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Unwrapping the Gift

1.1 The Pace of Change

> *In a way not seen since Gutenberg's printing press that ended the Dark Ages and ignited the Renaissance, the microchip is an epochal technology with unimaginably far-reaching economic, social, and political consequences.*
>
> —Michael Rothschild[1]

In 1804, Meriwether Lewis and William Clark set out on a two-and-a-half-year voyage to explore what is now the western United States. Many more years passed before their journals were published. Later explorers did not know that Lewis and Clark had been there before them. Stephen Ambrose points out in his book about the Lewis and Clark expedition, *Undaunted Courage*, that information, people, and goods moved no faster than a horse—and this limitation had not changed in thousands of years.[2] In 1997, millions of people went to the World Wide Web to watch a robot cart called Sojourner roll across the surface of Mars. We chat with people thousands of miles away, and instantly view Web pages from around the world. We can tweet from airplanes flying more than 500 miles per hour.

Telephones, automobiles, airplanes, radio, household electrical appliances, and many other 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 information, how we communicate, and how we organize our family lives. Our entry into space was one of the most dramatic feats of technology in the 20th century. Sputnik, the first man-made satellite, launched in 1957. Neil Armstrong walked on the moon in 1969. We still do not have personal spacecraft, vacation trips to the moon, or a large amount of commercial or research activity in space. Space tourism for the very rich is in an early stage. The moon landing has had little direct effect on our daily lives. But computer systems in cars can now apply the brakes if a pedestrian is in the car's path. Some cars park themselves, and experimental cars drive themselves on city streets. Computer programs beat human experts at chess and *Jeopardy!,* and our smartphones answer our questions. Surgeons perform surgery with robotic instruments miles from the patient. Roughly five billion people use cellphones; U.S. texters send more than a trillion texts in a year; Facebook has more than 800 million members; Twitter users tweet hundreds of thousands of times a day; and these numbers will be out of date when you read them. A day without using an appliance or device containing a microchip is as rare as a day without turning on an electric light.

The first electronic computers were built in the 1940s. Scientists at Bell Laboratories invented the transistor—a basic component of microprocessors—in 1947. The first hard-disk drive, made by IBM in 1956, weighed more than a ton and stored only five megabytes of data, less than the amount of space we use for one photo. Now, we can walk around

with 150 hours of video in a pocket. A disk with a terabyte (one thousand gigabytes, or one trillion bytes) of storage—enough for 250 hours of high definition video—is inexpensive. There are hundreds of billions of gigabytes of information on the Internet. The 1991 space shuttle had a 1-megahertz* computer onboard. Ten years later, some luxury automobiles had 100-megahertz computers. Speeds of several gigahertz are now common. When I started my career as a computer science professor, personal computers had not yet been invented. Computers were large machines in air-conditioned rooms; we typed computer programs onto punched cards. If we wanted to do research, we went to a library, where the library catalog filled racks of trays containing 3 × 5 index cards. Social-networking sites were neighborhood pizza places and bars. The point is not that I am old; it is the speed and magnitude of the changes. The way you use computer systems and mobile devices, personally and professionally, will change substantially in two years, in five, and in ten, and almost unrecognizably over the course of your career. The ubiquity of computers, the rapid pace of change, and their myriad applications and impacts on daily life characterize the last few decades of the 20th century and the beginning of the 21st.

It is not just the technology that changes so fast. Social impacts and controversies morph constantly. With PCs and floppy disks came computer viruses and the beginnings of a huge challenge to the concept of copyright. With email came spam. With increased storage and speed came databases with details about our personal and financial lives. With the Web, browsers, and search engines came easy access by children to pornography, more threats to privacy, and more challenges to copyright. Online commerce brought bargains to consumers, opportunities to entrepreneurs, and identity theft and scams. Cellphones have had so many impacts that we discuss them in more detail later in this chapter and in Chapter 2. With hindsight, it might seem odd that people worried so much about antisocial, anticommunity effects of computers and the early Internet. Now, with the popularity of social networking, texting, and sharing video, photos, and information, the Net is a very social place. In 2008, "experts" worried the Internet would collapse within two years because of the demands of online video. It did not. Privacy threats of concern several years ago seem minor compared to new ones. People worried about how intimidating computers and the Internet were; now toddlers operate apps on tablets and phones. Concerns about technology "haves" and "have-nots" (the "digital divide") waned as Internet access and cellphones spread throughout the United States and around the world, shrinking the digital divide far faster than long-standing global divides in, say, education and access to fresh water.

Discussions of social issues related to computers often focus on problems, and indeed, throughout this book we examine problems created or intensified by computer technologies. Recognizing the benefits is important too. It is necessary for forming a reasonable, balanced view of the impact and value of the technology. Analyzing and evaluating the

* This is a measure of processing speed. One megahertz is 1 million cycles per second; 1 gigahertz is 1 billion cycles per second. "Hertz" is named for the 19th-century physicist Heinrich Rudolf Hertz.

impact of new technologies can be difficult. Some of the changes are obvious. Some are more subtle. Even when benefits are obvious, the costs and side effects might not be, and vice versa. Both the technological advances brought about by computer technology and the extraordinary pace of development have dramatic, sometimes unsettling, impacts on people's lives. To some, this is frightening and disruptive. They see the changes as dehumanizing, reducing the quality of life, or as threats to the status quo and their well-being. Others see challenging and exciting opportunities. To them, the development of the technology is a thrilling and inspiring example of human progress.

When we speak of computers in this book, we include mobile devices such as smartphones and tablets, desktop computers and mainframes, embedded chips that control machines (from sewing machines to oil refineries), entertainment systems (such as video recorders and game machines), and the "Net," or "cyberspace." Cyberspace is built of computers (e.g., Web servers), communication devices (wired and wireless), and storage media, but its real meaning is the vast web of communications and information that includes the Internet and more.

In the next section, we look at some phenomena, often unplanned and spontaneous, that computer and communication technology made possible. They have deeply changed how we interact with other people, what we can accomplish, and how others can intrude into our relationships and activities. In the rest of the chapter, we introduce themes that show up often, and we present an introduction to some ethical theories that can help guide our thinking about controversies throughout the rest of the book. The next seven chapters look at ethical, social, and legal issues primarily from the perspective of any person who lives and works in a modern computerized society and is interested in the impact of the technology. The final chapter takes the perspective of someone who works as a computer professional who designs or programs computer systems or as a professional in any area who must make decisions and/or set policy about the use of computer systems. It explores the ethical responsibilities of the professional. The Software Engineering Code of Ethics and Professional Practice and the ACM Code of Ethics and Professional Conduct, in Appendix A, provide guidelines for professionals.

1.2 Change and Unexpected Developments

No one would design a bridge or a large building today without using computers, but the Brooklyn Bridge, built more than 130 years ago—long before computers, is both a work of art and a marvelous feat of engineering. The builders of the Statue of Liberty, the Pyramids, the Roman aqueducts, magnificent cathedrals, and countless other complex structures did not wait for computers. People communicated by letters and telephone before text messages, email, and Twitter. People socialized in person before social-networking sites. Yet we can identify several phenomena resulting from computer

and communication technology that are far different from what preceded them (in degree, if not entirely in kind), several areas where the impacts are dramatic, and many that were unanticipated. In this section, we consider a brief sampling of such phenomena. Some are quite recent. Some are routine parts of our lives now. The point is to remind us that a generation ago they did not exist. They illustrate the amazingly varied uses people find for new tools and technologies.

> *It is precisely this unique human capacity to transcend the present, to live one's life by purposes stretching into the future—to live not at the mercy of the world, but as a builder and designer of that world—that is the distinction between human and animal behavior, or between the human being and the machine.*
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> —Betty Friedan[3]

1.2.1 Connections: Cellphones, Social Networking, and More

The Web, social networking, cellphones, and other electronic devices keep us connected to other people and to information all day, virtually everywhere. We look at a few connectivity applications, focusing on fast changes and unanticipated uses and side effects (good and bad). The discussion suggests issues we study throughout the book.

Cellphones

In the 1990s, relatively few people had cellphones. Business people and sales people who often worked outside their office carried them. High-tech workers and gadget enthusiasts liked them. Others bought the phones so they could make emergency calls if their cars broke down. We were used to being out of touch when away from home or office. We planned ahead and arranged our activities so that we did not need a phone when one was not available. Within a short time, however, cell service improved and prices dropped. Cellphone makers and service providers developed new features and services, adding cameras, video, Web connections, and location detection. Apple introduced the iPhone in 2007, and phones got "smart." People quickly developed hundreds of thousands of applications and embraced the term *app*. Consumers downloaded 10 billion apps from Apple's App Store. Within very few years, people all over the world used phones, rather than PCs or laptops, as their connection to the Internet. Millions, then hundreds of millions, then billions of people started carrying mobile phones. In 2011, there were approximately five billion cellphone subscriptions worldwide—an astoundingly fast spread of a new technology. Writers describe the dramatic changes with observations such as, "A Masai warrior with a smartphone and Google has access to more information than the President did 15 years ago" and "More folks have access to a cellphone than to a toilet."[4]

Cellphones became a common tool for conversations, messaging, taking pictures, downloading music, checking email, playing games, banking, managing investments, finding a restaurant, tracking friends, watching videos. Smartphones serve as electronic wallets and identification cards at store terminals or security checkpoints. Phones monitor security cameras at home or control home appliances from a distance. Professional people use smartphone apps for a myriad of business tasks. Smartphones with motion detectors remind obese teenagers to get moving. An app analyzes blood glucose levels for diabetics and reminds them when to exercise, take medication, or eat something. Military personnel on the front lines can use specialized apps to download satellite surveillance video and maps. More unanticipated uses include location tracking, sexting, life-saving medical apps, and malicious data-stealing apps. People use cellphones to organize flash mobs for street dances and pillow fights—or for attacking pedestrians and looting stores. Terrorists use cellphones to set off bombs. Apps designed for poor countries inform people when water is available and help perform medical imaging.

These examples suggest the number and variety of unanticipated applications of this one, relatively new "connection" device. The examples also suggest problems. We discuss privacy invasion by data theft and location tracking in Chapter 2. In Chapter 3, we consider whether phone service should be shut down during riots. Is the security of smartphones sufficient for banking and electronic wallets? (What if you lose your phone?) Do people realize that when they synch their phone with other devices, their files become vulnerable at the level of the weakest security?

