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Computing Essentials 2019

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Making **IT** work for you

Computing Essentials

Making  work for you

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- *Computing Essentials 2017* (Complete Edition)
- *Computing Essentials 2019*

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- *Microsoft® Windows 7: A Case Approach*
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Computing Essentials

2019

Making **IT** work for you

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- Dedication

We dedicate this edition to Nicole and Katie—our inspiration.

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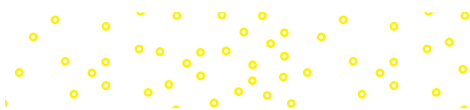
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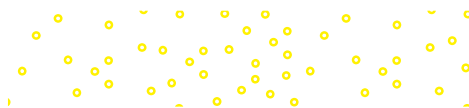
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New to Computing Essentials 2019

Every chapter's Making IT Work for You, Privacy, Ethics, and Environment features have been carefully reevaluated, enhanced, and/or replaced. Additionally, every chapter's Look to the Future has been revised to show that the expected breakthroughs of tomorrow are rooted in today's advances. More specific new coverage includes the following:

- Chapter 1: Revised Figure 1-1 Parts of an Information System to include (1) mobile devices (tablets and smartphones) and (2) Windows 10 operating system
- Chapter 2: Expanded coverage of Web 1.0, 2.0, and 3.0
Added coverage of the use of the Internet for online/social media news
Updated tips for personalizing your Internet browser
Added PHP to discussion of website technologies
Added coverage on social media features
Added WhatsApp to Instant Messenger Apps
Expanded coverage of Twitter
Added coverage of bitcoin
- Chapter 3: Improved coverage of the Ribbon GUI
Updated layout of database management systems
Updated layout of specialized applications
Updated video game design software and video editor software tools
Expanded information on collaborative and online office suites
- Chapter 4: Expanded coverage of Windows 10 Mobile
Added coverage of macOS High Sierra operating system
Expanded OS Utilities to include Virtual Assistants, Cortana, and Siri
Added coverage of Windows 10 Storage utility
- Chapter 5: Expanded discussion of gaming computers
Added coverage of USB-C and improvements over USB-A
Increased discussion of safe practices of powerful batteries in modern mobile devices
Added popular microprocessors to include AMD's Zen, Apple's A10 Fusion, and Intel's Kaby Lake
- Chapter 6: Updated voice recognition systems devices to include Amazon's Echo and Google's Home
Removed curved and 3D monitors
Added monitor resolutions standard 8K and tips for monitor calibration
Increased coverage of VR hardware, including head-mounted displays and controllers
Increased coverage of drones and robotics
- Chapter 7: Updated Cloud Storage Services to include Microsoft OneDrive
Added coverage on cloud storage features
- Chapter 8: Added 5G to wireless communications
Added information on mobile/personal hotspots
- Chapter 9: Updated browser security figures to use latest version of Chrome
Improved and expanded cybercrime information
Updated Common Internet Scams
Improved and updated Measures to Protect Computer Security
Improved discussion of security suites and antivirus software
Improved discussion of security best practices
Added information about cyberbullying
- Chapter 13: Updated and expanded description of popular programming languages

Preface

The 20th century brought us the dawn of the digital information age and unprecedented changes in information technology. In fact, the rate of change is clearly increasing. As we begin the 21st century, computer literacy is undoubtedly becoming a prerequisite in whatever career you choose.

The goal of *Computing Essentials* is to provide you with the basis for understanding the concepts necessary for success. *Computing Essentials* also endeavors to instill an appreciation for the effect of information technology on people, privacy, ethics, and our environment and to give you a basis for building the necessary skill set to succeed in the 21st century.

Times are changing, technology is changing, and this text is changing too. As students of today, you are different from those of yesterday. You put much effort toward the things that interest you and the things that are relevant to you. Your efforts directed at learning application programs and exploring the web seem, at times, limitless. On the other hand, it is sometimes difficult to engage in other equally important topics such as personal privacy and technological advances.

At the beginning of each chapter, we carefully lay out why and how the chapter's content is relevant to your life today and critical to your future. Within each chapter, we present practical tips related to key concepts through the demonstration of interesting applications that are relevant to your lives. Topics presented focus first on outputs rather than processes. Then, we discuss the concepts and processes.

Motivation and relevance are the keys. This text has several features specifically designed to engage and demonstrate the relevance of technology in your lives. These elements are combined with a thorough coverage of the concepts and sound pedagogical devices.

VISUAL CHAPTER OPENERS

chapter 2

The Internet, the Web, and Electronic Commerce



Why should I read this chapter?

The Internet has changed the world, and will continue to have an amazing impact on our day-to-day lives. For example, cars promise to soon be able to drive themselves, avoid traffic, accidents and congestion, and automatically adjust personal schedules and much more. This chapter covers the things you need to know to be prepared for the ever-changing digital world, including:

- Impact—how Internet technology is changing your world.
- Hardware—how to connect your life to the Internet, including Wi-Fi, smartphones, and tablets.
- Applications—how to get ahead using social networking, streaming technology, and cloud computing.

Learning Objectives

After you have read this chapter, you should be able to:

- 1 Explain the origins of the Internet and the web.
- 2 Explain how to access the web using providers and browsers.
- 3 Compare different web utilities, including files, file transfer utilities, and Internet security suites.
- 4 Compare different Internet communications, including social networking, blogs, microblogs, webcasts, podcasts, wikis, e-mail, text messaging and instant messaging.
- 5 Describe search tools, including search engines and specialized search engines.
- 6 Evaluate the accuracy of information presented on the web.
- 7 Identify electronic commerce, including B2C, C2C, B2B, and security issues.
- 8 Describe cloud computing, including the three-way interaction of clients, Internet, and service providers.
- 9 Discuss the Internet of Things (IoT) and the continuing development of the Internet to allow everyday objects to send and receive data.


Each chapter begins with a Why Should I Read This? feature that presents a visually engaging and concise presentation of the chapter's relevance to the reader's current and future life in the digital world. Then a list of chapter learning objectives is presented providing a brief introduction to what will be covered in the chapter.

VISUAL SUMMARIES

Visual summaries appear at the end of every chapter and summarize major concepts covered throughout the chapter. Like the chapter openers, these summaries use graphics to reinforce key concepts in an engaging and meaningful way.

