Discovering Computers 2018 Digital Technology Data and Devices 1st edition Vermaat Solutions Manual

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DISCOVERING COMPUTERS 2018: DIGITAL TECHNOLOGY, DATA, AND DEVICES

MODULE ONE: INTRODUCING TODAY'S TECHNOLOGIES: COMPUTERS, DEVICES, AND THE WEB

END OF MODULE SOLUTIONS

Study Guide

Answers to Study Guide questions are below.

1. Digital literacy involves having a current knowledge and understanding of computers, mobile devices, the web, and related technologies.

2. A computer is an electronic device, operating under the control of instructions stored in its own memory, that can accept data (input), process the data according to specified rules, produce information (output), and store the information for future use. Computers contain many electric, electronic, and mechanical components known as hardware. A user is anyone who interacts with a computer or mobile device, or utilizes the information it generates.

3. A personal computer (PC) is a computer that can perform all of its input, processing, output, and storage activities by itself and is intended to be used by one person at a time. A mobile computer is a portable personal computer, designed so that a user can carry it from place to place. Laptops are also called notebook computers.

4. A tablet is a thin, lighter weight mobile computer that has a touch screen. A popular style of tablet is the slate, which does not contain a physical keyboard. Like laptops, tablets run on batteries or a power supply or both; however, batteries in a tablet typically last longer than those in laptops. Touch screen gestures include tap, double-tap, press and hold, drag or slide, swipe, stretch, and pinch.

5. A desktop, or desktop computer, is a personal computer designed to be in a stationary location, where all of its components fit on or under a desk or table. On many desktops, the screen is housed in a display device (or simply display) that is separate from a tower, which is a case that contains the processing circuitry. Another type of desktop called an all-in-one does not contain a tower and instead uses the same case to house the display and the processing circuitry. The term, desktop, also sometimes is used to refer to an on-screen work area on desktops, tablets, and laptops.

6. A server is a computer dedicated to providing one or more services to other computers or devices on a network. Services provided by servers include storing content and controlling access to hardware, software, and other resources on a network.

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7. The mobile devices discussed in this module can be categorized as computers because they operate under the control of instructions stored in their own memory, can accept data, process the data according to specified rules, produce or display information, and store the information for future use.

8. A smartphone is an Internet-capable phone that usually also includes a calendar, an address book, a calculator, a notepad, games, and several other apps. Smartphones typically communicate wirelessly with other devices or computers. With most smartphone models, you also can listen to music, take photos, and record videos. Most smartphones have a touch screen.

9. A voice mail message is a short audio recording sent to or from a smartphone or other mobile device. A text message is a short note, typically fewer than 300 characters, sent to or from a smartphone or other mobile device. A picture message is a photo or other image, sometimes along with sound and text, sent to or from a smartphone or other mobile device. A video message is a short video clip, usually about 30 seconds, sent to or from a smartphone or other mobile device.

10. A digital camera is a device that allows you to take photos and store the photographed images digitally. A portable media player is a mobile device on which you can store, organize, and play or view digital media. An e-book reader is a mobile device that is used primarily for reading e-books. A wearable device or wearable is a small, mobile computing consumer device designed to be worn. Wearable devices include activity trackers and smartwatches. A game console is a mobile computing device designed for single-player or multiplayer video games.

11. Many smartphones and tablets enable you to take and store photos; store, organize, and play or view your digital media; read e-books; and play games. This trend of computers and devices with technologies that overlap, called digital device convergence, means that consumers may need fewer devices for the functionality that they require.

12. New home builders and existing homeowners are integrating features that automate a wide variety of tasks, save time and money, and enhance the overall at-home environment. Uses include remotes that turn light fixtures on and off, and motion sensors turn on lights when a car or a visitor approaches the driveway or walkway; programmable thermostats that adjust to seasonal needs and can be set to control temperatures in individual rooms; smart appliances, such as dishwashers, can be programmed to run at nonpeak electrical times and refrigerators can track expiration dates and create shopping lists; security systems can detect break-ins at doors and heat from fires, and they can send text and email messages to alert a homeowner when someone has entered or left the home. Surveillance cameras keep a watchful eye on the premises and interior rooms.

13. Data is a collection of unprocessed items, which can include text, numbers, images, audio, and video. Information conveys meaning to users. Your name, address, term, course names, course sections, course grades, and course credits all represent data that is processed to generate your semester grade report. Other information on the grade report includes results of calculations such as total semester hours, grade point average, and total credits.

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14. An input device is any hardware component that allows you to enter data and instructions into a computer or mobile device. Common input methods include keyboards, pointing devices, voice and video input, and scanners. An output device is any hardware component that conveys information from a computer or mobile device to one or more people. Common output methods include printers, displays, speakers, earbuds, and headphones.

15. A pointing device is an input device that allows a user to control a small symbol on a screen, called the pointer. Desktops typically use a mouse as their pointing device, and laptops use a touchpad.

16. A microphone is an input device that enables you to speak into a computer or mobile device. A headset contains both a microphone and a speaker. A webcam is a digital video camera that allows you to capture video and usually audio input for your computer or mobile device.

17. Memory consists of electronic components that store instructions waiting to be executed and the data needed by those instructions. Although some forms of memory are permanent, most memory keeps data and instructions temporarily, which means its contents are erased when the computer is shut off. Storage, by contrast, holds data, instructions, and information for future use.

18. A computer keeps data, instructions, and information on storage media. Examples include hard disks, solid-state drives, USB flash drives, memory cards, and optical discs.

19. Cloud storage is an Internet service that provides remote storage to computer users. Types of services offered by cloud storage providers vary. Some provide storage for specific types of media, such as photos, whereas others store any content and provide backup services.