As a side effect of cellphone use and the sophistication of smartphones, researchers are learning an enormous amount about our behavior. Laws protect the privacy of the content of our conversations, but smartphones log calls and messages and contain devices that detect location, motion, direction, light levels, and other phones nearby. Most owners carry their phones all day. Researchers analyze this trove of sensor data. (Yes, much of it can be stored.) Analysis of the data generates valuable information about traffic congestion, commuting patterns, and the spread of disease. In an example of the latter, by studying movement and communication patterns of MIT students, researchers could detect who had the flu, sometimes before the students knew it themselves. Researchers also can determine which people influence the decisions of others. Advertisers and politicians crave such information. Perhaps the eeriest result is that reseachers who analyzed time and location data from millions of calls said that, with enough data, a mathematical model could predict where someone would be at a particular future time with more than 90% accuracy. Who will have access to that information?[5]

Rudeness is an issue with cellphones. People use them in inappropriate places, disturbing others. The fact that so many people carry small cameras everywhere (mostly in phones, but also hidden in other small objects such as pens*) affects our privacy in public

* At least one company sells a working pen that records high-resolution video.

and nonpublic places.[6] How well do people armed with cellphone cameras distinguish news events and evidence of crimes from voyeurism, their own rudeness, and stalking?

Talking on a phone while driving a car increases the risk of an accident. Some states prohibit use of handheld phones while driving (and a lot of drivers ignore the ban). Researchers developed an app that uses motion detection by smartphones to deduce that a phone is in a moving car and block incoming calls. A more sophisticated version locates the phone well enough to block only the driver's phone, not that of a passenger.

Here is an example of a subtle behavioral change. When people began carrying cellphones and could call for help, more headed out in the wilderness or went rock climbing without appropriate preparation. In many areas of life, people take more risk when technology increases safety. This is not unreasonable if the added risk and increased safety are in balance. When rescue calls surged, some rescue services began billing for the true cost of a rescue—one way to remind people to properly weigh the risk.

Kill switches

Soon after Amazon began selling electronic books for its Kindle ebook readers, the company discovered that a publisher was selling books in Amazon's online store that it did not have the legal rights to sell in the United States. Amazon deleted the books from its store and from the Kindles of people who had bought them; it refunded their payments. A reasonable and appropriate response? Not to many customers and media observers. Customers were outraged that Amazon deleted books from their Kindles. People were startled to learn that Amazon *could* do so.* The response was so strong that Amazon announced that it would not remove books from customer Kindles again. Few realized at that time that Apple's iPhones already had a *kill switch*—a way for Apple to remotely delete apps from phones. In 2011, when a software developer discovered malicious code in an app for Android phones, Google quickly removed the app from its store and from more than 250,000 phones. Although this was a good example of the purpose of a kill switch and a beneficial use, the fact that Google could do it disturbed people. One of the troubling side effects of our connectivity is that outsiders can reach into our devices and delete our stuff.

Perhaps this extended reach should not have been a surprise. In many businesses, the IT department has access to all desktop computers and can install—or delete—software. Software on personal computers and other electronic devices communicates with businesses and organizations regularly, without our direct command, to check for updates of software, news, and our friends' activities. When we enable updates of software, a company remotely deletes old versions.

Now, the operating systems for smartphones, tablets, and some computers (e.g., Windows) have kill switches. The companies do not disclose much information about

* Ironically, one of the books Amazon removed was George Orwell's *1984*—a novel about a totalitarian government that regularly sent documents down a "memory hole" to destroy them.

them. The main purpose is security—to remove malicious software that the company discovers in an app after users have downloaded it. Indeed, companies such as Google and Apple that provide popular app stores see it as a serious responsibility to protect users from malicious apps. Some companies tell us about their removal capability in their terms of use agreements, but such agreements can run to thousands of words and have vague, general statements. Few people read them.

What are some potential uses and risks? Kill switches could remove content that infringes copyrights. They could remove content that a company or government deems offensive. What if malicious hackers found a way to operate the kill switches on our devices? Governments in many countries have extensive censorship laws and require that communications services provide government access to communications. Governments, in free and unfree countries, pressure businesses to act as the government prefers. For more than 2000 years, governments and religious and social organizations have burned books that displeased them. What pressures might governments put on companies to use the kill switches? Will the impact of electronic kill switches be more devastating than attempts to prohibit printed material? Or will companies use them carefully for improved security? Our new tools are remarkably powerful and remarkably vulnerable.

Social networking

> *While all this razzle-dazzle connects us electronically, it disconnects us from each other, having us "interfacing" more with computers and TV screens than looking in the face of our fellow human beings. Is this progress?*
>
> —Jim Hightower, radio commentator, 1995[7]

Facebook, one of the first of the social networking sites, started at Harvard as an online version of the hardcopy student directories available at many colleges. At first, the sites were wildly popular with young people, while older people did not understand the appeal or worried about safety and privacy. Adults quickly discovered benefits of personal and business social networking. Social networks are enormously popular with hundreds of millions of people because of the ease with which they can share so many aspects of their lives and activities with family, friends, co-workers, and the public.

As with so many other digital phenomena, people found unanticipated uses of social networking, some good, some bad. Friends and ex-boyfriends and ex-girlfriends post pranks and embarrassing material. Stalkers and bullies stalk and bully. Politicians, advertisers, businesses, and organizations seek donations, volunteers, customers, and connections. Protesters organize demonstrations and revolutions. Jurors tweet about court cases during trials (causing mistrials, overturned convictions, and jail time for offending jurors). Social networking brought us more threats to privacy and a steady stream of updates on the triv-

ial details of people's lives. Gradually, social network companies developed sophisticated privacy controls and feedback systems to reduce problems, though they certainly have not eliminated them. Overall, to most people, the benefits outweigh the problems, and social networking has become the new way of communicating.

Privacy issues for social networks: Section 2.3.2

In a phenomenon called "crowd funding," social networks, Twitter, and other platforms make it easy to raise money in small amounts from a large number of people for charities, political causes, artistic projects, and investment in start-up companies.

How do social networking sites affect people and relationships? People can have hundreds of friends and contacts, but have they traded quality of in-person relationships for quantity of superficial digital relationships? Does the time spent online reduce the time spent on physical activity and staying healthy? It is still too early for definitive answers, but it appears that the many critics who anticipated a serious problem of social isolation were mistaken. Researchers find that people use social networks mostly to keep in touch with friends and family and that the easy, frequent contact enhances relationships, empathy, and a sense of community. On the other hand, young people who spend a lot of time on a social network do poorly in school and have behavioral problems. (Are these people who would have problems in any case? Does the access to the networks exacerbate preexisting emotional problems?)

Just as researchers study social phenomena using the masses of data that smartphone systems collect, they also mine the masses of data in social networks. For example, social scientists and computer scientists analyze billions of connections to find patterns that could help identify terrorist groups.[8]

A person you follow in social media might not be a person at all. A *socialbot* is an artificial intelligence program that simulates a human being in social media. Researchers tricked Twitter users into building relationships with artificial tweeting personalities, some of which gained large followings. Political activists launched socialbots to influence voters and legislators. The U.S. military raised concerns about automated disinformation campaigns by enemies. Advertising bots are likely to be common. When the Internet was new, someone commented (and many repeated) that "on the Internet, no one knows you're a dog." It meant that we could develop relationships with others based on common interests without knowing or caring about age, race, nationality, gender, or physical attractiveness. Some of those others might not even be people, and we might not know it. Should we be comfortable with that?

More about artificial intelligence: Section 1.2.3

Communication and the Web

Email and the Web are so much a part of our culture now that we might forget how new and extraordinary they are. Email was first used mostly by computer scientists. In the 1980s, messages were short and contained only text. As more people and businesses connected to computer networks, use of email expanded to science researchers, then to

businesses, then to millions of other people. Limits on length disappeared, and we began attaching digitized photos and documents. People worldwide still send several billion emails daily (not counting spam), although texting, tweeting, and other social media have replaced email as the favored communication method in many contexts.[9]

High-energy physicists established the World Wide Web in Europe in 1990 to share their work with colleagues and researchers in other countries. In the mid- and late 1990s, with the development of Web browsers and search engines, the Web became an environment for ordinary users and for electronic commerce. Today there are billions of Web pages. The Web has grown from an idea to a huge library and news source, a huge shopping mall, an entertainment center, and a multimedia, global forum in less than one generation.

The Web gives us access to information and access to audiences unimaginable a generation ago. It empowers ordinary people to make better decisions about everything from selecting a bicycle to selecting medical treatments. It empowers us to do things that we used to rely on experts to do for us. Software tools, many available for free, help us analyze the healthiness of our diet or plan a budget. We can find references and forms for legal processes. We can read frank reviews of cameras, clothing, cars, books, and other products written by other buyers, not marketing departments. We can select our entertainment and watch it when we want to. We can fight back against powerful institutions by shaming them with videos that go viral* (see, for example, "United Breaks Guitars" on YouTube) or by posting legal documents intended to intimidate us (see, for example, chillingeffects.org). Businesses and organizations use "viral marketing"—that is, relying on large numbers of people to view and spread marketing messages in clever videos. We can start our own Web-based television network without the huge investment and government license requirements of broadcast television networks. A college student with a good idea and some well-implemented software can start a business that quickly grows to be worth millions or billions of dollars; several have. The openness of the Internet enables "innovation without permission," in the words of Vinton Cerf, one of the key people who has worked on Internet development since it began.[10]

Blogs (a word made up from "Web log") and videos are two examples of the many new forms of creativity that flourish because Web technology and special software make them so easy and inexpensive. They began as outlets for amateurs and now are significant sources of news and entertainment. They have created new paths for jobs—with news media, publishers, and advertising and entertainment companies. Of course, some amateur blogs and videos are dull, silly, and poorly written or made, but many are gems, and people find them. People blog on current events, celebrity gossip, hobbies, books, movies, dieting, law, economics, technology, political candidates, Internet issues, and virtually any other topic. They provide varied, sometimes quirky perspectives. The independence of

* "Going viral" describes the phenomenon where something posted in cyberspace catches the attention of people who view, copy, and spread it (or links to it) to millions more people.

"I've got pressure"

When asked by a young man to speak more quietly on his cellphone, a Hong Kong bus rider berated the man for nearly six minutes with angry insults and obscenities. In the past, a few other riders might have described the incident to friends, then soon forgotten it. But in this instance, another rider captured the scene on his cellphone. The video soon appeared on the Internet, and millions of people saw it. People provided subtitles in different languages, set the video to music, used clips as mobile-phone ringtones, and produced t-shirts with pictures and quotes. "I've got pressure" and other phrases from the rant slipped into conversations.

This incident reminds us that anything we do in a public place can be captured and preserved on video. But more, it illustrates how the Internet facilitates and encourages creativity and the quick creation and distribution of culture artifacts and entertainment, with the contribution of ideas, modifications, variations, improvements, and new works from thousands of people.

bloggers attracts readers; it suggests a genuine connection with what ordinary people are thinking and doing, not filtered through major news companies or governments. Businesses were quick to recognize the value of blogs, and many provide their own as part of their public relations and marketing programs. Inexpensive video cameras and video-manipulation tools have powered a burst of short amateur videos—often humorous, sometimes worthless, and sometimes quite serious. We can see a soldier's view of war, someone's encounter with aggressive whales, an arrest by police. Video sites also made it easy to post and trade professional videos, infringing copyrights owned by entertainment companies and individuals. We explore copyright issues in Chapter 4.

