# Instructor’s Manual Exploring Computing Concepts 2016, Chapter 1

## Available Instructor Resources

|  |  |  |
| --- | --- | --- |
| **Resource** | **File Name** | **Found** |
| **Student Data Files** | [Various](#_PROJECTS_AND_EXERCISES), click link to see file list | Online Instructor Resource Center |
| **Solution Files** | [Various](#_PROJECTS_AND_EXERCISES), click link to see file list | Online Instructor Resource Center |
| **Answer Keys** |  | Online Instructor Resource Center |
| Matching | cc01\_answerkey\_match.docx |
| Multiple Choice | cc01\_answerkey\_mc.docx |
| Concepts Checks | cc01\_answerkey\_concepts.docx |
| **Scorecards** | Various, example:  cc01\_b2StockData \_scorecard.xlsx | Online Instructor Resource Center |
| **Scoring Rubrics** | cc01 \_rubric.docx | Online Instructor Resource Center |
| **Annotated Solution Files** | Various, example:  cc01\_b2StockData\_annsolution.pdf | Online Instructor Resource Center |
| **PowerPoint Presentation** | cc01\_powerpoints.pptx | Online Instructor Resource Center |
| **Testbank** | cc01\_testbank.doc | Online Instructor Resource Center |
| **Instructor's Manual (lesson plans incl.)** | cc01\_instructormanual.docx | Online Instructor Resource Center |
| **Assignment Sheet** | cc01\_assignsheet.docx | Online Instructor Resource Center |
| **File Guide** | cc01\_file\_guide.xlsx | Online Instructor Resource Center |
| **Objective Map** | cc01\_objectivesmap | Online Instructor Resource Center |

## CHAPTER OBJECTIVES

### When students have finished reading this chapter, they will be able to:

* Identify types of computer hardware
* Work with software
* Classify networks
* Connect to the Internet
* Identify network components
* Collaborate over the Internet
* Communicate over the Internet
* Get information from the Web
* Understand computer threats
* Protect yourself and your digital property
* Use technology ethically

## CHAPTER OVERVIEW

Students will learn how to identify different types of computers, hardware, and software. They will learn how to connect to and communicate and collaborate on the Internet. Finally, students will learn how to identify various types of computer threats and ways to protect against them, and describe how to use technology ethically.

### The major sections in this chapter are:

1. **Computer Hardware and Software.** In this section, students will learn how to identify different types of computers, input and output devices; describe the CPU, RAM, and virtual memory; and identify devices used to store data. They will also identify desktop and mobile operating systems, describe the primary functions of an operating system, and describe various types of application software and their uses.
2. **The Internet and Networking.** This section covers how to describe the primary ways networks are classified and explains how to connect to the Internet using wired and wireless technology.
3. **Electronic Collaboration and Communication**. This section explains how to collaborate by sharing documents and using online tools as well as methods used to communicate over the Internet. In addition, this section describes web browsers and their functions, and will show how to identify and describe the components of a URL.
4. **Computer Security, Privacy, and Ethics**. In this section, students will learn how hackers, viruses, and malware are threats to computer systems. This section also explains how security software and firewalls protect data and devices from computer threats and describes methods used to backup data. In addition, how to use technology ethically is discussed.

## CLASS RUN-DOWN

1. Have students turn in homework assignments.
2. Talk about the chapter using the discussion questions listed below.
3. Use a PowerPoint presentation to help students understand the chapter content.
4. Have students complete the Capstone Exercise for Computing Concepts.
5. Use MyITLab for in-class work or to go over homework.
6. Give students the homework handout for the next class period.

## LEARNING OBJECTIVES

### At the end of this lesson students should be able to:

* Identify different types of computers
* Identify input devices
* Identify output devices
* Describe the CPU
* Describe RAM and virtual memory
* Identify devices used to store data
* Identify desktop and mobile operating systems
* Describe the primary functions of an operating system
* Describe various types of application software and their uses
* Describe the primary ways networks are classified
* Explain how to connect to the Internet using wired technology
* Explain how to connect to the Internet using wireless technology
* Identify the main components of a simple network
* Explain how to collaborate by sharing documents and using online tools
* Explain the methods used to communicate over the Internet
* Describe Web browsers and their functions; identify and describe the components of a URL
* Explain how hackers, viruses, and malware are threats to computer systems
* Explain how security software and firewalls protect data and devices from computer threats
* Describe methods used to back up data
* Discuss how to use technology ethically

## KEY TERMS

**2-in-1 PC -** A type of personal computer that is similar to a touchscreen laptop, but the monitor can fold or swivel to lie flat, turning the PC into a tablet-like device.

**Academic fair use -** An exception to copyright violation restrictions that enables educators and students to use copyrighted material for educational purposes without requiring specific permission to use the material.

**Adware -** Software that automatically displays or downloads unwanted advertising materials such as pop-ups, or redirects search requests to certain advertising websites.

**All-in-one desktop -** A type of computer that integrates the system unit into a thin and flat-panel monitor, equipped with a high-speed wireless keyboard and mouse.

**Antivirus software -** A type of software used to identify and remove viruses.

**Antispyware software -** A type of software used to remove spyware or to prevent spyware from entering your computer.

**Application software -** Software that is concerned with specific user tasks, such as creating documents, sending email, or working with digital photographs.

**Apps -** Small programs that are designed for a single purpose or to perform a single function.

**Backup -** A copy of files or programs stored in a separate location, so if something goes awry with your computer, you can retrieve your data and programs from the backup location.

**Binary -** A two-state system in which circuits must be either “on” or “off.”

**Binary digit (bit) -** A unit in the binary system that has two possible values: 0 or 1.

**Blog -** A type of Internet communication that represents an online journal.

**Bluetooth -** A wireless communication technology that uses low bandwidth, short-range wireless connections (usually less than 30 feet) between computers and peripherals.

