing standards might not admirable) in the original application but could have s(rious negative consequences in the new application. We saw in Chapter 8 that a complete safety evaluation is important even for software from an earlier vcrsion of (he same application is important even for software from an earlier vcrsion of the new application. We saw in Chapter 8 that a complete safety evaluation is important even for software from an earlier vcrsion of the new application. We saw in Chapter 8 that a complete safety evaluation is important even for software from an earlier vcrsion of the new application. .wd limitilliolls o/software. In several cases descri~d in Chapler 8, ther(' is a snong argument that the treatment of customers was dishonest. Honesty of salespeople is hardly a new issue. The line between emphasizing your best gualities and being dishonest is not always clear. btl(it should be clear that hiding known, serious flaws and lying 10 customers arc on lhe wrong side of the line. HOIIC'Sty includes taking responsibility for damaging or injuring others. If you break a neighbor's window playing ball or smash into somcone's car. you have an obligation to pay for the damage. If a business finds that its producr caused injury. it should not hide that fact or au('mp[to put [he blame 011 others. 44iO Chaptt'r 9 Profc!. SionaJ Erhics and Rnponsibilitit"S REINFORCING EXCLUSION A speakerprn:ognidon syS(cm is a synan (conaiJring of hardware and softwar is dil!i:l'Cllt from speech recognition, ~~~;~~~~;I discwsed in Section 7.5.2, which identifies they the words spoken.) One application of broughtillO him speaker recognition is teleconferencing for ttam mallbcn ..., reriGi bu.ine.. mcctings. The computer system left-handed.' identifies who is speaking and displays In some aPl~lic:ario..!. that person on ~cryone>s screens. Some SCOK to focw on nic:ile'audiicncc or speakerprec:ognilion systems recognize male ignore a special audience. but that choice voic.. much more easily than female should he conscious (and reasonable). voices. Sometimes when me sysrcm & its to recognize f.:::= ;:I°z, sri::;, optimized for the lower range of ~ S voices. " ~j.'., ' ~- v.ith product and expanding its POltlenitial - ~. Honl":'it)' aboul system limitations is cspecbJly important for rxpat IJIIrmt. or decision systems. that is. systems , hat use models and heuristics incorpor. Iling cxpcn knowledge to guide decision making (for cxJmpl Section 93 Scenarios 461 the seven people aboard. A comment from one of the engineers who opposed the launch sheds some light on how sub ric shifts in attitude can affect a decision. The night before the scheduled launch. thl... engineers argued for a delay. They knew the cold we: lther posed a severe threat to the shuttle. We cannot prove absolutely rhar ir will fail and kill someone. The engineer reported that, in the case of the Challenger. "It was up co ll.' to prove beyond a shadow of a doubt that it was not safe ro [launch]." 'Ibis. he said. was me total reverse of a usual Flight Readiness Revil"W. 'i For the ethical decision maker, the policy should lx, to su.'ipcnd or delay use of the system in me absence of a convincing case for disaster. PII} dllelJliol /0 d~'fi'U!tS. Everything. it seems. is cusromizable: the level of encryption on a cell phone or wireless network, whether consumers who buy something at a Web site will go on an e-maillisr for ads, the difficulty level of a compUter game. the rype of news stories your favorite news site displays for you. what a spam filter will fiher out. So the default settings might not seem importam. They arc. Many people do not know about the options they can control. They do not understand issues of security. They arc. Many people do not know about the options they can control. They do not understand issues of security. priority. Sometimes ca.~c of usc and compatibility with user expectations is a priority. Sometimes priorities conflicr. D~veJop communications skills. A computer security risks and the products 3vajlable to protect against them, he sees the diem's eyes glaze over. h is a tricky ethical and prolessional dilemma for him co decide JUSt how much to say so that the client will actually hear and absorb it. There are many situations in which a computer professional has to explain technical issues co customers and coworkers. Learning how to organize information, distinguishing what is imponant to communicate and what is nm, engaging the listenec actively in the conversation to maimain iorcrest, and so on, will help make onc's presentions more effective and help to ensure [hat the client is truly informed. 9.3 Scenarios 9.3.1 INTRODUCTION AND METHODOWGY The cases we present here, some based on real incideors. are just a fl..'W samples of the kinds (hat occur. They vary in seriousness and difficulty, and they include situations mat illustrate professional responsibilities (0 poremial users of computer systems in ,he general public. customers or clients. the employer. coworkers. and others. More scenarios appear in the exercises ar the end of the chapter. In most of this book. I have (ricd to give arguments on borh sides of conrroversial issues without taking a position. E{hical issues arc often even more difficult than some of the ochers we have coveroo. and {here could well he disagreement among compu[cr-emics 462 Chapt~r 9 Professional Ethics and Responsibilities specialises on some points in the case'i considered here. In any real ca'ic. there are many other relevant facts and details that affect (he conclusions. In spite of the difficulty of drawing ethical conclusions. For sOl11e of these where you have to make a decision. I do nm want {O leave the imprt'Ssion that. lh:cause a decision is difficult or because sOl11e people benefit or lose either way. then: is no ethical basis for making (he decision. (It scems ethically im.-sponsiblc to do so.) On (he other hand. in Section 1.4 we emphasized [hat there is not always one right answer to an ethical question. Often many responses or actions arc ethically acceptual. List all the people and organizations affeC[t.~. (They are the stdktholdns.) ... List risks. issues. problems. and consequences. .. List henefits. Identify who gets each benefit. .. In cases where there is no simple yes or no dl-cision maker. (Consider responsibilicies of bmh general ethics and professional e(hies.) S«tion 9.j Scenarios -'63 + Idemify rights of srakcholders. (lr might be hdpful [0 clarify whether (he), are nl"garive or positive rights, in thl.' + Consider Ihe impaci of .~enS(' of Section 1.4.3.) me aelion oplions on the nakcholders. (lr might be hdpful [0 clarify whether (he), are nl"garive or positive rights, in thl.' + Consider Ihe impaci of .~enS(' of Section 1.4.3.) me aelion oplions on the nakcholders. (lr might be hdpful [0 clarify whether (he), are nl"garive or positive rights, in thl.' + Consider Ihe impaci of .~enS(' of Section 1.4.3.) me aelion oplions on the nakcholders. (lr might be hdpful [0 clarify whether (he), are nl"garive or positive rights, in thl.' + Consider Ihe impaci of .~enS(' of Section 1.4.3.) me aelion oplions on the nakcholders. (lr might be hdpful [0 clarify whether (he), are nl"garive or positive rights, in thl.' + Consider Ihe impaci of .~enS(' of Section 1.4.3.) me aelion oplions on the nakcholders. (lr might be hdpful [0 clarify whether (he), are nl"garive or positive rights, in thl.' + Consider Ihe impaci of .~enS(' of Section 1.4.3.) me aelion oplions on the nakcholders. (lr might be hdpful [0 clarify whether (he), are nl"garive or positive rights, in thl.' + Consider Ihe impact of .~enS(' of Section 1.4.3.) me aelion oplions on the nakcholders. (lr might be hdpful [0 clarify whether (he), are nl"garive or positive rights, in thl.' + Consider Ihe impact of .~enS(' of Section 1.4.3.) me aelion oplions on the nakcholders. (lr might be hdpful [0 clarify whether (he), are nl"garive or positive rights, in thl.' + Consider Ihe impact of .