VISUAL SUMMARY The Internet, the Web, and Electronic Commerce

INTERNET AND WEB



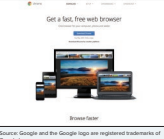
Internet
Launched in 1969 with ARPANET, the Internet connects computers across the globe.

Web
Introduced in 1991, the web (World Wide Web, WWW) provides a multimedia interface to Internet resources. These resources are organized into pages, which are linked together to form a web.

Common Uses
The most common uses of the Internet and the web include:

- Communication—the most popular Internet activity.
- Shopping—one of the fastest-growing Internet activities.
- Searching—access libraries and local, national, and international news.
- Education—sharing or taking online courses.
- Entertainment—music, movies, magazines, and computer games.

INTERNET ACCESS



Providers
Internet service providers are connected to the Internet, providing a path for individuals to access the Internet. Connection technologies include DSL, cable, and wireless modems.

Browsers
Browsers provide access to web resources. Some related terms are:

- **URL**—location or address to web resources; the (http://) or web suffix identifies type of organization.
- **HTML**—command to display web pages; hypertext (links) are connections.

Technologies providing interactive, animated web sites include cascading style sheets, or CSS. (by control the appearance of web pages); JavaScript (executed on the user's computer to trigger interactive features); and PHP (language that executes scripts on web server's computer). Mobile browsers run on portable devices.

WEB UTILITIES

To efficiently and effectively use computers, you need to be aware of resources available on the Internet and web, to be able to access these resources, to effectively communicate electronically, to efficiently locate information, to understand electronic commerce, and to use web utilities.

Files
Files are used by parents and organizations to block certain sites and to monitor use of the Internet and the web.

File Transfer Utilities
File transfer utilities copy files to (download) and from (upload) your computer. There are three types:

- **File transfer protocol (FTP)** and **secure file transfer protocol (SFTP)** allow you to efficiently copy files across the Internet.
- **Different distribution file transfers** across many different computers.
- **Web-based file transfer services** make use of a web browser to upload and download files.

Internet Security Suite
An Internet security suite is a collection of utility programs designed to protect your privacy and security on the Internet.

COMMUNICATION

Social Networking
Social networking sites connect people and organizations that share a common interest or activity. Common features include profiles, pages, groups, friends, news feeds, and share settings. Two well-known sites are Facebook and LinkedIn.

Blogs, Webcasts, and Wikis
Other sites that help individuals communicate across the web are blogs, microblogs, webcasts, podcasts, and wikis.

- **Blogs (web logs)** are typically personal websites to keep in touch with friends and family. Some are like online diaries. Businesses, newspapers, and others also use blogs as a quick publishing method.
- **Microblogs**, unlike traditional blogs, use only short sentences that take only a few seconds to write. Twitter is the most popular microblogging site. A Twitter message is known as a tweet.
- **Webcasts** deliver media content over the Internet. Using streaming technology (audio and video files continuously downloaded while you are listening to and/or viewing the file content), no file remains on your computer at the conclusion of the webcast.
- **Podcasts**, like webcasts, deliver media content but do not use streaming technology. Before content can be accessed, the entire media file has to be downloaded and saved to your computer.
- A **wiki** is a website designed to allow visitors to use their browsers to add, edit, or delete the site's content. Wikipedia is one of the most popular wikis.

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THE INTERNET, THE WEB, AND ELECTRONIC COMMERCE 47

Unique Content

MAKING IT WORK FOR YOU

Making IT work for you

FREE ANTIVIRUS PROGRAM

Have you or someone you know had a slower computing experience due to a spyware infection? Even worse, perhaps a malicious piece of software stole crucial, personal information or caused a total system failure. Most of these problems can be averted by having an up-to-date antivirus program running in your computer's memory at all times. This exercise shows you how to download and install a free antivirus program if your computer does not yet have one. (Please note that the web is continually changing, and some of the specifics presented here may have changed.)

Getting Started First, make sure your computer does not have an antivirus or security suite running. If it does, be sure to completely uninstall that program, even if the subscription is expired. Now, follow these steps to install AVG, a popular, free antivirus program.

- 1 Visit <http://free.avg.com> and click the **Download** button. You will be asked to click "save" to save the installation file to your computer.
- 2 Run the installation file and follow the prompts.
- 3 Select **Install Basic** to install the antivirus software. Once the program is installed, it will open automatically.

Using AVG Generally speaking, your antivirus program watches your system for malware and updates itself automatically. However, you can always download updates manually, set a schedule for full-system scans, and change basic settings for various components of the software.

- 1 Click **Scan now** to run a full scan on your computer.
- 2 Just to the right of that, click the button with the white cog to see the scan options where you can set a schedule for automated scans.
- 3 Click the **back arrow** to reach the main screen, where you can click various elements of the program to configure them. For example, clicking **Web** will allow you to turn on a feature that detects cookies that may be used to track your online activity.



Source: AVG

Special-interest topics are presented in the Making IT Work for You section found within nearly every chapter. These topics include Online Entertainment, Gaming, Virtual Assistants, and the Mobile Office.

Nearly every chapter has an Environment box located in the margin adjacent to the coverage of related technologies. Topics include plagiarism of online materials, editing images to promote a particular message, and the use of monitoring software.

Nearly every chapter has a Privacy box located in the margin adjacent to the coverage of related technologies. Topics include protecting personal information when using a free Wi-Fi network or when disposing of an outdated computer.

Nearly every chapter has an Ethics box located in the margin adjacent to the coverage of related technologies. Topics include proper disposal of older CRT monitors, empty inkjet cartridges, and old computers.

PRIVACY, ETHICS, AND ENVIRONMENT

environment

Daily newspapers are an important part of the free press; however, the traditional printed newspaper comes at a cost of millions of trees. Many national and local news organizations offer a digital version of their papers. Using the digital version instead of the paper version can deliver the news quickly, cheaply, and sustainably. If you want to save a tree, use the digital version of your favorite newspaper or magazine.

privacy

Have you ever seen one of those funny or not-so-funny embarrassing personal videos on the Internet? Unless you are careful, you could be starring in one of those videos. Without privacy settings, images and videos posted to these sites can be viewed and potentially reposted for all to see. If a social networking friend were to post an embarrassing video of you to Facebook, would all your friends be able to see it? What about parents, teachers, or potential employers? To check your Facebook privacy settings, go to Facebook and click on the security lock icon.

ethics

Many of the electronic devices purchased in the United States are manufactured in other countries. Some of these manufacturers pay extremely low wages, have unsafe or unsupportable work conditions, and pollute local environments. Do you think that consumers have an ethical responsibility regarding where and/or how products are manufactured?