The Web connects students and teachers. At first, universities offered online courses within their area, benefitting people who work full-time, who have varying work schedules that conflict with normal class schedules, who have small children at home, or who cannot travel easily because of disabilities. Gradually a potential to revolutionize advanced education became clear.* More than 100 million people have viewed the thousands of free lessons on sciences, economics, and other subjects at the online Khan Academy. When two artificial intelligence experts offered a Stanford University graduate course for free online, they expected 500–1000 students to sign up. They got 160,000 people from around the world, and more than 20,000 completed the course, which included automatically graded homework assignments and exams.[11]

The impact of the connections provided by the Web and cellphones is more dramatic in remote or less developed areas of the world, many of which do not have landline telephones. Mountains and thick jungle, with no roads, separate villagers in one town in

* For elementary education, it appears that regular classes and in-person teachers still have the advantage.

Telemedicine

Telemedicine, or long-distance medicine, refers to remote performance of medical exams, analyses, and procedures using specialized equipment and computer networks. On long airplane flights, telemedicine can help treat a sick passenger and ascertain whether the plane needs to make an emergency landing. Prisons use telemedicine to reduce the risk of escape by dangerous criminals. Some small-town hospitals use video systems to consult with specialists at large medical centers—eliminating the expense, time, and possible health risk of transporting the patient to the medical center. A variety of health-monitoring devices send their readings from a patient's home to a nurse over the Internet. This technology eliminates the expense, time, and inconvenience of more frequent visits, while enabling more regular monitoring of patients and helping to catch dangerous conditions early.

Telemedicine goes well beyond transmission of information. Surgeons in New York used video, robotic devices, and high-speed communication links to remotely remove a gall bladder from a patient in France. Such systems can save lives in emergencies and bring a high level of surgical skills to small communities that have no surgeons.

Malaysia from the next, but the villagers order supplies, check the market price of rice to get a good deal when selling their crop, and email family photos to distant relatives. Farmers in Africa get weather forecasts and instruction in improved farming methods. An Inuit man operates an Internet service provider for a village in the Northwest Territories of Canada, where temperatures drop to −40°F. Villagers in Nepal sell handicrafts worldwide via a website based in Seattle. Sales have boomed, more villagers have regular work, dying local arts are reviving, and some villagers can now afford to send their children to school.

The Web abounds with examples of collaborative projects, some organized, such as Wikipedia* (the online encyclopedia written by volunteers), some spontaneous. Scientists collaborate on research with scientists in other countries much more easily and more often than they could without the Internet. Informal communities of programmers, scattered around the world, create and maintain free software. Informal, decentralized groups of people help investigate online auction fraud, a murder, stolen research, and other crimes. People who have never met collaborate on creating entertainment.

Some collaborative projects can have dangerous results. To reduce the flow of illegal immigrants, a governor of Texas proposed setting up night-vision webcams along the Mexican border that volunteers would monitor on the Internet. Will the people monitoring a border webcam go out and attack those they see coming across the border? What training or selection process is appropriate for volunteers who monitor these security cameras? In China, a man posted the online name of another man he believed was having

* A *wiki* is a website, supported by special software, that allows people to add content and edit content that others provide. Wikis are tools for collaborative projects within a business or organization or among the public.

an affair with his wife. Thousands of people participated in tracking down the man's real name and address and encouraging public action against him. Thousands of Twitterers in Saudi Arabia called for the execution of a young writer who they believed insulted the Prophet Muhammad. Mobs and individuals emotionally involved in a political, religious, or moral cause do not always pause for the details of due process. They do not carefully determine whether they identified the correct person, whether the person is guilty of a crime, and what the appropriate punishment is. On the other hand, police departments in cities in several countries effectively use instant messaging to alert residents who help find crime suspects or stolen cars in their neighborhoods. Enlisting volunteers is a useful new collaborative tool for crime fighting and possibly antiterrorism programs. How can we guide the efforts of thousands of individuals toward useful ends while protecting against mistakes, instant vigilantism, and other abuses?

1.2.2 E-commerce and Free Stuff

In the 1990s, the idea of commercial websites horrified Web users. The Web, they believed, was for research, information, and online communities. A few brick-and-mortar businesses and a few young entrepreneurs recognized the potential and benefits of online commerce. Among the earliest traditional businesses on the Web, United Parcel Service and Federal Express let customers check the status of packages they sent. This was both a novelty and a helpful service. Amazon.com, founded in 1994, started selling books on the Web and became one of the most popular, reliable, and user-friendly commercial sites. Many, many Web-based businesses followed Amazon, creating new business models—such as eBay with its online auctions. Traditional businesses established websites. Online sales in the United States now total hundreds of billions of dollars a year. The Web changed from a mostly academic community to a world market in little more than a decade.

Some of the benefits of e-commerce are fairly obvious: we can consider more products and sellers, some far away, in less time and without burning gasoline. Some benefits are less obvious or were not obvious before they appeared. Auction sites gave people access to customers they could not have found efficiently before. The lower overhead and the ease of comparison shopping on the Web brought down prices of a variety of products. Consumers save 10–40%, for example, by buying contact lenses online, according to a Progressive Policy Institute report. Consumers who do price-comparison research on the Web before buying a new car typically save about $400.[12] Small businesses and individual artists sell on the Web without paying big fees to middlemen and distributors. The Web enabled a peer-to-peer economy with websites where ordinary people sell or trade their skills, make small loans, and trade their homes for vacations.

Growth of commerce on the Web required solutions to several problems. One was trust. People were reluctant to give their credit card numbers on the Web to companies they had not dealt with or even heard of before. Enter PayPal, a company built on the idea of having a trusted intermediary handle payments. Encryption and secure servers also

made payments safer.* The Better Business Bureau established a website where we can find out if consumers have complained about a company. Auction sites implemented rating and comment systems to help buyers and sellers determine whom to trust. Email confirmations of orders, consumer-friendly return policies, and easy packaging for returns all contributed to consumer comfort and more online sales. The University of Michigan's National Quality Research Center found that e-commerce businesses had a higher customer-satisfaction rating than any other sector of the economy. As online sales increased, competition led traditional stores to adopt some of the practices of e-commerce, such as consumer-friendly return policies.

Impacts of e-commerce on free speech: Section 3.2.5

Free stuff

Libraries have provided free access to books, newspapers, and journals for generations, and radio and television provided free news and entertainment before the Internet. But there is so much more free stuff now—a truly astounding amount—conveniently available on the Web.

For our computers, we can get free email programs and email accounts, browsers, filters, firewalls, encryption software, word processors, spreadsheets, software for viewing documents, software to manipulate photos and video, home inventory software, antispam software, antivirus software, antispyware software, and software for many other specialized purposes. This is a small sampling of software available for free.

We can find free game-playing programs for old board games and card games such as chess and bridge, as well as for new games. Phone service via Skype is free. There are free dating services on the Web. Major music festivals offer their concerts for free on the Internet, a nice alternative to paying $30 to $500 for a ticket. Craigslist, the classified ad site, one of the most popular websites in the world, is free to people who place ads and people who read them. Major (expensive) universities such as Stanford, Yale, and MIT provide video of lectures, lecture notes, and exams for thousands of their courses on the Web for free. We can download whole books from Google, Project Gutenberg, and other sources for free.† We can read news from all over the world for free. We can store our personal photographs, videos, and other files online for free. MySpace, Facebook, Twitter, LinkedIn, and YouTube are free; Google, Bing, and Yahoo are free. Specialized, scholarly encyclopedias (e.g., the Stanford Encyclopedia of Philosophy), Wikipedia, and hundreds of other references are free.

We pay for libraries with taxes. Advertisers pay for broadcasting radio and television programs. On the Web, advertising pays for many, many free sites and services, but far from all. Wikipedia carries no advertising—donations pay for its hardware and band-

* The ease and security of payment on the Web had a pleasant side effect: Many people contribute more to charitable organizations. That had the unpleasant side effect of spawning scam charity sites.

† Books available for free downloading are in the public domain (that is, out of copyright).

width. Craigslist charges fees of some businesses that post job announcements and brokers who post apartment listings in a few cities. That keeps the site free to everyone else and free of other paid ads. Businesses provide some free information and services for good public relations and as a marketing tool. (Some free programs and services do not have all the features of the paid versions.) Nonprofit organizations provide information as a public service; donations or grants fund them. One of the distinct and delightful features of the Internet is that individuals provide a huge amount of free stuff simply because it pleases them to do so. They are professionals or hobbyists or just ordinary people who enjoy sharing their expertise and enthusiasm. Generosity and public service flourish in the Web environment.

It is often obvious when we are viewing advertisements on websites or phones. Ads annoy some people, but they are not insidious, and their presence on a screen is not an unreasonable price to pay for free services. However, to earn ad revenue to fund multimillion-dollar services, many free sites collect information about our online activities and sell it to advertisers. This tracking is often not obvious; we consider it in Chapter 2.

1.2.3 Artificial Intelligence, Robotics, Sensors, and Motion

Artificial intelligence

Artificial intelligence (AI) is a branch of computer science that makes computers perform tasks we normally (or used to) think of as requiring human intelligence. It includes playing complex strategy games such as chess, language translation, making decisions based on large amounts of data (such as approving loan applications), and understanding speech (where the appropriateness of the response might be the measure of "understanding"). AI also includes tasks performed automatically by the human brain and nervous system—for example, vision (the capture and interpretation of images by cameras and software). Learning is a characteristic of many AI programs. That is, the output of the program improves over time as it "learns" by evaluating results of its decisions on the inputs it encounters. Many AI applications involve *pattern recognition*, that is, recognizing similarities among different things. Applications include reading handwriting (for automatic sorting of mail and input on tablet computers, for example), matching fingerprints, and matching faces in photos.

Early in the development of AI, researchers thought the hard problems for computers were tasks that required high intelligence and advanced training for humans, such as winning at chess and doing mathematical proofs. In 1997, IBM's chess computer, Deep Blue, beat World Champion Garry Kasparov in a tournament. AI researchers realized 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. In 2011, another specially designed computer system called Watson (also built by IBM) defeated human *Jeopardy!* champions by answering questions more quickly than the humans. Watson processes language (including puns, analogies, and so on) and general

knowledge. It searches and analyzes 200 million pages of information in less than three seconds. Practical applications of the Watson technology include medical diagnosis and various business decision-making applications.

We briefly describe a few more examples of AI applications. They were astonishing advances not long ago.