**Broadband -** An Internet connection that divides a transmission path into channels to accommodate more data traffic. Examples include DSL and cable.

**Byte -** A binary representation of one character that contains eight bits.

**Cable -** A popular broadband connection using the same technology as cable television.

**Central processing unit (CPU) -** A silicon chip containing the circuitry that controls all the computer’s activities.

**Chromebook -** A portable computer that only uses Google Chrome OS and operates primarily when connected to the Internet.

**Cloud storage -** A type of file storage system that uses the Internet.

**Commercial software -** Software that you are not allowed to copy.

**Computer virus -** A maliciously written software program that can result in small user annoyances or total destruction of data or system components.

**Cookie -** A text file that is placed on a computer that identifies the user as a returning visitor to a website.

**Copyleft -** A license agreement that comes with freeware, encouraging the user to adapt and redistribute the software and not restrict future copying.

**Data -** Facts that are used to produce usable results (information).

**Desktop computer -** A computer consisting of a separate system unit, monitor, keyboard, and mouse components, typically used in a small business/home situation, and not intended for portability. Also commonly known as a personal computer or a PC.

**Device drivers -** Specialized programs that translate a device’s specific commands into commands the operating system can understand.

**Dial-up -** A very slow Internet connection that uses existing telephone lines.

**Digital camera -** A device that collects pictures and video data in digital format.

**Digital subscriber line (DSL) -** A popular broadband connection that divides existing telephone lines into several channels.

**Domain name -** A part of a URL that identifies a website’s host or the location that maintains the computers that store the website files.

**Email -** A form of asynchronous electronic communication sent over the Internet that is centrally stored and archived. Files in the form of attachments can be sent with the communication.

**Embedded computer -** A specifically designed computer chip that resides in another device, designed to perform some specific task.

**Ethernet network -** An Ethernet network is based on the Ethernet protocol, which is a set of specifications for wired electronic data transmission.

**Fiber optics -** A broadband Internet connection that uses glass fibers to transmit data at the speed of light.

**Firewall -** Software or hardware that prevents unauthorized access to or from a computer connected to the Internet.

**Flash drive -** A small, portable flash memory device that connects to a computer’s USB port. Also known as a USB drive.

**Freeware -** Software that is free that comes with a less restrictive license than other applications software.

**Gigahertz (GHz) -** A measurement (billions of hertz or electrical vibrations per second) used to represent processor speed.

**Hacker -** A person who gains unauthorized access to a computer system for the purpose of stealing information or performing malicious acts.

**Hard disk drive -** The primary storage unit of a computer that stores programs and files for future access.

**Hardware -** The tangible pieces of equipment, such as a computer monitor, printer, mouse, and keyboard in a computer system that are responsible for input, output, processing, and storage of data.

**HDMI port -** The connection for multimedia devices that produce HD audio and video content to a computer.

**Information -** Data that has been organized so that it is usable.

**Inkjet printer -** A type of output device that produces high-quality color graphics and documents at an affordable price.

**Instant messaging (IM) -** A form of Internet communication that enables synchronous communication between two people.

**Intellectual property -** Works such as art, music, writing, and software that are protected by copyright law.

**Internet -** The world’s largest network that connects millions of computers and users around the globe.

**Keyboard -** An input device used to enter data and commands by pressing keys.

**Laptop -** A portable computer, with the monitor, keyboard, system unit, and pointing device all encased together.

**Laser printer -** A type of printer that uses toner cartridges rather than inkjet cartridges. They generally print faster and are less expensive to operate than inkjet printers.

**Light-emitting diode (LED) -** A type of monitor that can provide a more responsive display because the backlights are brighter than the fluorescent lamps in LCDs.

**Liquid crystal display (LCD) -** A flat-panel computer display that is used with desktops and laptop computers.

**Local area network (LAN) -** A type of network that connects nodes within a small geographic area, such as a computer lab at a school.

**Mainframe -** A computer system that is large, fast, and powerful, but smaller than a supercomputer.

**Malware** Software whose purpose is to be harmful, such as some adware, spyware, and scareware.

**Memory card -** Another form of a flash memory data storage device used to store digital information. They are commonly used in digital cameras, mobile phones, laptop computers, MP3 players, and video game consoles.

**Microphone -** A device used for audio input that converts sound waves to a digital format for storage on or manipulation by a computer.

**Mobile broadband -** A means of connecting mobile devices to the Internet by using the same cellular network used by mobile phones to make calls.

**Mobile operating system -** An operating system that combines the features of a personal computer operating system with other features more suited for a smaller mobile device.

**Modem -** A component of a network that connects devices to the Internet.

**Monitor -** An output device that displays text, graphics, and video.

**Motherboard -** The main circuit board of a computer located in the system unit.

**Mouse -** A small, handheld device that enables a user to execute commands, make selections, and open shortcut menus.

**Multifunction printer -** A type of printer that offers the ability to print, scan, copy, and fax all from one unit.

**Network -** Two or more computers (referred to as nodes) connected by software and hardware, making it possible for computers to interact with one another, sharing files and resources.

**Network adapter -** A device that is connected to (or within) each network node to facilitate data transmission within a network.

**Notebook -** A portable computer with the monitor, keyboard, system unit, and pointing device all encased together.

**Operating system -** A program that controls the hardware and software functions of a computer, and provides a user interface.

**Optical storage -** A form of storage in which lasers are used to burn data on the surface of discs. Includes CDs, DVDs, and Blu-ray discs.

**Organic light-emitting diode (OLED) -** A display technology, newer than LCD and LED, that provides higher contrast and better viewing angles because it works without a backlight.

**Path -** A component of a URL that comes after the top-level domain and is separated by a forward slash. It identifies the separate document or page within a website.

