Ciprian Adrian Rusen

IC³®

Internet and Computing Core Certification Global Standard 4

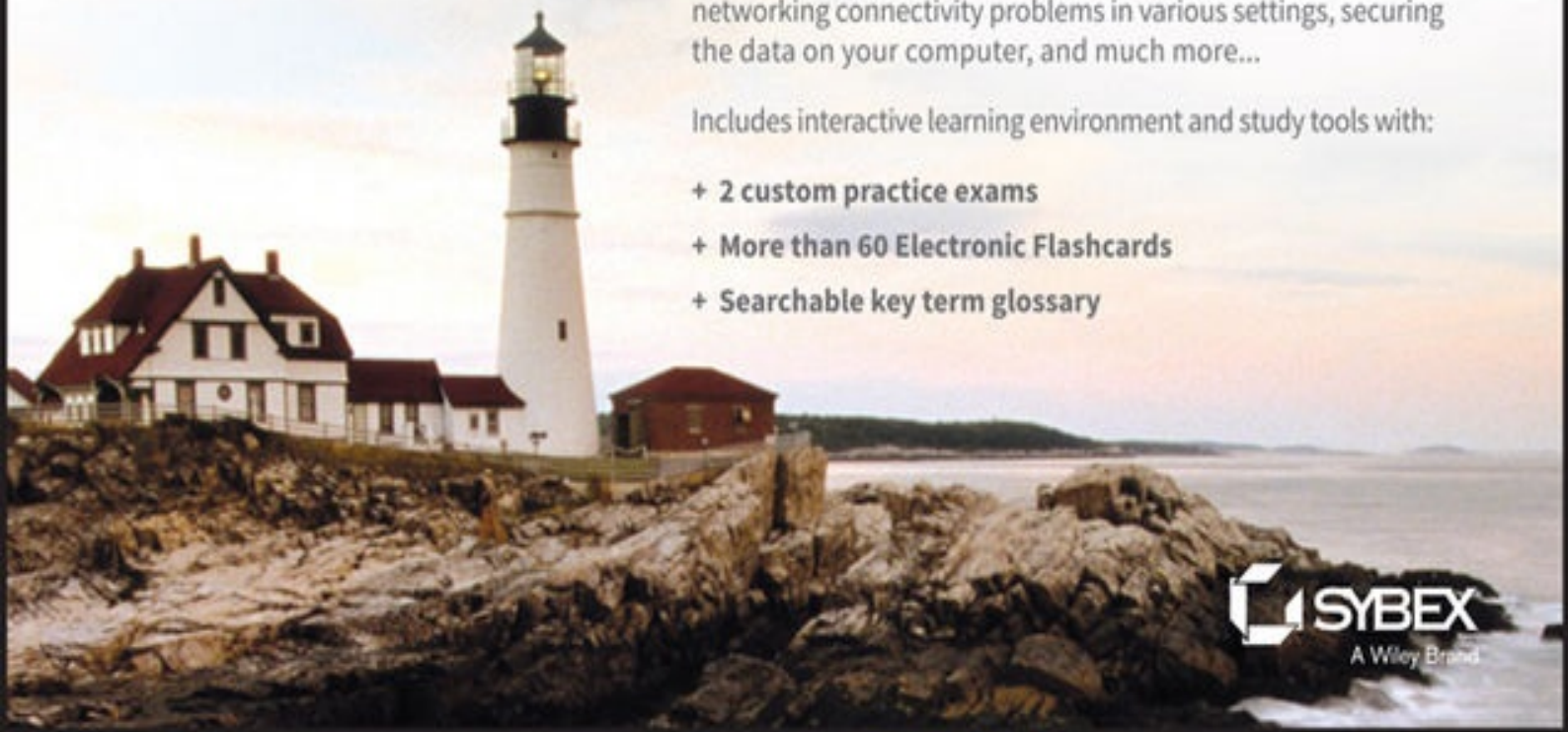
STUDY GUIDE

LIVING ONLINE EXAM

Covers 100% of exam objectives, including demonstrating how to search using an internet browser, managing e-mail communications, explaining the difference between firewalls and gateways, demonstrating the ability to solve simple networking connectivity problems in various settings, securing the data on your computer, and much more...

Includes interactive learning environment and study tools with:

+ **2 custom practice exams**
+ **More than 60 Electronic Flashcards**
+ **Searchable key term glossary**



SYBEX
A Wiley Brand

IC^{3}® Internet and Computing Core Certification Living Online

Study Guide

Ciprian Adrian Rusen

SYBEX
A Wiley Brand

Senior Acquisitions Editor: Ken Brown
Development Editor: Tom Cirtin
Technical Editor: Vlad Falon
Production Editor: Dassi Zeidel
Copy Editor: Linda Recktenwald
Editorial Manager: Mary Beth Wakefield
Production Manager: Kathleen Wisor
Associate Publisher: Jim Minatel
Supervising Producer: Rich Graves
Book Designers: Judy Fung and Bill Gibson
Proofreader: Kim Wimpsett
Indexer: Ted Laux
Project Coordinator, Cover: Brent Savage
Cover Designer: Wiley
Cover Image: ©Getty Images, Inc./Jeremy Woodhouse

Published simultaneously in Canada

ISBN: 978-1-118-99178-7 (ebk.)
ISBN: 978-1-118-99175-6 (ebk.)

Library of Congress Control Number: 2015936402

About the Author

Ciprian Adrian Rusen is a recognized Windows Consumer Expert – Microsoft Most Valuable Professional (MVP). He has published several books about Windows and Microsoft Office, and he's also a very active tech blogger at http://www.7tutorials.com.

On his website you can find many tutorials about Windows 7, Windows 8.1, and Windows 10. He and his team of editors also publish how-to guides about other Microsoft products like Windows Phone and Xbox One. If you would like to keep up to date with the latest Microsoft consumer products, you should subscribe to his blog.

Contents

List of Tables

List of Illustrations

Introduction

Welcome to the *IC3 Internet and Computing Core Certification Living Online Study Guide* for the IC3 Digital Literacy Certification. The purpose of this book is to help you prepare for the Living Online certification exam, which covers aspects of working in an Internet or networked environment, including basic knowledge of networks and the Internet, skills in specifi c applications such as email software and web browsers, skills required to fi nd and evaluate information, and an understanding of issues related to computing and the Internet being used at work, home, and school (ergonomics, security, ethics, Internet "netiquette," and so on).

The book contains all of the information you need to pass the Living Online exam. It also includes notes and warnings from the author to help reduce issues you may be experiencing in your own environment. By studying for and passing this exam, you will gain insight that will make you more valuable in your current position and will make you more likely to be recognized.

In the remainder of this section we will look at some of the facts about the exam, give some commonsense tips for taking the exam, and review the process for registering for the exam.

Exam Facts

Individuals seeking IC3 certification are required to take and pass all three IC3 exams: Computing Fundamentals, Key Applications, and Living Online. Here are some facts about them:

- The IC3 exams are administered by Certiport and are taken at Certiport Authorized Testing Centers.
- The exams are based on Microsoft Windows 7 and Microsoft Office 2010.
- There are 45 multiple-choice questions for each exam.
- There is a time limit of 50 minutes for each exam.
- Each exam has a maximum score of 1000.
- The minimum passing score could range from 620 in difficult tests to 720 on easier tests.
- There is a short survey before the exam begins (taking the survey does not use any of the available 50 minutes).
- If you do not pass the exam, you can retake it as many times as you want, but you must wait 24 hours before taking the exam a second time. If you do not pass the exam again, a two-day waiting period will be imposed for each subsequent exam retake.

Tips for Taking the IC3 GS4 Exams

Here are some general tips for improving the odds of passing your certification exam:

- Read each question carefully. Although the test is not written to be confusing, there are

times when the obvious choice is not the correct choice.

- Make sure you answer each question. Any unanswered questions are considered wrong, so you are better off making an educated guess than leaving a question unanswered.
- For any questions where you are unsure of the correct answer, use a process of elimination to remove any obviously incorrect answers first. Once you have eliminated the obviously incorrect answers, make an educated guess from the remaining answers.
- If you are unsure about a question, select the answer you think is most likely to be correct, mark it for review, and come back to it at a later time.
- Get a good night's sleep the night before the exam. This will help you to be more alert and think clearly during the exam.

Exam Registration

Take following steps to register for the IC3 exam:

1. Using a browser navigate to the Certiport website: http://www.certiport.com.
2. To register with Certiport, click the Register link in the top-right corner and provide all the required personal information.
3. Once the registration process is complete, select that you would like to take an exam or prepare for an exam and click Next.
4. Register for the IC3 certification.
5. Locate a Certiport Authorized Testing Center (CATC) near you.
6. Once you have found a CATC, you should then contact the Testing Center directly to confirm that they offer the exam(s) you wish to take, determine their prices and fees, set up a date and time to take the exam, and find out what exam preparation resources/courses they offer.

You can find the exam policies that you must abide by, at this web page:

http://www.certiport.com/PORTAL/desktopdefault.aspx?page=common/pagelibrary/LiveApp.htm.

IC3 requires certification candidates to accept the terms of a nondisclosure agreement before taking certification exams.

Who Should Read This Book?

This book is intended for individuals who want to prepare for the Living Online exam as part of earning their IC3 GS4 certification. For both the student and the job-seeker, IC3 provides the foundation of knowledge needed for success, and it is a well-respected and internationally recognized credential that reflects the most relevant skills needed in today's academic and business environments.

What's Inside?

Chapter 1: Using the Internet This chapter introduces the basics of the Internet and the World Wide Web. In this chapter you will learn what a web browser is and how to use it to navigate web pages, download files, and more.

Chapter 2: Understanding Networking and Its Most Important Concepts This chapter delves into complex network topics and tools like the different types of networks that are available, network addressing, security, and the performance of Internet connections. It also shares the basic tools for troubleshooting problems.

Chapter 3: Communicating Online with Others In this chapter you will learn the basics of communicating online with others, using services like email, text messaging, audio- and videoconferencing, social networks, blogs, and more.

Chapter 4: Being a Responsible Digital Citizen This chapter discusses ethics, Internet "netiquette," censorship, piracy, and common piracy-prevention tools and recommendations.

Chapter 5: Maintaining Your Health and Safety While Using Computers This chapter shares several recommendations about how to protect your identity when online, how to remove data from your computer, and how to secure your computer. It also provides recommendations on how to maintain your health while using computers for a long time.

Chapter 6: Searching the World Wide Web In the last chapter of this book you will learn how to use search engines to search for information, how to find information online, and how to evaluate its truthfulness.

What's Included with the Book

This book includes many helpful items intended to prepare you for the Living Online exam that's part of the IC3 GS4 certification.

Assessment Test The assessment test at the conclusion of the book's introduction can be used to quickly evaluate where you are with your general computing knowledge and skills that prove your competency in digital literacy. This test should be taken prior to beginning your work in this book, and it should help you identify areas in which you are either strong or weak. Note that these questions are purposely simpler than the types of questions you may see on the exams.

Objective Map and Opening List of Objectives At the start of this book is a detailed exam objective map showing you where each of the exam objectives is covered in this book. In addition, each chapter opens with a list of the exam objectives it covers. Use these to see exactly where each of the exam topics is covered.

Exam Essentials The end of each chapter provides a brief overview of the concepts covered in the chapter. We recommend reading through these sections carefully to check your recollection of each topic and returning to any sections of the chapter you're not confident about having mastered.

Chapter Review Questions Each chapter includes review questions. The material for these questions is pulled directly from information that was provided in the chapter. These questions are based on the exam objectives, and they are similar in difficulty to items you might actually encounter on the IC3 GS4 exam.

Interactive Online Learning Environment and Test Bank

The interactive online learning environment that accompanies this book provides a test bank with study tools to help you prepare for the certification exams—and increase your chances of passing it the first time! The test bank includes the following:

Sample Tests All of the questions in this book are provided: the assessment test, which you'll find at the end of this introduction, and the chapter tests that include the review questions at the end of each chapter. In addition, there are two practice exams. Use these questions to test your knowledge of the study guide material. The online test bank runs on multiple devices.

Flashcards Questions are provided in digital flashcard format (a question followed by a single correct answer). You can use the flashcards to reinforce your learning and provide last-minute test prep before the exam.

Other Study Tools A glossary of key terms from this book is available as a fully searchable PDF.

Go to http://sybextestbanks.wiley.com to register and gain access to this interactive online learning environment and test bank with study tools.

How to Use This Book

If you want a solid foundation for preparing for Living Online exam, then look no further. We've spent a lot of time putting this book together with the sole intention of helping you to pass the exam!

This book is loaded with valuable information. You'll get the most out of your study time if you follow this approach:

1. Take the assessment test immediately following this introduction. (The answers are at the end of the test, but no peeking!) It's okay if you don't know any of the answers—that's what this book is for. Carefully read over the explanations for any question you get wrong, and make note of the chapters where that material is covered.
2. Study each chapter carefully, making sure you fully understand the information and the exam objectives listed at the beginning of each one. Again, pay extra-close attention to any chapter that includes material covered in questions you missed on the assessment test.
3. Answer all the review questions related to each chapter. Specifically note any questions that confuse you, and study the corresponding sections of the book again. And don't just skim these questions—make sure you understand each answer completely.
4. Test yourself using all the electronic flashcards. This is a brand-new and updated flashcard program to help you prepare for the Living Online exam, and it is a really great study tool.

Learning every bit of the material in this book is going to require applying yourself with a good measure of discipline. So try to set aside the same time period every day to study, and select a comfortable and quiet place to do so. If you work hard, you will be surprised at how quickly you learn this material. If you follow the steps listed here and study with the review questions, practice exams, and electronic flashcards, you will increase your chances of passing the exam.

How to Contact Sybex

Sybex strives to keep you supplied with the latest tools and information that you need for your work. Please check the website at http://sybextestbanks.wiley.com.