20. Use a backup program to copy the contents of your entire hard drive to a separate device. Regularly copy music, photos, videos, documents, and other important items to an external hard drive, a USB flash drive, or a DVD. Subscribe to a cloud storage provider. Schedule your files to be backed up regularly. Backup plans for mobile devices are less specific. Apps for backing up your smartphone or tablet's content are available. You also can back up a mobile device to your computer's hard drive using synchronization software. Some mobile device manufacturers provide cloud storage solutions.

21. The Internet provides more than 3.5 billion home and business users around the world access to a variety of services. The World Wide Web is one of the widely used services of the Internet.

22. The Internet is a worldwide collection of computer networks that connects millions of businesses, government agencies, educational institutions, and individuals. Many everyday devices and objects or "things" are equipped with sensors that transmit data to and from the Internet, collectively called the Internet of Things (IoT). Some uses of the Internet include email, instant messaging, VoIP, and FTP.

23. The web consists of a worldwide collection of electronic documents. Each electronic document on the web is called a webpage.

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24. A browser is software that enables users with an Internet connection to access and view webpages on a computer or mobile device. A search engine is software that finds websites, webpages, images, videos, news, maps, and other information related to a specific topic.

25. An online social network, also called a social networking site, is a website that encourages members in its online community to share their interests, ideas, stories, photos, music, and videos with other registered users.

26. With Facebook, you share messages, interests, activities, events, photos, and other personal information — called posts — with family and friends. You also can "like" pages of celebrities, companies, products, etc. With Twitter, you "follow" people, companies, and organizations in which you have an interest to stay current with the daily activities of those you are following via their Tweets. On LinkedIn, you share professional interests, education, and employment history, and add colleagues or coworkers to your list of contacts.

27. Services of the Internet that facilitate communications include email, messaging services, VoIP, and FTP.

28. Malware is software that typically acts without a user's knowledge and deliberately alters the computer's or mobile device's operations. Protect your computer by following these practices: use virus protection software; use a firewall; be suspicious of all unsolicited email and text messages; disconnect your computer from the Internet; download software with caution; close spyware windows; before using any removable media, scan it for malware; keep current with the latest updates for your computer software; and back up regularly.

29. Users use online social networks to share their photos, videos, journals, music, and other personal information publicly. Risks include sharing information that would allow others to identify or locate you, and disclosing identification numbers, user names, passwords, or other personal security details. To create a strong password: avoid using personal information; use at least eight characters; use a variety of uppercase and lowercase letters, numbers, punctuation marks, and symbols; change your password frequently; do not use the same password for all websites you access; use a passphrase; avoid common number or letter sequences; memorize all of your passwords, or store them securely using a password management app on your computer or mobile device; and use online tools to evaluate password strength.

30. Prolonged or improper computer and mobile device use can lead to injuries or disorders of the hands, wrists, elbows, eyes, neck, and back. With the growing use of earbuds and headphones, some users are experiencing hearing loss. Two behavioral health risks are technology addiction and technology overload. Technology addiction occurs when someone becomes obsessed with using technology. Individuals suffering from technology overload feel distressed when deprived of computers and mobile devices.

31. Strategies that support green computing include recycling, using energy efficient hardware and energy saving features, regulating manufacturing processes, extending the life of computers, and immediately donating or properly disposing of replaced computers.

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32. Software consists of a series of related instructions, organized for a common purpose, that tells the computer what tasks to perform and how to perform them. Software also is called a program.

33. An operating system is a set of programs that coordinates all the activities among computer or mobile device hardware. It provides a means for users to communicate with the computer or mobile device and other software. Many of today's computers and mobile devices use a version of Microsoft's Windows, Apple's Mac OS, Apple's iOS, or Google's Android.

34. A desktop app is an application stored on a computer. A web app is an application stored on a web server that you access through a browser. A mobile app is an application you download from a mobile device's app store or other location on the Internet to a smartphone or other mobile device.

35. A software developer is someone who develops programs and apps or writes the instructions that direct the computer or mobile device to process data into information.

36. A communications device is hardware capable of transferring items from computers and devices to transmission media and vice versa. Examples of wireless communications technologies include Wi-Fi, Bluetooth, and cellular radio.

37. A hot spot is a wireless network that provides Internet connections to mobile computers and devices. Wi-Fi hot spots provide wireless network connections to users in public locations, such as airports and airplanes, train stations, hotels, convention centers, schools, campgrounds, marinas, shopping malls, bookstores, libraries, restaurants, coffee shops, and more. Bluetooth hot spots provide location-based services, such as sending coupons or menus, to users whose Bluetooth-enabled devices enter the coverage range.

38. Home networks save the home user money and provide many conveniences, allowing the users to: connect to the Internet at the same time; share a single high-speed Internet connection; access photos, music, videos, and other content on computers and devices throughout the house; share devices such as a printer, scanner, or external hard drive; play multiplayer games with players on other computers and mobile devices in the house; connect game consoles to the Internet; subscribe to and use VoIP; and interact with other devices in a smart home. Some reasons that businesses network their computers and devices together include the following: facilitate communications; share hardware; and share data, information, and software.

39. When you synchronize computers and mobile devices, you match the files in two or more locations with each other. With a one-way sync, also called mirroring, you add, change, or delete files in a destination location, called the target, without altering the same files in the original location, called the source. In two-way sync, any change made in one location also is made in any other sync location. Strategies for keeping your files in sync include the following: use a cable and software, use cloud storage, and use web apps.

40. Crowdsourcing is the practice of involving a large group of people — the crowd — to collectively contribute time, services, funds, expertise, or ideas to a project, cause, or other goal.

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Many crowdsourcing activities today are organized and promoted via online social networks, websites, or apps.