~enS(' of Section 1.4.3.) me aelion oplions on the nakcholders. (lr might be hdpful [0 clarify whether (he), are nl"garive or positive rights, in thl.' + Consider Ihe impact of .~enS(' of Section 1.4.3.) me aelion oplions on the nakcholders. (lr might be hdpful [0 clarify whether (he), are nl"garive or positive rights, in thl.' + Consider Ihe impact of .~enS(' of Section costs for ca ,ha, • Find sec,ions of ,he SE Code or ,he ACM Code .pply. Consider rhe guidelines in Section 9.23. Consider Kant's and Mill's approacht-s. 'Inen. c,ucgorizc each pm('mial action or response..' as ethically obligamry, ethically acceptable ... (f there arc sl'vl'ral ethically acceptable options, sclel'(an option, considering the ethical merits of each. counesy to O[hcrs, practicalif.)" self-interest, personal preferences. and so on. {In some (ascs. plan a st.-quence of actions, depending on the response to each.) The br:linstorming pha~e can generate a long discussion with humorous and obviously wrong options. In the analysis pha.~, we might reject some options or decide that the claims of some stakeholders arc irrelevant or Ollnor. The brairutorming efforl in generating these ideas was not wasrl-d. It could bring our ethical and praaical considerations and other uSt..ful ideas [h.u one wou]d nOI immooiately think ot: And il is as helpful to know why 500\(.' factors do not I.:arry heavy ethical weight as it is 10 know whi(."h ones do. 9.3.2 PROTECTING PERSONAL DATA Your CUS{Oll\cr is a community dinic. The dinic works wilh families that have problems of family violence. It has three sites in the same ciry, including a sheller for bancred women and children. °Inc director wanlS a computerized record system, networked for the three sites, with the ability to tr.t.nsfer filo among sites and make appointments ar any sire for any other. She wams (0
have an Internet connection for routine Web acca.) and e-mail communication with other social service agencies about client needs. She wams a few laptop computers on which staffers can carry records when they visit diems at home. At the shelter. s(aficrs use only first names for clients, but the records comain last names and forwarding addresses of women who hilve recently Idi. The clinic's budget is smajl. and she wants (0 keep Ihe (os(as low as possible. The clinic director is likely (0 be aWolre of the semirivity of Ihe information in rhe re-cords and 10 know .hat inapptopriate rdc.'3.SC of inform.:;uion can n.'suh in embarraS'smcm for families using th(clinic and physical harm 10 women who usc the shelter. But she might not be aWilfe of the fisk~ of a computer system. You, ;u the computer paticnt of .~idc effects of a drug he or she prescribes. (Sec. for example. ACM Code 1.7 and SE Code 2.07 and 3.12.) 464 Chap~r ') Professional Ethics and their family members. and they are nor involved in), our negotiations with the director. You, rhe director the clini, cmploYl'Cs. :md the donors or agencies thar fund the clinic arc also stakeholders. Suppose you warn the direcmr ahoUi Wlauthorized accC'ss (0 sensitive information by hackers and the potential for inverceprion of r("Cords and e-mail during transmission. You suggest measures to protocr diem privacy. including. for ("~mplc. and identification code system (not Social Security number) for clients of the din!.: to use when real names arc nO(necessary and encryption for e-m11 and transmission of records. You recommend sccurity software [0 reduce the threat of hackers who mig] [steal data. You tell the director that carrying client records on laptops has serious risks. citing examples of loss and theft of laptops containing large amounts of sensitive personal data. You advise £hat records on laptops be encrypted and suggesr that the director huy lapfop~ with thumbprim readers so that only authorized employees can access me data.

(Suppose a client is a candidate for the ciry council or a party in a child~cus(Qdy case.) You suggesr procedures to reduce such leaks. They include a wer 10 and password for each staff member. coded to allow access only to informacion [hat the particular worker needs, a log function that keeps track of who access.'icd and modified (he records. and monitoring and comrols on employee c~mail and Web a Section 9.3 Scenarios 465 The most difficult decision may be deciding whar is adequate. Encryption of personal record... on the laplops mighr be cssemial. Moniroring rmployce Web acc('S." is probably not. There is not always a sharp. dear line between sufficient prolection. You will have to rely on your professional knowledge. on being up-Io-d,, {e aboul current risks and sccuriry m('aSUfes. on good judgment. and perhaps on consuling others who develop systems for similar applications. You also have a profcssio nall', hical responsibility not (0 scare a cwtomcr into paying tor security mc;.tSures thar arc expensive but protoct against very unlikely rish . 9.3.3 DESIGNING AN E-MAIL SYSTEM WITH TARGETED ADS Your compan~' is developing a free e-mail service IhoH will indude targeted advenising hased on the content of rhe ('-mail mcssagc.ssimilar (0 Google's G mail. You arc part of the team designing th e system. What arc your ethical resporuibiliti rs? Obviously)'OU must protea the privacy of e-mail messages and SciCCI appropriate ads. No human will read the mcssages, Marketing for the fct.'C e-matl will make d ear (har users will s« large[ed ad.~. The priv:.IC)' policy wiD explain that (he content of the e-mail will determine which ads appear. So. the mun you consider to meet yout ethical responsibility in offering [his service to the public? Theorem]. fact that software. not a person. scans rhe e mail messages and assigns the ads n. 'duccs privacy threats. However. we now know that companies SlOrc huge amoums of data. What will this system store? Will it score data about which key words or phrases in c-mails cause panicular ads to be selected? Will it store data abour ~o clicked on specific ads? /Vw,'r (Jj Why arc rhesc qurs[ion "~ of ethi..:al conce rn ? Because we know thar *~:,~(J."I" " leaks. :heft. or demands ~~ a government. agency might c~mpromise the privacy of such dona. I he set of ads displayed ro a parncular user could provide a lot of informal conce rn? ion abour the person. jW[as onc's search queries do. Some of it will be incorrect or misleading information hccau\$(' of quirks in the ad.rargtring S"\"Inm .~" U mClhods. Should we insist that no such data be stored? Not nt.,(~'S.'iarilr. Some of il might have imported arc necasary for billing advertisers, some for analysis to improve a.d.targeting strategies. and pt'rhaps some tor responding {O complaints from e mail u~rs or ~dveniscrs. The system design [cam needs [0 determine whar records arc nCCf.\Sary. which need ro be a.~!iociated wirh individual users. how long the company will store [hem. how it will protect them (from hackers, 3ccidenral le;J.k~ . and so on). and under what conditions il will disclose Ihem, Now, back up and recomider informed conSl, 'nt. 'Jelling cusmrncrs that (hey will sec 3ds basL-o. on the (OJ1(cnt of their e-mail is not sufficient if the system stores data dlat can link a list of ads wilh a particular user, You must l'xplain this 10 potential users in a privacy policy or user agre,."ment. BUl we know that most peop": do nor read privac)' policies and user agreement. ,he designers mwt trunk about pmential risk... of the: sy!ilcm. ,:onsider privacy throughout the.: planning process. and design in protections. 