**Personal area network (PAN) -** A small network that connects devices close to one person (usually via Bluetooth).

**Phishing -** An email scam in which the sender tries to dupe you into revealing credit card, bank account, or other personal information that could be used to steal your identity.

**Plagiarism -** The result of representing someone else’s words or ideas as your own.

**Printer -** An output device capable of creating paper or hard copy output of both text and color graphics.

**Productivity software -** A category of application software that enables you to accomplish tasks such as writing a Word document, balancing a spreadsheet, or creating a slide presentation.

**Protocol -** A component of a URL, such as HTTP or FTP, that identifies the set of rules used to retrieve a Web document.

**Random access memory (RAM) -** Computer memory that stores data and programs that are currently in use.

**Read-only memory (ROM) -** A form of computer memory built into the motherboard that normally can only be read but not written to.

**Resolution -** The number of pixels that are displayed on a monitor. Image size is often referred to in pixels.

**Router -** A networking device that connects to an Internet modem, enabling several computers to share an Internet connection. A wireless-enabled router must be used to share an Internet connection wirelessly.

**Satellite -** An Internet connection that uses satellites to broadcast data.

**Scanner -** A device that is used to convert existing pictures or text into digital format and then send those images to a computer for manipulation and printing.

**Scareware -** A type of malware that downloads to your computer and displays a notification warning that your computer is infected and prompts you to buy the fake removal tools.

**Shareware -** A type of software that is available for free trial so that you can download and use before purchasing it with a voluntary payment.

**Smartphone -** A type of computer that makes phones calls via a cellular network and has input, processing, memory, output, and storage capabilities. Smartphones are distinguished from cell phones because of their ability to connect to the Internet.

**Software -** A set of instructions that tells a computer what to do.

**Solid state drive (SSD) -** A type of primary storage device that is built around semiconductors and chips rather than a magnetic media used with a traditional hard disk drive.

**Speaker -** An output device that produces sound.

**Spyware -** Software that has been downloaded and installed onto your computer to track your Internet travel, gather personal information, or change computer settings.

**Stylus -** A pen-shaped instrument used to input commands to a computer screen or mobile device by drawing, writing, or selecting options on the touchscreen.

**Supercomputer -** A type of computer system that is the most powerful in the world and used to compute extremely complex situations.

**System software -** Software composed of the operating system and utility programs and is the main software program of a computer system.

**System unit -** The main component of a computer system, containing the processor, memory, and storage devices.

**Tablet -** A mobile computer with an integrated touchscreen and no physical keyboard. Tablets are smaller and lighter than notebook computers and available in various sizes.

**Texting -** A form of SMS (short messaging service) that enables users to send messages between cell phones or from the Web to another cell phone.

**Thrashing -** A situation that occurs when excessive paging operations take place.

**Touchpad -** A touch-sensitive pad built into the keyboard of a laptop or notebook used instead of a mouse to input commands.

**Ultrabook -** A type of mobile computer that omits an optical drive and usually has an SSD instead of a hard drive for storage.

**URL (Uniform Resource Locator) -** The address of a webpage on the World Wide Web.

**USB drive -** A small, portable flash memory device that connects to a computer’s USB port.

**USB port -** A computer connection for devices such as keyboards, scanners, digital cameras, and microphones.

**User interface -** A function of the operating system; the means by which a user interacts with the computer.

**Utility program -** An application that performs special functions related to coordinating system resources and file management.

**Virtual memory -** Temporary memory on the hard drive that is used when RAM is full.

**Vlog (video log) -** An online journal that uses video as the primary content in addition to text.

**Voice over Internet Protocol (VoIP) -** A form of Internet communication that enables you to use your Internet connection as a telephone to make domestic or international calls.

**Web browser -** Software that lets you locate, view, and navigate the Web.

**Webcam -** A type of device that captures live video and picture data.

**Wide area network (WAN) -** A type of network that spans a large physical distance.

**Wi-Fi hotspot -** A wireless Internet access point that is often found in public locations such as restaurants, libraries, and schools.

**Wireless access point (WAP) -** A device that provides a location for wireless units to connect.

**Wireless range extender -** A device that rebroadcasts a wireless signal.

**Wireless fidelity -** Also referred to as Wi-Fi; a means of wireless network and Internet connectivity that uses radio waves.

**Wireless printer -** A device that provides hard copy output through a wireless network connection or via Bluetooth.

## DISCUSSION QUESTIONS

* What does the typical user need to know before upgrading from one version of an operating system to another?
* How would you explain the pros and cons of upgrading an operating system to someone else?
* Is there ever an advantage to waiting to upgrade instead of upgrading as soon as the new version is available?
* How have operating system changes affected how you personally use your computer?
* What is the Open Source initiative?

## CONNECTIONS: PRACTICAL PROJECTS AND APPLICATIONS

* Using the Snipping Tool and WordPad, create a “pictorial” of how to set up picture passwords or PIN logins suitable for sharing with friends or relatives.
* Some institutions may allow students to have access to servers—for file storage, completing coursework, hosting websites, etc. Ask students to determine whether their institution allows this and for what purposes. If allowed, practice accessing servers so that students can become familiar with the difference between their own machines and using a server.
* Security can be an important concern with both Instant Messages (IMs) and Voice Over IP (VoIP). Have students research the vulnerabilities with both types of communication and how they can protect themselves.
* Ask students to translate a phrase they would commonly use for a text message or other brief communication into binary code.
* Research the evolution of business productivity software. What was the first word processing program? The first spreadsheet program? Who used them?
* What is the “digital divide”? How does a lack of access affect people? Remind students “access” can also be limited by censorship―ask students to research some examples of countries that limit their citizens’ access not only to the Internet but to types of technology.

## TEACHING NOTES

### Computer Hardware and Software

In this section, the student will learn about the different types of computers and about the hardware components of a computer. They will also learn about the various types of software that are used to work on computers.