IC3 GS4 Exam Objectives

IC3—Module 3: Living Online

Objective Number	Objectives and Skill Sets	Chapter
1.0	Browsers	11
1.1	Internet vs. Browsers vs. WWW	
1.1.1	Explain the concepts of: Internet, Browsers, WWW.	
1.1.2	Explain the differences between: Internet, Browsers, WWW.	
1.1.3	Demonstrate how to use each: Internet, Browsers, WWW.	
1.2	Navigation	
1.2.1	Domains	11
1.2.2	Explain how hyperlinks function in a web browser environment.	
1.2.3	Demonstrate how and why you would want to set a homepage.	
1.2.4	Demonstrate how to move back, forward and refresh in a variety of browsers. Identify universal symbols used for each term.	
1.2.5	Explain why favorites/bookmarks are helpful. Describe how to establish, save, invoke, and delete a bookmark.	
1.2.6	Explain what a plugin is and its function. Describe how to find, install, configure, use, disable, enable, and delete a plugin.	
1.2.7	Explain how the History function of a browser works and how to use it. Describe how to clear history.	
1.2.8	Demonstrate how to search using an internet browser, including the use of advanced features such as using basic Boolean logic including, Or, And, plus sign +, quotation marks “, etc.	
1.2.9	Tabs	
1.2.10	Downloading/Uploading	
2.0	Networking concepts	12
2.1	Internet Connection	
2.1.1	Speed Explain the units of measurement associated with an internet connection and what they mean – mbps, kbps. Explain the things that can limit or increase speed: multiple browsers open, wireless connection, etc.	
2.1.2	Explain the differences between Dial up and broadband connections and the process each uses to establish a connection.	

2.1.3	Wireless	
2.1.4	Security	
2.2	Network types and features, capabilities	
2.2.1	Explain the concepts associated with the Publicly switched networks.	12
2.2.2	Explain the concepts associated with DNS (Domain Name Server).	
2.2.3	Explain the concepts associated with Addressing.	
2.2.4	Explain the concepts associated with and the difference between LAN vs. WAN.	
2.2.5	Explain the concepts associated with VPN.	
2.3	Network troubleshooting	
2.3.1	Demonstrate the ability to solve simple networking connectivity problems in various settings.	
2.3.2	Explain methods of identifying common network problems.	
2.3.3	Explain the concepts associated with Define IP Addressing.	
3.0	Digital Communication	13
3.1	E-mail communication	
3.1.1	E-mail Account Settings	
3.1.2	Appropriate use of e-mail	
3.1.3	Managing e-mail communications	
3.2	Real-Time-communication	
3.2.1	Text communication:	
3.2.2	Audio Visual communication	13
3.2.3	Social Media	
4.0	Digital Citizenship	14
4.1	Communication Standards	
4.1.1	Explain the difference between personal and professional communication and the importance of spelling and use of abbreviations in each type of communication.	
4.1.2	All capitals vs. standard capitalization	
4.1.3	Verbal vs. Written, Professional vs. Personal communication	
4.1.4	Explain the terms: Spamming, flaming, bullying and the harm that each can cause. Explain how they are not faceless, harmless electronic actions.	14
4.1.5	Explain the terms Libel and Slander and the real life legal consequences of each.	
4.2	Legal and responsible use of computers	

4.2.1	Explain what censorship is. Contrast its benefits and drawbacks.	
4.2.2	Explain what filtering is. Contrast its benefits and drawbacks.	
4.2.3	Explain Intellectual Property, its real value and the implications of its misuse.	
4.2.4	Explain Piracy, how to protect yourself from it and the ethical issues surrounding it.	
4.2.5	Explain what a copyright is, how it is obtained, the legal ramifications surrounding a copyright and its value to its holder.	
4.2.6	Licensing	
4.2.7	Explain what Creative Commons is, the licensing availability and legal issues surrounding it, as well as the benefits to the community.	
5.0	Safe Computing	15
5.1	Secure online communication or activity	
5.1.1	Identity Protection	
5.1.2	Explain Data Protection including the following: Explain how to completely remove data from hard drives, portable memory, digital devices. Explain how to secure the data on your computer and keep it updated by backing up data to other sources – cloud, backup hard drives. Describe how to use protection programs and the value of these services. Also describe the harm that can come from not using these products and services.	
5.2	Ergonomics	
5.2.1	Explain and demonstrate proper ergonomics. Problems that come from improper ergonomics in relation to monitor height and angle.	15
5.2.2	Explain and demonstrate proper ergonomics. Problems that come from improper ergonomics in relation to mouse and keyboard shapes and use.	
5.2.3	Explain the ergonomics around proper chair height and settings, arms, lumbar support, etc.	
5.2.4	Explain the issues around poor lighting, short term and long term eye problems.	
5.2.5	Explain the physical issues surrounding poor body posture, especially with prolonged time in the same position(s).	
6.0	Research Fluency	16
6.1	Using Search Engines	

6.1.1	Explain how to use search engines to acquire information. The value of the resources available on the internet.	
6.1.2	Demonstrate how to use search engines to answer questions and solve problems by using good search terms to get specific information from reputable sources.	
6.2	Evaluate search results	
6.2.1	Forums Explain the value and problems with internet forums.	
6.2.2	Explain that ads are paid messages from companies that want to interest you in their products. Messages are not necessarily factual.	
6.2.3	Explain that sponsored links are a form of advertising and not to be relied on as an informational resource.	
6.2.4	Explain that a knowledge base is a collection of data around a particular subject. Include examples like Help menus available from software and hard good manufacturers.	
6.2.5	Explain how to determine the validity of various sources, including but not limited to domain names/domain, published journals, government sites and documents vs. forums, blogs, personal websites.	16
6.2.6	Explain that articles can be both factual and made up. Articles are created for a number of reasons including, reviews of products that may or may not have been given to the reviewer, personal opinion, or well researched documenting of fact.	
6.3	Using advanced features of search engines	
6.3.1	Search types	

Assessment Test

IC3—Module 3: Living Online

1. What does WWW stand for?
   A. Wild Wild West
   B. World Wide WAN
   C. World Wide Web
   D. World Wide Fund for Nature
2. What is the Web?
   A. The whole of the Internet
   B. A system of websites connected by links
   C. A networking protocol
   D. A type of software
3. Which of the following is an example of a URL?
   A. `john.smith@email.com`
   B. #twitter
   C. ☺
   D. `http://www.microsoft.com`
4. Which of the following is an example of a web browser?
   A. Internet Explorer
   B. Skype
   C. OneDrive
   D. Microsoft Word
5. How do you save a website so that you quickly access it later?
   A. Save it as a document.
   B. Save it as a favorite.
   C. Send an email.
   D. Print it.
6. What does LAN stand for?
   A. Local area network
   B. Wide area network
   C. Legal area network
   D. Local area nature
7. Which of the following is an example of a WAN?

A. The network in your home
B. FTP
C. The network in your office building
D. The Internet

8. Which of the following commands can you use to test the connection between two devices on the network?
   A. ping
   B. FTP
   C. ipconfig
   D. Google
9. Which of the following is an example of an email address?
   A. http://www.microsoft.com
   B. #hashtag
   C. Instagram
   D. John.Smith@example.com
10. Which of the following applications can you use to make audio and video calls on the Internet?
    A. Bing
    B. FTP
    C. Skype
    D. Google
11. Which of the following is an example of a social network?
    A. Google
    B. Facebook
    C. #hashtag
    D. Blog
12. Which of the following is an example of an emoticon?
    A. Luv u
    B. @twitter
    C. #hashtag
    D. ☹
13. What is piracy?
    A. The whole phenomenon of copyright infringement

B. A licensing model

C. A DRM tool

D. Open source software

14. What is the keyboard shortcut for deleting a file that you select on your computer?

A. Alt+Tab

B. Ctrl+C

C. Del

D. Shift

15. What are search operators when referring to search engines?

A. Symbols that can be added to searches to help narrow down your results

B. Quotes that can be added to searches to help narrow down your results

C. Mathematical functions that can be added to searches to help narrow down your results

D. Words that can be added to searches to help narrow down your results

Answers to Assessment Test

IC3—Module 3: Living Online

1. C. WWW is an abbreviation for World Wide Web.
2. B. The Web, or the World Wide Web, is a system of websites connected by links.
3. D. `http://www.microsoft.com/` is an example of a URL.
4. A. Internet Explorer is a web browser.
5. B. You can set a website as a favorite and create a link that you can use to access it quickly later on.
6. A. LAN is an abbreviation for local area network.
7. D. The Internet is an example of a WAN.
8. A. The ping tool allows you to test the connection between two devices on the network.
9. D. `John.Smith@example.com` is an example of an email address.
10. C. Skype is an example of an application that can be used for both audio- and videoconferencing.
11. B. Facebook is a social network.
12. D. ☹ is an emoticon.
13. A. Piracy is the whole phenomenon of copyright infringement.
14. C. Del or Delete is the keyboard shortcut for deleting files.
15. D. Search operators are words that can be added to searches to help narrow down your results.

Chapter 1
Using the Internet

THE FOLLOWING IC3 GS4: LIVING ONLINE EXAM OBJECTIVES ARE COVERED IN THIS CHAPTER:

- ✓ **Browsers**
- ✓ **Internet vs. Browsers vs. WWW**
  - Explain the concepts of: Internet, Browsers, WWW.
  - Explain the differences between: Internet, Browsers, WWW.
  - Demonstrate how to use each: Internet, Browsers, WWW.
- ✓ **Navigation**
  - Domains
  - Explain how hyperlinks function in a web browser environment.
  - Demonstrate how and why you would want to set a homepage.
  - Demonstrate how to move back, forward and refresh in a variety of browsers. Identify universal symbols used for each term.
  - Explain why favorites/bookmarks are helpful. Describe how to establish, save, invoke, and delete a bookmark.
  - Explain what a plugin is and its function. Describe how to find, install, configure, use, disable, enable, and delete a plugin.
  - Explain how the History function of a browser works and how to use it. Describe how to clear history.
  - Demonstrate how to search using an internet browser, including the use of advanced features such as using basic Boolean logic including, Or, And, plus sign +, quotation marks “, etc.
  - Tabs
  - Downloading/Uploading

In the third part, “Living Online,” we start by talking about the Internet and the World Wide Web. You will learn what they are, what their names mean, and the mandatory terminology that will help you make sense of everything.

The Web is such an important part of our lives that everyone should know the basics of browsing the Web. That’s why we will share things like how to use web browsers, the

basics of navigating the Web, downloading and uploading files, and setting a homepage in your web browser.

Toward the end of this chapter we will take a deeper dive and cover more complex subjects like how to use and clear your browsing history, how to use favorites or bookmarks, how to search for text inside a web page from your web browser, and how to use plug-ins and add-ons to enhance your web-browsing experience.

There is a lot of ground to cover, so let’s get started.

Understanding the Terminology about the Internet and the WWW

Everyone has heard the term *Internet*, but even though we use it on a daily basis, not that many of us know what this word means. The *Internet* is a global network of interconnected networks that use standardized communication protocols—a set of rules that specify how data is transmitted—to exchange data. It operates without being governed by any entity, and each network that is part of the Internet joins it voluntarily while remaining autonomous from other networks. To put it more simply, the Internet is the physical network of computers and devices (smartphones, tablets, and the like) all over the world.

The origins of the Internet date back to research commissioned by the United States government in the 1960s to build robust communication using computer networks known as the Advanced Research Projects Agency Network (ARPANET). The term *Internet* was first used in December 1974, and the Internet, as a global network of networks, was fully commercialized in the United States by 1995. It started a rapid expansion to Europe and Australia in the mid- to late 1980s and to Asia in the late 1980s and early 1990s. There is no consensus on the exact date when the modern Internet came into being, but most specialists agree that it started to exist in the early to mid-1980s.

According to the UN's International Telecommunication Union, in 2014 the world's Internet users surpassed 3 billion or 43.6 percent of the world's population. By region, 42 percent of the world's Internet users were based in Asia, 24 percent in Europe, 14 percent in North America, 10 percent in Latin America and the Caribbean taken together, 6 percent in Africa, 3 percent in the Middle East, and 1 percent in Australia/Oceania.

One of the most frequent mistakes we all make is that when we think of the Internet, the first thing we think about is the World Wide Web (WWW). The terms *Internet* and *World Wide Web* are often used interchangeably, but they're actually not the same thing. The *World Wide Web* (abbreviated as *WWW*, commonly known as the Web) is a system of websites connected by links. Websites are stored on servers on the Internet, and the WWW is a part of the Internet but not the whole of Internet.

The World Wide Web was invented by the British computer scientist Tim Berners-Lee in 1989. Before the Web, the Internet transmitted only text and was used primarily by military officials and scientists. By utilizing the Hypertext Transfer Protocol (HTTP), web pages can include text, images, videos, and other types of media files.

Websites are locations connected to the Internet that maintain one or more web pages. A *website* is a set of related web pages typically served from a single web domain and hosted on at least one server that is accessible via the Internet. All publicly accessible websites collectively constitute the World Wide Web.

A *web page* is a document, typically written in text, that can incorporate multimedia

content like pictures, audio, and video that is suitable for the World Wide Web and web browsers.

A *web browser* is the application that you use to display a web page on a computer or mobile device. It coordinates the various resources and elements that are found on each web page so that they are displayed correctly in a form that is humanly readable. The major web browsers are Internet Explorer, Google Chrome, Mozilla Firefox, Opera, and Safari. The first web browser was invented in 1990, and it was called WorldWideWeb, to suggest that is was the only software needed to navigate websites and web pages found on the real World Wide Web.

Getting back to the Internet, the most common use for the Internet is to browse the World Wide Web using web browsers. However, since the Internet is a global network of interconnected networks, the Internet is capable of doing much more than providing access to websites. With the help of the Internet, we can send email messages to other people, use programs that take real-time data from the Internet and share it with us (for example, traffic data, weather data, stock market data, and so on), transfer files to other people across the globe, chat with others, access other computers across the globe, and much more. The ways the Internet can be used are practically unlimited, whereas the WWW is just one way to use the Internet.

Understanding the World Wide Web

Every website and web page on the World Wide Web has an address that can be used to find it with the help of a web browser. That address is called its *URL* (Uniform Resource Locator), and it consists of the following elements:

Protocol The specific data-transmission rules for accessing the resource on the Web. For websites and web pages, it can be `http://` (Hypertext Transfer Protocol) or `https://` (the `s` at the end stands for Secure). It used to be that you had to type the protocol to reach a website, but today's web browsers supply it automatically.

Prefix `www` is the prefix used for visiting websites on the Web. Most websites do not require it, and they can be accessed without typing `www` as the prefix. For example, typing `www.example.com` or `example.com` leads you to the same web page. The `www` prefix must always be followed by a dot.