When a man had a heart attack in a swimming pool in Germany, lifeguards did not see him sink to the bottom of the pool. An underwater surveillance system, using cameras and sophisticated software, detected him and alerted the lifeguards who rescued him. The software distinguishes a swimmer in distress from normal swimming, shadows, and reflections. It is now installed in many large pools in Europe and the United States. Just as AI software can distinguish a swimmer in trouble from other swimmers, AI software in video surveillance systems can distinguish suspicious behavior by a customer in a store that might indicate shoplifting or other crimes. Thus, without constant human monitoring, the AI-equipped video system can help prevent a crime, rather than simply identify the culprits afterwards.

Search engines use AI techniques to select search results. They figure out what the user meant if the search phrase contains typos, and they use context to determine the intended meaning of words that have multiple meanings. Automated websites that answer questions use AI to figure out what a question means and find answers.

Speech recognition, once a difficult research area, is now a common tool for hundreds of applications. Computer programs that teach foreign languages give instruction in correct pronunciation if they do not recognize what the user says. Millions of people who carry Apple smartphones can ask questions of Siri, Apple's "intelligent" personal assistant. Siri interprets our questions and searches the Web for answers. Air traffic controllers train in a mockup tower whose "windows" are computer screens. The trainee directs simulated air traffic. The computer system responds when the trainee speaks to the simulated pilots. Such simulation allows more intensive training in a safe environment. If the trainee mistakenly directs two airplanes to land on the same runway at the same time, no one gets hurt.

People continue to debate the philosophical nature and social implications of artificial intelligence. What does it mean for a computer system to be intelligent? Alan Turing, who developed fundamental concepts underlying computer science before there were computers, proposed a test, now called the Turing Test, for human-level intelligence. Let a person converse (over a network) with the system on any topics the person chooses. If the computer convinces the person that it is human, the computer passes the test. Is that enough? Many technologists think so (assuming the actual test is well designed). But is the computer intelligent? Philosopher John Searle argues that computers are not and cannot be intelligent. They do not think; they manipulate symbols. They do so at very high speed, and they can store (or access) and manipulate a huge quantity of data, but they are not conscious. They do not understand; they simulate understanding. Searle uses the following example to illustrate the difference: Suppose you do not know the

Chinese language. You are in a room with lots of boxes of Chinese symbols and a large instruction book written in English. People submit to you sequences of Chinese symbols. The instructions tell you how to manipulate the symbols you are given and the ones in the boxes to produce a new sequence of symbols to give back. You are very careful, and you do not get bored; you follow the instructions in the book exactly. Unknown to you, the sequences you receive are questions in Chinese. The sequences that you give back by following the instructions (just as a computer follows the instructions of a program) are the correct answers in Chinese. Everyone outside the room thinks you understand Chinese very well. Do you? Searle might say that although Watson won at *Jeopardy!*, Watson does not know it won.[13]

Whether we characterize machines as intelligent, or use the word metaphorically, or say that machines simulate intelligence, advances in AI are continuing at a very fast pace. It took IBM several years and millions of dollars to build Watson.[14] Technologist Ray Kurzweil thinks personal computers will have the power of Watson within 10 years.

The goal of 17th- and 18th-century calculators was modest: to automate basic arithmetic operations. It shocked people at the time. That a mindless machine could perform tasks associated with human intellectual abilities was disconcerting. Centuries later, Garry Kasparov's loss to a computer chess program generated worried articles about the value—or loss of value—of human intelligence. Watson generated more. So far, it seems that each new AI breakthrough is met with concern and fear at first. A few years later, we take it for granted.How will we react when *Jeopardy!* is oh, so trivial that anyone can do well at it? How will we react when we can go into a hospital for surgery performed entirely by a machine? Will it be scarier than riding in the first automatic elevators or airplanes? How will we react when we can have a conversation over the Net 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 a search engine? Will we still be human?

Implications of human-level AI: Section 7.4.3

Robots

Robots are mechanical devices that perform physical tasks traditionally done by humans or tasks that we think of as human-like activities. Robotic machines have been assembling products in factories for decades. They work faster and more accurately than people can. Computer software with artificial intelligence controls most robotic devices now. Robotic milking machines milk hundreds of thousands of cows at dairy farms while the farmhands sleep or do other chores. Some robots dance, and some make facial expressions to convey emotions. However, just as general intelligence is a hard problem for AI, general movement and functioning is a hard problem for robots. Most robotic devices are special-purpose devices with a relatively limited set of operations.

McDonald's and other fast-food sellers use robotic food preparation systems to reduce costs and speed service. A robot pharmacist machine, connected to a patient database,

plucks the appropriate medications from pharmacy shelves by reading bar codes, checks for drug interactions, and handles billing. One of its main goals is reduction of human error. Robots deliver medications and carry linens in hospitals. They navigate around obstacles and "push" elevator buttons with wireless signals. Physicians do complex and delicate surgery from a console with a 3-D monitor and joysticks that control robotic instruments. The software filters out a physician's shaky movements. Robots work in environments that are hazardous to people. They inspect undersea structures and communication cables. They search for survivors in buildings collapsed by bombs or earthquakes. They explore volcanoes and other planets. They move or process nuclear and other hazardous wastes.

For several years, Sony sold a robot pet dog, Aibo. It walked (with a camera system providing vision). It responded to commands, and it learned. Several companies make robots with a more-or-less human shape. Honda's Asimo, for example, walks up and down stairs. Various companies and researchers are developing robots with more general abilities. One goal is to develop robots that can act intelligently and perform a variety of operations to assist people. Robots (doglike or humanlike) can serve as companions to elderly people. Is an emotional connection with a machine dehumanizing, or is it an improvement over living alone or in a nursing home where the staff cannot provide regular companionship? Will knowing that Grandma has a robot companion ease the guilt of family members and lead them to visit less often? Will we come to view robot companions as positively as pets?

Smart sensors, motion, and control

How do robots walk, climb stairs, and dance? Tiny motion-sensing and gravity-sensing devices collect status data. Complex software interprets the data and determines the necessary motions, and then sends signals to motors. These devices—accelerometers, or *mems* (for microelectromechanical systems)—help robots, and Segway's motorized scooters, stay upright.

A sharp price drop for mems triggered a burst of applications.[15] They provide image stabilization in digital cameras. They detect when a car has crashed, when someone has dropped a laptop, or when an elderly person has fallen. (In those applications, the system deploys an airbag, triggers a lock on the disk drive to reduce damage, or calls for help.) The Wii game console, whose controller detects the user's motion, and motion detectors in smartphones brought motion-sensing applications to millions of consumers.

Tiny microprocessors with sensors and radio transmitters (sometimes called smart dust, though they are still larger than dust particles) are finding all sorts of applications. Some are in use; some are in development. We mention a few examples. These examples have many obvious benefits. What are some potential problems?

Oil refineries and fuel storage systems uses thousands of sensors to detect leaks and other malfunctions. Sandia National Laboratory developed a "chemical lab on a chip" that can detect emissions from automobiles, chemical leaks, dangerous gases in fires (reducing

risk for firefighters), and many other hazards. Similar chips could detect chemical warfare agents.

Sensors detect temperature, acceleration, and stress in materials (such as airplane parts). Sensors distributed throughout buildings and bridges can detect structural problems, report on damage from earthquakes, and so on. These applications increase safety while reducing maintenance costs.

Sensors in agricultural fields report on moisture, acidity, and so on, helping farmers to avoid waste and to use no more fertilizer than needed. Sensors could detect molds or insects that might destroy crops. Sensors implanted in chickens monitor the birds' body temperature. A computer automatically reduces the temperature in the chicken coop if the birds get too hot, thus reducing disease and death from overheating. Sensors in food products monitor temperature, humidity, and other factors to detect potential health problems while the food is in transit to stores.

What will be the impact of tiny flying sensor/computers that communicate wirelessly and which the military can deploy to monitor movement of equipment and people, or with which police or criminals can spy on us in our homes and public places?

A Microsoft researcher developed a system with which a user manipulates 3-D images with hand movements, without touching a screen or any controls. Designers of buildings, machines, clothing, and so on, could use it to examine designs before implementing them. Someone with dirty (or sterile) hands (e.g., mechanics, cooks, surgeons) could examine reference materials while working. What other applications will people think of?

Sensors in baby clothes detect when a baby is sleeping face down, at risk for Sudden Infant Death Syndrome, and warn parents on their cellphone. A heart monitor in a firefighter's shirt alerts supervisors if the firefighter is too stressed and needs a break. Trainers plan to use sensors in special clothing to better train athletes. What other applications will we find for *wearware*?

Already we implant or attach microprocessor-controlled devices in or on human bodies: heart pacemakers and defibrillators and devices that restore motion to paralyzed people (which we describe in Section 1.2.4). These will likely see modifications that enhance performance for healthy people. At first it might be physical performance for athletes—for example, to help a competitive swimmer swim more smoothly. Then what? Biological sciences and computer sciences will combine in new ways.

1.2.4 Tools for Disabled People

One of the most heartwarming applications of computer technology is the restoration of abilities, productivity, and independence to people with physical disabilities.

Some computer-based devices assist disabled people in using ordinary computer applications that other people use, such as Web browsers and word processors. Some enable disabled people to control household and workplace appliances that most of us operate by hand. Some improve mobility. Some technologies that are primarily conveniences

for most of us provide significantly more benefit for disabled people: consider that text messaging was very popular among deaf people before it was popular with the general population.

For people who are blind, computers equipped with speech synthesizers read aloud what a sighted person sees on the screen. They read information embedded in Web pages that sighted visitors do not need, for example, descriptions of images. Google offers search tools that rank websites based on how accessible they are for blind users. For materials not in electronic form, a scanner or camera, optical-character-recognition software, and a speech synthesizer combine to read aloud to a blind person. The first such readers were large machines. Now, handheld versions can read menus, bills, and receipts in restaurants, as well as magazines and mail at home. Where noise is a problem (or for a person both blind and deaf), a grid of buttons raised and lowered by the computer to form Braille characters can replace speech output. Braille printers provide hard copy. (Books have long been available in Braille or on tape, but the expense of production for a small market kept the selection limited.) Systems similar to navigation systems in cars help blind people walk around and find their way in unfamiliar neighborhoods.

Prosthetic devices, such as artificial arms and legs, have improved from heavy, "dumb" wood, to lighter materials with analog motors, and now to highly sensitive and flexible digitally controlled devices that enable amputees to participate in sports and fly airplanes. A person whose leg was amputated above the knee can walk, sit, and climb stairs with an artificial "smart" knee. Sensors attached to the natural leg measure pressure and motion more than a thousand times a second and transmit the data to a processor in the prosthetic leg. Artificial intelligence software recognizes and adapts to changes in speed and slope and the person's walking style. The processor controls motors to bend and straighten the knee and support the body's movement, replacing the normal complex interplay of nerves, muscles, tendons, and ligaments. Artificial arms use electrodes to pick up tiny electrical fields generated by contractions of muscles in the upper (natural) limb. Microprocessors control tiny motors that move the artificial limb, open and close fingers, and so on. For people with paralyzed legs or for others who cannot use an artificial leg, there are wheelchairs that climb stairs and support and transport a person in an upright position. In 2012, Exso Bionics sold its first exoskeleton, a device with sensors and tiny motors that straps to a person with paralyzed legs and enables the person to walk.[16]

Various conditions—loss of limbs, quadriplegia (paralysis in both arms and legs, often resulting from an accident), and certain diseases—eliminate all or almost all use of the hands. Speech recognition systems are an extremely valuable tool for these people and for others. (Deaf people can use speech-recognition systems to "hear" another speaker as the computer displays the spoken words on a screen.) People who cannot use their hands can dictate documents to a word processor and give commands to a computer to control household appliances.