#### Identifying Types of Computer Hardware

* **USB and HDMI Ports**: Connecting all these peripheral devices to your computer may require you to connect the peripheral device to the system unit. The most common connection is the USB port. Because it is such a popular connector, there are usually several USB ports on desktops and laptop computers. To connect multimedia devices that produce HD audio and video content such as TVs, projectors, and optical players to your device, you will need an HDMI port. Other specialized ports may be needed to connect audio/video devices, microphones, speakers, and monitors (Figure 1.7).
* **View Amount of Random Access Memory**: As you evaluate software that you want to purchase, you will need to make sure that your system has at least the required amount of RAM. If you are using the Windows operating system, open Settings from the Start menu or Notifications area, select System, and then select About. This screen also displays information about the operating system version and type of process in your computer.
* **Back Up a Flash Drive**: As tempting as it is, you should never use a flash drive as your primary storage unit because flash drives are small and portable and are also easy to misplace. Make sure that you back up every important file stored on your flash drive on at least one other storage device such as a hard drive.
* **Teaching Tips**: There are a lot of vocabulary words in this chapter. It may be worth your while to discuss with students why all these words and their definitions are important; for instance, knowing the right words to use can make getting technical support a much smoother process.
* **Teaching Tips:** Your students may be confused by the differences between laptop and tablet, or even Mac and PC. Provide as many visual examples as possible.
* **Teaching Tips:** Users of tablets or even laptops with touchpads and smaller keyboard space may find they are inadvertently resting parts of their hands on the touchpad, resulting in inadvertent mouse movements or text selection. You can adjust the sensitivity of a touchpad in Settings or even turn it off if you prefer not to use the touchpad at all.
* **Teaching Tips:** If you can bring in a hard drive that has actual discs to show students, you can demonstrate the origin of the term “crashing.”
* **Teaching Tips:** A visual representation of computer measurements can help students understand the differences.
* **Teaching Tips:** Demonstrate how a flash drive should be ejected from a computer; many users simply remove them without taking the steps needed to properly disconnect the drive. Discuss what consequences there might be to failing to eject a drive―open files, for instance, may be corrupted if they are not closed and the drive correctly ejected.
* **Teaching Tips:** Students often get “bits” and “bytes” confused―the words are very similar.
* **Teaching Tips:** This is often one of the areas where students struggle with the material because it’s “too technical.” Try to relate the material to something they use regularly that they do understand―like letters and words. A bit is like a letter while a byte is analogous to a word.
* **Teaching Tips:** The size and shape of computers has changed significantly over the years. Show students some pictorial examples of early computers, as well as some from the 1980s-1990s. The trend was to make them smaller, but has this trend reversed itself? Some computing devices are becoming larger again.
* **Teaching Tips:** Many students use their laptops or tablets on their laps or other “soft” surfaces. This can be hazardous because these devices can generate a lot of heat, especially when charging, and can be warm enough to burn skin, scorch material, or even start a fire.
* **Teaching Tips:** Some students may be surprised to learn that women were such an integral part of the early history of computing. Ada Lovelace is one of the more well-known names, but some lesser-known women include Henrietta Swan Leavitt, Grete Hermann, actress Hedy Lamarr, the original programmers of the ENIAC, and Admiral Grace Hopper who were all important contributors.
* **Teaching Tips:** Today’s typical college student is often considered a “digital native.” Discuss with students what this term usually means, and ask whether they think it does apply to them. Why or why not?

#### Working with Software

* **Teaching Tips:** Demonstrate the difference, if you can, between the current Windows version of Office and the current Mac version of Office.
* **Teaching Tips:** Toolbars and other “add-ons” can affect a computer’s performance. Users may not think of these items as software, but they are. Use care when adding programs to your computer; pay attention to whether a program includes such “benefits” as a tool bar add-on or other items.
* **Teaching Tips:** Discuss the pros and cons of using open–source productivity software.
* **Teaching Tips:** Free software is often “you get what you pay for.” Discuss why it’s a good idea to research the reviews of a particular “free” software alternative to see what other users experienced. “Free” isn’t really free if you get a virus along with the software you wanted to use, or if it causes your computer to crash.
* **Teaching Tips:** Ask students to define the terms “shrink-wrap license” and “click-wrap license.”
* **Teaching Tips:** Ask students to research and compare the free suites such as OpenOffice and ThinkFree with Microsoft’s subscription service for Office 365. What are the advantages and disadvantages of choosing this service as opposed to the “free” options?

### The Internet and Networking

This section teaches students about the different ways to classify networks, how they can access the Internet, and the hardware components that are found in most networks.

#### Connecting to the Internet

* **Finding a Wi-Fi Hotspot:** Many people use a mobile device daily to access online resources. If you find yourself in an area without ready access to the Internet, you can use a Wi-Fi hotspot, which is a wireless Internet access point. Popular locations for hotspots include restaurants, coffee shops, local libraries, schools, and businesses such as department stores. Some Wi-Fi hotspots are open access, whereas others require a password. Find a hotspot in your community by visiting a website such as www.Wi-Fifreespot.com. You can also download apps, such as Wi-Fi Finder and Free Zone Wi-Fi, to your smartphone to locate a nearby Wi-Fi hotspot. You may also use your smartphone as a hotspot, if it is capable and if you are willing to pay for the necessary data.

In some instances, when Wi-Fi is not available, you can use your smartphone as a mobile hotspot using its cellular data plan and use that connection with other devices. Mobile broadband uses a cellular network, a set of connected geographic areas (cells), centered on a large communications tower with antennas, amplifiers, receivers, and transmitters. As you move with your mobile device, the signal is monitored and switched from the cell with a weakening signal to the next cell with a stronger signal. Mobile broadband standards are 3G, 4G, and 4G LTE, with the difference being greater speed and increased security and reliability.