Domain Name This consists of one or more parts or labels, delimited by dots, like `example.com`. The right label (`com`) is called the top-level domain. Each label to the left of the top-level domain is a subdomain of the domain on its right. In `example.com`, `example` is a subdomain of the `com` domain. Some websites may have multiple subdomains, like `example1.example2.com`. In this scenario, `example 1` is a subdomain of `example 2`, and `example2` is a subdomain of the `com` top-level domain.

Path This element is optional and is generally used to access a very specific resource on a website, like a certain web page, file, and so on. The path is always preceded by a `/` and then followed by the address of the resource you are trying to access, such as `example.com/example`.

The complete URL for `example.com` is the following: `http://www.example.com`. The `http://` protocol is automatically completed by your browser, and you don't have to type it. Also, you can access the same website by using `http://example.com`, without the `www` prefix. However, some websites may require you to type `www` and cannot be accessed without this prefix. This behavior varies from website to website and depends on how its administrator has configured it.

Standard Domain Names

As you have seen in earlier examples, the top-level domain is always the last label of the domain name, and it follows the final dot in an address. The list of top-level domains that can be used on the Internet is managed by the Internet Corporation for Assigned Names and Numbers (ICANN). In October 2014, there were 735 active top-level domains, and the list is growing each year. In the early days of the Internet, there were only seven generic top-level domains:

`.com` Commercial: a generic top-level domain that is accessible to any person or entity.

`.org` Organization: it was originally intended for use by nonprofit organizations. Today, it is open to any person or entity.

`.net` Network: it was originally intended for use by domains pointing to networks. It is now open to any person or entity.

`.int` International organizations: strictly limited to organizations, offices, and programs that are endorsed by a treaty between two or more nations.

`.edu` U.S. higher education: it is used almost exclusively by American colleges and universities.

`.gov` U.S. national and state government agencies: it is limited to only such entities.

`.mil` U.S. military: it is used only by the United States military.

In the modern era of the Internet, each country has its own top-level domain. For example, UK has `.uk`, Canada has `.ca`, Germany has `.de`, Romania has `.ro`, Vietnam has `.vn`, and so on.

Special Domain Names

There are many other types of top-level domains, and new ones are made available each year. ICANN has created a long list of generic domains like `.academy` (which can be used by academic institutions all over the world), `.biz` (open to commercial entities all over the world), or `.pro`, which is reserved for licensed or certified professionals worldwide. A new practice is for famous brands and companies to register their own branded top-level domains. To give you a few examples, Google has `.android` as the top-level domain for websites that are related to its Android mobile operating system, IBM has its `.ibm` top-level domain, while the German car manufacturer BMW has its own `.bmw` top-level domain.

Understanding Hyperlinks

When visiting websites and web pages in your browser, you will encounter many links to other web pages and websites. These links are called *hyperlinks*, and a hyperlink is only a reference to data that can be accessed by clicking it. A hyperlink has an anchor on the page, which can be a selection of text, an image, or another kind of element.

Web browsers usually display hyperlinks in some distinguishing way, like using a different color (usually blue), font, or style. When you move your mouse pointer over a hyperlink, it turns into a hand, signaling that the element you are over is a hyperlink that can take you to another resource. You can see an example in Figure 1.1.

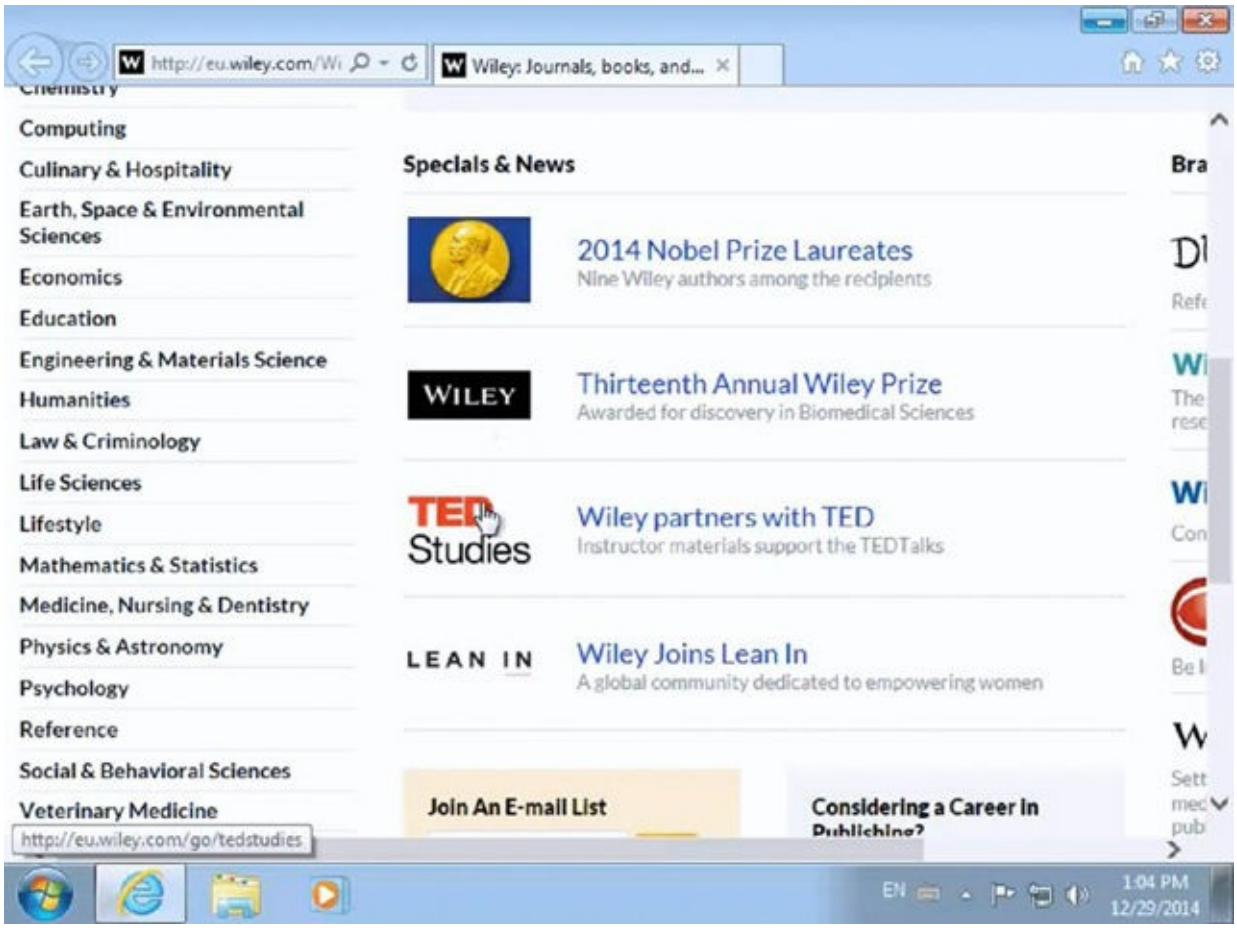


FIGURE 1.1 A hyperlink with a mouse pointer hovering above it

Browsing the Web with a Web Browser

Now that you know the theory behind the Internet and the World Wide Web, as well as their most important concepts, you'll start to put your newfound knowledge to good use and learn how to browse the Web.

There are many web browsers to choose from, depending on the device and the operating system that you are using. For example, on Windows you can find Internet Explorer, Google Chrome, Mozilla Firefox, and Opera. On Mac OS X Safari is the most popular browser, while on mobile platforms like Android you can choose from browsers like Dolphin, Opera Mini, Google Chrome, UC Browser, Maxthon, and many others.

Each web browser looks different from the others, but most of them offer the same capabilities and features. In order to get you acquainted with the concept of a web browser, we will go through a few exercises. First, we will be using Internet Explorer, the browser with the biggest market share on Windows. You open this browser by clicking its icon on the taskbar—the big blue *E*. You can also find it by going to Start menu and clicking All Programs ➢ Internet Explorer, as shown in Figure 1.2.

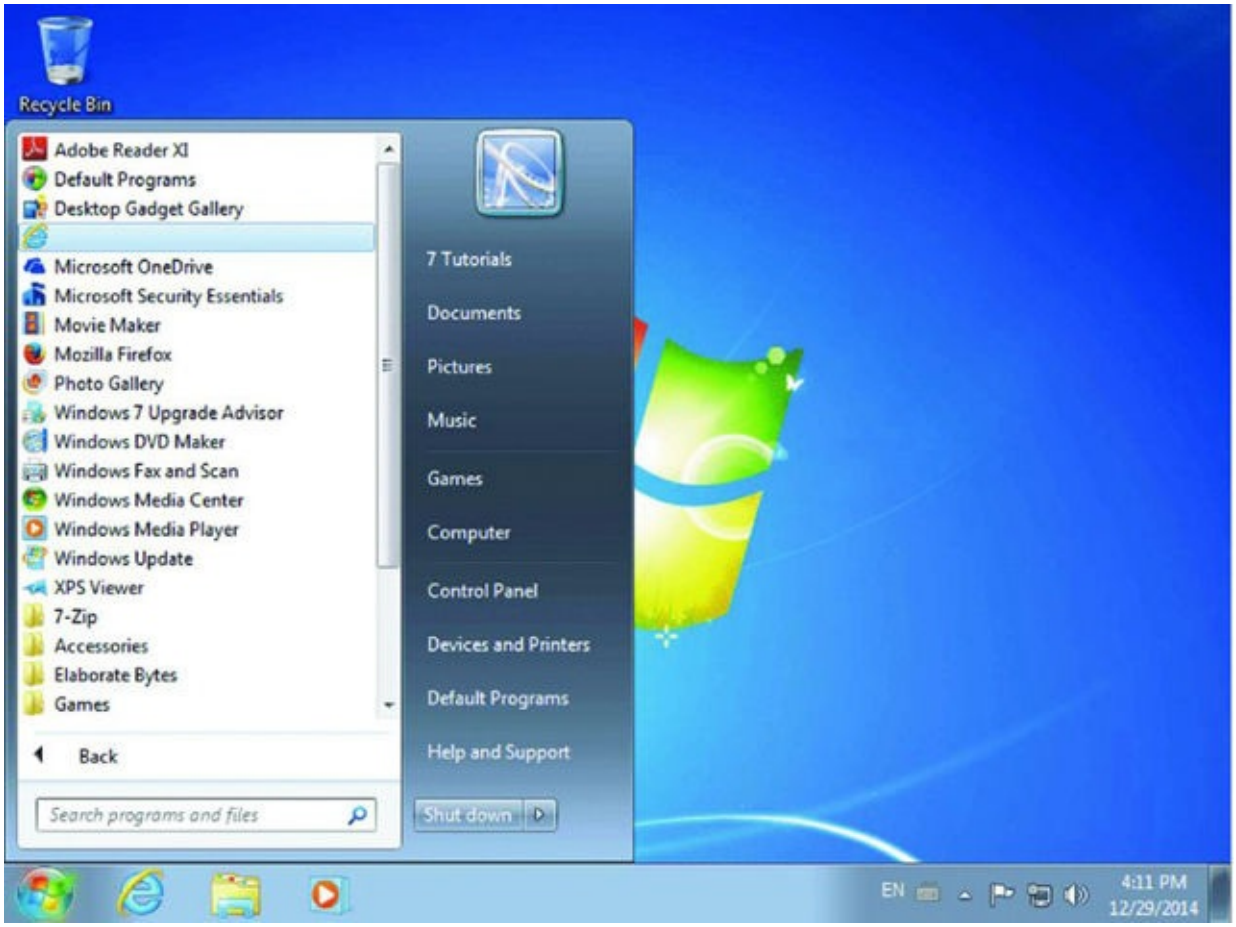


FIGURE 1.2 The shortcuts for Internet Explorer

When you open the Internet Explorer window, the website that is set as your homepage is automatically opened. By default, it is the MSN website. On the top side of the window are several buttons and interface elements, highlighted in Figure 1.3:

FIGURE 1.3 Buttons in Internet Explorer

Back An arrow pointing to the left side of the screen. It becomes active after you visit a second web page or website. When you click it, it takes you back to the previous page.

Forward An arrow pointing to the right side of the screen. It becomes active after clicking Back, and it takes you to the page that you visited prior to clicking Back.

Address Bar A text field next to the Back and Forward buttons where you can type the address of the website that you want to visit.

Refresh On the right side of the Address bar you will find the Refresh button. Clicking it reloads the current web page.

In Exercise 1.1 you will learn how to open Internet Explorer, use it to browse different websites, and go back and forth between them.

EXERCISE 1.1

Browsing the Web with Internet Explorer

1. Click Start ➢ All Programs ➢ Internet Explorer.
2. Click inside the Address bar, type microsoft.com, and then press Enter.

   Notice how Internet Explorer autocompletes the address and takes you to `http://www.microsoft.com`.
3. Click inside the Address bar, type wikipedia.org, and then press Enter.

   Notice how the Wikipedia website is now opened instead of Microsoft.com (Figure 1.4). Also, notice how Internet Explorer autocompleted the full URL and took you to `http://www.wikipedia.org`.
4. Click the Back button and notice how the Microsoft website is loaded instead of Wikipedia.
5. Click the Forward button and notice how the Wikipedia website is loaded.
6. Click the Refresh button to reload the Wikipedia website.
7. Close Internet Explorer.

FIGURE 1.4 The Wikipedia website loaded in Internet Explorer

As mentioned earlier, many web browsers are available, and while they all look different,

they are used for the same purpose and have mostly the same features. One of the most popular open-source browsers for Windows is Mozilla Firefox. You open this browser by clicking its icon, which looks like a fox surrounding Earth, on the taskbar. You can also find it by going to the Start menu and clicking All Programs and then Mozilla Firefox, as shown in Figure 1.5.