Communication

As previously mentioned, communication is the most popular Internet activity, and its impact cannot be overestimated. At a personal level, friends and family can stay in contact with one another even when separated by thousands of miles. At a business level, electronic communication has become a standard way to stay in touch with suppliers, employees, and customers. Some popular types of Internet communication are social networking, blogs, microblogs, webcasts, podcasts, wikis, e-mail, and messaging.

Social Networking

Social networking is one of the fastest-growing and most significant Web 2.0 applications. Social networking sites focus on connecting people and organizations that share a common interest or activity. These sites typically provide a wide array of tools that facilitate meeting, communicating, and sharing. There are hundreds of social networking sites, but they share some common features:

- **Profiles** are created by individuals to share information about them. These profiles often include photos, personal details, and contact information. (See Figure 2-10.)
- **Pages** are created by companies to promote their business. These pages often include hours of operations, upcoming sales, and information about their products.
- **Groups** are communities of individuals who share a common interest and come together online to share information and discuss specific topics. Groups are typically organized around topics, events, or ideas. They are popular among clubs and organizations to coordinate activities or share information.
- **Friends** are a list of other members on a social media site that you want to communicate with.
- **News feed** is the first page you see after logging into a social networking site. It typically consists of a collection of recent posts from friends, trending topics on the site, people's responses to your posts, and advertisements.
- **Share settings** on your social media account determine who can see your posts. The most common options include sharing with everyone, just your friends, or just a subset of your friends.



Figure 2-10 Facebook profile
Source: Facebook

Unique End-of-Chapter Discussion Materials

MAKING IT WORK FOR YOU

Making IT Work for You discussion questions are carefully integrated with the chapter's Making IT Work for You topics. The questions facilitate in-class discussion or written assignments focusing on applying specific technologies into a student's day-to-day life. They are designed to expand a student's awareness of technology applications.

PRIVACY

Privacy discussion questions are carefully integrated with the chapter's marginal Privacy box. The questions facilitate in-class discussion or written assignments focusing on critical privacy issues. They are designed to develop a student's ability to think critically and communicate effectively.

DISCUSSION

Respond to each of the following questions.

1 Making IT Work for You: ONLINE ENTERTAINMENT

Review the Making IT Work for You: Online Entertainment on pages 28–29 and then respond to the following: (1) Do you currently use online entertainment? If so, which ones? If not, do you plan on using one in the future? Why or why not? (2) What are the advantages and disadvantages of online entertainment options compared to traditional sources? Be specific. (3) Compare news feeds to traditional newspapers. Which would be better for exposing you to new ideas? Which one would be better at challenging your point of view? Be specific and defend your position.

2 Privacy: SOCIAL NETWORKING

When a Facebook friend posts a picture, video, or text that includes you, who can view that post? Review the Privacy box on page 34, and respond to the following: (a) Who should be responsible for ensuring privacy on social networking sites? Defend your position. (b) Do you think that most people are aware of their privacy settings on Facebook? Have you ever checked your settings? Why or why not? (c) Investigate and then summarize the default security settings for a social networking website such as Facebook or Google+.

3 Ethics: MONITORING CONTENT

Review the Ethics box on page 27 and then respond to the following: (1) Does Facebook have an ethical responsibility to monitor content? Defend your position. (2) If you responded yes to (1), who should have the power to determine or to arbitrate what is and what is not objectionable? If you responded no to (1), can you think of any situations in which it would not be appropriate to block or remove content? Be specific and defend your position.

4 Environment: DIGITAL NEWS

Review the Environment box on page 34 and then respond to the following: (1) Does the publisher of your favorite newspaper have a website? If so, does it include the news and features that you would find in your daily paper? (2) Go to the website of a national newspaper or magazine that also publishes online. Do they offer a digital subscription? How does the digital edition differ from the print edition? How does the digital edition price compare to the print edition price? (3) Do you currently have a digital newspaper or magazine? If so, what does it cost you to subscribe to? If not, would you consider switching to digital subscriptions? Why or why not?

ETHICS

Ethics discussion questions are carefully integrated with the chapter's marginal Ethics boxes. The questions facilitate in-class discussion or written assignments focusing on ethical issues relating to technology. They are designed to develop a student's ability to think critically and communicate effectively.

ENVIRONMENT

Environment discussion questions are carefully integrated with the chapter's marginal Environment boxes. The questions facilitate in-class discussion or written assignments focusing on environmental issues relating to technology. They are designed to develop a student's ability to think critically and communicate effectively.

DISCUSSION

Respond to each of the following questions.

1 Making IT Work for You

Making it a habit of keeping current with technology applications can be a key to your success. Numerous full-page spreads identified as *Making IT Work for You* are presented in the following chapters. These sections address some of today's most interesting and useful applications. They include online entertainment in Chapter 2, online office suites in Chapter 3, and cloud storage in Chapter 7. Select one that you find the most interesting and then respond to the following: (a) Why did you select this application? (b) Have you used this application? If so, when and how? If not, do you plan to in the near future? (c) Go to the chapter containing your selected application, and locate the application's Making IT Work for You coverage. Review and briefly describe its contents. (d) Did you find the coverage useful? Why or why not?

2 Privacy

Privacy is one of the most critical issues facing society today. Numerous Privacy boxes appear in the margins of the upcoming chapters presenting a variety of privacy issues. These issues include apps that constantly track your movements without your knowledge or consent in Chapter 3, public Wi-Fi connections that record all of your personal communications in Chapter 8, and protection of personal privacy while using social networking sites such as Facebook in Chapter 9. Select one that you find the most interesting, and then respond to the following: (a) Why did you select this issue? (b) Do you have knowledge of or experience with the issue? If so, describe your knowledge or experience. If not, do you consider the issue to be important for protecting your privacy? (c) Go to the chapter containing your selected issue, locate the Privacy box, read it, and describe its contents. (d) Did you find the coverage thought-provoking? Why or why not?

3 Ethics

Computer ethics are guidelines for the morally acceptable use of computers in our society. Numerous Ethics boxes appear in the margins of the upcoming chapters presenting a variety of ethical issues. These issues include image editing in Chapter 3, unauthorized use of webcams in Chapter 6, and unauthorized monitoring or snooping of Internet activity in Chapter 8. Select one issue that you find the most interesting and then respond to the following: (a) Why did you select this issue? (b) Do you have knowledge of or experience with the issue? If so, describe your knowledge or experience. If not, do you consider the issue critical for individuals or organizations? (c) Go to the chapter containing your selected issue, locate the Ethics box, read it, and describe its contents. (d) Did you find the coverage thought-provoking? Why or why not?