9.3.4 SPECIFICATIONS You arc a relativelyjunior programmer working on modules that coUC'Cr data from loan application forms and convert rhem to fomu.t~ required by the parts of the program, helt evaluate the al'plications. You find that some demographic data arc missing from some forms. panicularly race and age. What should your program do? What should rou do? Consule rhe spC1.: ificacions for the program, Any project should have: specification docume: nts approved by the die:nt or managers of the company d(."Vcloping me project (or both), Your (ompany has .10 e: thical and blL~incss obligation to ensure (har the sJXcifications an: complcu:, and (0 produt.: l" a program thar meel'i them. Ethical reasons for , his include. bur go beyond. doing what the company has agreed to do and had been paid [0 do. Suppose you do not find anything in the 5p'-'CS thar cover your problem. The ncxr stcp is [0 bring rh\.': problem (0 the OlHe:ntion of your manage:r. SUPPOM: the manager tells you "Just make the program assume: 'whitc' for race if it's missing. Banks shouldn't discriminate base:d on race anyway." Do you acce:pt your manager's decision? You should not. You do not have the authoriry (0 make a decision not covered by the specific.nions withOUT consulting the client or higher level managers in your company who arc responsible for the program design Probably rour manager docs nor either. The manager's quick and simplistic response suggests that he or she is not acling with informed responsibility, [n addition. your com pany must document whatever decision it makes. That is. the specifications need a revision so that they will be complete (SE Codd.!!). Why is it imporram, from an othical point of view, fO consult somr:onc else? Decisions about how a program to make a good decision. In this example. it is possible .hat the modules of (he program that cvaluate the loan applil..d.tion do not usc (he dara on race 011 all. The lender or ,he governmc.fl(might want data on race to ensure compliance with nondiscrim ina tion policics and laws, St-Clion 9.3 Scenarios 467 What other con!.Cque"c~ could thC' manager's dl..'ci~ion have? Suppose [he company latcr uses some of your modules in anmher projcC(, say one that evalua(es patic:nts for inclusion in resL".uch studies on nl'W drugs. Some diseases and drugs affect people in different ethnic groups differently, Inaccurate data could threalen the health or life of people in the studies and dlston the conclusions in ways that harm other people who later USC' (he dru~s, Bul. you might say. we emphasized in Chapter 8 and Section 9.2.3 (hat pl'Ople who reuse existing software. especially in a safl>ty criril...al projCCt. should review, he softwarc and iu specifications (0 ensure (hat it I1\Cl'tS the safer)' standards of Ihe new project. That is thl'i r responsibility, you say. But if your way of handling missing data is nO(in the specifications, how will the.'Y know about it? Perhaps someonc will notice that [he specs arc incomplete. Perhaps they will (cst (he modules thoroughly before reusing rhem and discovc-r what the code docs. However, we have seen enough examples of human error (0 derive a lesso n tor a responsible professional: 00 not counc on everyone else to do their jobs perfectly. Do your OCst to make- sure your pan is nor one of the factors are sponsible professional: 00 not counce on everyone else to do their jobs perfectly. that conlribme 10 a failure . 9.3.5 SKIPPING TESTS As we observed in C hapter 8, there arc often pressures for reducing testing of software. "Jesting is one of the last Steps in development. so when deadlines approach, testing schedules oftcn shrink. A nf The central issue.' h 468 Ch"pfcr I) Profession .. 1 Ethics and Re5.pomibililio and overall is less expen.. S«lion 9.3 Sccnarins 469 will u."tc Ihe machine is [0 be sure (h.lt if is a... safe as good prof~uional prac(icc c.an make it. and that includes proper testing. You do nOI have an erhical obligation 10 cure prople of cancer. You do have an erhical obligation 10 cure prople of cancer. knowledge, to additional harm. What about your responsibility 10 your company? Even if we.' weigh the shonterm cfK'Cts of the delay more highly than the risks of losSt."S that would result from a side of fully cC'S[lng (he machinc.. Yes, you malfunction, [he c:thieal arguments arc on have a rcsponsibility 10 your company] Ix: successful. but that is not an abwlUlc obligation. (Recall the discussion of go;,1}s and constraints. In the present case, avoiding unreasonable risk of hann to patients is the ethical constf2int (Sf Code 1.02). me: Getting" product arc nOf safety-critical ones where Haws might thrc; ucn people',!; lives. Consider this scenario: You arc a programmer working for a vcry small stafl~Up company. The company has a modest product line and is now dC'vcloping a truly innovative new produce. Everyone is working 60 hour weeks and the lugel release date is nine months away. The bulk of the programming and testing is done. You arc about (0 begin the bel .. Ic~aing. (Sec Section 8.3.2 for an explanation of bela losting.) 'I'he owner of Ihe company has k'a rned abou(an annua.l indwtry show dlac would be ideal (or introducing ,he new produce. The show i~ in two monchs.. Packaging must s[art within a week in order to have the product on the shelves (or the show. The o wner talk.~ with the project manager. Thhc-tc' I';ilit"l'n~ ~nJ hospit~h .Ill nUl pr'''I(nl kn<jngly If)" ri)k~' Jru~~ III 11'C', IImrfil~ . H"rc. We' ~re' J, "unlillJ; Ih;Il doc:.or ~ .ru: .It-vin, ~~ fi.ky nr rtl) 'tinrcIH' ~ III'..... prcmnul, I., ~ f(. ''''IImcn! JC\\i,c-. 470 Chapter 9 ProfO=i5ional Ethics and Rcsponsibilitie" Thi~ is nor a fairy rale. Ir is an acrual case, and ,he outcome I jlLu described is what actually happened. 'Ini\$ ca~e makes a very imponant point: Sometimes people.- will lislen to you. provided . of course. you arc rcspcClful . (houghtful. and well prepan.-d. In another ac(ual C:ISC.;I manager within a (ompany. but not in the software division. asked a progr daim. (SI: Cod < 2.06 and .H19 apply.) The CEO replaced him wid, someone who had a "can do" attiludc. This is one of many cases when..' doing what is professionall), responsible corrc.--sponds with doing what is professionall), responsible
corrc.--sponds with doing what is professionall). what is good for oncsd(']11.e software cngin«r did nO{ want the stress o(working under an acremely unreasonable schedule and (he responsibility for ,he inevitable failure. Leaving the company was noc a bad thing. 9.3.6 COPYRIGHT VIOLATION Your company has 25 licenses for a computer program. bY(you discover that it h;l~ been copied onto 80 compUlers. The first nep here is to inform your supervisor , hat the copies violate (he license agreement. Suppose the supervisor is not willing (0 take any action? What next? What if you bring the problem to the anemion of higher level people in the company and no one cares? There are scvl'ral pos..."ibll' aclions: Give up: you did your best ro inform your supervisor is not willing (0 take any action? What next? What next correct the problem, Call rhe softv.,.uc vendor anJ r('port the- ofTemt:. Qui(your job. Is giving up at this point ethically acc~p(3ble? My students thought it depended in pan on wh~her you arc the person who ~igncd the licenS(' agr«mcnu. If so, you h.avc made an agreement about the usc of Ihe softr.'arc. and you, as the representative of)lour company, arc obligated to honor it. Because.' you did not make the copio; , you have not broken the agreemel (directly. hut you have responsibility for the software, Your n; une on thl" li!..'('llSc could expose you to legal ri.~k. or unethical managers in your company could make you l scapegoat. Thus, you might preder to repon the violation or quit your job and have your name (('moved from the licenses to protCCt youuclf. If you arc nO{ the person .~tion 9.3 Sl.:cnarins 471 who signed the licenses. {hen you observed a wrong and brough(if (0 the auenfion of appropriate people in the company. Is that enough? What do Sccrions 2.02. 6.13. dnd 7.01 of !he SE Code and I.) and 2.6 of ,he ACM CAlde sugges!? 9.3.7 GOING PUBUC Suppose you arc a member of ;] (cam working on a compurer . ..:onrrolled crashavoidance system for auromobilcs. You rhink (he system has a flw rhill could endanger JXople. The project manager does nor seem conce rned and cx.pccrs {O announce com pierion of rhr' proj ect soon. Do you have an ethical obligation to do something? Given the potential consequences. yes (sec SE Code 1.04; ACM C()dc 1.2. 