41. Digital technology offers flexibility and a revised classroom setting, including allowing students to bring their own devices; virtual field trips; games and simulations; interactive whiteboards; share projects; and 3-D printers.

42. People in the United States access government websites to view census data, file taxes, apply for permits and licenses, pay parking tickets, buy stamps, report crimes, apply for financial aid, and renew vehicle registrations and driver's licenses. Many people and companies use online banking or finance software to pay bills, track personal income and expenses, manage investments, and evaluate financial plans. You can purchase just about any product or service on the web, including groceries, flowers, books, computers and mobile devices, music, movies, airline tickets, and concert tickets, from an online retailer. You can use computers and mobile devices to listen to audio clips or live audio; watch video clips, television shows, or live performances and events; read a book, magazine, or newspaper; and play a myriad of games individually or with others. Hospitals and doctors use computers and mobile devices to maintain and access patient records; computers and mobile devices monitor patients' vital signs in hospital rooms and at home; patients use computers to manage health conditions, such as diabetes; robots deliver medication to nurses' stations in hospitals; computers and computerized devices assist doctors, nurses, and technicians with medical tests; doctors use the web and medical software to assist with researching and diagnosing health conditions; doctors use email, text messaging, and other communications services to correspond with patients; patients use computers and mobile devices to refill prescriptions, and pharmacists use computers to file insurance claims and provide customers with vital information about their medications; surgeons implant computerized devices, such as pacemakers, that allow patients to live longer; surgeons use computer-controlled devices to provide them with greater precision during operations; medical staff use virtual reality (VR) to simulate education and training environments, and patients use VR for recovery treatments; and medical staff create labels for medicine, hospital ID bracelets, and more. Scientists use computers to assist them with collecting, analyzing, and modeling data. Scientists also use the Internet to communicate with colleagues around the world. GPS technology assists travelers with creating maps, determining the best route between two points, locating a lost person or stolen object, monitoring a person's or object's movement, determining altitude, calculating speed, and finding points of interest. Many websites offer services to the public where you can search for and compare flights and prices, order airline tickets, or reserve a rental car. Many publishers of books, magazines, newspapers, music, film, and video make their works available online. Computer-aided manufacturing (CAM) refers to the use of computers to assist with manufacturing processes, such as fabrication and assembly.

43. A blog is an informal website consisting of time-stamped articles (posts) in a diary or journal format, usually listed in reverse chronological order. Podcasts are a popular way to distribute audio or video on the web. A podcast is recorded media that users can download or stream to a

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computer or portable media player. A wiki is a collaborative website that allows users to create, add to, modify, or delete the content via their browser.

44. A home user is any person who spends time using technology at home. A small/home office user includes employees of companies with fewer than 50 employees, as well as the self-employed who work from home. A mobile user includes any person who works with computers or mobile devices while away from a main office, home, or school. A power user is a user who requires the capabilities of a powerful computer. An enterprise has hundreds or thousands of employees or customers who work in or do business with offices across a region, the country, or the world. Each employee or customer who uses computers, mobile devices, and other technology in the enterprise is an enterprise user.

CHECKPOINT

TRUE/FALSE (REWRITTEN AS TRUE SHOW ONE POSSIBLE SOLUTION)	MATCHING
1. T	H
2. F Rewritten as true: An all-in-one does not contain a separate tower.	A
3. F Rewritten as true: A wearable device or wearable is a small, mobile computing consumer device designed to be worn.	I
4. F Rewritten as true: Information conveys meaning to users, and data is a collection of unprocessed items, which can include text, numbers, images, audio, and video.	F
5. F Rewritten as true: Earbuds are a type of output device.	J
6. F Rewritten as true: A scanner is a light-sensing input device.	G
7. T	C
8. F Rewritten as true: A hard disk contains one or more inflexible, circular platters that use magnetic particles to store data, instructions, and information.	E
9. F Rewritten as true: The terms, web and Internet, are not interchangeable.	D
10. T	B
11. T	
12. T	

PROBLEM SOLVING

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These exercises ask students to solve practical computer problems by using outside resources available to them, including but not limited to a computer or mobile device, articles on the web or in print, blogs, podcasts, videos, television, user guides, other individuals, and electronics or computer stores. Tip Sheets, which are suggested starting points for the Problem Solving exercises, are included with your Instructor Resources. Answers may vary.

HOW TO: YOUR TURN

These hands-on activities solidify the concepts presented in the module with practical application. Answers may vary.

INTERNET RESEARCH

In these exercises, students use various web resources to discover additional information related to this module. Encourage students to use their browsers and the link in each exercise or a search engine to complete selected exercises. Answers will vary for the Making Use of the Web, Social Media, Search Skills, Security, and Cloud Services exercises.

CRITICAL THINKING

Thought-provoking situations exercise students' minds and challenge them to construct creative solutions. The Critical Thinking exercises are intended to be discussed or presented in class, assigned for student research, or completed as a team. The Case Study will provide students with a common framework within to explore and find answers as they complete the modules in the book. Answers will vary.

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Discovering Computers 2018: Digital Technology, Data, and Devices

Module One: Introducing Today's Technologies: Computers, Devices, and the Web

A Guide to This Instructor's Manual:

We have designed this Instructor's Manual to supplement and enhance your teaching experience through classroom activities and a cohesive summary at the end of each module.

This document is organized chronologically, using the same headings found in the textbook formatted in **red** for easy visibility. Below each heading you will find (in order) the following: Lecture Notes that summarize the section; Figures and Boxes found in the section, if any; Teacher Tips; Classroom Activities; and Lab Activities. Pay special attention to teaching tips and activities geared toward quizzing your students, enhancing their critical thinking skills, and encouraging experimentation within the software.

