

INTERNATIONAL
EDITION



A Gift of Fire

Social, Legal, and Ethical Issues for Computing Technology

FOURTH EDITION

Sara Baase



ALWAYS LEARNING

PEARSON

A GIFT OF FIRE



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Social, Legal, and Ethical Issues
for Computing Technology

FOURTH EDITION

SARA BAASE

San Diego State University

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To *Keith*, always

And to *Michelle Nygord Matson* (1959–2012)

For her love of life, learning, and adventure

For her laughter, wisdom, and determination

For her friendship

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PREFACE

This book has two intended audiences: students preparing for careers in computer science (and related fields) and students in other fields who want to learn about issues that arise from computing technology, the Internet, and other aspects of cyberspace. The book has no technical prerequisites. Instructors can use it at various levels, in both introductory and advanced courses about computing or technology.

Scope of This Book

Many universities offer courses with titles such as “Ethical Issues in Computing” or “Computers and Society.” Some focus primarily on professional ethics for computer professionals. Others address a wide range of social issues. The bulky subtitle and the table of contents of this book indicate its scope. I also include historical background to put some of today’s issues in context and perspective. I believe it is important for students (in computer and information technology majors and in other majors) to see and understand the implications and impacts of the technology. Students will face a wide variety of issues in this book as members of a complex technological society, in both their professional and personal lives.

The last chapter focuses on ethical issues for computer professionals. The basic ethical principles are not different from ethical principles in other professions or other aspects of life: honesty, responsibility, and fairness. However, within any one profession, special kinds of problems arise. Thus, we discuss professional ethical guidelines and case scenarios specific to computing professions. I include two of the main codes of ethics and professional practices for computer professionals in an Appendix. I placed the professional ethics chapter last because I believe students will find it more interesting and useful after they have as background the incidents, issues, and controversies in the earlier chapters.

Each of the chapters in this book could easily be expanded to a whole book. I had to leave out many interesting topics and examples. In some cases, I mention an issue, example, or position with little or no discussion. I hope some of these will spark further reading and debate.

Changes for the Fourth Edition

For this fourth edition, I updated the whole book, removed outdated material, added many new topics and examples, and reorganized several topics. New material appears throughout. I mention here some major changes, completely new sections and topics, and some that I extensively revised.

- This edition has approximately 85 new exercises.
- In Chapter 1, I added a section on kill switches for smartphone apps, tablets, and so on, i.e., the ability of companies to remotely delete apps and other items from a user's device (in Section 1.2.1).
- All parts of Section 1.2 have new material, including, for example, uses of smartphone data and social network data for social research.
- I added a brief section on social contracts and John Rawls' views on justice and fairness (in Section 1.4.2).

New topics in Chapter 2 include

- smartphones and their apps collecting personal data without permission (in Section 2.1.2)
- Fourth Amendment issues about tracking a person's location via cellphone, tracking cars with GPS devices, and search of cellphones (in Sections 2.2.2 and 2.2.3)
- applications of face recognition (several places in the chapter)
- privacy implications of some social networking applications and social network company policies
- a right to be forgotten (Section 2.3.4)

Chapter 3 includes new sections on

- sexting (Section 3.2.3)
- ethics of leaking sensitive information (in Section 3.3)
- shutting down cellphone service or access to social media during riots or protests (Section 3.5.3)

The chapter also has

- use of social media by freedom movements and countermeasures by governments
- more on Western countries selling surveillance systems to dictators.

Chapter 4 includes

- discussion of plagiarism
- expanded sections on the Digital Millennium Copyright Act (Sections 4.2.2 and 4.2.3)
- an expanded section on patents for software (Section 4.5)

Chapter 5 has new sections on

- hacking by governments to attack others (Section 5.2.4)

- expansion of the Computer Fraud and Abuse Act to cover actions it was not intended to cover (in Section 5.2.6)

Chapter 6 has new sections on

- how content of social media can affect getting hired and fired
- use of social media and personal devices at work

Chapter 7 has expanded sections on

- the “wisdom of the crowd”
- ways the Internet can narrow or restrict the points of view people see (in Section 7.1.1)

Chapter 8 has

- an introduction to high reliability organizations (in Section 8.3.1).