2.5). We consider a varicry of options. fir, H. at a minimum. discus... your concerns with (he project manager. Voicing your concerns is admirable and obligatory. It is also good for your concerns with (he project the company. as well as rhe public. from aU the negative consc:quences of releas ing a dangerous product. If the manager decides to proceed as planned wirh no examination of the problem. your n('XI opcion is to go [0 someone higher up in the company is willing {O inve5rig:m.: your concerns, you have a moC(" diffi,uit dilemma. Your so a mode as planned wirh no examination of the problem. your n('XI opcion is to go [0 someone higher up in the company is willing {O inve5rig:m.: your concerns, you have a moC(" diffi,uit dilemma. Your so a mode as planned wirh no examination of the problem. your n('XI opcion is to go [0 someone higher up in the company is willing {O inve5rig:m.: your concerns, you have a mode as planned wirh no examination of the problem. your n('XI opcion is to go [0 someone higher up in the company is willing {O inve5rig:m.: your concerns, you have a mode as planned wirh no examination of the problem. your n('XI opcion is to go [0 someone higher up in the company is willing {O inve5rig:m.: your concerns, you have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned wirh no examination of the problem. You have a mode as planned w now have Ihe option of going outside the company to the customer. IO rhe news media. or (0 a government agency. T here is also , he ethical issue of the damage you might do to your company, and ult im ately (0 rhe people who would benefit from the sySlcm. You might be misraken . Or yo u might Ix correct. but you r method of whinkblowing migh! produce nega!iYe publiciI)' !ha! kill, a por 472 Chapter 9 Profc~ional Erhies and Rt-spomibililic=s crirical memos and rcpons. The engincers werC' fir('d . During the next few years, when several c.rashC'soccurroo.. there were public investigations and numerous recommendations made for improving safely of lhe system. 7 One of (he BART engineers made .he.'SC comments aboul Ihe. proct.'Ss: If there is something that oughr to be corrected illside an organization. the most efft.'Cciw way to do it is to do it within the organization and e xhausr all p It is imp\.'arance of bias can be as damaging (to you and to NerWorkx) as actual bias. Suppose you take the job and you find (hat one of the other bids i.s much bcue::r chan the bid from Nct\Vorkx. Arc you prepared (0 handle that siruation ethically? What arc the consequences of disclosing (he conflict of imcrest 10 the diem now? You will probably los!' ulis particular job, but rht.'Y might valu(" your honesl)' more highly and that might gCI you more busint"S.'i in the furure. Thus. there could be bendits, even to you . from disclosing the conAicl of interest. Suppose ir is unlikely that are:: your responsibilities to your pote::mial diem as a profession all consul[am? When ~c rion 9.3 So:narios 475 someone hire.."S you as a consultanr. [hey C'JCPCC[you co offer unhiased, honcs[, impartial professional advice. There is an implicir ass umption that you do not have a personal interest in the out(ome or a personal reason to favor one of the bids you will review. "The conclusion in this c:asc hangs on this point. In spitc of your belicfin yo ur impartiality. you could be unintentic nally biase..-d. It is not up to you (0 make the decision about whether you can be fair. The diem should nuke that decision . Your chical obligation in this case is to inform CybcrStuff of the ("ooRkt of inrcn..OSL (Sec Sf C ode Prialliplc 4, 4.03. and 4.05. and 4.05. and 4.05. and ACM Cod< 2.5.) 9.3.10 KICKBACKS AND OISCWSURE You arc a programmer on the programming staff of a major university. The office th:u plans freshman orientarion is selecting one or two brands of security softwa.rc for laptops and cell phones to recommend (0 all new Sludents. Your supervisor has askt" publicity (and possibly legal sanctions). (&c SE Cod< 6.05 and (•. 06. SE Cod< 1.06. 4.03, and 4.04 arc also relevant 10 (h is selecting one or two brands of security softwa.rc for laptops and cell phones to recommend (0 all new Sludents. Your supervisor has askt" publicity (and possibly legal sanctions). case.) \X'ho docs noc hcndlt from (he arr:mgcmcm with the software company? Any company that charges les.o; for software of comparable quaiity. Any company that charges 476 Chapter 9 Professional & hics and Rnponsibilitin the same or JX'rhaps a liule more for a bener product. All (he students who rely on the recommendation. The uniVt'rsity's and Rnponsibilitin the same or JX'rhaps a liule more for a bener product. obligation in making the recommendation represents an ho nest opinion of and university receive sway their choice of company to the product bt. 'St for the students? People want to know when a recommendation represents an ho nest opinion of and university receive sway their choice of company to the product bt.'St for the students? People want to know when a recommendation represents an ho nest opinion of a negative state of company to the product bt.'St for the students? People want to know when a recommendation represents an ho nest opinion of a negative state of company to the product bt.'St for the students? ex]>Cn un iversities and ("t'nain OIhcr organizations [0 beimpauial in their reco mmendations. When a pro~rammer selects sofrwan.' {O recommend. the programmer's opinion. the bayer. If there are other reasons for me selection, the programmer should disclose them. Disclosure is a key point. Many o rganizations encourage cheir members [0 get a cr~dit card that provides a kickback (0 the o rganization. This is noc unethical primarily because (he kickback is made clear. It is even a selling point: Usc th is card "nd hdp fund o ur good ca use, However. even if (he un iversity makes clear in irs rccommendarion rh:u it Noefits financially from sales of the produCt, there arc good arguments against the arungcmem, They arc not co mputer professio nal iss ues. so we leave them for you to Ihink about. 9.3.11 A TEST PLAN A {cam of programmers is developing a communications system for firefighters to usc when fighting a fire. Firefighters to usc when fighting a fire. sors ncar the scene, and with other emergency personnel. The programmers will test the sys.tem in a field ncar the company office. Whar is (he erhical i ~ ue ? The (cs(plan is in sufficient and (his is an application where lives could he at risk. l esring should in\'o lve real firefighters iruide buildings or in varied terrain. perhaps in an actual fire (perhaps a controlled burn). The programmers who work on [he system know how it behaves. They arc cxpericn 9.3.12 ARTIFICIAL INTELUGENCE AND SENTENCING CRIMINALS You arc