In addition to this Instructor's Manual, our Instructor's Resources also contain PowerPoint presentations, test banks, and other supplements to aid in your teaching experience.

SAM:

This text is available with SAM Assessment, Training, and Projects that map directly to the learning objectives covered in each module. SAM's active, hands-on training and skill-based assessment help you master Microsoft Office skills. SAM Projects let you apply skills in real-world scenarios using the actual Microsoft Office applications. Immediate feedback and comprehensive study guides give you the practice and support you need to succeed.

If you have a SAM account, login at *www.cengage.com/sam*. To obtain a SAM account, visit *www.cengagebrain.com* or contact your instructor or bookstore for additional information.

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Glossary of Secondary Terms

Module Objectives

Students will have mastered the material in Module One when they can:

- Differentiate among laptops, tablets, desktops, and servers
- Describe the purpose and uses of smartphones, digital cameras, portable and digital media players, e-book readers, wearable devices, and game devices
- Describe the relationship between data and information
- Briefly explain various input options (keyboards, pointing devices, voice and video input, and scanners), output options (printers, displays, and speakers), and storage options (hard disks, solid-state drives, USB flash drives, memory cards, optical discs, and cloud storage)
- Differentiate the web from the Internet, and describe the relationship among the web, webpages, websites, and web servers
- Explain the purpose of a browser, a search engine, and an online social network
- Briefly describe digital security risks associated with viruses and other malware, privacy, your health, and the environment
- Differentiate between an operating system and applications
- Differentiate between wired and wireless network technologies, and identify reasons individuals and businesses use networks
- Discuss how society uses technology in education, government, finance, retail, entertainment, health care, science, travel, publishing, and manufacturing
- Identify technology used by home users, small/home office users, mobile users, power users, and enterprise users

Today's Technology (p. 1-2)

LECTURE NOTES

- Discuss the role of computers in communication and in everyday life
- Use Figure 1-1 to define digital literacy

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FIGURES AND TABLES

Figure — 1-1

TEACHER TIP

As a way of explaining the term digital literacy or computer literacy, invoke this quotation from Dan Bricklin, creator of VisiCalc (the first successful spreadsheet program). He emphasizes that digital literacy implies a general knowledge of computers. "What does it mean to be computer literate? It does not mean knowing how to use a particular program, it means knowing how to use a computer. Car literate doesn't mean knowing how to drive the particular car you learned on, it means being able to get into any car on any road and drive."

CLASSROOM ACTIVITIES

1. Assign a Project: The place of computers in today's schools can be an interesting discussion topic. Advocates argue that computers add interest, reinforce skills, and even improve behavior. Critics claim that computers promote superficial thinking, lead to shortened attention spans, and even damage vision and posture. Consider having students debate the merits of computer use in schools. Students can find many works, such as Lynne Schrum and Barbara Levin's *Leading 21st-Century Schools: Harnessing Technology for Engagement and Achievement*, to support the inclusion of computers. Books such as Jane Healy's *Failure to Connect: How Computers Affect Our Children's Minds and What We Can Do about It* and Mark Bauerlein's *The Dumbest Generation: How the Digital Age Stupefies Young Americans and Jeopardizes Our Future* present a less optimistic view of computer use in schools.

2. Assign a Project: News about technology — both for good and for worse — is reported daily. Consider setting up a blog on which students could post technology-related articles for class discussion. Some popular technology magazines offer special rates for students and instructors. Technology can be a fascinating area of study. For example, biophysicists recently have experimented with using computer technology to treat visual impairments — implanting a computer chip in the eye or using a digital camera attached to a small computer that stimulates electrodes in the visual cortex. Have students do an extra-credit project on innovative uses of technology.

3. Quick Quiz:

1) What does digital literacy involve? (Answer: It involves having a current knowledge and understanding of computers, mobile devices, the Internet, and related technologies.)

4. Critical Thinking: "To err is human, but to really foul things up requires a computer." This anonymous quote, from a 1982 BBC radio broadcast, reflects the way many people once felt about computers. In 1982, few people owned a personal computer, and only a few more had much confidence in them. Since that time, however, over a billion personal computers have been purchased. Today, the majority of Americans owns a computer or mobile device. Even people who do not own their own computers often can access them through work, schools, libraries, and community centers. Has the increasingly widespread availability and use of computers changed people's feelings about them? If so, how? Are people today more optimistic about the impact of computers than people were a generation ago? Why?

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Computers (p. 1-3)

LECTURE NOTES

- Define computer
- Distinguish between input and output
- Define hardware
- Define personal computer (PC)
- Define mobile computer
- Define user
- Use Figure 1-2 to define laptop or notebook computer
- Use Figure 1-3 to define tablet, including the slate style of tablet
- Use Figures 1-4a and 1-4b to define desktop, including tower-style desktops and all-in-one desktops
- Use Figure 1-5 to define server

FIGURES AND TABLES

Figures — 1-2, 1-3, 1-4a, 1-4b, 1-5

BOXES

1. Consider This: *If a slate tablet has no keyboard, how do you type on it?* Discuss the on-screen keyboard with students, along with the physical keyboard that attaches to or wirelessly communicates with the tablet.

2. How To 1-1: *Interact with a Touch Screen*. Review the descriptions and common uses of each of the touch screen gestures in the table.

3. BTW: *Desktop.* Offer an explanation of the term, desktop, on tablets, laptops, and desktop computers.

4. Consider This: *Which type of computer — laptop, tablet, or desktop — is best?* Challenge students to consider the circumstances under which each of these types of computers would be well suited to that situation. Discuss why a larger display would be preferred.