To restore control and motion to people paralyzed by spinal injuries, researchers are experimenting with chips that convert brain signals to controls for leg and arm muscles.

Researchers in the United States and Europe are developing brain–computer interfaces so that severely handicapped people can operate a computer and control appliances with their thoughts.[17]

The impact of all these devices on the morale of the user is immense. Think about a person with an active mind, personality, and sense of humor—but who cannot write, type, or speak. Imagine the difference when the person gains the ability to communicate—with family and friends, and with all the people and resources available on the Internet.

1.3 Themes

Several themes and approaches to analysis of issues appear through this book. I introduce a few here.

Old problems in a new context

> Cyberspace has many of the problems, annoyances, and controversies of noncyber life, among them crime, pornography, violent fiction and games, advertising, copyright infringement, gambling, and products that do not work right.

Throughout this book, I often draw analogies from other technologies and other aspects of life. Sometimes we can find a helpful perspective for analysis and even ideas for solutions to new problems by looking at older technologies and established legal and social principles. The emphasis on the fact that similar problems occur in other areas is not meant to excuse the new problems. It suggests, however, that the root is not always the new technology but can be human nature, ethics, politics, or other factors. We will often try to analyze how the technology changes the context and the impact of old problems.

Adapting to new technology

> Changes in technology usually require adaptive changes in laws, social institutions, business policies, and personal skills, attitudes, and behavior.

When cellphones first came with built-in cameras, privacy laws in Pennsylvania (and elsewhere) were not sufficient to convict a man who used his cellphone to take a photo up a woman's skirt. (The man was found guilty of disorderly conduct.) A federal regulation requiring medical x-rays on film, rather than digital formats, was still in effect in 2011. During Japanese election campaigns in 2005, candidates were afraid to use email and blogs and to update their websites to communicate with voters, because a 1955 law that specifies the legal means of communicating with voters does not, of course, include these methods. It allows postcards and pamphlets.

We might naturally think some actions are criminal, and some should be legal, but legislators did not consider them when writing existing laws. The legal status of an action might be the opposite of what we expect, or it might be uncertain. Many new activities

that new technology makes possible are so different from prior ways of doing things that we need a new set of "rules of the game."

We have to relearn standards for deciding when to trust what we read. The major impact of computer technology on privacy means we have to think in new ways about how to protect ourselves. We have to decide when privacy is important and when we are willing to put it at risk for some other benefit.

Varied sources of solutions to problems

> Solutions for problems that result from new technology come from more or improved technology, the market, management policies, education and public awareness, volunteer efforts, and law.

The cycle of problems and solutions, more problems and more solutions, is a natural part of change and of life in general. Throughout this book, when we consider problems, we consider solutions from several categories. Technical solutions include hardware and software. "Hardware" might mean something other than part of a computer system; improved lighting near ATMs to reduce robberies is a hardware solution. Authentication technology helps reduce identity theft. Market mechanisms, such as competition and consumer demand, generate many improvements. We all must become educated about the risks of the high-tech tools we use and learn how to use them safely. Legal solutions include effective law enforcement, criminal penalties, lawsuits, legislation, and regulation. For example, there must be appropriate penalties for people who commit fraud online, and there must be appropriate liability laws for cases where system failures occur.

The global reach of the Net

> The ease of communication with distant countries has profound social, economic, and political effects—some beneficial, some not.

The Net makes information and opportunities more easily available to people isolated by geography or by political system. It makes crime fighting and law enforcement more difficult, because criminals can steal and disrupt services from outside the victim's country. Laws in one country prohibiting certain content on the Web or certain kinds of Web services restrict people and businesses in other countries because the Web is accessible worldwide.

Trade-offs and controversy

> Increasing privacy and security often means reducing convenience. Protecting privacy makes law enforcement more difficult. Unpleasant, offensive, or inaccurate information accompanies our access to the Web's vast amounts of useful information.

Some of the topics we discuss are not particularly controversial. We will sometimes address an issue more as a problem-solving exercise than as a controversy. We will look at the

impact of electronic technology in a particular area, observe some problems that result, and describe solutions. On the other hand, many of the issues are controversial: leaking confidential information on the Internet, proper policies for privacy protection, how strict copyright law should be, offshoring of jobs, the impact of computers on quality of life.

We consider various viewpoints and arguments. Even if you have a strong position on one side of a controversy, it is important to know the arguments on the other side, for several reasons. Knowing that there are reasonable arguments for a different point of view, even if you do not think they are strong enough to win overall, helps make a debate more civilized. We see that the people on the other side are not necessarily evil, stupid, or ignorant; they may just put more weight on different factors. To convince others of your own viewpoint, you must counter the strongest arguments of the other side, so, of course, you first must know and understand them. Finally, you might change your own mind after considering arguments you had not thought of before.

Perfection is a direction, not an option.

In general, when evaluating new technologies and applications, we should not compare them to some ideal of perfect service or zero side effects and zero risk. That is impossible to achieve in most aspects of life. Instead, we should compare them to the alternatives and weigh the problems against the benefits. The ideal shows us the direction to go as we endeavor to seek improvements and solutions to problems.

Another reason that we cannot expect perfection is that we all have different ideas of what perfection is.

This does not excuse sloppiness. It is possible to meet extremely high standards.

Differences between personal choices, business policies, and law

> The criteria for making personal choices, for making policies for businesses and organizations, and for writing laws are fundamentally different.

We can make a personal choice—for example, about what social networks to join, what apps to put on our phones, or what ebooks to buy—according to our individual values and situation. A business bases its policies on many factors, including the manager's perception of consumer preferences, what competitors are doing, responsibilities to stockholders, the ethics of the business owners or managers, and relevant laws.

Laws are fundamentally different from personal choices and organizational policies because they impose decisions by force on people who did not make them. Arguments for passing a law should be qualitatively different from reasons for adopting a personal or organizational policy. It might seem odd at first, but arguments on the merits of the proposal—for example, that it is a good idea, or is efficient, or is good for business, or is helpful to consumers—are not good arguments for a law. We can use these arguments to try to convince a person or organization to adopt a particular policy voluntarily. Arguments for a law must show why the decision should be enforced against someone

who *does not agree* that it is a good idea. It is better to base laws on the notion of rights rather than on personal views about their benefits or how we want people to behave.

1.4 Ethics

Honesty is the best policy.

—English proverb, pre-1600

1.4.1 What Is Ethics, Anyway?

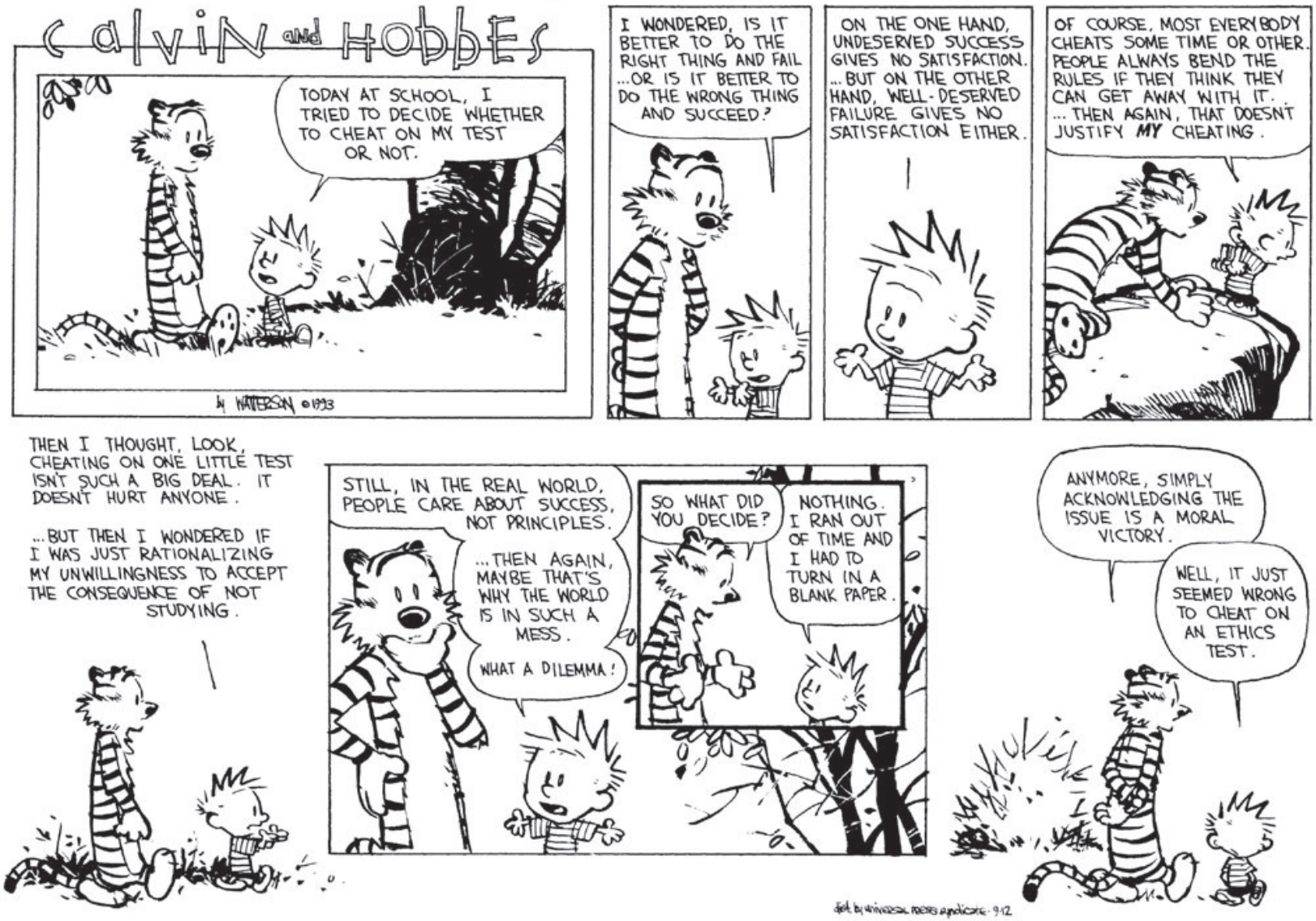
Sometimes, we discuss issues and problems related to computer technology from a somewhat detached perspective. We see how a new technology can create new risks and how social and legal institutions continually adapt. But technology is not an immutable force, outside of human control. People make decisions about what technologies and products to develop and how to use them. People make decisions about when a product is safe to release. People make decisions about access to and use of personal information. People make laws and set rules and standards.