pa rr of a tcam develo ping a sophist icared program using artificial imelligence (AI) techniques (0 make sentencing deci ~iom for convicted criminals. &-clion 9.3.12 ARTIFICIAL INTELUGENCE AND SENTENCING CRIMINALS You arc pa rr of a tcam develo ping a sophist icared program using artificial imelligence (AI) techniques (0 make sentencing deci ~iom for convicted criminals. &-clion 9.3.12 ARTIFICIAL INTELUGENCE AND SENTENCING CRIMINALS You arc pa rr of a tcam develo ping a sophist icared program using artificial imelligence (AI) techniques (0 make sentencing deci ~iom for convicted criminals. &-clion 9.3.12 ARTIFICIAL INTELUGENCE AND SENTENCING CRIMINALS You arc pa rr of a tcam develo ping a sophist icared program using artificial imelligence (AI) techniques (0 make sentencing deci ~iom for convicted criminals. &-clion 9.3.12 ARTIFICIAL INTELUGENCE AND SENTENCING CRIMINALS You arc pa rr of a tcam develo ping a sophist icared program using artificial imelligence (AI) techniques (0 make sentencing deci ~iom for convicted criminals. &-clion 9.3.12 ARTIFICIAL INTELUGENCE AND SENTENCING CRIMINALS You arc pa rr of a tcam develo ping a sophist icared program using artificial imelligence (AI) techniques (0 make sentencing deci ~iom for convicted criminals. &-clion 9.3.12 ARTIFICIAL INTELUGENCE AND SENTENCING CRIMINALS You arc pa rr of a tcam develo ping a sophist icared program using artificial imelligence (AI) techniques (0 make sentencing deci ~iom for convicted criminals. &-clion 9.3.12 ARTIFICIAL INTELUGENCE AND SENTENCING CRIMINALS You arc pa rr of a tcam develo ping a sophist icared program using artificial imelligence (AI) techniques (0 make sentencing deci ~iom for convicted criminals. &-clion 9.3.12 ARTIFICIAL INTELUGENCE AND SENTENCING CRIMINALS You arc pa re of a tcam develo ping a sophist icared ping arc pa re of a tcam develo ping a tcam dev Scenarim 477 Maybe. in (he futun.'. we will have compu(t'r sys(cms capable of doing this well withom human imcrvencion . If is helpful for judges usc their discretion in deciding licmcnecs (within bound.~ establisht.-d in law). Prosecutors and defense lawyers present arguments that a judge considers. but software cannot. A judge- can consider unusual circunistances in the case. characterinia of the convicted person, and other hand. some judge,; have a rcpu(;uion for giving cxm:mcly [Gugh sentences. while others arc very lenient. Some people argue that software might be more fair [han a judge influenced by pcrwnal impressions and biases. At this poim, however, most of {he legal communicy. and probably the public, would prefer to have human judges make S('nrencing decisions. Yean: of experience provide insights that are, at this time. difficult to cnL"Ode into software. ror now. we modify the scenario by adding rwo words: You:U'C PUt of il tcam developing; a sophisticated program wingAi techniques help judges make sentencing decisions for ('onvictoo criminals. [0 The system will analyze charaneriscics of the crime and the criminal to find other cases that are similar. Based on irs analysis of cases, more or less as a search engine would, so that the judge can Cl'Vi~ them? Or should it provide both a r("Commended semenCt:' and the relevant cases?") and the relevant cases? This is cle3r1y 3n applic3tion where it is csscmiallO have expcru and potential users involved in the design. The expertise and strategies for selecting the similar cases on which the program bases its recommendarion or on which a judge bases a decision. The systC!'m's recommendations. if it makes them. must comply with sentencing requirements specified in laws. The involvement oflawyers can improve more subdedccisions. Consider the question of the ordering of the cases the system displays. Should it order them by date or by me length of the scenence? If the bItL'r. should mc shoncs(or longest sentences the system displays. ..:omc firsr? This last question suggests .hac the proieer's consultants should include bo[h prosccurors and defense.' lawyers. Rut probably none of their simibrity or relevance to the current case. Thar is a fuzzier cricerion ,han date or length of sc:mcncc. Again it is important ro include a varic[)' of eXp 478 Chapter 9 Professional Erhi(:s and Rnpons:jbili(j~ from comput~r systems. {We saw ~xampl~s in Chaptcr 8. County dc-ction ofticial~ and school distrkts ignored warnings that they should nm rely soldy on rcsules from computer systems. {We saw ~xampl~s in Chaptcr 8. County dc-ction ofticial~ and school distrkts ignored warnings that they should nm rely soldy on rcsules from computer systems. students to summ('r school.} Evcn when ()Cople arc deliberate and careful in imcrprcting outpUt from a compmcr system. the manner in which the viewers sec the data can influence their percquions. Thus carctul planning. induding much consultation with rdevam C'Xpcns. is an ethical requirement in a system that will have significant impact on people's lives. A company or governmem agency I hat develops or installs this systl"m must consider how it will maintain and updalc the system handle changes in sentencing laws? Should il discard cases docided under dl~ old law? Include them but Rag them clearly as predating the change? How much weight should the system give such ca~s in irs selection criteria? We have nm yet answered .he ques(ion abour whether (he system should recommendation from the judge's initial plan might lead a judge (0 give a case more thought. Or it might inRucnce a judge more (han it should. If the system presents a recommendation. legislators or administramrs might begin [0 think (hat a clerk or law student, not a judge. can operate (he syslem and handle semencing. This is not likely in (he shoft term-judges and lawyers would object. It is. however. a possible consequence of apparcndy sophisticated Al syslems making apparendy wise dccisions in any professional arca. A potcn[ial drop in employment for judges (or other professionals) is not the main issue. The quality of Al teChnology (and the specific system) at the time of development and on the sensitivity of the application (Sec Exerdse 6.27 for ; Inorher applicuion area.) Suppose judges in your Slate usc a sentencing decision system that displays similar cases for the judgt. (0 rt..... iew. You arc a programmer working for your stare government. Your stare government. depanment administrator. tcll.; you to modify the program 10 add this new category of crime and assign (he same rell'Vancy weights ro cases as the program currently docs for using a cell phone while driving a car (already illegal in your state). The first qUClition. one for your OOI'Os. i!i whethC"r the contraCt under which (he system operates allows (he state {O make changes. tor many consumer products. guaramC'es and service agreements become void if .he consumer takes (he produCl apan and makes changes. The same can be (ruc Cor softwuc. Let us assume the decision quickly and independently. You should say no. with appropriate politeness and n~ilSOns . SE Code 3.1 S states a vcry importam. often ignored principle: "Treat all forms of software maintenance with the same professionalism as ncw dcvclopmcnt." That includes developing specifications. in me this example in consultation with lawyers and judges who underS[and the law and irs subtlcties. We raised a s:lmpling of the complex and sensitive issues that go inro the design of a system such as this. Modifications and upgrades should undergo as thorough planning and resting. 9.3.13 A GRACIOUS HOST You are the computer system administrator for a mid-sized company. You can monitor the company network from home, and you frc:quently work from home . Your niece. a college student, is visiting for a week. She asks if she can use your computer ro check her e- mail. Sure. you say. You are being a gracious host. What is the cmical problem? Maybe there is none, Maybe your have an excellent firewall and excdlem amivirus sofrwarc, Maybe your files arc password protected. and you created a separate account on yOUl computer for your niece asked to use {he computer. Your niece is a rcspomible pcrson. She would nor imentionally snoop or harm you or your company. But after chC"Cking c·mail. she might vi~it MySpace, th~n look for someone sciling ch~ap concert rickets. then ... who knows? Maybe h~r own company nc{Work contains cmployC'C records, customer records. and plenty of inform:uion about company projects. finances. and plans. Depending on what the company docs. the system might contain oth('(very sensitive information. Downtime. due to a virus or similar problem. would be very cosdy for the company employee signed up for a peerro peer file sharing service and did not properly SC't [he options indicating which files were [0 be shared. Mortgage application information for a few thousand customers leaked and spread on [he Web. The point of ,his scenario is Ihat you musl always be alert family and work applications poses risks. (0 pot('mial risks. Mixing [X~HCI'>rs Review Exercises 9.1 9.2 9.3 9,4 What an:: two ways professional ethics difF~r from ethics in gmeral? Why did. Pros"" [0 read J..ndwrit;ng. d.vdopcd by Microooft progrunm Who ,hould you u1k to about it fint? 480 Chapter 9 Profc='SSional Ethics and Ro ponsibilitie,o;: General Exercises 9.S Describe a ax at work or in school where someone.ked or presaumi you [0 do IOmtthin, you Ihou&ht unethical. 9.6 Review me description of me airplane crash n Press. 1996. • Johnson Dd>orah G. Compuur £.tbics. 3rd ed. Premia' Hall, 2001. : -I ORGANIZATIONS AND WEB SITES • ACM: www.acm.org • Compu[er Professionals for Soci:tl Responsibiliry: cpsr.org 485 • IEEE ComplU('r Society: www.acm.org • Compu[er Professionals for Soci:tl Responsibiliry: cpsr.org 485 • IEEE ComplU('r Society: www.acm.org • Compu[er Professionals for Soci:tl Responsibiliry: cpsr.org 485 • IEEE ComplU('r Society: www.acm.org • Compu[er Professionals for Soci:tl Responsibiliry: cpsr.org 485 • IEEE ComplU('r