5. BTW: *Online.* Provide a definition of the word, online.

CLASSROOM ACTIVITIES

1. Assign a Project: Computers have a singularly ubiquitous (being or appearing everywhere at the same time) presence. Watching television, driving a car, using a credit card, and even ordering fast food, not to mention typing a term paper on a laptop, all involve computers. For one day, have students make a list of each computer they encounter (be careful not to limit themselves just to the computers they see). How is the computer used? Why? How was the same task that the computer performs done before computers?

2. Class Discussion: Have students describe personal computers with which they are familiar. How was the computer used? What factors influence the choice of a personal computer? In addition to such obvious considerations as processing speed and amount of memory, less apparent factors, such as available software or even the computer's "footprint" (the amount of space it occupies on the work surface), also might be important.

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3. Quick Quiz:
   1) Which touch screen gesture allows you to move an object around the screen? (Answer: slide)
   2) A tower-style desktop uses the same case to house the screen and the processing circuitry for a desktop. True or false? (Answer: False)
   3) What is a server? (Answer: a computer dedicated to providing one or more services to other computers or devices on a network)

4. Critical Thinking: Because they are portable, laptops often are more convenient and can be used more often. Desktop computers, however, tend to be less expensive and more reliable — one industry analyst estimates that laptop users call for support 10 to 20 times more frequently than desktop computer users. In addition, if a desktop computer component, such as the keyboard, fails, it is simple to get a replacement. When a laptop component fails, the whole computer must be serviced. Laptop repairs typically are more expensive than desktop computer repairs. What are the merits of laptop versus desktop computers?

5. Critical Thinking: What makes personal computers "personal"?

Mobile and Game Devices (p. 1-5)

LECTURE NOTES

- Define mobile device
- Explain what is meant by the term, Internet-capable
- Use Figure 1-6 to define smartphone
- Review the four types of messages you can send with smartphones: voice mail message, text message, picture message, and video message
- Use Figure 1-7 to define digital camera
- Use Figure 1-8 to define portable media player, earbuds, and digital media player or streaming media player
- Use Figure 1-9 to define e-book reader (electronic book reader, or e-reader) and e-book
- Use Figure 1-10 to define wearable devices, including an activity tracker and a smartwatch
- Use Figure 1-11 to define game console and to distinguish between a game console and a handheld game device

FIGURES AND TABLES

Figures — 1-6, 1-7, 1-8, 1-9, 1-10, 1-11

BOXES

1. Consider This: *Are mobile devices computers?* Discuss which attributes of smartphones make mobile devices be categorized as computers.

2. BTW: *Messaging Services.* Caution students about the cost implications of sending text, picture, and video messages via a smartphone.

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3. Ethics & Issues 1-1: *Should It Be Legal to Use a Hands-Free Device while Driving?* Encourage students to engage in this debate. What are the arguments for and against this practice?

4. Consider This: *Are digital cameras, portable media players, e-book readers, and handheld game devices becoming obsolete because more and more smartphones and tablets include their functionality?* Discuss the concept of digital device convergence and ask students to list reasons why a user might purchase separate stand-alone devices.

5. Tech Feature 1-1: *Gaming and Digital Home.* Review the wide variety of game accessories and input techniques — and the categories of games themselves. Also discuss home automation and the wide variety of features available today. Survey students about their experience with all of these options.

CLASSROOM ACTIVITIES

1. Class Discussion: Ask if students have ever used a mobile device in signing for a package or other delivery. What are other industries that have made good use of the handheld technology that mobile devices represent?

2. Assign a Project: Greenpeace issued a report examining the environmental friendliness of the three leading game consoles — and all of them tested positive for various hazardous chemicals. The analysis detected the use of hazardous chemicals and materials in Nintendo's Wii, Sony's PlayStation, and Microsoft's Xbox. With the game consoles market one of the fastest growing in consumer electronics — over 60 million game consoles have been sold, for example — this issue in the field of green computing is only going to become more significant. Have students research technology that manufacturers can use to design out harmful toxins and produce cleaner gaming systems.

3. Quick Quiz:

1) Which of the following is NOT a popular type of message you can send with smartphones? a) text message, b) picture message, c) video message, or d) media message (Answer: d)
2) The trend of computers and devices with technologies that overlap is called digital integration. True or false? (Answer: False)

Data and Information (p. 1-10)

LECTURE NOTES

- Use Figure 1-12 to define data, information, storage and processes
- Explain what an input device is
- Use Figure 1-13 to review available kinds of keyboards
- Explain what a pointing device is, and use Figure 1-14 to show a mouse and a touchpad
- Use Table 1-1 to review the descriptions and common uses of mouse operations
- Use Figure 1-15 to discuss the use of voice and video input
- Explain what a microphone, headset, and webcam are
- Use Figure 1-16 to define scanner
- Explain what an output device is
- Use Figure 1-17 to discuss the use of printers
- Define hard copy or printout

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- Use Figure 1-18 to discuss the use of displays
- Use Figure 1-19 to discuss the use of speakers, earbuds, and headphones
- Explain the role of memory and storage media, and discuss what a storage device is
- Use Figure 1-20 to discuss a hard disk
- Use Figures 1-21 through 1-24 to discuss the following storage devices: solid-state drives, external hard drives, USB flash drives, and memory cards
- Use Figure 1-25 to discuss the use of optical discs
- Use Figure 1-26 to discuss the use of cloud storage

FIGURES AND TABLES

Figures — 1-12, 1-13, 1-14, 1-15, 1-16, 1-17, 1-18, 1-19, 1-20, 1-21, 1-22, 1-23, 1-24, 1-25, 1-26;
Table 1-1

BOXES

1. BTW: *Mobile Computer Input.* Discuss the familiar input options that are available for laptop users (keyboard and mouse).