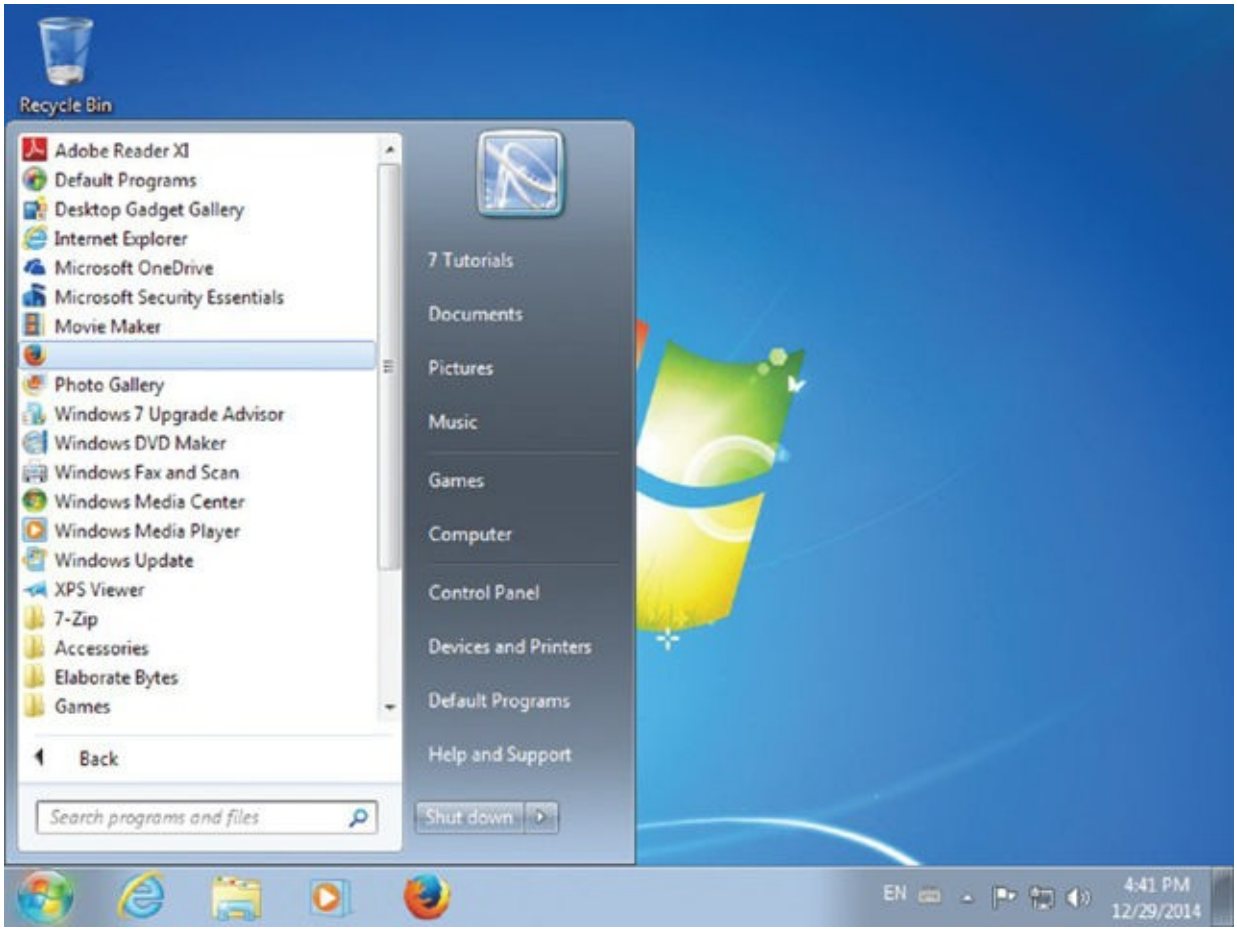


FIGURE 1.5 The shortcuts for Mozilla Firefox

When you open the Mozilla Firefox window, the website that is set as the homepage is automatically opened. At the top of the window are the same buttons as in Internet Explorer. But they look different and, their positioning is not exactly the same, as you can see in Figure 1.6.

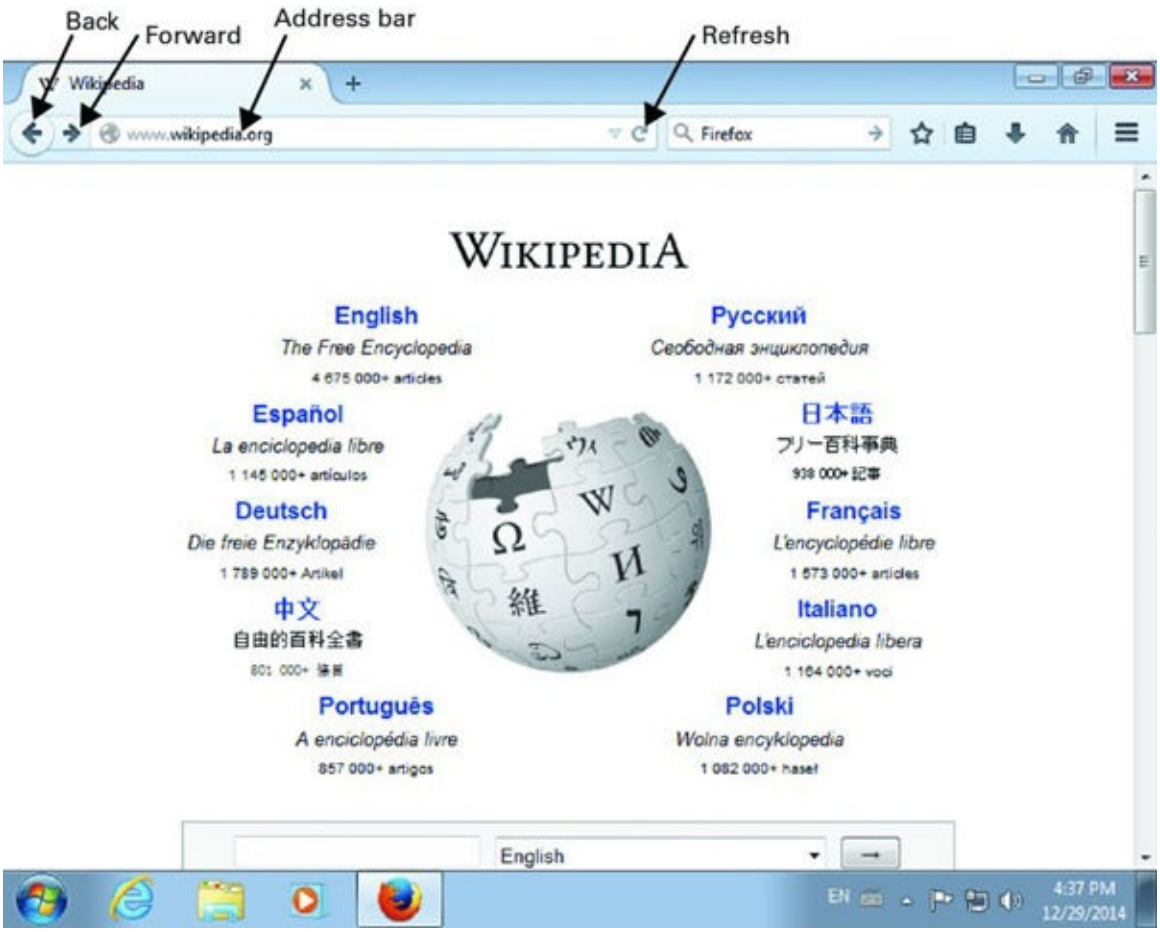


FIGURE 1.6 Buttons in Mozilla Firefox

One difference between Internet Explorer and Mozilla Firefox is that in Mozilla Firefox, the Forward button is hidden until you click the Back button, in order to make more room for the Address bar.

In Exercise 1.2 you will learn how open Mozilla Firefox and use it to browse different websites and go back and forth between them.

EXERCISE 1.2

Browsing the Web with Mozilla Firefox

1. Click Start ➢ All Programs ➢ Mozilla Firefox.
2. Click inside the Address bar, type microsoft.com, and then press Enter.

   Notice how Mozilla Firefox autocompletes the address and takes you to http://www.microsoft.com.
3. Click inside the Address bar, type **wikipedia.org**, and then press Enter.

   Notice how the Wikipedia website is now opened instead of Microsoft.com. Also, notice how Mozilla Firefox autocompleted the full URL and took you to http://www.wikipedia.org.
4. Click the Back button and notice how the Microsoft website is loaded instead of Wikipedia.
5. Click the Forward button and notice how the Wikipedia website is loaded.
6. Click the Refresh button to reload the Wikipedia website.
7. Close Mozilla Firefox.

Using Multiple Tabs While Browsing the Web

When you browse the Web, you will access many websites and web pages. Even though using the Back and Forward buttons is useful, it can become counterproductive to keep using them in order to flip through the websites that you visit during a web-browsing session. To help you out, all modern web browsers use tabs as a tool for switching between web pages.

When you open a web browser, one tab is opened and the website set as the homepage is loaded automatically. You can open a new tab and navigate to another website in the same web browser window by clicking the button for creating a new tab or by pressing Ctrl+T on your keyboard. When the new tab opens, type the address of the website that you want to visit and press Enter. To close a tab, you simply click the small X button on the right side of that tab. To switch between tabs, simply click them.

As shown in Figure 1.7, in Internet Explorer the New Tab button is placed on the right side of the list with tabs. Each tab has its own little X button on its right, which you can use to close it.

FIGURE 1.7 The Close Tab and New Tab buttons in Internet Explorer

In Mozilla Firefox, these buttons look slightly different and they have different names, as shown in Figure 1.8:

- The tabs are placed above the Address bar and not to its right, like in Internet Explorer.
- The button for opening new tabs is found on the right side of the tabs, and it is in the form of a + sign.

FIGURE 1.8 The Close Tab and Open A New Tab buttons in Mozilla Firefox

Just like in other browsers, you close a tab by clicking the X button on its right. To switch between tabs, simply click them.

Downloading and Uploading Files on the Web

We use the Web not only to find information but also to download files and use them on our computers. Many of us also upload our own files to the Web and post them online for others to view or use.

The term *download* means receiving data on your computer or device from another remote system. This remote system can be a web server, email server, or another similar system. *Download* can mean either any file that is offered for downloading or that has been downloaded or the process of receiving such a file. We download all kinds of files from the Web, ranging from pictures to music, software, books, and other items.

Depending on the type of the file that you download from the Web, you are asked where to save it on your computer and whether you want to run it (this happens only when downloading executable files), like in Figure 1.9. After selecting where you want to save it, the download starts.

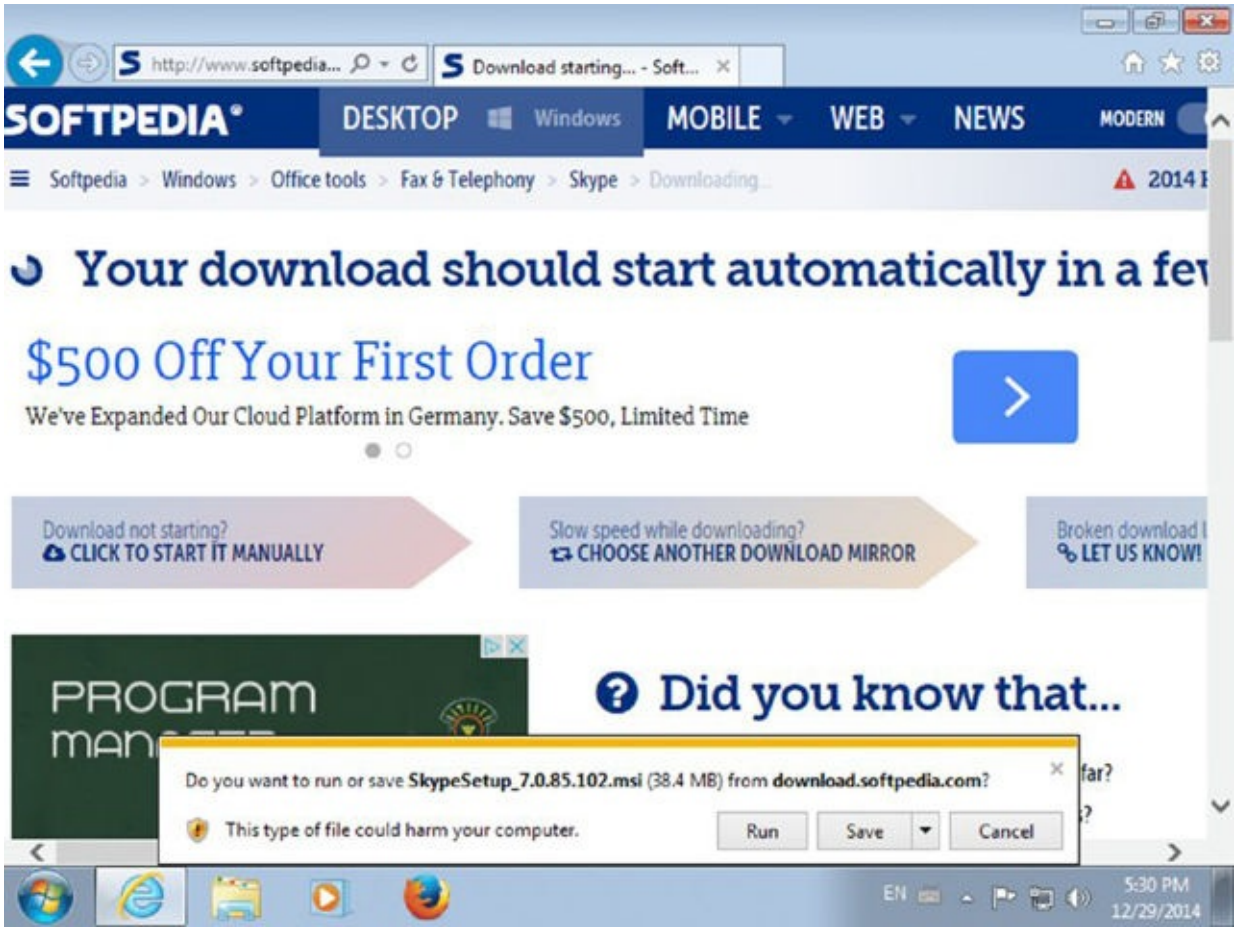


FIGURE 1.9 Downloading a file in Internet Explorer

The term *upload* refers to the sending of data from your computer or device to a remote system, like a web server, email server, or another similar system. *Upload* can mean either any file that is uploaded or that has been uploaded or the process of sending such a file. Some common examples of uploads include posting your pictures on Facebook, creating a gallery with your photos on Flickr, or posting a video you have made on YouTube.