Society: www.acm.org • Compu[er Professionals for Soci:tl Responsibiliry: cpsr.org 485 • IEEE ComplU('r Society: www.acm.org • Compu[er Professionals for Soci:tl Responsibiliry: cpsr.org 485 • IEEE ComplU('r Society: www.acm.org • Compu[er Professionals for Soci:tl Responsibiliry: cpsr.org 485 • IEEE ComplU('r Society: www.acm.org • Compu[er Professionals for Soci:tl Responsibiliry: cpsr.org 485 • IEEE ComplU('r Society: www.acm.org • Compu[er Professionals for Society: www.acm.org • Comp we celebrate the enormous benefits that computer technology and the Imcrnet have brought us. erides of computer technology predicted many very negative con.«'guences that did nor occur (for example. mass unemployment). Crilics. especially those wimout a rechnical background, were less likely to anticipate some of the problems mat do occur: bctwccn governments and citizens, between hackers and security experts. betwccn people who want to protect rheir privacy and businesses that want to use personal information. Entrenched powers such as governments for solutions to some problems caused by technology. but we should remember that governments arc institutions:. like businesses and other organizations. With dme. we solve or reduce many of the problems. using more or better technology. the market. innovative services and busines. I: arrangements. laws. education. and so on. We cannot eliminate all negative effects of computer technology. We accept some and adapt {O a new environment. We always make trade-offs in life. In some areas, such as privacy of personal data and activitk'S. could fundamentally alter our imeractions with the people around us and with our governments. Ie is essential for businesses and computer professionals to think about appropriate guidelines for usc of the technology. It is essential to think ahead-to anticipate potential problems and risks and to design products and policies to reduce them. On the other hand, we must be careful not to regulate tOO soon in ways that would stifle innovation and prevent new bCllefits. These included encrypcion, anonymity on the Web. devices and software (lut copy music and movies, 487 software to circumven(copyrighr pro{cccion. intelligenc robou. and so on. 'The difficulty of predicting future beneficial uses of {echnologies is a strong argumeO(against such bans. We learn from experience. Syscem failures. even disasters. lead [0 beccer syscems. However. the observation that perfcc[ion is not possible docs not absolve bans. We learn from experience. Syscem failures. even disasters. lead [0 beccer syscems. However. the observation that perfcc[ion is not possible docs not absolve bans. We learn from experience. Syscem failures. even disasters. lead [0 beccer syscems. However. the observation that perfcc[ion is not possible docs not absolve bans. We learn from experience. Syscem failures. even disasters. lead [0 beccer syscems. However. the observation that perfcc[ion is not possible docs not absolve bans. We learn from experience. System failures. even disasters. lead [0 beccer system] us of responsibility for sloppy or uncthicaJ work. There are many opporcunicies for computer professionals co develop wonderful new products and to uS(', heir skills and creativity to build solutions (0 some- of [he problems we h.ve discussion of risks and faitures encourages] you to cxc:rciSC" [he: high~t degree of professional and personal rcsponsibilic)'. APPENDIX A THE SOFTWARE ENGINEERING CODE A.1 The Software Engineering Code of Ethics and Professional Practice' Preamble Computers have a (("ntral and growing role in commerce, industry, government, medicine, education emenainmer, and society at large. Sofm'arc engineers arc mose who contribute by direct participation or by teaching. [0 (he analysis. sp«ification. design. developing safNo'art' syscems. \$() ftwarc engineers have signification. maintenance, and r~(ing of software systems. Because of their roles in developing safNo'art' syscems. \$() ftwarc engineers have signification. maintenance, and r~(ing of software systems. Because of their roles in developing safNo'art' syscems. \$() ftwarc engineers have signification. maintenance, and r~(ing of software systems. Because of their roles in developing safNo'art' syscems. \$() ftwarc engineers have signification. maintenance, and r~(ing of software systems. Because of their roles in developing safNo'art' systems. Because of their roles in developing safNo'art' systems. cause harm. (0 enable olhers (0 do good or cau.o; e harm. or to influence olhers to do good or cau.o harm. ')0 cmucr, as much as pcm.iblC,', thar (heir efforts will be u~d for good. sofrw3re engineers must commit themselves (0 mOlking software engineers shall adhere to the following Code of Ethics and Profc:ssional Practice. The Code comains eight Principles rdatcd to the behavior of and decisions made by professional sofcwarc engineers. including practi(ioncr~, educators, managc'fS. supervisors. and policy makers. as ¥."eU as (rainCC5 and nooenrs of the profC5.'lion , The Principles rdatcd to the behavior of and decisions made by professional sofcwarc engineers. identify the ethically responsible relationships in which individuals, groups. and organizations participate and the primary obligations within these relationships. The Clauses of each Principle arc illustrations of some of the obligations within these relationships. owed to people affected by the work of software engineers. and the unique clements of the practice of ~oftware engineer. r... • Vc-nion ~ ...!. pN:~ by Ihe." ACMIIE F.IA.~ Juim TAo'" "e." Uflo S..flw.uo: f..ngiuco:rlng Elhic)d l\u(.:.t.6urul $r \sim ..., "n. b,.", -'Uli'"r \ommiHC'C": []run.dJ (;')(u::rh \sim 111 (Cll..url . Muh M,lkt, Uk! Siml'n ~m"II . }...inlly apflfUll'N by the." AC M lnd die' IEEE-CS ~ lilt- ~.onJ;atd fOI 1e.".Khinf. lnd ptlc.1i.... n~ JtwlK tnttincnlng. t) I'm by tM inldill.lte." fit! lku'ic.~ :mJ FJrtUullic~ Enj::llln% III~. ;.uullhe AliMK~lion fot C.llmpuling M~:hincry. 111(, 489 490 Appendix A$ It is nor intended {hat the individual pans of the C...ode be usa:! in i.~larion to justify errors of omission or commission. The liu of Principles and Clauses is nor exhaustive'. The Clauses is nor exhaustive'. The Clauses is nor exhaustive'. The value of the clauses is nor exhaustive and clauses is nor exhaustive and clauses is nor exhaustive. The value of the clauses is nor exhaustive and clauses is nor exhaustive and clauses is nor exhaustive. that gc.'flcrates ('thical decisions. In some situations, standards may be in tension with each other or with standards from other sources. TheS4!' situations require the software engineer (0 uS(' cthil Code of Ethics and Profl."Ssional Practice. given the circumstances. Ethical tensions can best be addressed by thoughtful consideration of fundamental principles. rather than blind rdiance on detailed regulations. These Prin(:jplcs should inOuencC' software engineers to (:onsidec broadly who is affecte-d by their work: to e-xamine if they and the-ir colleagues are [ceating other human beings wim due cC!