Chapter 9 contains

- two new scenarios.

This is an extremely fast-changing field. Clearly, some issues and examples in this book are so current that details will change before or soon after publication. I don't consider this to be a serious problem. Specific events are illustrations of the underlying issues and arguments. I encourage students to bring in current news reports about relevant issues to discuss in class. Finding so many ties between the course and current events adds to their interest in the class.

Controversies

This book presents controversies and alternative points of view: privacy vs. access to information, privacy vs. law enforcement, freedom of speech vs. control of content on the Net, pros and cons of offshoring jobs, market-based vs. regulatory solutions, and so on. Often the discussion in the book necessarily includes political, economic, social, and philosophical issues. I encourage students to explore the arguments on all sides and to be able to explain why they reject the ones they reject before they take a position. I believe this approach prepares them to tackle new controversies. They can figure out the consequences of various proposals, generate arguments for each side, and evaluate them. I encourage students to think in principles, rather than case by case, or at least to recognize similar principles in different cases, even if they choose to take different positions on them.

My Point of View

Any writer on subjects such as those in this book has some personal opinions, positions, or biases. I believe strongly in the principles in the Bill of Rights. I also have a generally

positive view of technology. Don Norman, a psychologist and technology enthusiast who writes on humanizing technology, observed that most people who have written books about technology “are opposed to it and write about how horrible it is.”* I am not one of those people. I think that technology, in general, has been a major factor in bringing physical well-being, liberty, and opportunity to hundreds of millions of people. That does not mean technology is without problems. Most of this book focuses on problems. We must recognize and study them so that we can reduce the negative effects and increase the positive ones.

For many topics, this book takes a problem-solving approach. I usually begin with a description of what is happening in a particular area, often including a little history. Next comes a discussion of why there are concerns and what the new problems are. Finally, I give some commentary or perspective and some current and potential solutions to the problems. Some people view problems and negative side effects of new technologies as indications of inherent badness in the technology. I see them as part of a natural process of change and development. We will see many examples of human ingenuity, some that create problems and some that solve them. Often solutions come from improved or new applications of technology.

At a workshop on Ethical and Professional Issues in Computing sponsored by the National Science Foundation, Keith Miller, one of the speakers, gave the following outline for discussing ethical issues (which he credited to a nun who had been one of his teachers years ago): “What? So what? Now what?” It struck me that this describes how I organized many sections of this book.

An early reviewer of this book objected to one of the quotations I include at the beginnings of many sections. He thought it was untrue. So perhaps I should make it clear that I agree with many of the quotations—but not with all of them. I chose some to be provocative and to remind students of the variety of opinions on some of the issues.

I am a computer scientist, not an attorney. I summarize the main points of many laws and legal cases and discuss arguments about them, but I do not give a comprehensive legal analysis. Many ordinary terms have specific meanings in laws, and often a difference of one word can change the impact of a provision of a law or of a court decision. Laws have exceptions and special cases. Any reader who needs precise information about how a law applies in a particular case should consult an attorney or read the full text of laws, court decisions, and legal analysis.

Class Activities

The course I designed in the Computer Science Department at San Diego State University requires a book report, a term paper, and an oral presentation by each student. Students do several presentations, debates, and mock trials in class. The students are very

* Quoted in Jeannette DeWyze, “When You Don’t Know How to Turn On Your Radio, Don Norman Is On Your Side,” *The San Diego Reader*, Dec. 1, 1994, p. 1.

enthusiastic about these activities. I include several in the Exercises sections, marked as Class Discussion Exercises. Although I selected some exercises for this category, I find that many others in the General Exercises sections are also good for lively class discussions.

It has been an extraordinary pleasure to teach this course. At the beginning of each semester, some students expect boredom or sermons. By the end, most say they have found it eye-opening and important. They've seen and appreciated new arguments, and they understand more about the risks of computer technology and their own responsibilities. Many students send me news reports about issues in the course long after the semester is over, sometimes after they have graduated and are working in the field.