Should you download movies from unauthorized websites? Should you talk on your cellphone while driving on a freeway? Should you hire foreign programmers who work at low salaries? Should you warn potential customers that the smartphone app you sell needs to copy their contact list? Should you fire an employee who is criticizing your business in social media? What information should you allow advertisers and other trackers to collect from visitors to the website you run? Someone sent you the contents of a friend's (a teacher's, a city council candidate's) email account; should you post it on the Web? In these examples, you are confronting practical and legal issues—and ethical ones. In each case you can restate the problem as a question in the form "Is it right to . . . ?" Is it right to make a significant change in your company's privacy policy without giving customers or members advance notice?

In this section, we introduce several ethical theories. We discuss some distinctions (e.g., between ethics and law) that are important to understand when tackling ethical issues.

Ethics is the study of what it means to "do the right thing." It is a complex subject that has occupied philosophers for thousands of years. This presentation is necessarily simplified.

Ethical theory assumes that people are rational and make free choices. Neither of these conditions is always and absolutely true. People act emotionally, and they make mistakes. A person is not making a free choice when someone else is pointing a gun at him. Some argue that a person is not making a free choice in a situation where she might lose a job. However, free choice and use of rational judgment are capacities and characteristics of


calvin and hobbes
TODAY AT SCHOOL, I TRIED TO DECIDE WHETHER TO CHEAT ON MY TEST OR NOT.
by WATTERSON ©1993
I WONDERED, IS IT BETTER TO DO THE RIGHT THING AND FAIL ...OR IS IT BETTER TO DO THE WRONG THING AND SUCCEED?
ON THE ONE HAND, UNDESERVED SUCCESS GIVES NO SATISFACTION. ...BUT ON THE OTHER HAND, WELL-DESERVED FAILURE GIVES NO SATISFACTION EITHER.
OF COURSE, MOST EVERYBODY CHEATS SOME TIME OR OTHER. PEOPLE ALWAYS BEND THE RULES IF THEY THINK THEY CAN GET AWAY WITH IT. ... THEN AGAIN, THAT DOESN'T JUSTIFY MY CHEATING.
THEN I THOUGHT, LOOK, CHEATING ON ONE LITTLE TEST ISN'T SUCH A BIG DEAL. IT DOESN'T HURT ANYONE.
...BUT THEN I WONDERED IF I WAS JUST RATIONALIZING MY UNWILLINGNESS TO ACCEPT THE CONSEQUENCE OF NOT STUDYING.
STILL, IN THE REAL WORLD, PEOPLE CARE ABOUT SUCCESS, NOT PRINCIPLES.
...THEN AGAIN, MAYBE THAT'S WHY THE WORLD IS IN SUCH A MESS.
WHAT A DILEMMA!
SO WHAT DID YOU DECIDE?
NOTHING. I RAN OUT OF TIME AND I HAD TO TURN IN A BLANK PAPER.
ANYMORE, SIMPLY ACKNOWLEDGING THE ISSUE IS A MORAL VICTORY.
WELL, IT JUST SEEMED WRONG TO CHEAT ON AN ETHICS TEST.
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human beings, and they are reasonably assumed as the basis of ethical theory. We take the view that the individual is, in most circumstances, responsible for his or her actions.

Ethical rules are rules to follow in our interactions with other people and in our actions that affect other people. Most ethical theories attempt to achieve the same goal: to enhance human dignity, peace, happiness, and well-being. Ethical rules apply to all of us and are intended to achieve good results for people in general, and for situations in general—not just for ourselves, not just for one situation. A set of rules that does this well respects the fact that we are each unique and have our own values and goals, that we have judgment and will, and that we act according to our judgment to achieve our goals. The rules should clarify our obligations and responsibilities—and our areas of choice and personal preference.*

We could view ethical rules as fundamental and universal, like laws of science. Or we could view them as rules we make up, like the rules of baseball, to provide a framework in which to interact with other people in a peaceful, productive way. The titles of two books illustrate these different viewpoints. One is *Ethics:* Discovering *Right and Wrong*; the other is *Ethics:* Inventing *Right and Wrong*.[18] We do not have to decide which view is correct to find good ethical rules. In either case, our tools include reason, introspection, and knowledge of human nature, values, and behavior.

Behaving ethically, in a personal or professional sphere, is usually not a burden. Most of the time we are honest, we keep our promises, we do not steal, we do our jobs. This should not be surprising. If ethical rules are good ones, they work for people. That is, they make our lives better. Behaving ethically is usually practical. Honesty makes interactions among people work more smoothly and reliably, for example. We might lose friends if we often lie or break promises. Social institutions encourage us to do right: We might land in jail if caught stealing. We might lose our jobs if we do them carelessly. In a professional context, doing good ethically often corresponds closely with doing a good job in the sense of professional quality and competence. Doing good ethically often corresponds closely with good business in the sense that ethically developed products and ethical policies are more likely to please consumers. Sometimes, however, it is difficult to do the right thing. It takes courage in situations where we could suffer negative consequences. Courage is often associated with heroic acts, where one risks one's life to save someone in a dangerous situation—the kind of act that makes news. Most of us do not have those opportunities to display courage, but we do have many opportunities in day-to-day life.

1.4.2 A Variety of Ethical Views[19]

Although there is much agreement about general ethical rules, there are many different theories about how to establish a firm justification for the rules and how to decide what is

* Not all ethical theories fit this description. Ethical relativism and some types of ethical egoism do not. In this book, however, we assume these goals and requirements for ethical theories.

ethical in specific cases. We give very brief descriptions of a few approaches to ethics. Some ethicists* make a distinction between ethical theories that view certain acts as good or bad because of some intrinsic aspect of the action and ethical theories that view acts as good or bad because of their consequences. They call these deontological (or nonconsequentialist) and consequentialist theories, respectively. The distinction is perhaps emphasized more than necessary. If the criteria that deontologists use to determine the intrinsic goodness or badness of an act do not consider its consequences for people—at least for most people, most of the time—their criteria would seem to have little ethical merit.

Deontological theories

Deontologists tend to emphasize duty and absolute rules, to be followed whether they lead to good or ill consequences in particular cases. One example is: Do not lie. An act is ethical if it complies with ethical rules and you chose it for that reason.

Immanuel Kant, the philosopher often presented as the prime example of a deontologist, contributed many important ideas to ethical theory. We mention three of them here. One is the principle of universality: We should follow rules of behavior that we can universally apply to everyone. This principle is so fundamental to ethical theory that we already accepted it in our explanation of ethics.

Second, deontologists argue that logic or reason determines rules of ethical behavior, that actions are intrinsically good because they follow from logic. Kant believed that rationality is the standard for what is good. We can reason about what makes sense and act accordingly, or we can act irrationally, which is evil. The view that something is evil because it is illogical might seem unconvincing, but Kant's instruction to "Respect the reason in you"—that is, to use your reason, rationality, and judgment, rather than emotions, when making a decision in an ethical context—is a wise one.

Third, Kant stated a principle about interacting with other people: One must never treat people as merely means to ends, but rather as ends in themselves.

Kant took an extreme position on the absolutism of ethical rules. He argued, for instance, that it is always wrong to lie. For example, if a person is looking for someone he intends to murder, and he asks you where the intended victim is, it is wrong for you to lie to protect the victim. Most people would agree that there are cases in which even very good, universal rules should be broken—because of the consequences.

Utilitarianism

Utilitarianism is the main example of a consequentialist theory. Its guiding principle, as expressed by John Stuart Mill,[20] is to increase happiness, or "utility." A person's utility is what satisfies the person's needs and values. An action might decrease utility for some people and increase it for others. We should consider the consequences—the benefits and

* Ethicists are philosophers (and others) who study ethics.

damages to all affected people—and "calculate" the change in aggregate utility. An act is right if it tends to increase aggregate utility and wrong if it tends to decrease it.

Utilitarianism is a very influential theory, and it has many variations. As stated above, the utilitarian principle applies to individual actions. For each action, we consider the impact on utility and judge the action by its net impact. This is sometimes called "act utilitarianism." One variant of utilitarianism, called "rule utilitarianism," applies the utility principle not to individual actions but to general ethical rules. Thus, a rule utilitarian might argue that the rule "Do not lie" will increase total utility, and for that reason it is a good rule. Rule utilitarians do not do a utility calculation for each instance where they consider lying. Generally, a utilitarian would be more comfortable than a deontologist breaking a rule in circumstances where doing so would have good consequences.

There are numerous problems with act utilitarianism. It might be difficult or impossible to determine all the consequences of an act. If we can do so, do we increase what *we* believe will, or should, contribute to the happiness of the people affected, or what *they* choose themselves? How do we know what they would choose? How do we quantify happiness in order to make comparisons among many people? Should some people's utility carry more weight than others'? Should we weigh a thief's gain of utility equal to the victim's loss? Is a dollar worth the same to a person who worked for it and a person who received it as a gift? Or to a rich person and a poor person? How can we measure the utility of freedom?

A more fundamental (and ethical) objection to act utilitarianism is that it does not recognize or respect individual rights. It has no absolute prohibitions and so could allow actions that many people consider always wrong. For example, if there is a convincing case that killing one innocent person (perhaps to distribute his or her organs to several people who will die without transplants) or taking all of a person's property and redistributing it to other community members would maximize utility in a community, utilitarianism could justify these acts. A person has no protected domain of freedom.

Rule utilitarianism suffers far less than does act utilitarianism from these problems. Recognizing that widespread killing and stealing decrease the security and happiness of all, a rule utilitarian can derive rules against these acts. We can state these particular rules in terms of rights to life and property.

Natural rights

Suppose we wish to treat people as ends rather than merely means and we wish to increase people's happiness. These goals are somewhat vague and open to many interpretations in specific circumstances. One approach we might follow is to let people make their own decisions. That is, we try to define a sphere of freedom in which people can act freely according to their own judgment, without coercive interference by others, even others (including us) who think they are doing what is best for the people involved or for humanity in general. This approach views ethical behavior as acting in such a way

that respects a set of fundamental rights of others, including the rights to life, liberty, and property.

These rights are sometimes called natural rights because, in the opinion of some philosophers, they come from nature or we can derive them from the nature of humanity. John Locke[21] argued that we each have an exclusive right to ourselves, our labor, and to what we produce with our labor. Thus, he argued for a natural right to property that we create or obtain by mixing our labor with natural resources. He saw protection of private property as a moral rule. If there is no protection for property, then the person who invents a new tool would be loathe to show it to others or use it in their view, as they might take it. Clearing land and planting food would be pointless, as one could not be present at all times to prevent others from picking all the crop. Thus, a right of private property increases overall wealth (utility) as well; the toolmaker or farmer has more to give or trade to others.