>pcct; to considC'r how the public. if reasonably well informed. would view [heir decisions; to analyze how the least empowered will be affected by their decisions: and to consider whether meir aels would be judged worthy of ,he ideal professional working as a software engineer. In all these judgmems concern for the health. safety and welfare of the public is primary; mat is. the "Public Imerest" is cemral (0 (his ('...ode. The dynamic and demanding context of software engineering requires a code that is adaptable and rclevanr to na1. The Code hdps to ddinC' those actional function. As this Cod..: expresses the consensus of [he profession on ethical issues, it is a means to educale both (he public and aspiring professionals about the ethical obligations of all software engineers. PrInciples PRINCIPLE 1: PUBUC Software engineers shall act consistently with the public iOlerCS(. In particular. software engineers. PrInciples PRINCIPLE 1: PUBUC Software engineers shall act consistently with the public iOlerCS(. In particular. software engineers. PrInciples PRINCIPLE 1: PUBUC Software engineers shall act consistently with the public iOlerCS(. In particular. software engineers. PrInciples PRINCIPLE 1: PUBUC Software engineers. 1.01. Aco:p(full responsibility for (heir own work. 1.02. Moder3((, the intcrests of (hc sofrware engineer. the employer., he dient•.and, he users with the public good. 1.03. Approve sofrware only if they have a wcll~ founded belief that it is safe, mttlS specifications, pa5scs appropriate tcstS, and does not diminish quality of lite-, diminish privacy. or harm the environment. The ui{imatc df *t of rhe work should be to the public good. Appcnd;" A 491 1.04. Disclose to appropriate persons or authorities any acrual or potential danger to the uSC'r, the public. or the environment. that they reasonably believe to Ix- as...ociatcd with software or related documcnu. 1.05. C'..oopei.lte in efforts to address man(u of gr:ave public concern caused by software. its im;tallation, maintenance. support. or documents, methods. and (ools. 1.07. Consider issues of physical disabilities. allocation of rC'\$Owces. econonUc disadvantage. and other factors that can diminish acctSs to [he ~nefits of software. 1.08. Be encouraged to volumeer professional skills [0 good causes lind contribute to public education concerning ,he discipline. PRINCiPU 2: CLIENT AND EMPLOYER Software engineers shall act in a manner (hat is in the beS{ intercsts of their client and employer. consistent with the public imcrcs(. In particular, softwart' engineers shall. as appropriate: 2.01. Provide service ill their areas of competence. being honest and forthright abom any limitations of their experience and education. 2.02. Not knowingly use software that is obtained or retained either illegally or un«hically. 2.03. Usc the property of a diem or employer only in
ways properly authorized. and with the client's or emplorcr's knowledge and COllSCnI. 2.04. Enswc that any document upon which they rely has been appmv("d. when requin-d. by someone authorized [0 approve it. 2.OS. Keep private any confidential information gained in [heir professional work, where such confidentiality is consim:m with the public interest and consistent with the law. 2.06. Identify. document. collect eviJcnce. and report to the diem or the employe.r promptly if. in their opinion, a projea is likely to fail. {O prove roo expensive. to violate intellectual property law. or otherwise to be problematic. 2.07. Idencify. document, and report significant issues of social concern, of which {hey are aware, in soft-wan- or rdared documents, 10 the employer or the dient. 2.08. Accept no outside work dNrimclltai (0 the work {hey perform for their employer or diem. unless a higher emiul concern is being compromised; in that case. inform the employer or anofher appropriate authority of the ethical concern. 492 App PRINCIPLE 3: PRODUCT Sohwarc engineers shall ensure that their produces and related modifications mCft the highcs(professional standards possible. In panicuiar. sonware engineers shall ensure that their produces and related modifications mCft the high quality, acCC professional standards possible. In panicuiar. tradeoffs arc clear to and accepted by me employer and [he dient. and arc available for consideradon by the user and the public. 3.02. Ensure pCOp 3.03. Identify. define. and addrc.:s." ethical. economic. cultural. legal. and environmental issues related to work projects. 3.04. Ensure that they are qualified for an)" project on which they work or propose to work by an appropriate combination of education and training. and experience. 3.05. Ensure an appropriate for k .. hand, depaning from only when ethically justified or k .. hand, depaning from only when ethically justified or k .. hand, depaning from only when ethically justified or k .. hand, depaning from only when ethically justified or k .. hand, depaning from only when ethically justified or k .. hand, depaning from only when ethically justified or k .. hand, depaning from only when ethically justified or k .. hand, depaning from only when ethically justified or k .. hand, depaning from only when ethically justified or k .. hand, depaning from only when ethically justified or k .. hand, depaning from only when ethically justified or k ... hand, depand to k ... hand, 3.07. Suive (0 fully understand the specifications for software on which they work. 3.08. Ensure that specifications for software on which chry work have been wdl documented. satisty the users' rc:quircmenrs. and ha\'c the appropriate approv:lls. 3.09. Ensure that specifications for software on which chry work have been wdl documented. any project on which they work or propose to work and provide an u", creaimy as." cssment of these ~timates. 3.10. Ensure adequate documentation. including significant problems discovered and solutions adopted. for any project on which they work. 3.12. Work to develop softw'arc and rdated documents .hat respect the privacy of those who will be affected by that ,ofrware. 3.13. Ik careful [0 use only accurate data denved by ethical and lawful means, and use it only in ways properly authoriud. 3.14. MaIntain the integrity ordara. being scn~i(ive to oUldated or flawed occurrences. 3.15. Treal all forms of software maintenance with the same professionalism a~ new development. mc ".. mcse PRINCIPLE 4: JUDGMENT Software engineers shall maimain integrity and independence in cheir professional judgment. In particular. software engineers shall. as appropri2tc: 4.01. Tcmpcrall technical judgmcnu by the need (0 support and maintain human values. Appendix A 493 4.02. Only cndorsc: document5 either proparc.-d under their supervision or within their areas of competence and with which they aCC' in agreement. 4.03. Maintain professional objectivity with respect [0 any software or rdated documents they are a\ked (0 evaluaTe. 4.04. Nm eng.ge in deceptive financial pl'llcticcs such as bribery. double billing. or mher improper financial practices . •. OS. Disclose to all concerned panics {hose confliclS of inTeresT[hat cannol reasonably be avoided or ('scaped. 4.06. Rrfuse to participate, as members or advisors, in a private. governmental. or professional body concerned with software related issues. in which they the-if employers. or their diems have undisclosed potential conflicts of imerest. PRINCiPlE 5, MANAGEMENT Sonw:uc engineering managers and leaders shall l'iubscri~ [0 and promotC' an ethial approach (0 [he management of sofrwarc d~clopmenr and maintenance. In pauicular. those managing or leading software engineers shall, as appropriate: 5.01. Ensure good management for any project on which they work. including effective procedures for promorion of quality and reduction of risk. 5.03. Ensure that software ("ngineers know the employer's policies and proadures for protecting passwords. files. and infonnarion that is confidemial (0 me employer or con6dcnri .. 1 to others. 