Additional Sources

The notes at the ends of the chapters include sources for specific information in the text and, occasionally, additional information and comment. I usually put one endnote at or near the end of a paragraph with sources for the whole paragraph. In a few places the endnote for a section is on the section heading. (We have checked all the Web addresses, but files move, and inevitably some will not work. Usually a search on the author and a phrase from the title of a document will locate it.) The lists of references at the ends of the chapters include some references that I used, some that I think are particularly useful or interesting for various reasons, and some that you might not find elsewhere. I have made no attempt to be complete.

An italic page number in the index indicates the page on which the index entry is defined or explained. The text often refers to agencies, organizations, and laws by acronyms. If you look up the acronym in the index, you will find its expansion.

My website for this book (www-rohan.sdsu.edu/faculty/giftfire) contains updates on topics in the book and other resources. Pearson Education maintains a website (www.pearsonhighered.com/baase) with supplements for instructors, including PowerPoint slides and a testbank. For access to instructor material, please contact your Pearson Education sales representative or visit the site, where you will find instructions.

Feedback

This book contains a large amount of information on a large variety of subjects. I have tried to be as accurate as possible, but, inevitably, there will be errors. I appreciate corrections. Please send them to me at GiftOfFire@sdsu.edu.

Acknowledgments

I am grateful to many people who provided assistance for this edition: Susan Brown (Florida Atlantic University) for advice about citations; Charles Christopher for regularly sending me legal articles perfectly targeted to topics I am writing about; Mike Gallivan (Georgia State University) for checking the Web addresses in endnotes; Julie Johnson (Vanderbilt University) for research assistance, an exercise, and the scenario and analysis in Section 9.3.4; Patricia A. Joseph (Slippery Rock University) for research assistance and

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I appreciate the efforts of the staff at Pearson Education who worked on this book: my editor Tracy Johnson, associate editor Carole Snyder, production project manager Kayla Smith-Tarbox, the marketing department, and the people behind the scenes who handle the many tasks that must be done to produce a book. I thank the production team: Paul Anagnostopoulos, Richard Camp, Ted Laux, Jacqui Scarlott, and Priscilla Stevens.

Last but not most, I thank Keith Mayers, for assisting with research, managing my software, reading all the chapters, being patient, running errands, finding other things to do while I worked (building a guitar!), and being my sweetheart.

PROLOGUE

Prometheus, according to Greek myth, brought us the gift of fire. It is an awesome gift. It gives us the power to heat our homes, cook our food, and run the machines that make our lives more comfortable, healthy, and enjoyable. It is also awesomely destructive, both by accident and by arson. The Chicago fire in 1871 left 100,000 people homeless. In 1990, the oil fields of Kuwait were intentionally set ablaze. Since the beginning of the 21st century, wildfires in the United States have destroyed millions of acres and thousands of homes. In spite of the risks, in spite of these disasters, few of us would choose to return the gift of fire and live without it. We have learned, gradually, how to use it productively, how to use it safely, and how to respond more effectively to disasters, be they natural, accidental, or intentional.

Computer technology is the most significant new technology since the beginning of the Industrial Revolution. It is awesome technology, with the power to make routine tasks quick, easy, and accurate, to save lives, and to create large amounts of new wealth. It helps us explore space, communicate easily and cheaply, find information, create entertainment, and do thousands of other tasks. As with fire, this power creates powerful problems: potential loss of privacy, multimillion-dollar thefts, and breakdowns of large, complex systems (such as air traffic control systems, communications networks, and banking systems) on which we have come to depend. In this book, we describe some of the remarkable benefits of computer and communication technologies, some of the problems associated with them, and some of the means for reducing the problems and coping with their effects.

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1

UNWRAPPING THE GIFT

- 1.1 The Pace of Change
 - 1.2 Change and Unexpected Developments
 - 1.3 Themes
 - 1.4 Ethics
- Exercises



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 Rothschild¹

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.

—Betty Friedan³

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 researchers 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.