2. Consider This: *What is another example of data and its corresponding information?* Review the example in the text that offers a clear distinction between data and information in a context that is very familiar to students.

3. Consider This: *What can you do to ease eyestrain while using a computer or mobile device?* Discuss the practical tips provided in the text for optimal use of computers and mobile devices.

4. Consider This: *How can you protect your hearing when using earbuds or headphones?* Discuss ways to protect your hearing and avoiding permanent hearing loss. Also discuss personal preferences when listening to music through headphones or earbuds, including volume.

5. BTW: *Disk vs. Disc.* Review the significance (and applications) of the two different spellings of the word.

6. Consider This: *What is an external hard drive?* Define external hard drive, and then review the differences and similarities to an internal hard disk.

7. BTW: *Hard Drives.* Define the term, hard drive.

8. Consider This: *What is the general use for each type of local storage media?* Define file, and then review the types of files for which each of the different types of storage media typically is used.

9. Secure IT 1-1: *Backing Up Computers and Mobile Devices.* Discuss cloud storage solutions, and review the components of a backup plan.

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CLASSROOM ACTIVITIES

1. Class Discussion: Ask students what storage devices they have used and for what purpose (e.g., burning music on CDs, playing movies on DVD, or placing files on removable storage media, such as USB flash drives). Have students suggest other examples of storage devices (magnetic tape, PC Cards, and so on).

2. Critical Thinking: Challenge students to give examples of data and information. Encourage them to explain why they classified each example as they did. Clifford Stoll — lecturer, computer security expert, and author of *Silicon Snake Oil: Second Thoughts on the Information Superhighway* — notes a wide gap between data and information. Information, Stoll writes, has a pedigree, or lineage. Its source is known, whether it is by a respected professor or a seventh grader. "The Internet has great gobs of data," Stoll maintains, "and little, little information." Students familiar with the Internet might be interested in discussing Stoll's observation. Is Stoll right?

3. Critical Thinking: On the subject of data and information, ask students to recall instances of a computer error with which they are personally familiar. How might human blunders have resulted in the "computer error"? Why are people apt to blame computers?

LAB ACTIVITIES

1. If possible, visit the school computer lab or use a computer setup in the classroom to familiarize students further with the kinds of storage media described in the text.

The Web (p. 1-17)

LECTURE NOTES

- Use Figure 1-27 to discuss the Internet
- Explain that the World Wide Web (or web) is one of the most widely used services on the Internet
- Review some of the online tasks that users perform on the web
- Use Figure 1-28 to explain what the web and its webpages are, and to explain what a link (hyperlink) is
- Define surfing the web
- Define website and web server
- Explain what a browser is, and refer students to How To 1-2 for instructions about using a browser to display a webpage
- Explain what a search engine is, and refer students to How To 1-3 for instructions about the use of a search engine for performing a basic web search
- Use Figure 1-29 to discuss an online social network (social networking site)
- Review some of the other services available on the Internet — in addition to the web — like email, IM, VoIP, and FTP

FIGURES AND TABLES

Figures —1-27, 1-28, 1-29

BOXES

1. Consider This: *How do I access the Internet?* Discuss the different methods of accessing the Internet and why students would subscribe to an ISP. Discuss the Internet of Things (IoT).

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2. Consider This: *Are the web and Internet the same?* Debunk what is perhaps one of the biggest misunderstandings in this subject area: the conflation of the concepts of the Internet and the web.

3. BTW: *Downloading.* Define this term.

4. How To 1-2: *Use a Browser to Display a Webpage*. Review the steps to use a browser to display a webpage using a computer or mobile device.

5. How To 1-3: *Perform a Basic Web Search.* Review the steps to conduct a web search using search text in a search engine on a computer or mobile device.

6. BTW: *Blogs.* Explain that posts on Twitter constitute a blog because of the nature of its journal format.

7. Consider This: *How do Facebook, Twitter, and LinkedIn differ?* Review the three online social networks listed in the text and discuss the uses of each.

8. Ethics & Issues 1-2: *Should You Be Required to Obtain Permission before Posting Photos of Others?* Encourage students to engage in this debate — and also to search for their own names online as mentioned in the text and to take the steps necessary to protect their online reputation.

CLASSROOM ACTIVITIES

1. Class Discussion: Ask students to list other tasks that they perform on the web besides the ones listed in the text.

2. Class Discussion: Ask students if they have ever created a webpage or website. If so, what type of information did they provide on that webpage or website?

3. Quick Quiz:
   1) What can a webpage contain? (Answer: text, graphics, audio, and video)
   2) The web is a worldwide collection of computer networks that connects millions of businesses, government agencies, educational institutions, and individuals. True or false? (Answer: False)

Digital Security and Privacy (p. 1-22)

LECTURE NOTES

- Review the protection that users must afford to their computers and mobile devices as well as the health risks and environmental issues associated with the use of these devices
- Define malware and refer students to Secure IT 1-2 for guidelines for the protection of their computer and mobile device
- Discuss the role of privacy in the digital era in terms of the information that is available about individuals online and the need to secure your own information through the judicious use of email, online social networks, and passwords
- Refer students to Secure IT 1-3 for tips on creating strong passwords
- Review some of the health concerns associated with prolonged or improper computer use

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- Define e-waste and green computing, and discuss some of the environmental issues that have arisen with the advent of computing technology

BOXES

1. BTW: *Malware.* Discuss the onslaught of malware that users face in the contemporary computing environment.

2. Secure IT 1-2: *Protection from Viruses and Other Malware.* Explain what an antivirus program is, and review the precautions that must be taken to prevent the infection of a computer by computer viruses and other malware.

3. Secure IT 1-3: *Creating Strong Passwords.* Review the guidelines for creating strong passwords.

4. Consider This: *How can you contribute to green computing?* Review habits that can reduce the environmental impact of computing.