5.04. Assign work only after taking inlo accoW1t ;)ppropria[c contributions of education and experience: tempered with a desire to further dut education and experience: tempered with a desire to further dut education and experience. any project on which they work or propose to work. and provide an uncertainry assessment of these ~timates. 5.06. Attract potential software engineers only by full and accurate description of (hc conditions of employment. 5.07. Offer f2ie 2nd jW{ remunc r:.uion. 5.08. NO[unjustly prevent someone (rom taking a position for which that person is suitably qualified. 5.09. Ensure {hat there is a fair agreement concerning owne~hip of any software. process."S. research. writing. or other intellectual property to which a software engineer has contributed. 5.10. Provide for dUl" process in hearing charges of violation of an l"mployer's policy or of .hi. Cod 494 Appendix A PRINCIPLE 6: PROFESSION Software engineers shall advance the integrity and reputation of the profession consistcnr with the public interest. In panicul:u. software engineers shall. as appropri:;ue: 6.01. Help develop an organizational environment favorable [0 acting C'thicaUy. 6.02. Promote public knowledge of software engineers shall. engineering knowledge by appropriate' paniciparion in professional organizations. 6.04. Support. as members of a profession. client. Of employer. 6.06. Obey all laws governing their work, unless, in exceptional circuffi."itanccs, such compliance is inconsistent with the public interest. 6.07. Be accurate in nating the characteristics of software on which they work. avoiding not only false claims but also claims chat might reasonably be supposed [0 be speculari~. vacuous, deceptive. misleading. or doubtful. 6.OS. Take responsibili[y for dcrccdng. correcting. and reporting errors in software engineer's commitment to this Code of echics. and the subsequem ramifications of such commitment. 6.10. Avoid associations with businesses and organizations which are in cooSier with this code. 6.11. Recognize that violations of this Code are inconsistem with being a professional software engineer. 6.12. Express concerns [0 the people involved when significant violations of this Code are inconsistem with being a professional software engineer. when it is dear that consultation with people involved in these significam violations is impossible. counterproductive. or dangerous. PRINCIPLE 7: COLLEAGUES Software engineers shall be fair to and supportive of their colleagues to adhere to this Code. Assist colleagues in professional development. Credit fully [he work of others and refrain from £aking undue credit. Review the opinions. concerns, or complaints of a colleagues in Ix-ing fully aware of current standard work practices including policies and procedures for profession and lihall promote an clhical approach to the practice of ,he profession. In particular. software enginten> shall continual)' ('ndeavor to: 8.0t. Funher lheir knowledg(' of dcvdopmcOise and procedures for profession. In particular. software enginten> shall continual)' ('ndeavor to: 8.0t. 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Software engines and profession. Software enginten> shall continual in [he analysis. specification, d('Sign. d~elopmem. maintenance. and rcsting of software and rcl:ued documents. together with the management of (he devclopmenr process. 8.02. improve their ability to crea(ewc. rcli:lble, and useful quality software at reasonable cost and wilhin a reasonable cost and rcsting of software and rcsting of software accurate. informative. and well-wriucn documentation. 8.04. Improve their underscanding of the software and rdated documeO(s on which they work and of the environment in which they work and of the software and rdated documeO(s on which they work and of the knowledge of this C..odc. its in(crpretation, and its applica(ion [0 (hC'ir work. 8.07. Not give unfair treatment to anyone h«au.sc of any irrelevanl prejudi~i. 8.08. Not influence others to undertake any action [hat involves a breach of this Code. 8.09. Recogniu that ~rsonal violations of this Code arc inconsistC'nt with being a professional software engincer. A.2 The ACM Code of Ethks and Professional Conduct' Preamble Commitment co ethical profC'ssional conduct is expected of every members, and studem members) of the As.qw:iation for l-:Ompucing Machinery (ACM). • Tht' C.ndc anti .he- ,urrlrnu:nul CuiJrJinn 'Nne Jc.-,.rC'uopnl ~• • he l~ rot(:t:' fi' Appendix A This Code, consisting of 24 imperativC5 formulated as statements of personal responsibility. identifies the dements of such a commitment. It contains many. bur not all, issues professionals. are likely to face. SeClion 1 oudino fundamental ethical considerations. while Section 2 addresses additional. more specific consideradons of professional conduct. Statements in Section 3 pertain more specifically to individuals who have a leadership role. whether in the workplace or in a volunteer capacity such as with organizations like ACM. Principles involving compliance with this Code are given in Section 4. The Code shall be supplemented by a set of Guidelines, which provide no section 4. The Code are given in Section 4. The Code shall be supplemented by a set of Guidelines, which provide no section 4. The Code shall be supplemented by a set of Guidelines, which provide no section 4. The Code are given in Section 4. The Code shall be supplemented by a set of Guidelines, which provide no section 4. The Code shall be supplemented by a set of Guidelines, which provide no section 4. The Code shall be supplemented by a set of Guidelines, which provide no section 4. The Code shall be supplemented by a set of Guidelines, which provide no section 4. The Code shall be supplemented by a set of Guidelines, which provide no section 4. The Code shall be supplemented by a set of Guidelines, which provide no section 4. The Code shall be supplemented by a set of Guidelines, which provide no section 4. 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Secondarily. they may serve as a basis for judging th~ merit of a formal complaint pertaining (0 violation of professional me ethical standards. It should be noted that anhough computing is not mention~d in the imperatives are expressed in a general form to emphasize th:n ethical principles which apply to computer ethics arc derived from more general ethical principles. It is undersmod that some words and phrases in a code of ethics arc subject to varying interpretations. ethical conflicts can best be answered by thoughtful consideration of fundamental principles. rather than reliance on dcuiled regulations. Contents and Guidelines 1. GENERAL MORAL IMPERATIVES. As an ACM mnnb" I will . . . 1.1 Contribute to society and human well-being. This principle concerning the quality of life of all p~oplC' affirms an ACM mnnb" I will . . . 1.1 Contribute to society and human well-being. obligation [0 protect fundamental human rights and [0 respect the diversity of all cultun."S. An essendal aim of computing professionals is to minimize negative consequences of computing professionals must attempt to ensure that the products of their effons wills used in socially responsible ways. wiU meet social needs. and will avoid harmful effects to health and wdhec. In addition to a safe social environment. Therefore, computing professionals who design and develop systems must be alert to. and make others aware of, any potentia 341. }43 qualiryof, 155- 1,6, 171 Fingcrprinu. 17.96. 281. 41U Fircfox, 236 Fiu.....all . 27 1. 272 FiN Amendment. U.S. Constitution. .~S. 68. 144- 153. I C;). J« a&' INDEX Freedom of spe«h: Frttt..lum of thc prcss Fishing npcdirlon. 62. 288 Fly-by-wire. 421, JU abo Ain:rafr S)~tem~ Food and Drug Administration. 427. 428. 4j') Ford Motor Company 2_~4, .~74. 419 t;orcign Imdligencc: Sut'.'eillance Act. 124 Foreign ImeUigc:ncc Survcillam:e Coun, 124. 12S Forgery, su Digital forgery, 502 ForSalc:ByOwner.com. 167 Founh Amendment. 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