Bluetooth technology provides wireless communication using low-bandwidth, short-range wireless connections (usually less than 30 feet) between computers and peripherals. A device that is equipped with a small Bluetooth chip can transmit data automatically and wirelessly to another device that is configured to accept the transmission in a secured personal area network. Portable devices such as wearable fitness trackers, headsets, and speakers connect to smartphones via Bluetooth. Wi-Fi sets up a network between computers and devices with the Internet, whereas Bluetooth provides wireless connections between devices. One problem with a wireless network is that obstacles such as refrigerators or walls can interfere with wireless signals. Some cordless phones might disrupt communication as well. Wireless networks also have a slower data transfer rate than wired networks, and as distance between units increases, the connection becomes weaker.

* **Teaching Tips:** Ask your students whether they know how to create a hotspot using their cellphone. Have they ever done it? What do they need to know to do this? What precautions should they take?
* **Teaching Tips:** Ask students what type of Internet connection they have at home. What kind did they have growing up? If you have students from disparate backgrounds, you may get some surprising answers.
* **Teaching Tips:** Discuss how Internet connectivity is part of the digital divide. You may have to define the digital divide first—and ask how this might contribute to access to healthcare, jobs, social benefits, etc.
* **Teaching Tips:** What is the National Broadband Plan–Connecting America? (See broadband.gov.)

#### Identifying Network Components

* **Teaching Tips:** As an informed computer user, it’s a good idea to know what all those lights on the back of your computer and on your router look like when functioning normally—that will help you when you are trying to determine whether something is wrong.
* **Teaching Tips**: Firewalls are actually filters and are typically part of an antivirus program. Sometimes these interfere with the legitimate operation of your computer. Discuss how a user might react if a firewall slows down a system or causes disruption to programs the user needs.
* **Teaching Tips:** Make note of the difference between a telephone jack and a network jack—they often look very similar although the network jack is slightly larger. Sometimes the network jack is a different color but not always.
* **Teaching Tips:** How many home users have a wireless network that isn’t secured? The majority of devices that are Internet-enabled today are equipped for wireless access. What are the vulnerabilities of having an unsecured wireless network? Ask students to research the potential problems, including what illegal uses a “piggybacker” could put your network to. For example, could you prove it wasn’t *you* who downloaded the illegal files on your network?

### Electronic Collaboration and Communication

In this section, students will learn about ways to collaborate and communicate over the Internet.

#### Collaborating over the Internet

* **Teaching Tips:** Ask students if they are familiar with the term wardriving. *Wardriving* is the act of actually driving around while using a portable computer to search for wireless networks. The intent of wardrivers is to map the locations of wireless access points, one of which could be your own home network, if it is unprotected. Once connected, the wardriver can catch a free ride on your internet connection and access information in your files such as passwords and credit card information. Have students research methods to protect their home networks.
* **Teaching Tips:** Sharing documents through Dropbox, or a similar service, should be done with caution. Once you have shared a document, you cannot control what the other parties do with it.
* **Teaching Tips:** Compatibility of software and files is important when collaborating with others online. Show students how to choose a format that is likely to be compatible for other users in Office 2016.
* **Teaching Tips:** When collaborating online, you may wish to password-protect your files. If you choose to do so, you also need to determine how you will communicate that password to the recipient safely.
* **Teaching Tips:** Students might not be aware that they can share files through IM, as with any other type of file sharing, it’s important to know what you are sharing. Files shared through IM can contain viruses or other types of malware.
* **Teaching Tips:** OneDrive, Dropbox, and Google Drive are all ways for users to share information, manage files, and provide reports. Research the features of these services and others like them to determine which might work best for you.

#### Communicating over the Internet

* **Web-Based Versus Client-Based Email**: There are two primary methods of accessing and managing your email. You can use an email client, or you can choose a Web-based email system. Web-based email systems, such as the one established by your Internet service provider, or more generic systems such as Gmail, Yahoo!, and Outlook.com, enable you to access your email from any device connected to the Internet. An email client, such as Outlook, is installed on a single device, so your email is only accessible when it is on that device. However, email clients are usually more full-featured than a Web-based system. Email clients offer built-in calendar and task functionalities, as well as the ability to send and receive meeting requests. You can have the best of both worlds by creating a Web-based email account, then using that account in your email client program.
* **Teaching Tips:** It’s easy for students to confuse Outlook.com and Outlook, especially because they have a similar appearance and many of the same functionalities.
* **Teaching Tips:** While the tip in the book implies Outlook is installed on only one device, if you have a web-based email account, you can install Outlook on multiple devices and connect them all to the same Web-based email service.
* **Teaching Tips:** Discuss why having multiple email accounts can be useful. You may wish to use one particular email address when signing up for online services and another one for job applications. Discuss why it’s important to establish a professional-looking email address for job applications and other business purposes.
* **Teaching Tips**: Ask students about cloud computing. Remind students that if they are using a Web-based email client, such as Gmail, they are already using cloud computing.
* **Teaching Tips**: Most students probably have a favorite IM or chat service, or they might use more than one. Services such as Trillian and Pidgin allow users to IM on multiple services at the same time; for instance, you might have accounts with AIM, Windows Live Messenger, Yahoo!, and Google Talk because friends and/or family members have accounts with those services. Using a service such as Trillian allows you to log into a single service (Trillian) and have access to all of your IM accounts in one place.