TEACHER TIP

It is impossible to overstate the importance of protecting your computer and mobile device from viruses and other malware. As a possible activity, encourage students to research the latest products available for protection from malicious software, as a way to encourage them to make sure that they have coverage for their own devices.

CLASSROOM ACTIVITIES

1. Class Discussion: Present students with a series of passwords that you have created and ask them to gauge, using the guidelines in the text, which are strong and which are weak passwords.

2. Quick Quiz:
   1) What is the term for software that acts without a user's knowledge and deliberately alters the computer's operations and mobile device's operations? (Answer: malware, or malicious software)
   2) What does green computing involve? (Answer: reducing the electricity consumed and environmental waste generated when using a computer)

Programs and Apps (p. 1-24)

LECTURE NOTES

- Define software, or program
- Review the two categories of software: system software and application software
- Use Figure 1-30 to discuss operating systems
- Explain what an application (or app) is, and use Table 1-2 to review categories of applications
- Differentiate among a desktop app, a web app, and a mobile app
- Discuss the process of installing software, and explain what it means to load software
- Explain what a user interface is
- Discuss the role of the software developer in creating programs and apps using Figures 1-31a and 1-31b

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FIGURES AND TABLES
Figures — 1-30, 1-31a, 1-31b;
Table — 1-2

BOXES
1. Consider This: *How do you know if a program will run on your computer?* Review the significance of specifications for a program in order to determine that it is one that you can use on your computer or device.

TEACHER TIP
Help students to understand the difference between computer hardware and computer software. A CD or DVD is hardware; however, the programs stored on it are software. Mention different types of software instructions. If possible, show an example of a software package. Explain the purpose of an interface.

CLASSROOM ACTIVITIES
1. Class Discussion: Ask how many students have purchased software packages or mobile apps. What type of application did they buy? In the case of desktop apps, did they purchase it in a physical store or via a download from the web? What information was on the software package (or on the webpage for the download)? Software packages and websites for downloading usually stipulate hardware requirements, such as processor speed and memory capacity.

2. Class Discussion: Ask students to describe the experience of working with a user interface that they remember being difficult to use. Why was it difficult to use?

3. Class Discussion: Ask students to guess the cost of various applications. Write student estimates on the board, and compare them to the prices shown in current advertisements.

4. Assign a Project: Developing icons for a graphical user interface is not an easy task. Although a good icon need not be a work of art, it must be a memorable symbol of the task it represents. According to Susan Kare, creator of the icons used with many popular GUIs, "The best icons are more like traffic signs than graphic illustrations." Have students choose three commonplace activities, and, using three sheets of graph paper, create an icon to represent each. Color the appropriate squares on the graph paper to create the image for each icon. On the back of the graph paper, have students explain why the icon is suitable for the activity chosen.

LAB ACTIVITIES
1. If possible, ask students to go into the computer lab and see examples of different kinds of operating system software and application software.

Communications and Networks (p. 1-27)

LECTURE NOTES
- Use Table 1-3 to review uses of communications technologies

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- Use Figure 1-32 to define communications device, and discuss the differences in the technologies shown at work in this figure
- Review the wireless communications technologies listed in the text: Wi-Fi, Bluetooth, and cellular radio
- Describe the capabilities available to home and business networks
- Use Figure 1-33 and Tech Feature 1-2 to define network and resources
- Discuss the capabilities available to users of home networks and business networks

FIGURES AND TABLES

Figures — 1-32, 1-33;
Table 1-3

BOXES

1. BTW: *The Internet.* Discuss the significance of the Internet.

2. Tech Feature 1-2: *Staying in Sync.* Define synchronize (or sync). Survey students about their experience using synchronization to keep multiple computers and mobile devices working in harmony.

CLASSROOM ACTIVITIES

1. Class Discussion: After surveying students about their familiarity with the communications technologies listed in the text, ask them to identify circumstances in which some or all of the available technologies could be particularly useful.

2. Quick Quiz:
   1) What is a network? (Answer: a collection of computers and devices connected together, often wirelessly, via communications devices and transmission media)
   2) What is a communications device? (Answer: hardware capable of transferring items from computers and devices to transmission media and vice versa)

Technology Uses (p. 1-31)

LECTURE NOTES

- Discuss the areas in which people interact with computers and technology
- Use Figure 1-34 to discuss how computers and mobile devices are used in local, state, and federal agencies
- Review how people use computers to manage their finances, and discuss online investing
- Use Figure 1-35 to discuss the impact of technology on retail in terms of the steps involved in a purchase made from an online retailer
- Define streaming, and review the role of computers and mobile devices in the entertainment industry
- Use Figure 1-36 to point out the widespread use of computers in the health care industry
- Define neural network, and discuss the use of computers in all branches of science
- Use Figure 1-37 to discuss how computers are used in the travel industry
- Use Figure 1-38 to discuss the use of computers and associated equipment by publishers
- Define blog, podcast, and wiki
- Use Figure 1-39 to define computer-aided manufacturing (CAM), and discuss the use of computers in manufacturing

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FIGURES AND TABLES

Figures —1-34, 1-35, 1-36, 1-37, 1-38, 1-39

BOXES

1. Consider This: *How does technology impact crowdsourcing?* Define crowdsourcing, and discuss how it is promoted via online social networks, websites, or apps.

2. Tech Feature 1-3: *Digital School*. Discuss the digital school, virtual field trips, games and simulations, mobile devices/tablets, 3D printers, share projects, and interactive whiteboards.

3. Secure IT 1-4: *Shopping Safely Online*. Review tips that can help students shop online safely.

4. Consider This: *Can I make copies of songs or other media that I have purchased and downloaded from a legitimate website, such as iTunes?* Discuss legal copyright issues and sharing music.