Respect for the rights to life, liberty, and property implies ethical rules against killing, stealing, deception, and coercion.

Those who emphasize natural rights tend to emphasize the ethical character of the *process* by which people interact, seeing acts generally as likely to be ethical if they involve voluntary interactions and freely made exchanges where the parties are not coerced or deceived. This contrasts with other ethical standards or approaches that tend to focus on the *result* or state achieved by the interaction, for example, seeing an action as likely to be unethical if it leaves some people poor.

Negative and positive rights, or liberties and claim rights

When people speak of rights, they are often speaking about two quite different kinds of rights. In philosophy books, these rights are usually called negative and positive rights, but the terms liberties and claim rights are more descriptive of the distinction.[22]

Negative rights, or liberties, are rights to act without interference. The only obligation they impose on others is not to prevent you from acting. They include the right to life (in the sense that no one may kill you), the right to be free from assault, the right to use your property, the right to use your labor, skills, and mind to create goods and services and to trade with other people in voluntary exchanges. The rights to "life, liberty, and the pursuit of happiness" described in the U.S. Declaration of Independence are liberties, or negative rights. Freedom of speech and religion, as guaranteed in the First Amendment of the U.S. Constitution, are negative rights: the government may not interfere with you, jail you, or kill you because of what you say or what your religious beliefs are. The right to work, as a liberty, or negative right, means that no one may prohibit you from working or, for example, punish you for working without getting a government permit. The (negative) right to access the Internet is so obvious in free countries that we do not even think of it. Authoritarian governments restrict or deny it.

Claim rights, or positive rights, impose an obligation on some people to provide certain things for others. A positive right to a job means that someone must hire you

regardless of whether they voluntarily choose to, or that it is right, or obligatory, for the government to set up job programs for people who are out of work. A positive right to life means that some people are obligated to pay for food or medical care for others who cannot pay for them. When we interpret freedom of speech as a claim right, or positive right, it means that we may require owners of shopping malls, radio stations, and online services to provide space or time for content they do not wish to include. Access to the Internet, as a claim right, could require such things as taxes to provide subsidized access for poor people or foreign aid to provide access in poor countries. The last example suggests the following question: How far does the obligation to provide a positive right extend? Also, when thinking about what might be a positive, or claim, right, it is helpful to consider whether something should be a claim right if it depends on achieving a certain level of technology. For example, if access to the Internet is a positive right now, was it a positive right in the 1800s?

Here is a more fundamental problem: negative rights and positive rights often conflict. Some people think that liberties are almost worthless by themselves and that society must devise social and legal mechanisms to ensure that everyone has their claim rights, or positive rights, satisfied, even if that means diminishing the liberties of some. Other people think that there can be no (or very few) positive rights, because it is impossible to enforce claim rights for some people without violating the liberties of others. They see the protection of liberties, or negative rights, as ethically essential.

This is one of the reasons for disagreement on issues such as some privacy protection regulations, for example. Although we will not solve the disagreement about which kind of right is more important, we can sometimes clarify the issues in a debate by clarifying which kind of right we are discussing.

Golden rules

The Bible and Confucius tell us to treat others as we would want them to treat us. This is a valuable ethical guideline. It suggests a reciprocity, or a role reversal. We should not take the rule too literally however; we need to apply it at the appropriate level. It tells us to consider an ethical choice we are making from the perspective of the people it affects. No matter how much you enjoy fast driving on winding roads, it might not be kind to roar around those corners with a passenger who gets carsick easily. No matter how much you like your friends to share photos of you partying, it might not be good to share a photo of friend who prefers privacy. We want people to recognize us as individuals and to respect our choices. Thus, we should respect theirs.

Contributing to society

We are focusing on how to make ethical decisions. Some ethical theories take a wider goal: how to live a virtuous life. That is beyond the scope of this book, but some of the ideas relate to ethical choices. Aristotle says that one lives a virtuous life by doing virtuous acts. This leaves us with a question: What is a virtuous act? Most people would agree that

helping to serve meals at a homeless shelter is a virtuous act. The view that this type of activity (doing unpaid charitable work) is the only or the main kind of virtuous act is common but is too limited. Suppose a nurse is choosing between spending one evening a week taking a course to learn new nursing skills or spending one evening a week helping at the homeless shelter. Or a programmer at a bank is choosing between a course on new computer security techniques and helping at the homeless shelter. There is nothing wrong with either choice. Is either one more virtuous than the other? The first choice increases the person's professional status and possibly the person's salary; you could see it as a selfish choice. The second choice is charitable work, helping unfortunate people. But the analysis should not stop there. A professional person, well trained and up-to-date in his or her profession, often can do far more to help a large number of people than the same person can accomplish performing low-skill tasks outside the person's professional area. The fact that the person is paid for his or her work is not significant in evaluating its contribution. Doing one's work (whether it is collecting garbage or performing brain surgery) honestly, responsibly, ethically, creatively, and well is a virtuous activity.

> *His philanthropy was in his work.*
>
> —Mike Godwin, writing about Apple co-founder Steve Jobs[23]

Social contracts and a theory of political justice[24]

Many topics we consider in this book go beyond individual ethical choices. They are social and legal policies. Thus we introduce (again, quite briefly) philosophical ideas about forming social and political systems.

The early foundations of social contract theory, the idea that people willingly submit to a common law in order to live in a civil society, are in the writings of Socrates and Plato but were not fully formed until the 1600s. Thomas Hobbes developed ideas of social contract theory in his book *Leviathan* (1651). Hobbes describes a starting point called the State of Nature, a dismal place where each man acts according to his own interests, no one is safe from physical harm, and there is no ability to ensure the satisfaction of one's needs. Hobbes believed that man is rational and will seek a better situation, even at the cost of giving up some independence in favor of common law and accepting some authority to enforce this "social contract." John Locke thought people could enforce moral rules, such as the rights to life, liberty and property, in a state of nature but that it was better to delegate this function to a government instituted by an implicit social contract.

The modern philosopher John Rawls[25] took social contract theory further, developing provisions of the "contract" based on his view of justice as fairness. I will criticize parts of his work, but some of his points provide useful ethical guidelines. Rawls sought to establish principles for proper political power in a society with people of varying religions,

viewpoints, lifestyles, and so on. Rawls, like other social contract theorists, said that reasonable people, recognizing that a legal (or political) structure is necessary for social order, will want to cooperate on terms that all accept, and they will abide by the rules of society, even those they do not like. He argued that political power is proper only if we would expect all citizens to reasonably endorse its basic, or constitutional, principles. Tolerance is essential because deep questions are difficult, we answer them differently based on our life experiences, and people of good will can disagree. Thus, a proper political system protects basic civil liberties such as freedom of speech and free choice of occupation. It will not impose the views of some on the others.

To this point, Rawls' foundation is consistent with an emphasis on liberties (negative rights). Rawls distinguishes his system of justice by adding a strong requirement for claim rights (positive rights): a just and fair political system will ensure that all citizens have sufficient means to make effective use of their freedoms.* To Rawls, government financing of election campaigns is an essential feature of the system. This is a very specific political policy; people hotly debate its fairness and practical consequences. Rawls has made a leap that appears inconsistent with his emphasis that people of good will disagree on important issues and that a proper political system does not impose the views of one group on another.

In Rawls' view, an action or a social or political structure is not ethical if it has the effect of leaving the least-advantaged people worse than they were before (or would be in some alternative system). Thus, in a sense, Rawls gives far more weight (indeed, infinite weight) to the utility of the least-advantaged people than to anyone else. This is odd as an absolute rule, and its fairness is not obvious. His emphasis on concern for the least well off, however, is a reminder to consider impacts on such people; a loss or harm to them can be more devastating than to someone in a better position.

Rawls proposed a conceptual formulation termed the "veil of ignorance" for deriving the proper principles or policies of a just social or political system. By extension, we can use it as a tool for considering ethical and social issues in this book. We imagine that each person behind the veil of ignorance does not know his or her gender, age, race, talents, wealth, and so on, in the real world. Behind the veil of ignorance, we choose policies that would be fair for all, protecting the most vulnerable and least-advantaged members of society. Many writers use this tool to derive what they conclude to be the correct ethical positions on social policy issues. I find that sometimes when I go behind the veil of ignorance, I come to a different conclusion than the author. The tool is useful, like the principles of the ethical theories we described earlier, but, like them, it is not absolute. Even ignoring our status in society, people of good will come to different conclusions

* The meaning of fairness is not obvious. In various contexts and to different people, it can mean being judged on one's merits rather than irrelevant factors, getting an equal share, or getting what one deserves.

because of their knowledge of human behavior and economics and their understanding of how the world works.*

We illustrate with a policy example. The Children's Online Privacy Protection Act (COPPA) is a privacy law intended to protect a vulnerable population by requiring that websites get parental permission before collecting personal information from children under 13. After COPPA passed, because of the expense of complying with its requirements and the potential liability, some companies deleted online profiles of all children under 13, some canceled their free email and home pages for kids, and some banned children under 13 entirely. The *New York Times* does not allow children under 13 to register to use its website. Facebook's terms of use prohibit children under 13 from joining, but *Consumer Reports* estimates that more than seven million children under 13 have ignored the rule and joined.[26] The fiction that there are no members under 13 implies there is no need to provide mechanisms to protect them. Economists would have predicted these effects. We might have come up with COPPA behind a veil of ignorance, but it is not clear how well it actually helps and protects children. More knowledge helps us make better decisions and design better policies and laws.

No simple answers

We cannot solve ethical problems by applying a formula or an algorithm. Human behavior and real human situations are complex. There are often trade-offs to consider. Ethical theories do not provide clear, incontrovertibly correct positions on most issues. We can use the approaches we described to support opposite sides of many an issue. For example, consider Kant's imperative that one must never treat people as merely means to ends, but rather as ends in themselves. We could argue that an employer who pays an employee a very low wage, say, a wage too low to support a family, is wrongly treating the employee as merely a means for the employer to make money. But we could also argue that expecting the employer to pay more than he or she considers reasonable is treating the employer merely as a means of providing income for the employee. Similarly, it is easy for two utilitarians to come to different conclusions on a particular issue by measuring happiness or utility differently. A small set of basic natural rights might provide no guidance for many situations in which you must make ethical decisions—however, if we try to define rights to cover more situations, there will be fierce disagreement about just what those rights should be.

Although ethical theories do not completely settle difficult, controversial issues, they help to identify important principles or guidelines. They remind us of things to consider, and they can help clarify reasoning and values. There is much merit in Kant's principle of

* Rawls specifies that we assume people behind the veil of ignorance have knowledge of accepted economic principles, but in fact many philosophers and ordinary people do not—and of course, people will disagree about what is accepted.

Do organizations have ethics?