Download Speed vs. Upload Speed

After downloading and uploading several files, you will notice that the download is generally faster than the upload. Since most users spend much more time downloading files than they do uploading, Internet service providers have designed their systems to give priority to downloading, and Internet packages are typically asynchronous, meaning that the service provider offers more bandwidth for downloads than for uploads. If you are a person who uploads a lot of content online or you have a company that needs to send lots of data to its clients, it is very important to examine the Internet packages offered by your local provider and take a close look at the speed they advertise for uploads.

Setting a Homepage in Your Web Browser

Most web browsers have a default homepage. This page is loaded each time you start the browser, and you can change it to something else. For example, if you check your email a lot, you may want to set the homepage to be your email service. Or, if you spend a lot of time on Facebook, you may want to set this social network as your homepage.

Each browser has a different user interface with different menus and options, but all of them allow you to set your homepage. However, since we can’t cover all web browsers, we will show how this is done in the most popular web browser for Windows, Internet Explorer.

In Exercise 1.3 you will learn how set the homepage in Internet Explorer.

EXERCISE 1.3

Setting the Homepage in Internet Explorer

1. Click Start ➢ All Programs ➢ Internet Explorer.
2. Click the Tools button on the upper-right corner of the Internet Explorer window, or press Alt+X on your keyboard to open the Tools menu (Figure 1.10).
3. In the Tools menu, click Internet Options (Figure 1.11).
4. In the Internet Options window, go to the Home Page section in the General tab.

   There you will see the homepage that is currently set in Internet Explorer (Figure 1.12).
5. Double-click the current homepage and start typing the new one, for example, `http://www.facebook.com` (Figure 1.13).
6. Click OK and then close Internet Explorer.
7. Open Internet Explorer again, and notice how the homepage that you set is opened automatically when you start the browser.
8. Close Internet Explorer.