#### Getting Information from the Web

* **Evaluating Websites**: As you are aware, the Web contains a wide variety of information, not all of which is appropriate for research. In addition, you cannot assume that all information you find is suitable for your specific needs, even if it does seem “research-worthy. Maybe because the information is out of date, or perhaps it reflects a biased opinion. Therefore, consider the following points to help evaluate whether a website is appropriate for your research needs:
  + Authority: Determine the author of the article or the sponsor of the website to ensure the material has credibility.
  + Bias: Evaluate the content of the website critically to determine if the opinions or information presented favor only one point of view.
  + Relevance: Look for dates or other indicators to determine how current information may be. For information on topics that change frequently, such as technology, ensuring you have the most up-to-date may be critical.
  + Audience: Evaluate the website for the tone or style to determine if it matches your needs.
  + Links: Check to see if the links provided in the article or website are still active and current. Do not assume they are the only additional sources of information for your topic. Investigate other sites as well.
* **Teaching Tips:** To demonstrate how content on the web is not always reliable, have students research the hazards of dihydrogen monoxide.
* **Teaching Tips:** Have students compare the results they get for the same search term when using different search engines. The results can be very different.
* **Teaching Tips:** Discuss how search engines determine what should be at the top of any given search term’s “hit list.”
* **Teaching Tips:** Discuss why Wikipedia is not usually accepted as a creditable source for research papers. A good example is the story of John Siegenthaler, Jr.

### Computer Security, Privacy, and Ethics

In this section, students will learn about the various types of risks that can threaten their computing experience and how to protect themselves and their digital property from these threats. In addition, they will learn about how to use technology ethically.

#### Understanding Computer Threats

* **Teaching Tips:** Users often choose ease of use over security. Ask students to review their own habits and how they might be putting themselves or others at risk.
* **Teaching Tips:** Remind students that security software is only as good as its currency – in other words, whether it’s up to date. Many users install a security program and think no more about it not realizing that new viruses and malware are released every day. Ask students to check their own machines and see whether their security is out of date.
* **Teaching Tips:** Have students research one or more of the “free” antivirus software options available. Compare them with one of the popular “for purchase” options. Which would they prefer? How much does the cost influence their decisions?
* **Teaching Tips:** Is your TV or Blu-ray player a security risk? These devices, among other home entertainment equipment, contain embedded computers often with the ability to access the Internet. Ask students to explore the potential security risks involved. Are there ways consumers can protect themselves?

#### Protecting Data and Digital Devices

* **Stay Safe Online:** The Internet is a fascinating place with much to offer. Unfortunately, you might also find things that are not so attractive, such as Internet fraud and attempts by cybercriminals (people who use the Internet to perpetrate crimes) to steal your identity. Be well informed by visiting sites such as [www.onguardonline](http://www.onguardonline).gov to learn what to expect and how to counteract Internet offenses.
* **Teaching Tips**: Many of us find add-ons and plug-ins annoying, but some add-ons and plug-ins are actually useful. Adblock, for instance, blocks most ads on websites, which many people find annoying. Have students look up the Adblock or Adblock Plus extension for their preferred browser and determine whether they would want to use it.
* **Teaching Tips**: Pop-up blockers are also good tools that can help you be safe online—be aware, however, that pop-up blockers can interfere with proper functioning of a website. You may need that pop-up window to perform a task. Have students explore how to turn off the pop-up blocker on their browser and the different options it provides. If they have toolbars installed, have them perform the same check.
* **Teaching Tips:** Discuss common browsers’ privacy and security features as compared to each other. Which features are the same or similar? Which features are different?
* **Teaching Tips:** The security of what you use online is as important as security software for your own computer. What is two-step verification? Does Google use it? What is its purpose? What other security options does Google Drive have in place for users?
* **Teaching Tips:** Users often overlook the security of their passwords by using the same one for multiple sites, using one that is easily guessed, or not changing them often enough. Discuss why using the same password for multiple sites is a bad idea and how students can create better passwords to help protect themselves online.

#### Using Technology Ethically

* **Teaching Tips:** Ask students to research their own institution’s rules about plagiarism. How does their school’s policy directly or indirectly address content obtained online?
* **Teaching Tips:** Discuss what “trolling” is and how it relates to the ethical use of technology.
* **Teaching Tips:** Ask students how their Internet presence can be used by others against them―not just by direct responses, but also by using it to impersonate them elsewhere.

## OBJECTIVE TESTS IN MYITLAB

To find an objective test to help your students practice for tests, have them sign in to MyITLab:   
[www.myitlab.com](http://www.myitlab.com).

## ADDITIONAL WEB RESOURCES

1. WinDirStat: a free, open-source utility to display disk usage in a color-coded map: https://windirstat.net/
2. 3 Ways to Visualize Mac Disk Usage: https://computers.tutsplus.com/tutorials/3-ways-to-visualize-mac-disk-usage--mac-3719

## PROJECTS AND EXERCISES

|  |  |  |
| --- | --- | --- |
|  | **Data file** | **Save As** |
| Practice Exercise 1 | cc01p1ComputerGuide.pptx | cc01p1ComputerGuide\_LastFirst.pptx |
| Mid-Level Exercise 1 |  | cc01m1Mobile\_LastFirst.docx |
| Mid-Level Exercise 2 |  | cc01m2WirelessGrant\_LastFirst.docx |
| BYC General Case | cc01b1TechWishList | cc01b1TechWishList\_LastFirst.docx |
| BYC Research Case | cc01b2NetworkGuide | cc01b2NetworkGuide\_LastFirst.docx |
| Capstone | cc01c1ScholarshipNeeds.pptx | cc01c1ScholarshipNeeds\_LastFirst.pptx cc01c1AcceptanceLetter\_LastFirst.docx |

## CHAPTER REVIEW/ANSWERS TO END OF CHAPTER MATERIAL

**Quick Concepts Check 1**

1. **List the different types of computers and describe what each is best used for.**

The different types of computers and their primary uses are:

* Desktops: personal computers that are not intended to be portable. They usually have separate components that include a system unit, keyboard, monitor, and mouse, but some have the system unit integrated into the monitor.
* Mobile computers: smaller computing devices that are designed to be portable with all components encased together. There are several types of mobile computers. Laptop is a self-contained unit that is the traditional portable computer; ultrabook is a thinner and lighter type of laptop that does not include an optical drive and typically has a solid-state drive as an internal storage device. 2-in-1 PC is similar to a touchscreen laptop but offers the capability to convert into a tablet-like device.
* Tablets: A mobile computer integrated into a touch-sensitive screen.
* Smartphones: A device that is used to make phone calls over a cellular network, that also has input, output, processing, and storage capabilities. Smartphones are equipped with a variety of sensors and other technologies such as GPS, cameras, microphones, and speakers. They are distinguished from cell phones due to their ability to connect to the Internet.
* Supercomputer: Extremely powerful computers that contain massive parallel and multi-core processors used in processing computationally intensive tasks.
* Mainframe: Fast and powerful computer systems that are frequently used to manage large amounts of data, computations, and transactions from multiple users at the same time.
* Embedded computer: Specifically designed computer chip that resides in another device to perform a specific task.

1. **Describe the different types of hardware used for input, output, and storage.**

The different types of hardware used for input, output, and storage include:

* Input devices: mouse, touchpad, keyboard, microphone, stylus, webcam, digital camera, and scanner.
* Output devices: monitor (LCD, LED, OLED), printer (inkjet, laser, multifunction, wireless), and speakers.
* Storage devices: hard disk drives (mechanical), solid state drives, optical storage (CD, DVD, Blu-ray), portable storage (flash drive, memory card), and cloud storage.

1. **Describe the functions of a CPU and the CPU features that affect its performance.**

The central processing unit (CPU) is a silicon chip that processes instructions from system memory. Clock speed, measured in gigahertz, the number of cores, and the amount of cache all contribute to the performance of a CPU.

1. **Describe RAM and virtual memory, and explain why these are forms of temporary storage.**

Random Access Memory (RAM) holds the programs and data that a system is using while the system is powered on. When the system is shut down, the contents of RAM are emptied, thus considering RAM temporary or volatile storage. When there is not enough space in RAM to hold all the instructions and data in use, the less needed programs and data are transferred to an area on the hard drive where it is temporarily stored until it is needed. This is called virtual memory.

1. **Explain the main functions of an operating system.**

The operating system is responsible for coordinating with the hardware devices using device drivers, coordinating with software using APIs, and providing a user interface.

1. **Describe the three ways networks are classified.**

Networks are classified by the distance between nodes, the way the network is managed, and by how data is exchanged between nodes.

Distance: Networks are distinguished by how close or far the nodes are to each other. Personal area networks connect devices close to one person, local area networks connect devices within a contained geographic area such as a room or building, and wide area networks connect nodes that span a large physical distance.

Management: Networks can be classified as peer-to-peer networks, such as home networks, or client/service networks similar to the Internet.

Network Standard: The most popular way to connect computers to a network is an Ethernet network, which has both wired and wireless standards.

1. **Compare the four broadband connections.**

You can connect to the Internet using one of four broadband connections:

Fiber optics uses thin glass or plastic strands that transmit data at the speed of light. Fiber optics is very fast, but performance can be affected by demand. It is more expensive than other options.

Cable is available through a cable television provider. The data lines are shared with other users, so performance can slow during peak usage times. Pricing is competitive and often bundled with other services.

Digital Subscriber Line (DSL) is available through local telephone service providers. The lines are not shared with others, so performance is not affected by demand. However, performance is dependent on your location relative to the central switching office. Like cable, pricing is competitive and often bundled with other services.

Satellite is best used when other broadband options are not available or too expensive. Satellite uses data transmission that accesses satellites orbiting the earth and require a satellite dish placed outside, which is then connected by a modem by cable.

1. **Explain the advantages and disadvantages of wireless networks.**

Wireless networks offer the convenience of devices accessing an Internet connection without the constraints of wires, thus enabling greater flexibility. However, wireless networks are slower than wired networks and are subject to interference from other devices nearby.

1. **Describe the standard components required of a basic network.**

Networks require a modem that connects devices to the Internet; a router connects to the modem and is used to distribute the Internet connection to other devices on the network. Routers must be capable of transmitting a wireless signal for devices to connect to the network wirelessly. Wireless access points are used to extend the range of a wireless network.

1. **Describe the available methods to share documents online and the benefits of doing so.**

Online storage sites such as OneDrive, Google Drive, Dropbox and iCloud, along with the collaborative and sharing features in the latest productivity software such as Office 365, Office Online, and Google Docs facilitate the synchronization of multiple users working in one document simultaneously. This synchronization eliminates the confusion that can occur when multiple versions of a document are passed around via email and eliminates the need to meet in person to collaborate on a project.

1. **Explain the pros and cons of communicating with email.**

Email remains the most common form of online communication because of its ease of use, its ability to transmit other files as attachments, and its asynchronous feature enabling communication to happen at the convenience of both parties. Email can be centrally stored and archived enabling it to provide a historical record. However, email is not private or secure so should never be used for personal information.

1. **Summarize the similarities and differences between instant messaging and texting.**

Instant messaging and texting are both forms of Internet-based communications that are best used for brief messages. IM is synchronous while texting is asynchronous. IM uses computers, but requires a proprietary service, and texting requires a cell phone connection.

1. **Explain what a Web browser is used for, and list some of the common and unique features of Web browsers.**

A Web browser is software that is used to access, view, and navigate the content on the Web. The most commonly used browsers are graphical browsers and can display images and multimedia in addition to text. Common features of Web browsers include tabbed browsing, and some form of privacy browsing. Most browsers have a single search and address bar. Google Chrome runs on any type of device and is compatible with any operating system, so specific settings and bookmarks can be accessible from any device used to sign into a Google account. Microsoft Edge is the newest browser from Microsoft and replaces Internet Explorer. Microsoft Edge offers a Reading View that removes distracting ads and other content from a page so the online article is cleaner and easier to read. With Microsoft Edge, you can also take clips of a Web page, add annotations and share directly from the browser. Firefox is an open source browser, and Safari is used mostly on Apple devices.