Some philosophers argue that it is meaningless to speak of a business or organization as having ethics. Individual people make all decisions and take all actions. Those people must have ethical responsibility for everything they do. Others argue that an organization that acts with intention and a formal decision structure, such as a business, is a moral entity.[27] However, viewing a business as a moral entity does not diminish the responsibility of the individual people. Ultimately, it is individuals who are making decisions and taking actions. We can hold both the individuals and the company or organization responsible for their acts.*

Whether one accepts or rejects the idea that a business can have ethical rights and responsibilities, it is clear that organizational structure and policies lead to a pattern of actions and decisions that have ethical content. Businesses have a "corporate culture," or a "personality," or simply a reputation for treating employees and customers in respectful and honest—or careless and deceptive—ways. People in management positions shape the culture or ethics of a business or organization. Thus, decisions by managers have an impact beyond the particular product, contract, or action a decision involves. A manager who is dishonest with customers or who cuts corners on testing, for example, is setting an example that encourages other employees to be dishonest and careless. A manager's ethical responsibility includes his or her contribution to the company's ethical personality.

* Regardless of whether or not we view businesses and organizations as moral agents, they are legal entities and can be held legally responsible for their acts.

universalism and his emphasis on treating people as intrinsically valuable "ends." "Do not lie, manipulate, or deceive" is a good ethical principle. There is much merit in utilitarianism's consideration of consequences and its standard of increasing achievement of people's happiness. There is much merit in the natural rights approach of setting minimal rules in a rights framework to guarantee people a sphere in which they can act according to their own values and judgment. The Golden Rule reminds us to consider the perspective of the people our actions affect. Rawls reminds us that it is especially important to consider the impact of our choices on the least-advantaged people.

1.4.3 Some Important Distinctions

A number of important distinctions affect our ethical judgments, but they are often not clearly expressed or understood. In this section, we identify a few of these. Just being aware of these distinctions can help clarify issues in some ethical debates.

Right, wrong, and okay

In situations with ethical dilemmas, there are often many options that are ethically acceptable, with no specific one ethically required. Thus, it is misleading to divide all

acts into two categories, ethically right and ethically wrong. Rather, it is better to think of acts as either ethically obligatory, ethically prohibited, or ethically acceptable. Many actions might be virtuous and desirable but not obligatory.

Distinguishing wrong and harm

Carelessly and needlessly causing harm is wrong, but it is important to remember that harm alone is not a sufficient criterion to determine that an act is unethical. Many ethical, even admirable acts can make other people worse off. For example, you may accept a job offer knowing someone else wanted the job and needed it more than you do. You may reduce the income of other people by producing a better product that consumers prefer. If your product is really good, you might put a competitor out of business completely and cause many people to lose their jobs. Yet there is nothing wrong with doing honest, productive work.

Declining to give something (say, $100) to someone is not the same ethically as taking the thing away from the person. Both actions leave the person less well off by $100 than they would be otherwise. But if we took that simplistic view of harm, the harm would be essentially the same. To identify harm as wrong, we must identify what the person is due, what his or her rights are, and what our rights and obligations are.

On the other hand, there can be wrong when there is no (obvious or immediate) harm. Some hackers argue that breaking into computer systems is not wrong, because they do no harm. Aside from the fact that the hacker might do unintended harm, one can argue that hacking is a violation of property rights: a person has no right to enter your property without your permission, independent of how much harm is done in any particular instance.

Separating goals from constraints

Economist Milton Friedman wrote that the goal or responsibility of a business is to make a profit for its shareholders. This statement appalled some ethicists, as they believe it justifies, or is used to justify, irresponsible and unethical actions. It seems to me that arguments on this point miss the distinction between goals, on the one hand, and constraints on actions that may be taken to achieve the goals, on the other hand—or the distinction between ends and means. Our personal goals might include financial success and finding an attractive mate. Working hard, investing wisely, and being an interesting and decent person can achieve these goals. Stealing and lying might achieve them too. Stealing and lying are ethically unacceptable. Ethics tells us what actions are acceptable or unacceptable in our attempts to achieve the goals. There is nothing unethical about a business having the goal of maximizing profits. The ethical character of the company depends on whether the actions taken to achieve the goal are consistent with ethical constraints.[28]

Personal preference and ethics

Most of us have strong feelings about a lot of issues. It might be difficult to draw a line between what we consider ethically right or wrong and what we personally approve or disapprove of.

Suppose you get a job offer from a company whose products you do not like. You might decline the job and say you are doing so on ethical grounds. Are you? Can you convincingly argue that anyone who takes the job is acting unethically? Most likely you cannot, and that is not what you actually think. *You* do not want to work for a company you do not like. This is a personal preference. There is nothing ethically wrong with declining the job, of course. The company's freedom to produce its products does not impose an ethical obligation on you to assist it.

When discussing political or social issues, people frequently argue that their position is right in a moral or ethical sense or that an opponent's position is morally wrong or unethical. People tend to want to be on the "moral high ground." People feel the stigma of an accusation that their view is ethically wrong. Thus, arguments based on ethics can be, and often are, used to intimidate people with different views. It is a good idea to try to distinguish between actions we find distasteful, rude, or ill-advised and actions that we can argue convincingly are ethically wrong.

Law and ethics

What is the connection between law and ethics? Sometimes very little. Is it ethical to prohibit marijuana use by terminally ill people? Is it ethical for the government or a state university to give preference in contracts, hiring, or admissions to people in specific ethnic groups? Is it ethical for a bank loan officer to carry customer records on a laptop to work at the beach? The current law, whatever it happens to be at a particular time, does not answer these questions. In addition, history provides numerous examples of laws most of us consider profoundly wrong by ethical standards; slavery is perhaps the most obvious example. Ethics precedes law in the sense that ethical principles help determine whether or not we should pass specific laws.

Some laws enforce ethical rules (e.g., against murder and theft). By definition, we are ethically obligated to obey such laws—not because they are laws, but because the laws implement the obligations and prohibitions of ethical rules.

Another category of laws establishes conventions for business or other activities. Commercial law, such as the Uniform Commercial Code, defines rules for economic transactions and contracts. Such rules provide a framework in which we can interact smoothly and confidently with strangers. They include provisions for how to interpret a contract if a court must resolve a dispute. These laws are extremely important to any society and they should be consistent with ethics. Beyond basic ethical considerations, however, details could depend on historic conventions, practicality, and other nonethical criteria. In the United States, drivers must drive on the right side of the road; in England,

drivers must drive on the left side. There is obviously nothing intrinsically right or wrong about either choice. However, once the convention is established, it is wrong to drive on the wrong side of the road because it needlessly endangers other people.

Unfortunately, many laws fall into a category that is not intended to implement ethical rules—or even be consistent with them. The political process is subject to pressure from special interest groups of all sorts who seek to pass laws that favor their groups or businesses. Examples include the laws (promoted by the television networks) that delayed the introduction of cable television and, later, laws (promoted by some cable television companies) to restrict satellite dishes. When margarine was first introduced, the dairy industry successfully lobbied for laws against coloring margarine yellow to look more like butter. After opposing re-sale auctions of event tickets for years, Ticketmaster accepted this popular online sales paradigm—and lobbied for laws restricting competitors.[29] Many prominent people in the financial industry reported receiving a large number of fundraising letters from members of Congress—in the week that Congress took up new regulations for their industry. Many political, religious, or ideological organizations promote laws to require (or prohibit) certain kinds of behavior that the group considers desirable (or objectionable). Examples include prohibitions on teaching foreign languages in schools (in the early 20th century),[30] prohibitions on gambling or alcohol, requirements for recycling, and requirements that stores close on Sundays. At an extreme, in some countries, this category includes restrictions on the practice of certain religions. Some politicians or political parties pass laws, no matter how public-spirited they sound, purely to give themselves and their friends or donors advantages.

Copyright law has elements of all three categories we have described. It defines a property right, violation of which is a form of theft. Because of the intangible nature of intellectual property, some of the rules about what constitutes copyright infringement are more like the second category, pragmatic rules devised to be workable. Powerful groups (e.g., the publishing, music, and movie industries) lobby for specific rules to benefit themselves. This is why some violations of copyright law are clearly unethical (if one accepts the concept of intellectual property), yet others seem to be entirely acceptable, sometimes even noble.

Legislators and their staffs draft some laws in haste, and they make little sense. Some laws and regulations have hundreds or thousands of pages and are full of specific detail that make many ethical choices illegal. When members of Congress debate whether pizza is a vegetable,[31] they are not debating an ethical issue.

Do we have an ethical obligation to obey a law just because it is a law? Some argue that we do: as members of society, we must accept the rules that the legislative process has created so long as they are not clearly and utterly ethically wrong. Others argue that, whereas this might often be a good policy, it is not an ethical obligation. Legislators are just a group of people, subject to errors and political influences; there is no reason to feel an ethical obligation to do something just because they say so. Indeed, some believe all

laws that regulate personal behavior or voluntary economic transactions to be violations of the liberty and autonomy of the people forced to obey and, hence, to be ethically wrong.

Is it always ethically right to do something that is legal? No. Laws must be uniform and stated in a way that clearly indicates what actions are punishable. Ethical situations are complex and variable; the people involved might know the relevant factors, but it might not be possible to prove them in court. There are widely accepted ethical rules that would be difficult and probably unwise to enforce absolutely with laws—for example: Do not lie. New law lags behind new technology for good reasons. It takes time to recognize new problems associated with the technology, consider possible solutions, think and debate about the consequences and fairness of various proposals, and so on. A good law will set minimal standards that can apply to all situations, leaving a large range of voluntary choices. Ethics fills the gap between the time when technology creates new problems and the time when legislatures pass reasonable laws. Ethics fills the gap between general legal standards that apply to all cases and the particular choices made in a specific case.

While it is not ethically obligatory to obey all laws, that is not an excuse to ignore laws, nor is a law (or lack of a law) an excuse to ignore ethics.

EXERCISES

Review Exercises

1.1 What were two unexpected uses of social networking?

1.2 What are two ways free services on the Web are paid for?

1.3 Describe two applications of speech recognition.

1.4 List two applications mentioned in this chapter that help ordinary people to do things for which we used to rely on experts.

1.5 What are two of Kant's important ideas about ethics?

1.6 What is the difference between act utilitarianism and rule utilitarianism?

1.7 Give an example of a law that implements an ethical principle. Give an example of a law that enforces a particular group's idea of how people should behave.

1.8 Explain the distinction between the negative and positive right to freedom of speech.

1.9 When one goes behind Rawls' veil of ignorance, what is one ignorant of?

General Exercises

1.10 Write a short essay (roughly 300 words) about some topic related to computing technology or the Internet that interests you and has social or ethical implications. Describe the background; then identify the issues, problems, or questions that you think are important.

1.11 Christie's (www.christies.com), an international auction house, was founded in 1766. So why was eBay a big deal?