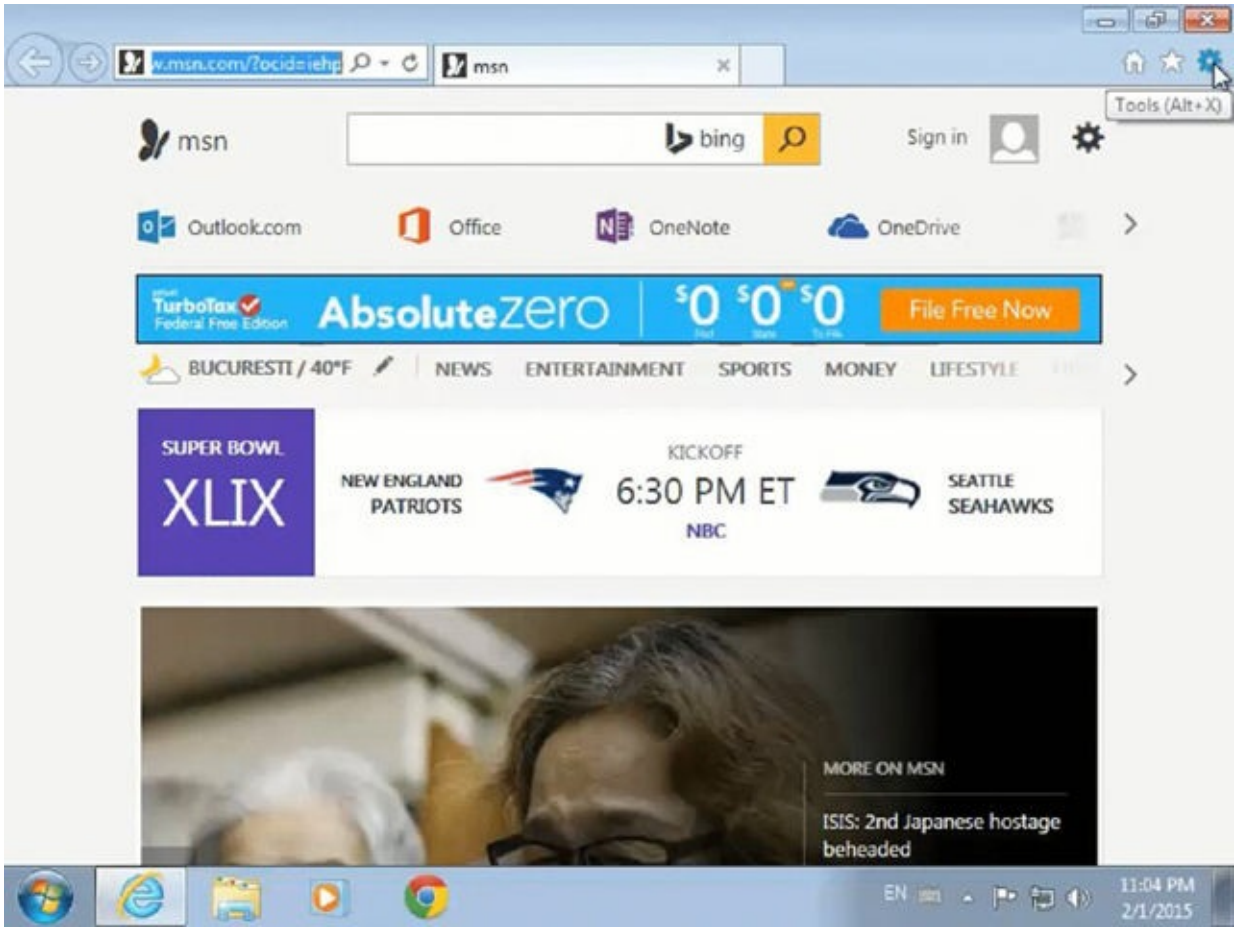


FIGURE 1.10 The Tools button in Internet Explorer

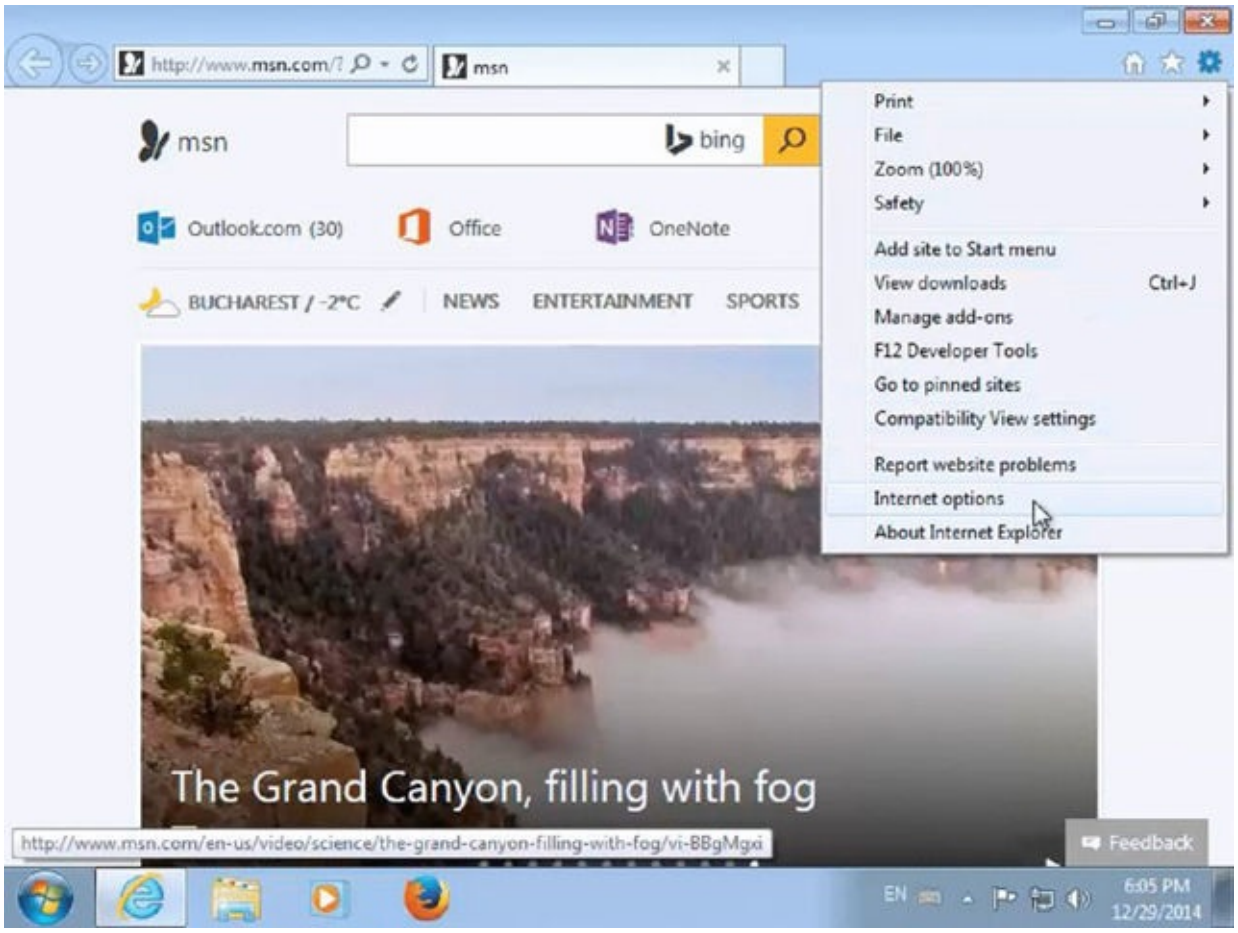


FIGURE 1.11 The Tools menu in Internet Explorer

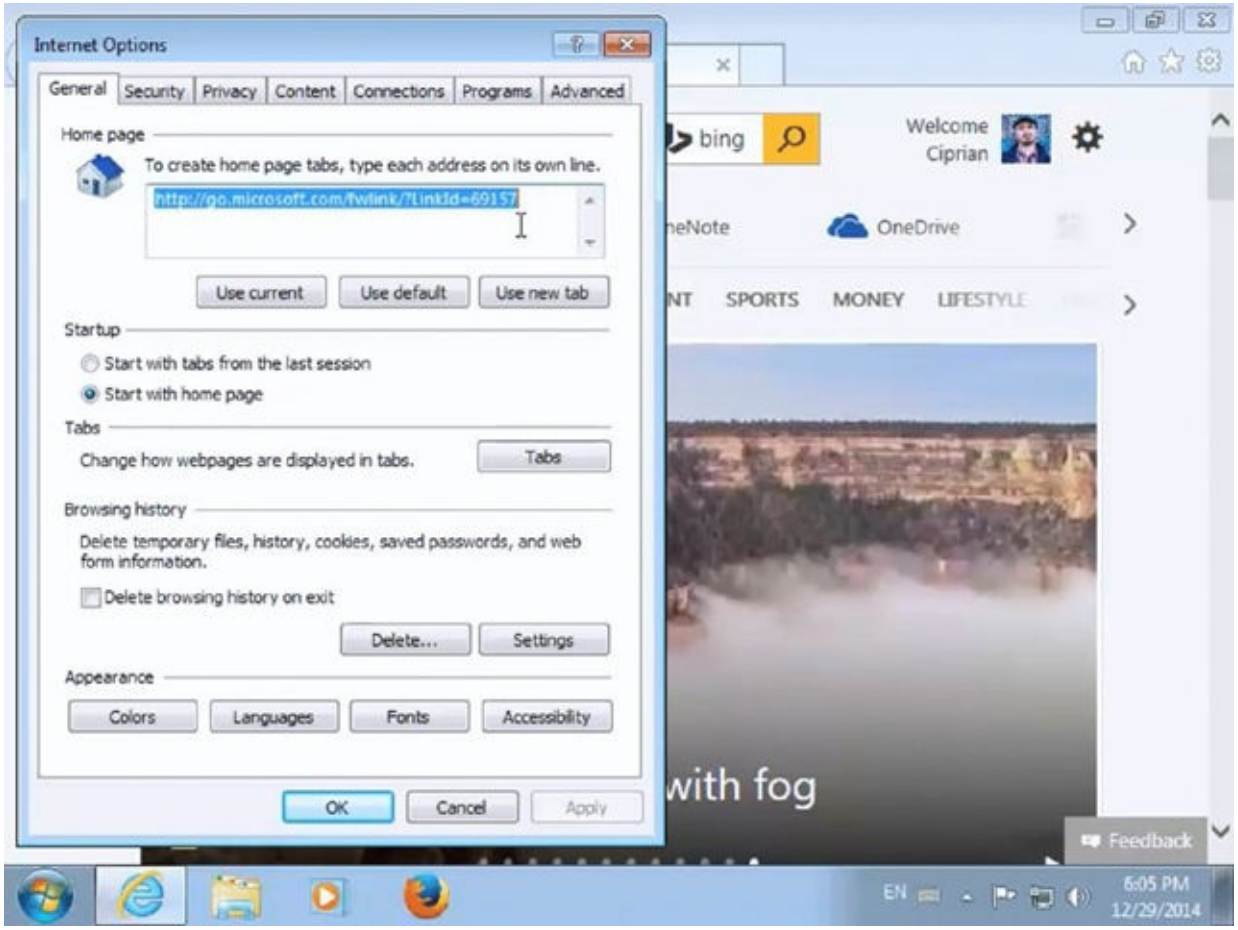


FIGURE 1.12 The Internet Options window

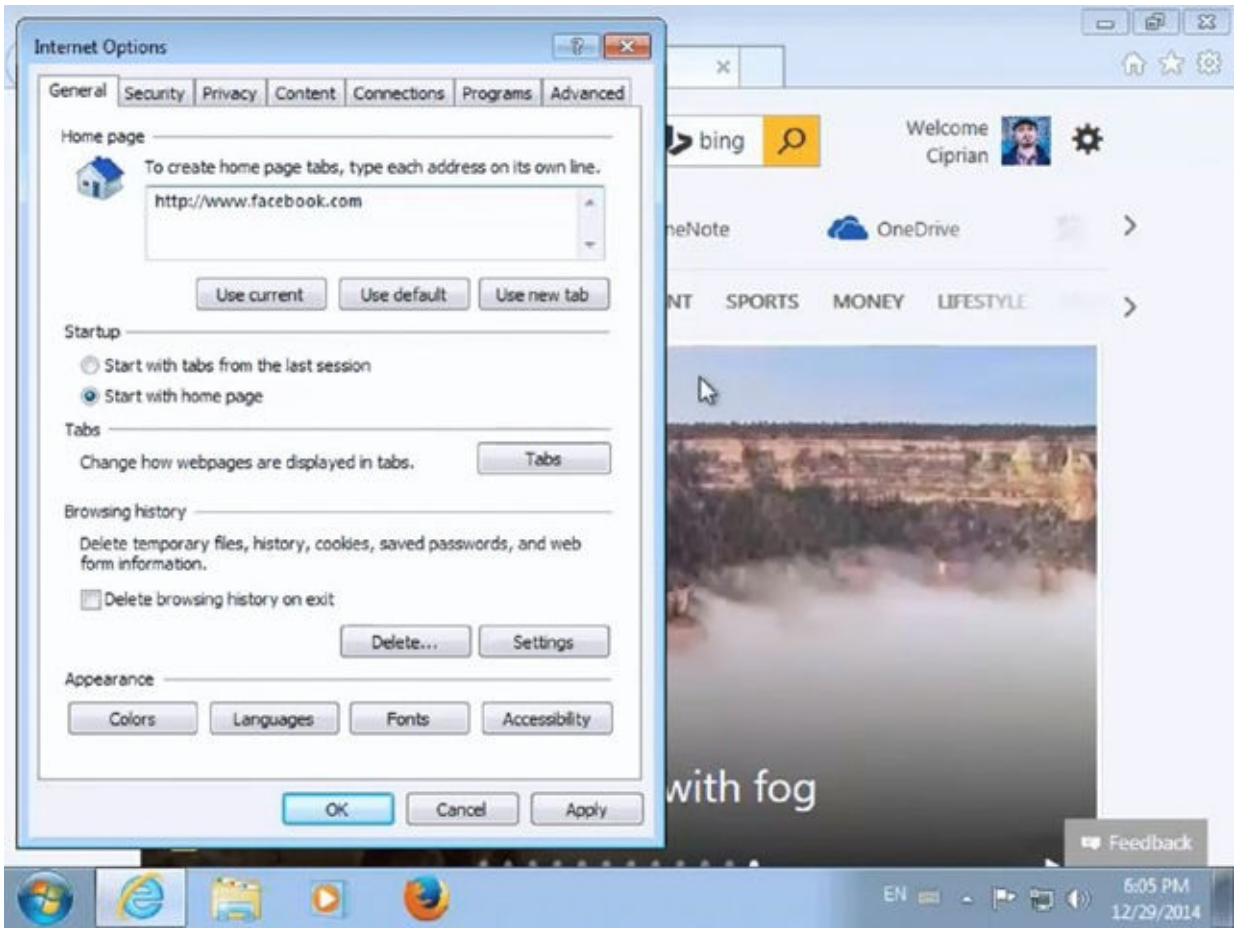


FIGURE 1.13 Setting the homepage

Using and Clearing Your Browsing History

All web browsers store a complete log of the websites and web pages that you have visited. This is useful because you can easily access your history and find the web pages that you have visited in the past. Also, each browser uses your history to autocomplete URLs in the Address bar. This makes navigation faster because you don't have to fully type each URL after you visit it once. As you can see in Figure 1.14, you type only a few letters, the browser suggests the full URL from your history, you press Enter, and the web page is immediately loaded.

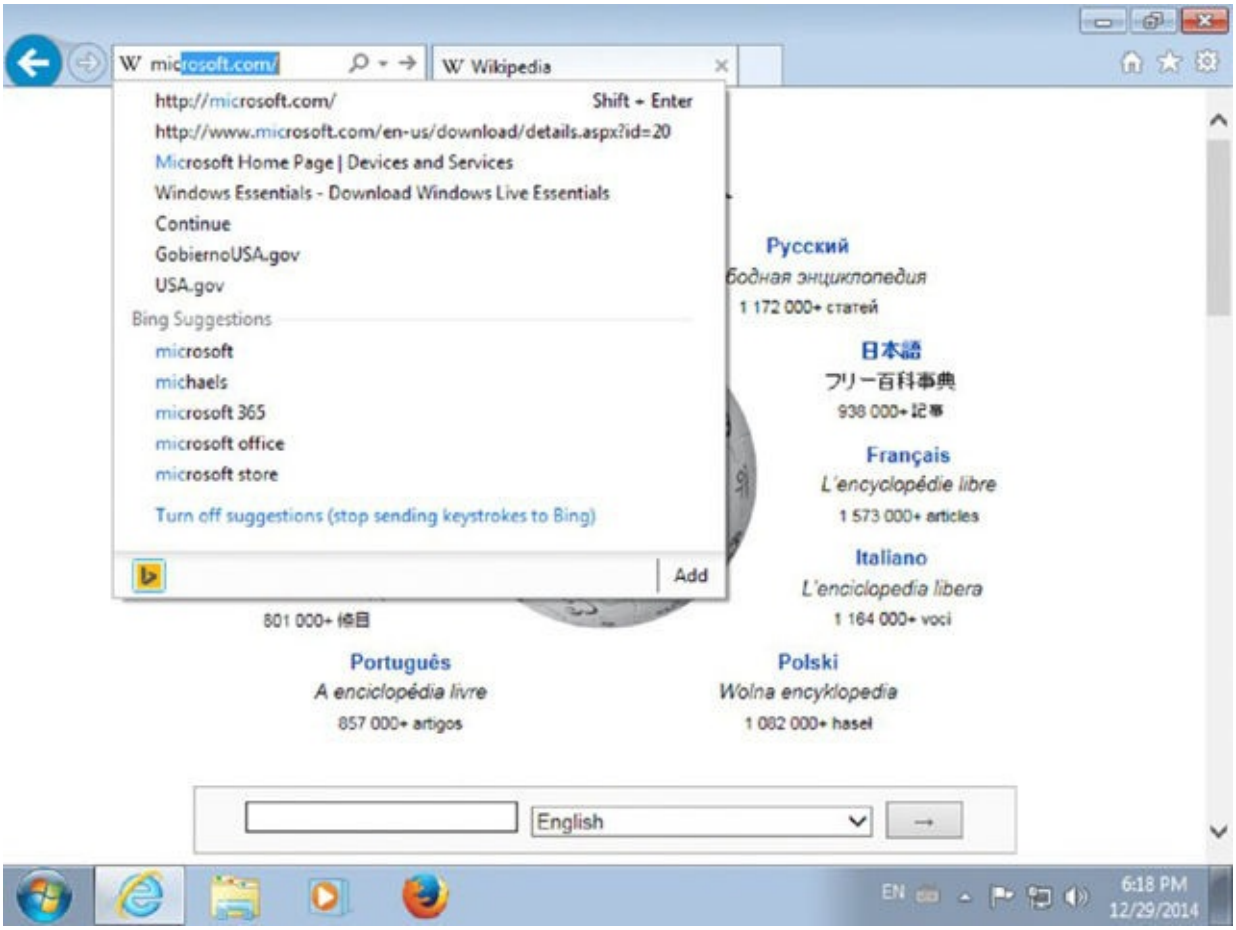


FIGURE 1.14 Internet Explorer suggesting URLs based on what you type and your history

Accessing your browsing history is different from browser to browser, and in Exercise 1.4 we share how it is done in Internet Explorer.

EXERCISE 1.4

Accessing Your Browsing History in Internet Explorer

1. Click Start ➢ All Programs ➢ Internet Explorer.
2. Click the View Favorites, Feeds, And History button (the one in the shape of a star), on the top-right side of the window. You can also press Alt+C on your keyboard (Figure 1.15).
3. Click the History tab to access your browsing history, split by date (Figure 1.16).
4. Click Today, and then click one of the web pages that you have visited during the day (Figure 1.17).
5. Wait for the page to load, and then close Internet Explorer.

FIGURE 1.15 The View Favorites, Feeds, And History button

FIGURE 1.16 The browsing history shown by date

FIGURE 1.17 Today's browsing history

One downside to the fact that a browser stores your browsing history is that this history is available to anyone using that browser on the same user account. If you share your computer with others using the same user account, you may want to clear your browsing history regularly.

Another issue is that web browsers tend to become slower after being used for a long time, and clearing your history may help them run faster. Whatever the reasons for clearing your browsing history, this can be done in any web browser.

In Exercise 1.5 we share how to clear your browsing history in Internet Explorer.

EXERCISE 1.5

Clearing Your Browsing History in Internet Explorer

1. Click Start ➢ All Programs ➢ Internet Explorer.
2. Click the Tools button on the upper-right corner of the Internet Explorer window, or press Alt+X on your keyboard to open the Tools menu.
3. Click Safety and then Delete Browsing History (Figure 1.18). You can also press Ctrl+Shift+Del on your keyboard.
4. In the Delete Browsing History window, select History and other things that you want to delete, and then click Delete (Figure 1.19).
5. Wait a couple of seconds until Internet Explorer deletes everything that you have selected. No prompts or confirmations will be displayed.
6. Close Internet Explorer.