1. **Define URL and describe the functions of the three main features of a URL.**

A URL stands for Uniform Resource Locator, and it represents the unique address of a Web page. The three main components of a URL are the protocol, the domain name, and the path. The protocol identifies the set of rules that are used to retrieve a Web document, such as HTTP. The domain name identifies the host, and the path identifies the specific page or a separate document within the website.

1. **Describe how hackers, viruses, and malware can cause havoc to your computer system, and explain how to protect against such threats.**

A hacker breaks into computer systems without permission with the intent of accessing secure or private information and uses the information for their own benefit or sells it for a profit. A computer virus is a program that attaches itself onto another program and spreads to other computers when files are exchanged. Viruses can either cause significant damage to a system or merely be annoying. Malware, includes adware, spyware, and scareware. Adware are software programs that track your online behaviors and push unwanted advertisements to you as you browse the Web or sell it to third parties. Usually, the user has accepted terms to have the adware run in the background. Spyware tracks your online behavior without your consent and can be more intrusive. Scareware displays notification warnings that your computer is infected and prompts you to buy fake removal tools. Using antivirus software, antispyware software, and ensuring your computer is protected by an active firewall can help manage and avoid these online invaders.

1. **Describe how to protect against unexpected loss of files.**

Creating a backup of your programs and files protects against the unexpected loss of files. Backups can be as easy as making a copy of your most important files and saving them on a flash drive or external hard drive that you store somewhere safe. For more complete protection, you can back up your entire system by creating an image of the hard drive on a separate storage device (usually an external hard drive, network-storage device, or a cloud storage service). Once the image copy has been made, incremental backups can then be run periodically (usually daily) to ensure that changes to the system are backed up so the backup copy is always up to date.

1. **Discuss the challenges of protecting intellectual property rights.**

Intellectual property is work that results from someone’s creativity or knowledge such as art, writing, music, pictures, or software. These works are protected by copyright law, and making illegal copies and distributing them digitally is illegal and unethical. Plagiarism happens when someone represents another’s work as their own without giving credit or revealing the source of the information. While plagiarism is not illegal, it usually does not go unpunished in some way. To avoid copyright violation through plagiarism, take care to ensure your work is your own. But if you use someone else’s work, you not only need to give credit to the source, but also must obtain permission from the copyright holder. Academic fair use excuses educators and students from having to obtain permission as long as the work is being used for academic purposes, and without generating economic gain.

**Key Terms Matching**

1. A software or hardware component that prevents unauthorized access to or from a computer connected to the Internet.

**g. Firewall**

2. Concerned with specific user tasks, such as creating documents, sending email, or working with digital photographs.

**b. Application software**

3. This technology is a wireless communication that uses low-bandwidth, short-range wireless connections (usually less than 30 feet) between computers and peripherals.

**c. Bluetooth**

4. A type of portable computer that converts into a tablet.

**a. 2-in-1 PC**

5. A maliciously written software program that can result in small user annoyances or total destruction of data or system components.

**s. Virus**

6. A type of connection for multimedia devices to play HD audio and video content.

**i. HDMI**

7. Computer memory that stores data and programs that are currently in use.

**o. Random Access Memory (RAM)**

8. An email scam in which the sender tries to dupe you into revealing credit card, bank account, or other personal information that could be used to steal your identity.

**m. Phishing**

9. Uses glass fibers to transmit data at the speed of light.

**f. Fiber optics**

10. Data turned into meaningful content.

**j. Information**

11. Enables you to use your Internet connection as a telephone to make domestic or international calls.

**t. Voice over Internet Protocol (VoIP)**

12. Means for mobile devices to connect to the Internet wirelessly.

**k. Mobile broadband**

13. Someone who gains unauthorized access to a computer system for the purpose of stealing information or performing malicious acts.

**h. Hacker**

14. Newer technology for monitors that provides higher contrast and better viewing angles because it works without a backlight.

**l. Organic light-emitting diode (OLED)**

15. Representing someone else’s work as your own.

**n. Plagiarism**

16. Software that has been downloaded and installed onto your computer to track your Internet travel, gather personal information, or change computer settings.

**q. Spyware**

17. A silicon chip containing the circuitry that controls all the computer’s activities.

**e. Central processing unit (CPU)**

18. An Internet connection that divides a transmission path into channels to accommodate more data traffic. Examples include DSL and cable.

**d. Broadband**

19. An application that performs special functions related to coordinating system resources and file management.

**r. Utility program**

20. A type of storage device that has no moving parts.

**p. Solid state drive**

**Multiple Choice**

1. Software that is concerned with basic computer tasks such as accepting input from the keyboard and displaying output on a monitor is called:

**a) operating system**.

1. A router:

**b) enables several computers to share a single Internet connection.**

1. The type of computer that is a specifically designed chip that resides in another device is a(n):

**a) embedded computer**

1. Email that attempts to trick you into divulging personal information such as account numbers or financial data is called:

**c) phishing**.

1. Which is NOT a benefit of storage that uses the Internet?

**d) Files are accessible from mobile devices only**

1. A firewall protects against which of the following security risks?

**d) Unauthorized access by a hacker**

1. Which is *not* a type of network categorization?

**b) By device**

1. A slight disadvantage of a cable Internet connection is that it is:

**b) shared with neighbors so speed might decrease during peak usage times.**

1. Which is *not* a shared feature of the most commonly used Web browsers?

**d) Universally available on all devices**

1. Which of the following is a kind of license that provides for a more flexible use of others’ works?

**b) Copyleft**