4 Environment

Almost everyone agrees that protecting our environment today is more important than ever before. Numerous Environment boxes appear in the margins of the upcoming chapters. These boxes present a variety of environmental topics, including digital media benefits in Chapter 2, operating systems reducing energy consumption in Chapter 4, and recycling old inkjet cartridges in Chapter 6. Select one that you find the most interesting and then respond to the following: (a) Why did you select this topic? (b) Go to the chapter containing your selected topic, locate the Environment box, read it, and describe its contents. (c) Did you find the coverage thought-provoking? Why or why not?

Design Elements: Concept Check icons: ©Dizze52/Getty Images; Making IT Work for You: ©Shutterstock/colofart

Reinforcing Key Concepts

CONCEPT CHECKS

Located at points throughout each chapter, the Concept Check cues you to note which topics have been covered and to self-test your understanding of the material presented.



concept check



- What are the parts of an information system?
- What is a program?
- What is the difference between data and information?

KEY TERMS

address (31)	pages (34)
Advanced Research Project Agency Network (ARPANET) (26)	podcast (38)
attachment (37)	PHP (31)
BitTorrent (33)	profiles (34)
blog (35)	protocol (31)
browser (30)	search engine (39)
business-to-business (B2B) (41)	search service (39)
business-to-consumer (B2C) (41)	secure file transfer protocol (SFTP) (33)
cable (30)	share settings (34)
cascading style sheets (CSS) (31)	signature (37)
client-based e-mail system (37)	SMS (short messaging service) (38)
cloud computing (42)	social networking (34)
consumer-to-consumer (C2C) (41)	spam (38)
digital cash (41)	spam filter (38)
domain name (31)	specialized search engine (39)
downloading (32)	spider (39)
DSL (30)	streaming (36)
e-commerce (40)	subject (37)
e-learning (27)	texting (38)
electronic commerce (40)	text messaging (38)
electronic mail (37)	top-level domain (TLD) (31)
e-mail (37)	tweet (35)
e-mail client (37)	Twitter (35)
Facebook (39)	uniform resource locator (URL) (31)
file transfer protocol (FTP) (33)	uploading (32)
filter (32)	virus (38)
friend (34)	web (26)
groups (34)	Web 1.0 (26)
header (37)	Web 2.0 (26)
hyperlink (31)	Web 3.0 (26)
Hypertext Markup Language (HTML) (31)	web auction (41)
instant messaging (IM) (38)	web-based e-mail system (37)
Internet (26)	web-based file transfer services (32)
Internet of Things (IoT) (43)	webcasts (36)
Internet security suite (33)	web log (41)
Internet service provider (ISP) (30)	webmail (37)
JavaScript (31)	webmail client (37)
link (31)	webmaster (44)
LinkedIn (40)	web page (31)
location (31)	web suffix (31)
message (37)	web utility (32)
microblog (35)	wiki (36)
MMS (multimedia messaging service) (38)	Wikipedia (36)
mobile browser (31)	wireless modem (30)
news feed (34)	World Wide Web (26)
online (27)	WWW (26)

KEY TERMS

Throughout the text, the most important terms are presented in bold and are defined within the text. You will also find a list of key terms at the end of each chapter and in the glossary at the end of the book.

CHAPTER REVIEW

Following the Visual Summary, the chapter review includes material designed to review and reinforce chapter content. It includes a key terms list that reiterates the terms presented in the chapter, multiple-choice questions to help test your understanding of information presented in the chapter, matching exercises to test your recall of terminology presented in the chapter, and open-ended questions or statements to help review your understanding of the key concepts presented in the chapter.

MULTIPLE CHOICE

Circle the correct answer.

- The network that connects computers all over the world.
a. ARPANET c. LAN
b. Internet d. web
- The rules for exchanging data between computers.
a. DSL c. web
b. protocols d. WWW
- Using file transfer utility software, you can copy files to your computer from specially configured servers on the Internet. This is called:
a. downloading c. blogging
b. filtering d. uploading
- Communities of individuals who share a common interest typically create Facebook:
a. clients c. pages
b. groups d. profiles
- Type of e-mail account that does not require an e-mail program to be installed on a user's computer is:
a. blog-based c. utility-based
b. client-based d. web-based
- The most popular microblogging site:
a. LinkedIn c. Twitter
b. Google+ d. Wikipedia
- Using a keyword, a search engine returns a list of related sites known as:
a. blogs c. podcasts
b. hits d. strikes
- This is the Internet's equivalent to traditional cash.
a. digital cash c. ftp
b. e-commerce d. Internet dollars
- The continuing Internet development that allows objects to send and receive data over the Internet.
a. HTML c. search engines
b. IoT d. Web 2.0
- Three basic components to cloud computing are clients, Internet, and _____.
a. CSS c. streaming
b. service providers d. Web 3.0

The Future of Information Technology

CAREERS IN IT

- **Cloud computing** uses the Internet and the web to shift many computer activities from a user's computer to computers on the Internet. Rather than relying solely on their computer, users can now use the Internet to connect to the cloud and access more powerful computers, software, and storage.
- **Wireless communication** has changed the way we communicate with one another. The rapid development and widespread use of wireless communication devices like tablets, smartphones, and wearable devices has led many experts to predict that wireless applications are just the beginning of the **wireless revolution**, a revolution that will dramatically affect the way we communicate and use computer technology.
- **The Internet of Things (IoT)** is the continuing development of the Internet that allows everyday objects embedded with electronic devices to send and receive data over the Internet. It promises to connect all types of devices, from computers to smartphones to watches to any number of everyday devices.

Wireless communication, cloud computing, and IoT are driving the mobile Internet. They promise to continue to dramatically affect the entire computer industry and how you and I will interact with computers and other devices. Each will be discussed in detail in the following chapters. For just a few of these mobile devices, see Figure 1-17.

concept check

- Define data. List four common types of files.
- Define connectivity and networks.
- What is cloud computing? Wireless revolution? IoT?

Careers in IT

Now that you know the basic outline and important features of this book, we would like to talk about some of the most exciting and well-paid careers in information technology.