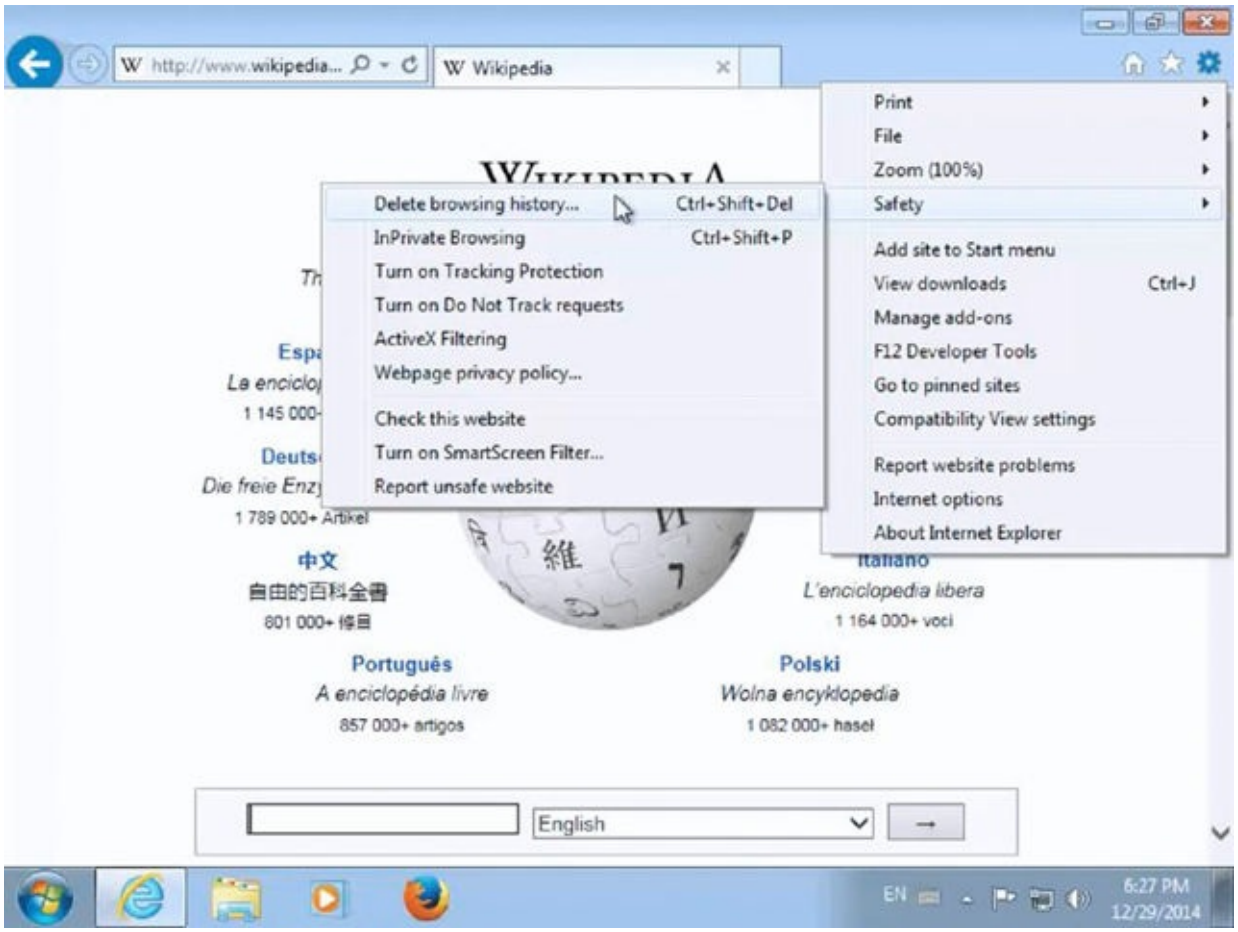


FIGURE 1.18 The Tools menu in Internet Explorer

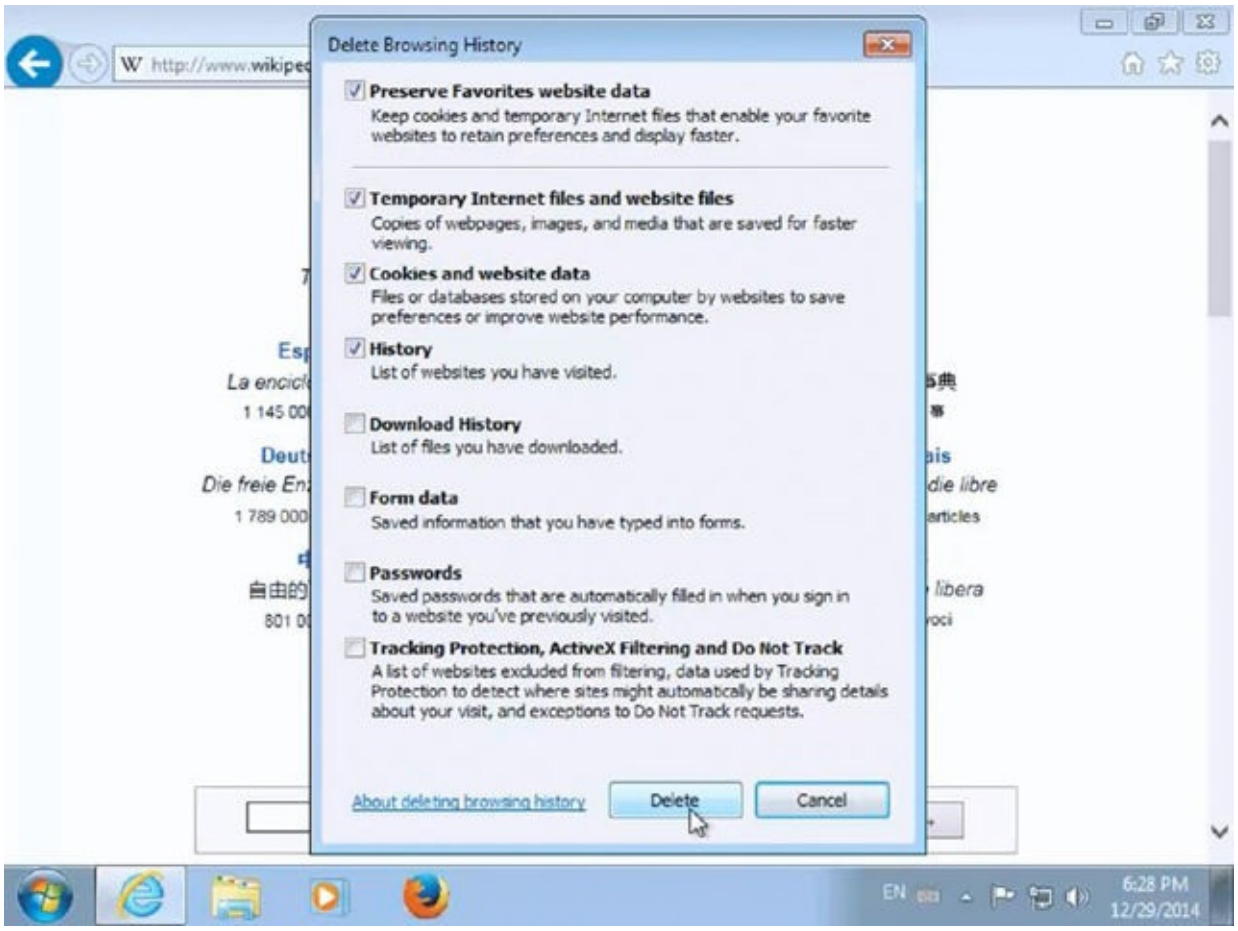


FIGURE 1.19 The Delete Browsing History window

Using Favorites or Bookmarks in Your Web Browser

Bookmarks or *favorites* are links to websites that make it easy to get back to your favorite places. The term *bookmarks* is used by most browsers with the exceptions of Internet Explorer. In this web browser, bookmarks are known as favorites.

The easiest way to find a site that you've bookmarked is to start typing its name in the Address bar. As you type, a list of websites that you've bookmarked, tagged, and visited is shown. Bookmarked sites are generally prioritized in the list of suggestions shown in the Address bar, above your browsing history. All you have to do is click one of the sites, and you'll be taken there instantly.

Bookmarked sites are also displayed in their own menus and toolbars, depending on the web browser. To make a comparison, look at Figure 1.20 to see how favorites are shown in Internet Explorer. To access them, click the View Favorites, Feeds, And History button (the one in the shape of a star), on the top-right side of the window, or press Alt+C on your keyboard.

FIGURE 1.20 Favorites in Internet Explorer

To access a favorite web page, click it and it is immediately loaded in the current tab.

Now look at Figure 1.21 to see how bookmarks are shown in Mozilla Firefox. As you can see, the Bookmarks menu looks different. To access it, click the Show Your Bookmarks button or press Ctrl+Shift+B on your keyboard.

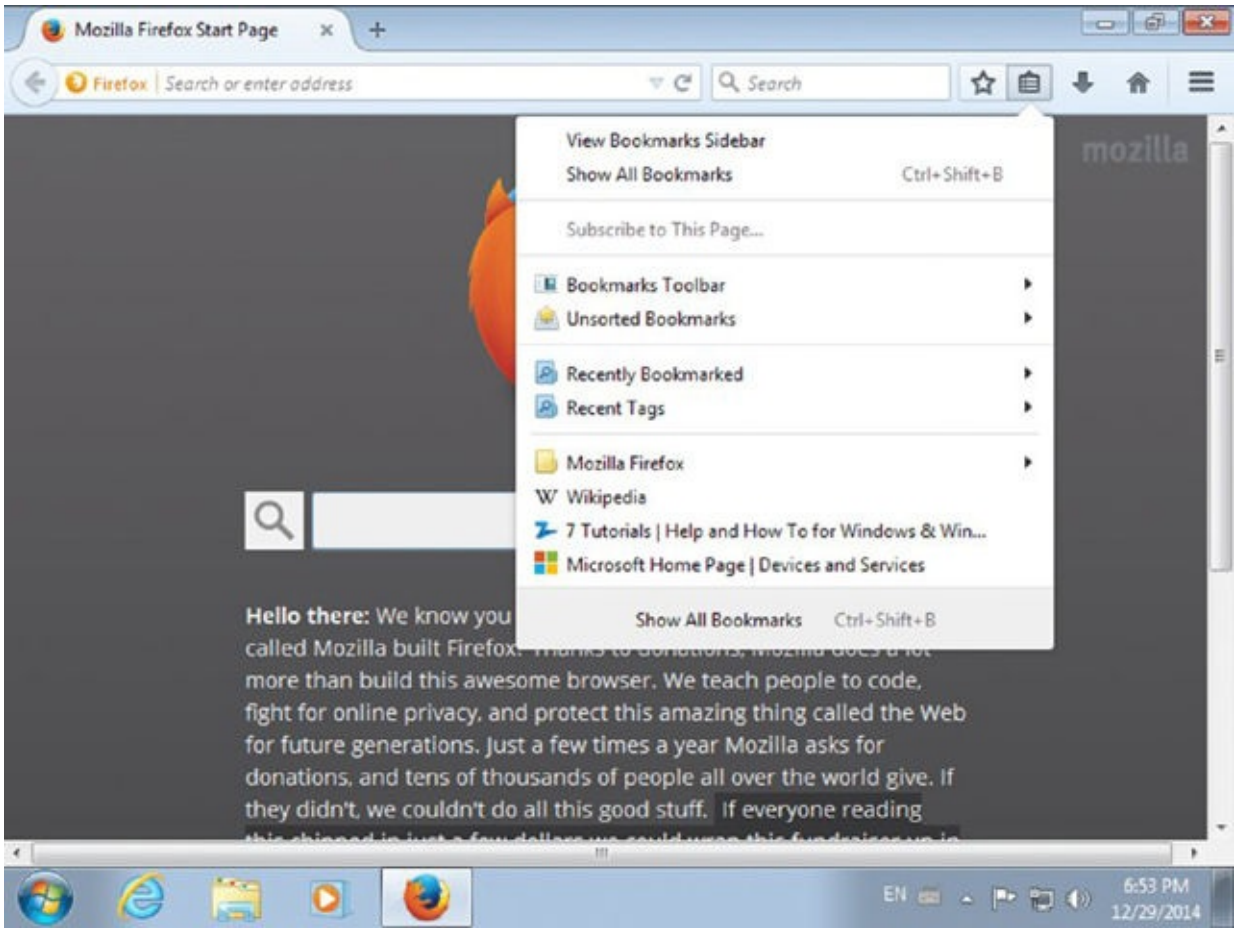


FIGURE 1.21 Bookmarks in Mozilla Firefox

The process for saving a web page as a favorite or bookmark varies from browser to browser. In Exercise 1.6 we share how to save a web page as a favorite in Internet Explorer.

EXERCISE 1.6

Saving a Web Page as a Favorite in Internet Explorer

1. Click Start ➢ All Programs ➢ Internet Explorer.
2. In the Address bar, type facebook.com and press Enter on your keyboard.

   Wait for Facebook to load.
3. Click the View Favorites, Feeds, And History button (the one in the shape of a star), on the top-right side of the window (Figure 1.22). You can also press Alt+C on your keyboard.
4. Click Add To Favorites.

   You can type a name for this web page, or you can leave the default name provided by Internet Explorer.
5. Click Add, and the website is saved as a favorite (Figure 1.23).
6. To double-check whether the web page was added to your favorites, click View Favorites, Feeds, And History. You can also press Alt+C on your keyboard.

   Notice that Facebook was added to your list of favorites.
7. Close Internet Explorer.

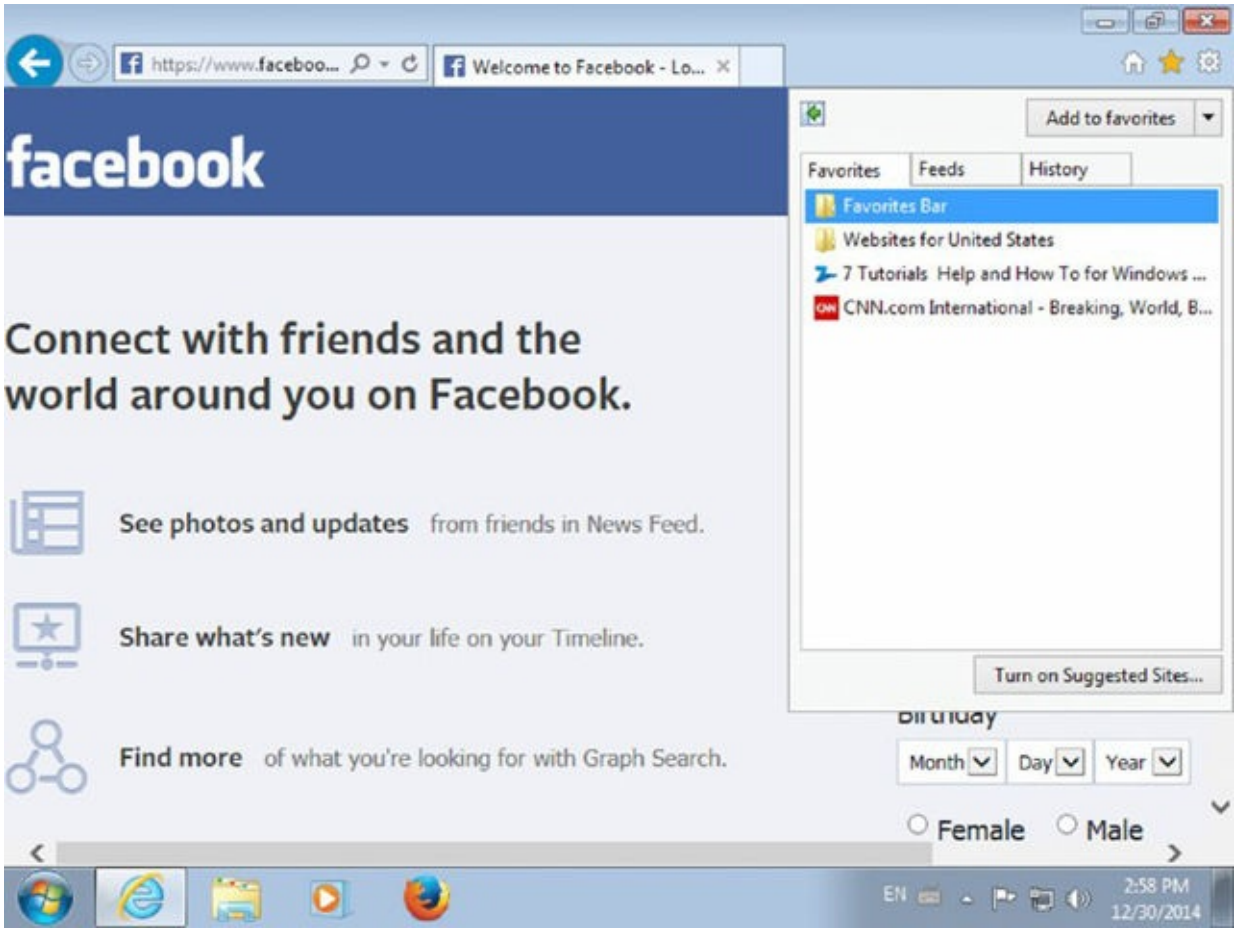


FIGURE 1.22 The list of favorites in Internet Explorer

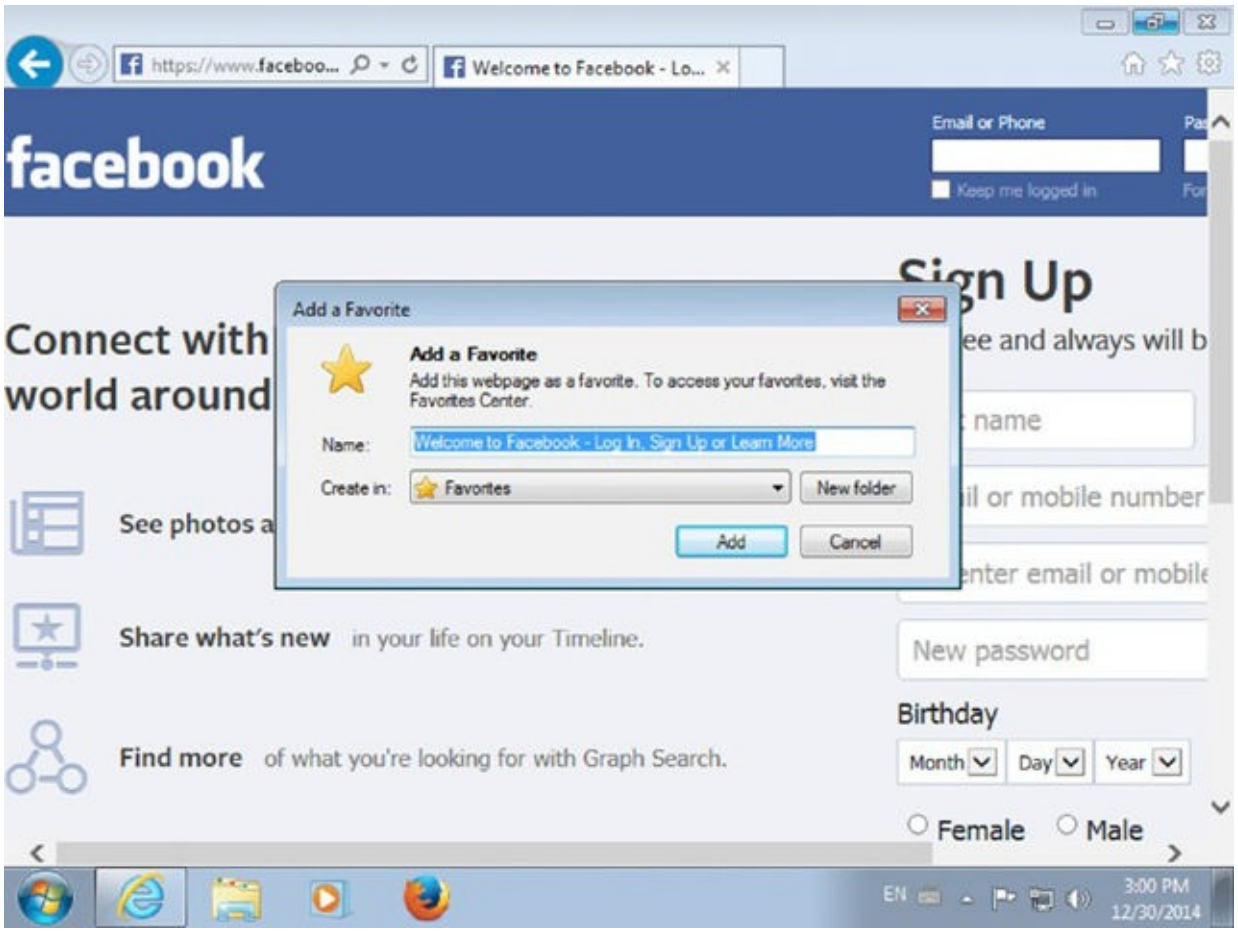


FIGURE 1.23 The Add A Favorite dialog

You can manage your list of favorites by dragging and dropping them into the appropriate folders, just as you would do with a file in Windows Explorer. To delete a favorite web page, access the list of favorites, right-click it, and then click Delete. The entry is deleted without any confirmation prompts. The context menu is shown in Figure 1.24.