5. Ethics & Issues 1-3: *Should Wikis Be Allowed as Valid Sources for Academic Research?* Explain the reluctance of educators and librarians to consider wikis for academic research, and encourage students to engage in this debate, perhaps citing their own experience with wikis, either as a participant or in the course of their academic research.

TEACHER TIP

Computers have touched fields that some might consider surprising. When the Denver Broncos football team won its first Super Bowl, one of the recipients of a championship ring was not a player or coach, but the head of the team's information systems department that used computers to make player selections and develop game plans. Throughout this section, encourage students to suggest ways in which they have seen computers are used.

CLASSROOM ACTIVITIES

1. Group Activity: Divide the students into teams, and ask them to debate the merit of computers in schools.

2. Class Discussion: Ask students who have participated in online banking or online stock trading to describe their experiences.

3. Assign a Project: A number of important people in the computer industry, including such figures as Gordon Moore, cofounder of Intel, and Steve Wozniak, cofounder of Apple, have expressed concern about who is using computers. They fear that, for cultural, financial, or societal reasons, certain groups of people are more likely to use computers than others. As computers play an increasingly important role in the race for success, this gives some people a head start, while others might be beginning with a handicap. Are computers purchased by individuals from a broad spectrum, or is there a certain type that represents most computer buyers? Have students visit a computer vendor and interview the manager or a salesperson about the demographics of computer buyers at that store. What gender are most buyers? In what age range do they fall? What seems to be the typical educational level? What is the approximate average income of a typical buyer?

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Do buyers tend to share any other characteristics? If their interviews show any trends, what reasons might be behind the results?

4. Assign a Project: Challenge students to a contest in which they imagine the most valuable new use of computer technology, and present their concepts to the class. When each student has presented his or her idea, the class can vote on a winner. This topic gets the students to ponder what the world might be like for their children. This project will be enjoyed by science fiction lovers.

5. Quick Quiz:

1) Which of the following refers to an informal website consisting of time-stamped articles in a diary or journal format, usually listed in reverse chronological order?
   a) wiki, b) b-cast, c) podcast, or d) blog (Answer: d)
2) Some websites support streaming, where you access media content while it downloads. True or false? (Answer: True)

6. Critical Thinking: The industrial revolution changed society similar to what ways in which computers have changed society? What are the differences?

7. Critical Thinking: Many areas develop a vocabulary unique to their discipline, and computer science is no exception. *Wired* magazine's book, *Jargon Watch*, is a dictionary of patter used by computerphiles. The book defines such terms as alpha geek (the most technologically advanced person in an office), meatspace (the real, as opposed to the virtual, world), and scud memo (a memo that does more harm to the writer's standing than to the intended target). Have students visit a local office, or the school's computer lab, and compile their own list of computer-related jargon. Include both the terms and their meanings. What terms are most universally understood? What terms rarely are heard? Will any terms be accepted as status quo in the future? Why or why not?

Technology Users (p. 1-38)

LECTURE NOTES

- List the five categories of computer users: home user, small/home officer user, mobile user, power user, and enterprise
- Use Table 1-4 to discuss the hardware and software requirements for the different categories of users

FIGURES AND TABLES

Table 1-4

CLASSROOM ACTIVITIES

1. Class Discussion: Ask if any students have had corporate computer experience. If so, have them share their experiences with the class, explaining how computers were used in the department where they worked and in any other department with which they were familiar.

2. Class Discussion: Ask students what social networks and privacy settings they use. Discuss sharing passwords with employers and the possible monitoring of accounts.

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3. Assign a Project: Poll students with computers about the types of applications they use — word processing, personal finance, reference, entertainment, educational, communications, browser, and so on. Then ask students to graph the results, perhaps with a spreadsheet program, such as Microsoft Office Excel.

4. Critical Thinking: What impact have computers had on the "interpersonal" side of business (i.e., employee and customer relationships)? How have computers changed people's jobs? Have computers cost any people their jobs? Has any job loss been balanced by the introduction of new, computer-related positions?

LAB ACTIVITIES

1. If the school has a CAD department, arrange for a guided tour.

End of Module Material (p. 1-40)

- **Study Guide** materials reinforce module content.
- **Key Terms** present the terms from the text to help students prepare for tests and quizzes. Students should know each Primary Term (shown in bold-black characters in the module) and be familiar with each Secondary Term (shown in italic characters in the module).
- **Checkpoint** activities provide true/false and matching exercises to reinforce understanding of the topics presented in the module.
- **Problem Solving** activities call on students to relate concepts to their own lives, both personally and professionally, as well as provide collaboration opportunity.
- **How To: Your Turn** activities enable students to learn and to reinforce new practical skills with personally meaningful and applicable exercises.
- **Internet Research** exercises require follow-up research on the web and suggest writing a short article or presenting the findings of the research to the class.
- **Critical Thinking** activities provide opportunities for creative solutions to the thought-provoking activities presented in each module. They are constructed for class discussion, presentation, and independent research and designed for a team environment.

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Glossary of Primary Terms

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- app (1-25)
- application (1-25)
- backup (1-16)
- Bluetooth (1-28)
- browser (1-19)
- cloud storage (1-16)
- communications device (1-28)
- computer (1-3)
- desktop (1-5)
- digital camera (1-7)
- digital device convergence (1-9)
- e-book reader (1-8)
- game console (1-8)
- green computing (1-24)
- hard drive (1-15)
- input device (1-10)
- Internet (1-17)
- laptop (1-3)
- memory (1-15)
- network (1-5)
- online social network (1-21)
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Glossary of Secondary Terms

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