As mentioned previously, each of the following chapters highlights a specific career in information technology. Each provides specific job descriptions, salary ranges, advancement opportunities, and more. For a partial list of these careers, see Figure 1-18.

Career	Description
Webmaster	Develops and maintains websites and web resources. See page 64.
Software engineer	Analyzes users' needs and creates application software. See page 71.
Computer support specialist	Provides technical support to customers and other users. See page 97.
Computer technician	Repairs and installs computer components and systems. See page 103.
Technical writer	Prepares instruction manuals, technical reports, and other scientific or technical documents. See page 152.
Network administrator	Creates and maintains computer networks. See page 203.

Figure 1-18 Careers in information technology

Some of the fastest-growing career opportunities are in information technology. Each chapter highlights one of the most promising careers in IT by presenting job titles, responsibilities, educational requirements, and salary ranges. Among the careers covered are webmaster, software engineer, and database administrator. You will learn how the material you are studying relates directly to a potential career path.

A LOOK TO THE FUTURE

Each chapter concludes with a brief discussion of a recent technological advancement related to the chapter material, reinforcing the importance of staying informed.

A LOOK TO THE FUTURE

Using and Understanding Information Technology

The purpose of this book is to help you use and understand information technology. We want to help you become proficient and provide you with a foundation of knowledge so that you can understand how technology is being used today and anticipate how technology will be used in the future. This will enable you to benefit from an important information technology development.

The Internet and the Web

The Internet and the web are considered to be the two most important technologies in the 21st century. Understanding how the Internet is being used and how it is being used to communicate and locate information is an essential skill. These issues are presented in Chapter 2: The Internet, the Web, and Business. Comments

Powerful Software

The software that is now available can do an extraordinary number of tasks and help you in an endless number of ways. You can create professional-looking documents, analyze massive amounts of data, create dynamic multimedia web pages, and much more. Today's employees are expecting the people they hire to be able to efficiently and effectively use a variety of different types of software. General-purpose, specialized, and mobile applications are presented in Chapter 3: System software is presented in Chapter 4.

Powerful Hardware

Personal computers are now much more powerful than they used to be. Smartphones, tablets, and communication technologies such as wireless networks are dramatically changing the ways to connect to other computers, networks, and the Internet. However, despite the rapid change of specific equipment, their essential features remain unchanged. It becomes an efficient and effective user you should focus on these features. Chapters 5 through 8 explain what you

Privacy, Security, and Ethics

What about people? Experts agree that we as a society must be careful about the potential of technology to negatively affect our lives. Specifically, we need to be aware of how technology can affect our personal privacy and our environment. Also, we need to understand the role and the importance of organizational and personal ethics. These critical issues are integrated in every chapter of this book as well as extensively covered in Chapter 9.

Organizations

Almost all organizations rely on the quality and flexibility of their information systems to stay competitive. As a member or employee of an organization, you will undoubtedly be involved in these information systems. In order to use, develop, modify, and maintain these systems, you need to understand the basic concepts of information systems and know how to safely, efficiently, and effectively use computer systems. These concepts are covered throughout this book.

Changing Times

Are the times changing any faster now than they ever have? Almost everyone thinks so. Whatever the answer is to that question, it is a fair prediction. The Evolution of the Computer Age section presented at the end of this book tracks the major developments since computers were first introduced.

After reading this book, you will be in a very favorable position compared with many other people in industry today. You will have not only the best of hardware, software, connectivity, the Internet, and the web, but also the most current technology. You will be able to use these tools to your advantage.

16

MoviesOnline: Information Systems

Introduction

MoviesOnline is an entirely Web-oriented streaming rental business. Similar to other streaming movie services, like Netflix, MoviesOnline conducts all business over the Web at its Web storefront. For a monthly fee, their customers are able to view any movie from a listing posted at the company Web site. The movies the customers select are downloaded to their computer. The customer watches the movie, as the customer watches one part of the movie, the next scene in the movie is downloaded, and the scenes already watched are deleted from the computer. Although in operation for only three years, MoviesOnline has experienced rapid growth. To help manage and to accelerate this growth, the company has just hired Alice, a recent college graduate. Let's follow Alice on her first day at MoviesOnline which begins with a meeting with Bob, the vice president of Marketing.


Alice's First Assignment

Bob: Oh, hi Alice . . . come on in! I know that we were scheduled for an orientation meeting this morning. But I'm afraid that will have to wait. There is an important fire to put out today. Let me introduce you to one of your coworkers. This is Jamal.

Alice and Jamal exchange hellos and Bob motions Alice to take one of the chairs across from his desk as he speaks.

"She said she was concerned about how our members were connecting to our Web site."

Bob: Just came back from a meeting with Carol, our CEO. While we were discussing the Monthly Membership Report, she said she was concerned about how our members were connecting to our Web site. This really caught me off guard! Our membership growth has exceeded projections and I had assumed that our meeting was to discuss how to handle all the new members. She requested that her Morning Report be modified to include the percentage of our customers who use mobile devices, and she wants us to analyze the



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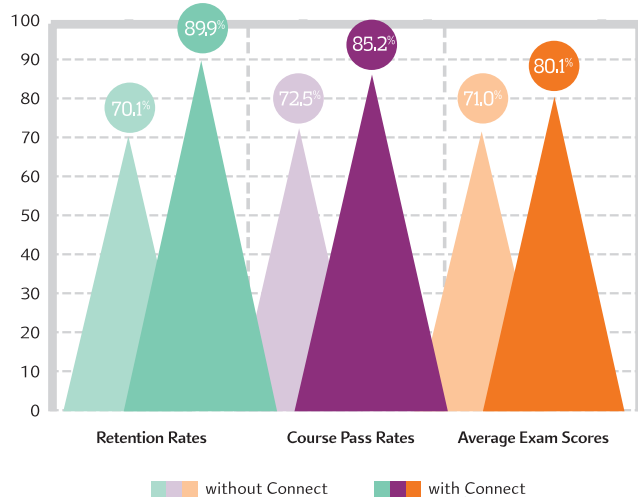
Found in Connect for Computing Essentials 2019, Using IT at MoviesOnline—A Case Study of a fictitious organization provides an up-close look at what you might expect to find on the job in the real world. You will follow Alice, a recent college graduate hired as a marketing analyst, as she navigates her way through accounting, marketing, production, human resources, and research, gathering and processing data to help manage and accelerate the growth of the three-year-old company.

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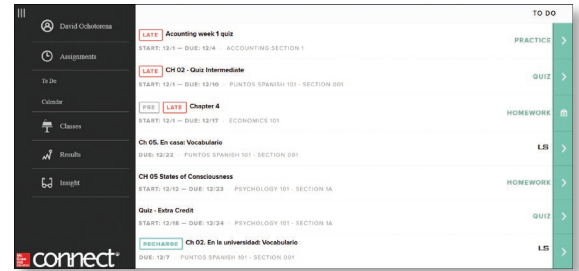


Robust Analytics and Reporting

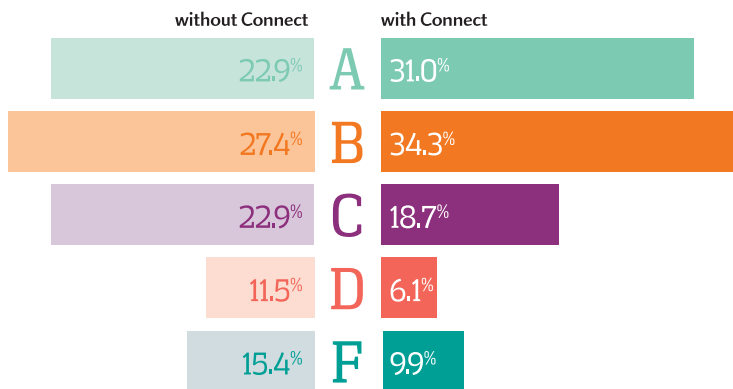
- Connect Insight® generates easy-to-read reports on individual students, the class as a whole, and on specific assignments.
- The Connect Insight dashboard delivers data on performance, study behavior, and effort. Instructors can quickly identify students who struggle and focus on material that the class has yet to master.
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Support Materials in Connect

The Instructor's Manual offers lecture outlines with teaching notes and figure references. It provides definitions of key terms and solutions to the end-of-chapter material, including multiple-choice, matching, and open-ended questions.

The PowerPoint slides are designed to provide instructors with a comprehensive resource for lecture use. The slides include a review of key terms and topics, as well as artwork taken from the text to further explain concepts covered in each chapter.

The testbank contains over 2,200 questions categorized by level of learning (definition, concept, and application). This is the same learning scheme that is introduced in the text to provide a valuable testing and reinforcement tool. Text page references have been provided for all questions, including a level-of-difficulty rating.

SIMNET ONLINE TRAINING AND ASSESSMENT FOR OFFICE APPLICATIONS



SIMnet™ Online provides a way for you to test students' software skills in a simulated environment. SIMnet provides flexibility for you in your applications course by offering:

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About the Authors

Tim and Linda O’Leary live in the American Southwest and spend much of their time engaging instructors and students in conversation about learning. In fact, they have been talking about learning for over 25 years. Something in those early conversations convinced them to write a book, to bring their interest in the learning process to the printed page. They are joined by their son Dan O’Leary as a coauthor. Dan has completed his PhD in Electrical Engineering with significant experience in teaching and consulting in information technology.



Source: Timothy O’Leary

The O’Leary’s form a unique team blending experience and youth. Tim has taught courses at Stark Technical College in Canton, Ohio, and at Rochester Institute of Technology in upstate New York, and is currently a professor emeritus at Arizona State University. Linda offered her expertise at ASU for several years as an academic advisor. She also presented and developed materials for major corporations such as Motorola, Intel, Honeywell, and AT&T, as well as various community colleges in the Phoenix area. Dan has taught at the University of California at Santa Cruz and at City College of San Francisco, developed energy-related labs at NASA, and worked as a database administrator and as a consultant in information systems.

Tim, Linda, and Dan have talked to and taught numerous students, all of them with a desire to learn something about computers and applications that make their lives easier, more interesting, and more productive.

Each new edition of an O’Leary text, supplement, or learning aid has benefited from these students and their instructors who daily stand in front of them (or over their shoulders).

chapter **1**

Information Technology, the Internet, and You



Why should I read this chapter?



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The future of computers and digital technology promises exciting challenges and opportunities. Powerful software and hardware systems are changing the way people and organizations interact in their daily life and on the Internet.

This chapter introduces you to the skills and concepts you need to be prepared for this ever-changing digital world, including:

- Information systems—how the critical parts of technology interact.
- Efficiency and effectiveness—how to maximize the use of technology.
- Privacy, ethics, and environment—how to integrate technology with people.
- Software, hardware, and data—understand the technology used in information systems.
- Connectivity and cloud computing—how the Internet, web, and the wireless revolution are changing how we communicate and interact.

Learning Objectives

After you have read this chapter, you should be able to:

- 1 Explain the parts of an information system: people, procedures, software, hardware, data, and the Internet.
- 2 Distinguish between system software and application software.
- 3 Differentiate between the three kinds of system software programs.
- 4 Define and compare general-purpose, specialized, and mobile applications.
- 5 Identify the four types of computers and the five types of personal computers.
- 6 Describe the different types of computer hardware, including the system unit, input, output, storage, and communication devices.
- 7 Define data and describe document, worksheet, database, and presentation files.
- 8 Explain computer connectivity, the wireless revolution, the Internet, cloud computing, and IoT.

Introduction

“Welcome to *Computing Essentials*. I'm Katie, and this is Alan, we work in information technology. On the following pages, we'll be discussing some of the most exciting new developments in computer technology, including smartphones, tablet computers, and cloud computing. Let me begin this chapter by giving you an overview of the book and showing you some of its special features.”



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The purpose of this book is to help you become a highly efficient and effective computer user. This includes how to use (1) apps and application software; (2) all types of computer hardware, including mobile devices like smartphones, tablets, and laptops; and (3) the Internet. Becoming a highly efficient and effective computer user also requires a full understanding of the potential impact of technology on privacy and the environment as well as the role of personal and organizational ethics.

To effectively and efficiently use computers, you need to know the parts of an information system: people, procedures, software, hardware, data, and the Internet. You also need to understand the wireless revolution, the mobile Internet, and the web and to recognize the role of information technology in your personal and professional life.

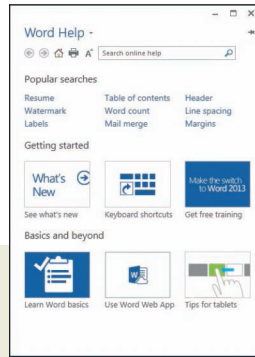
Information Systems

When you think of a personal computer, perhaps you think of just the equipment itself. That is, you think of the screen or the keyboard. Yet there is more to it than that. The way to think about a personal computer is as part of an information system. An **information system** has several parts: *people, procedures, software, hardware, data, and the Internet*. (See Figure 1-1.)

- **People:** It is easy to overlook people as one of the parts of an information system. Yet this is what personal computers are all about—making **people, end users** like you, more productive.
- **Procedures:** The rules or guidelines for people to follow when using software, hardware, and data are **procedures**. These procedures are typically documented in manuals written by computer specialists. Software and hardware manufacturers provide manuals with their products. These manuals are provided in either printed or electronic form.
- **Software:** A **program** consists of the step-by-step instructions that tell the computer how to do its work. **Software** is another name for a program or programs. The purpose of software is to convert **data** (unprocessed facts) into **information** (processed facts). For example, a payroll program would instruct the computer to take the number of hours you worked in a week (data) and multiply it by your pay rate (data) to determine how much you are paid for the week (information).
- **Hardware:** The equipment that processes the data to create information is called **hardware**. It includes smartphones, tablets, keyboards, mice, displays, system units, and other devices. Hardware is controlled by software.
- **Data:** The raw, unprocessed facts, including text, numbers, images, and sounds, are called data. Processed data yields information. Using the previous example of a payroll program, the data (number of hours worked and pay rate) is processed (multiplied) to yield information (weekly pay).
- **Internet:** Almost all information systems provide a way to connect to other people and computers, typically using the Internet. This **connectivity** greatly expands the capability and usefulness of information systems.

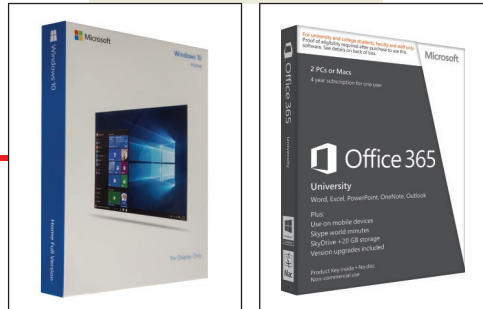


People
are end users who use computers to make themselves more productive.



Procedures
specify rules or guidelines for computer operations.

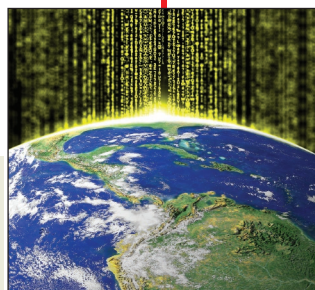
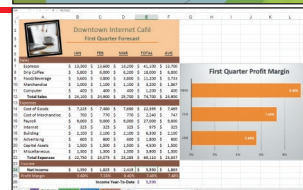
Software
provides step-by-step instructions for computer hardware.



Hardware
includes keyboard, mouse, display, system unit, tablets, smartphones, and other devices.



Data
consists of unprocessed facts, including text, numbers, images, and sounds.



Internet
allows computers to connect to people and other computers.

Figure 1-1 Parts of an information system

People: ©Africa Studio/Shutterstock; **Procedures:** Source: Microsoft; **software:** (Windows 10) ©McGraw-Hill Education/Aaron Roeth, photographer; (Office 365) Source: Microsoft; **hardware:** (Smartphone) ©Valentin Valkov/Shutterstock; (Tablet) ©Stanca Sanda/Alamy; (Desktop) ©Scanrail1/Shutterstock; **Data:** (Rescue puppy or Dog) ©Image Source/Getty Images; (Employee portrait) ©Sam Edwards/age fotostock; (Coffee) ©Stockbyte/Getty Images; **Internet:** ©frankreporter/iStock/Getty Images



concept check



What are the parts of an information system?



What is a program?



What is the difference between data and information?

environment

Recycling last year reduced our landfills by over 10 million tons. This success is largely due to voluntary participation of people across the country, who have made “reduce, reuse, and recycle” a personal commitment. This includes recycling old computers, cell phones, printers, and displays. Your participation in recycling means fewer one-use products, cleaner water, and cleaner air. But recycling may someday pay off financially too. Many now see waste as a resource, and one that we shouldn’t squander by filling up the garbage can instead of the recycling bin. Imagine a future where the garbage collector drops off a check for your contributions to going green.

People

People are surely the most important part of any information system. Our lives are touched every day by computers and information systems. Many times the contact is direct and obvious, such as when we create documents using a word processing program or when we connect to the Internet. (See Figure 1-2.) Other times, the contact is not as obvious.

Throughout this book you will find a variety of features designed to help you become an efficient and effective end user. These features include Making IT Work for You, Tips, Privacy, Environment, Ethics, and Careers in IT.



Figure 1-2 People and computers

©Fancy Photography/Veer

- **Making IT Work for You.** Throughout this book you will find Making IT Work for You features that present numerous interesting and practical IT applications. For just a few of the Making IT Work for You topics, see Figure 1-3.
- **Tips.** We all can benefit from a few tips or suggestions. Throughout this book you will find numerous tips to make your computing safer, more efficient, and more effective. These tips range from the basics of keeping your computer system

Application	Description
Free Antivirus Program	Protect your computer by installing and using a free antivirus program. See page 9.
Online Office Suites	Create and collaborate with others online to make better documents and presentations. See page 72.
Gaming	Delve into the world of video games and find the best video game hardware for you. See page 110.
Cloud Storage	Move your files online to synch files between devices or free up space on your digital devices. See page 172.
The Mobile Office	Get work done on the road; whether a business trip or your daily commute, these tools will help you make the most of your time. See page 192.

Figure 1-3 Making IT Work for You applications

running smoothly to how to protect your privacy while surfing the web. For a partial list of the tips presented in the following chapters, see Figure 1-4.

- **Privacy.** One of the most critical issues today is how to protect the privacy of our personal information. Throughout this book you will find Privacy boxes in the margin that present information about protecting our privacy.
- **Environment.** Today it is more important than ever that we be aware of our impact on the environment. In this chapter and the following ones, you will find Environment boxes in the margin that present important relevant environmental information.
- **Ethics.** Most people agree that we should behave ethically. That is, we should follow a system of moral principles that direct our everyday lives. However, for any given circumstance, people often do not agree on the ethics of the situation. Throughout this book you will find numerous Ethics boxes posing a variety of different ethical/unethical situations for your consideration.
- **Careers in IT.** One of the most important decisions of your life is to decide upon your life's work or career. Perhaps you are planning to be a writer, an artist, or an engineer. Or you might become a professional in **information technology (IT)**. Each of the following chapters highlights a specific career in information technology. This feature provides job descriptions, projected employment demands, educational requirements, current salary ranges, and advancement opportunities.

Are you getting the most out of your computer? Here are just a few of the tips to make your computing safer, more efficient, and more effective.

tips

- 1 **Low battery.** Do you find that your laptop's battery keeps its charge for less time than it used to? Here are some ways to make your battery last longer. See page 121.
- 2 **Language translation.** Have you had trouble communicating with someone who does not speak English? If so, Google Translate may be just what you need. See page 140.
- 3 **Lost files.** Have you ever accidentally deleted or lost important files from your flash drive? Here are a few suggestions that might help. See page 168.
- 4 **Wireless networks.** Do you use your laptop to connect to wireless networks at school, coffee shops, airports, or hotels? If so, it is important to use caution to protect your computer and your privacy. A few suggestions are on page 199.
- 5 **Protecting your identity.** Identity theft is a growing problem and can be financially devastating if you are a victim. Some steps to protect your identity are on page 221.

Figure 1-4 Selected tips



concept check

- Which part of an information system is the most important?
- Describe the Making IT Work for You, Tips, and Privacy features.
- Describe the Environment, Ethics, and Careers in IT features.

Software

Software, as we mentioned, is another name for programs. Programs are the instructions that tell the computer how to process data into the form you want. In most cases, the words *software* and *programs* are interchangeable. There are two major kinds of software: *system software* and *application software*. You can think of application software as the kind you use. Think of system software as the kind the computer uses.

System Software

The user interacts primarily with application software. **System software** enables the application software to interact with the computer hardware. System software is “background” software that helps the computer manage its own internal resources.



Figure 1-5 Windows 10

Source: Microsoft



Figure 1-6 macOS

Source: Apple

System software is not a single program. Rather, it is a collection of programs, including the following:

- **Operating systems** are programs that coordinate computer resources, provide an interface between users and the computer, and run applications. Smartphones, tablets, and many other mobile devices use **embedded operating systems**, also known as **real-time operating systems (RTOS)**. Desktop computers use **stand-alone operating systems** like Windows 10 or macOS. (See Figures 1-5 and 1-6.) Networks use **network operating systems (NOS)**.
- **Utilities** perform specific tasks related to managing computer resources. One of the most essential utility programs that every computer system should have is an antivirus program. These programs protect your computer system from **viruses** or malicious programs that are all too often deposited onto your computer from the Internet. These programs can damage software and hardware, as well as compromise the security and privacy of your personal data. If your computer does not have an antivirus program installed on it, you need to get one. To see how you can install a free antivirus program on your computer, see Making IT Work for You: Free Antivirus Program on page 9.

Application Software

Application software might be described as end-user software. Three types of application software are *general-purpose*, *specialized*, and *apps*.

General-purpose applications are widely used in nearly all career areas. They are the kinds of programs you have to know to be considered an efficient and effective end user. Some of the best known are presented in Figure 1-7.

Specialized applications include thousands of other programs that are more narrowly focused on specific disciplines and occupations. Two of the best known are graphics and web authoring programs.

Mobile apps, also known as **mobile applications** or simply **apps**, are small programs primarily designed for mobile devices such as smartphones and for tablet computers. There are over half a million apps. The most popular mobile apps are for social networking, playing games, and downloading music and videos.

Type	Description
Word processors	Prepare written documents
Spreadsheets	Analyze and summarize numerical data
Database management systems	Organize and manage data and information
Presentation software	Communicate a message or persuade other people

Figure 1-7 General-purpose applications

FREE ANTIVIRUS PROGRAM

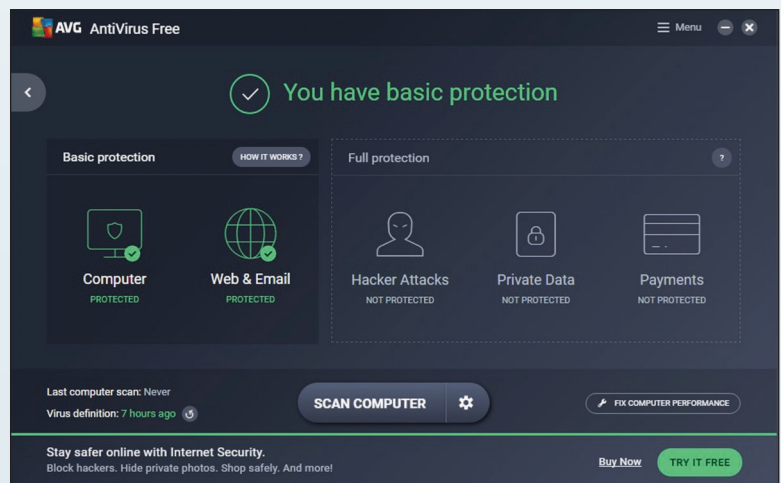
Have you or someone you know had a slower computing experience due to a spyware infection? Even worse, perhaps a malicious piece of software stole crucial, personal information or caused a total system failure. Most of these problems can be averted by having an up-to-date antivirus program running in your computer's memory at all times. This exercise shows you how to download and install a free antivirus program if your computer does not yet have one. (Please note that the web is continually changing, and some of the specifics presented here may have changed.)

Getting Started First, make sure your computer does not have an antivirus or security suite running. If it does, be sure to completely uninstall that program, even if the subscription is expired. Now, follow these steps to install AVG, a popular, free antivirus program:

- 1 • Visit <http://free.avg.com> and click the **Download** button. You will be asked to click “save” to save the installation file to your computer.
- 2 • Run the installation file and follow the prompts.
- 3 • Select **Install Basic** to install the antivirus software. Once the program is installed, it will open automatically.

Using AVG Generally speaking, your antivirus program watches your system for malware and updates itself automatically. However, you can always download updates manually, set a schedule for full-system scans, and change basic settings for various components of the software.

- 1 • Click **Scan now** to run a full scan on your computer.
- 2 • Just to the right of that, click the button with the white cog to see the scan options where you can set a schedule for automated scans.
- 3 • Click the **back arrow** to reach the main screen, where you can click various elements of the program to configure them. For example, clicking **Web** will allow you to turn on a feature that detects cookies that may be used to track your online activity.



Source: AVG