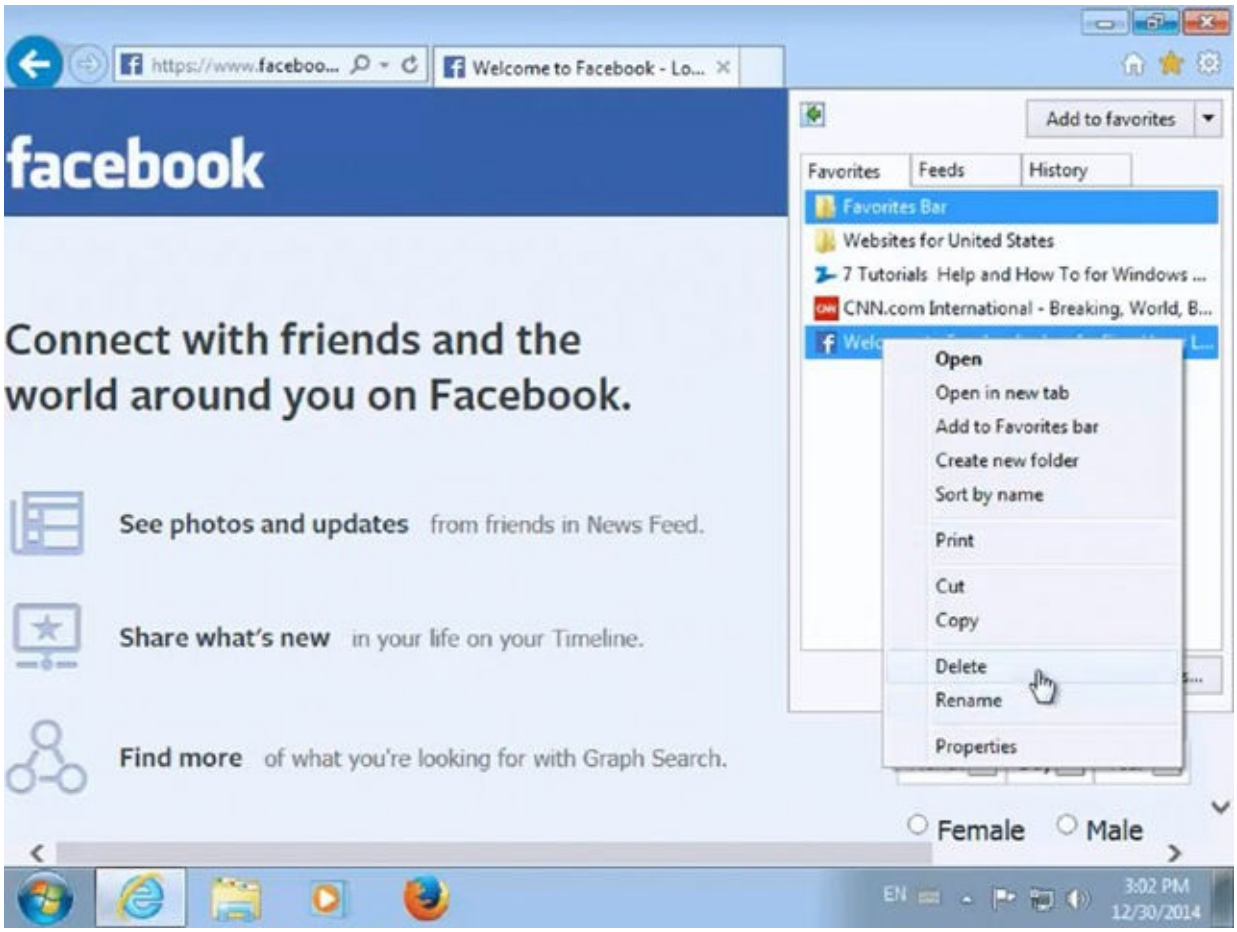


FIGURE 1.24 Deleting a favorite in Internet Explorer

The process is very similar in other browsers, even though their user interface looks different.

Searching for Text in a Web Page from Your Web Browser

When reading a web page, you may want to quickly search for the portion of text that covers a subject of interest, instead of reading the whole thing and scrolling through the page. All modern web browsers have a Find tool that allows you to make quick searches based on one or more keywords on the page that is currently loaded. The Find dialog is accessed in most browsers by pressing Ctrl+F on your keyboard. We tested it in Internet Explorer, Mozilla Firefox, and Google Chrome, and the shortcut works in all three browsers.

In Exercise 1.7 we share how to quickly search for text on a web page in Internet Explorer.

EXERCISE 1.7

Quickly Searching for Text on a Web Page in Internet Explorer

1. Click Start ➢ All Programs ➢ Internet Explorer.
2. In the Address bar, type Wikipedia.org and press Enter on your keyboard.

   Wait for Wikipedia to load.
3. Press Ctrl+F on your keyboard to open the Find dialog at the top of the Internet Explorer window.
4. In the Find box type Italiano. Notice that Internet Explorer says that it has found two matches (Figure 1.25).
5. Click Next to move through all the matches that it found.
6. Close Internet Explorer.

FIGURE 1.25 The Find dialog in Internet Explorer

Using Plug-ins, Add-ons, and Extensions in Your Web Browser

When dealing with web browsers you will encounter terms like *plug-ins*, *add-ons*, and *extensions*. They are all software components that add specific features to a browser and enable it to do more. The most popular plug-in for web browsers is Adobe Flash Player, which allows you to view multimedia content that was created with Adobe Flash and posted online. You can download and install Adobe Flash Player online by visiting `http://get.adobe.com/flashplayer/`. You download it and install it on your computer just like any other piece of software.

Modern web browsers also have customized collections of add-ons, plug-ins, and extensions that are maintained by their developers and their community of users. You can find add-ons for Internet Explorer by going to `http://www.iegallery.com`, add-ons for Mozilla Firefox by going to `https://addons.mozilla.org`, and add-ons for Google Chrome by going to `https://chrome.google.com/webstore/category/extensions`.

These add-ons can be installed only from the browsers they are created for. For example, you can't install Internet Explorer add-ons from Mozilla Firefox or the other way around. For each add-on you will find a description of what it does, a couple of pictures, and a button for installing it. When you click the button, the add-on is downloaded, and the web browser handles the installation process (Figure 1.26).

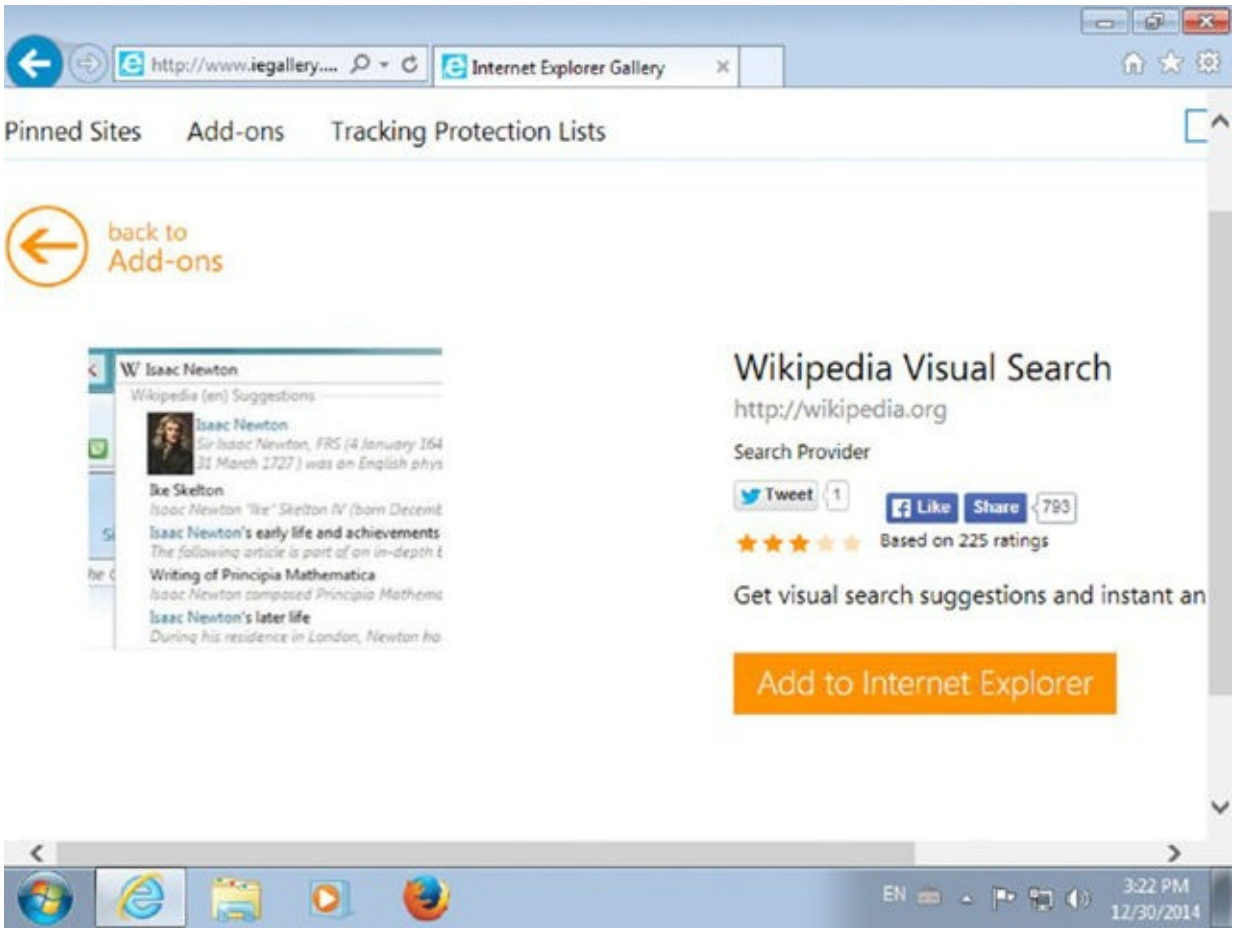


FIGURE 1.26 An add-on for Internet Explorer

With the help of add-ons, you can extend what you can do with your web browser. For

example, you can install multiple search engines, ad blockers, add-ons that block the tracking of your online activities, and so on.

There’s a caveat to using add-ons: installing too many of them will slow down your web browser and decrease the quality of your web-browsing experience. That’s why it is recommended to install only plug-ins and add-ons that are useful to you.

Add-ons and plug-ins are managed from the web browser where you are using them. The browser provides the features necessary to access the list of installed add-ons, configure them, disable them, or remove them if you no longer wish to use certain add-ons. The process of accessing and managing add-ons is different from browser to browser, so we won’t get into detail in this chapter.

Summary

In this chapter you learned about the Internet and the World Wide Web, what they have in common, and what's different about them. You also learned important concepts like websites, web pages, web browsers, and more.

In order to browse the Web and access information and services online, you need a web browser. We demonstrated how to navigate web pages in a browser, use multiple tabs at the same time, and set your homepage, and we shared a few details about downloading and uploading files and why speeds differ between the two activities.

Then we moved into more advanced subjects like using your browsing history, clearing it, saving web pages as favorites or bookmarks, searching for text in a web page, and using plug-ins to extend what your web browser can do.

In the next chapter we will discuss networking, security, and troubleshooting network problems. It's a very technical chapter, so reserve some quality time for it in order to go through it and understand everything that we will cover.

Exam Essentials

Understand the difference between the Internet and the WWW. Many people confuse the Internet with the World Wide Web. Knowing what each of them is and what's different between these concepts is a key aspect of living online.

Know what a web browser is and how to use it. You cannot browse the Web without a web browser. Knowing how to use a web browser is mandatory for being productive when online.

Know how to use the basic features of a web browser. In order to be productive when browsing the Web, you should know how to navigate among the websites that you have visited, open multiple tabs at the same time, set the homepage, bookmark favorite websites, and more.

Learn how to access and clear your browsing history. Your browsing history can help you to access web pages that you have visited in the past. You should learn how to access it and how to clear it when appropriate.

Understand what plug-ins are and why they are useful. Plug-ins, add-ons, and extensions can extend what you can do with a web browser. You should learn what plug-ins are and where you can find them for your web browser.

Key Terms

Before you take the exam, be certain you are familiar with the following terms:

bookmarks	URL
download	web browser
favorites	web page
hyperlink	website
Internet	World Wide Web
upload	WWW

Review Questions

1. What is the Internet? (Choose all that apply.)
   A. A network with many computers and devices
   B. The physical network of computers and devices (smartphones, tablets, and so on) all over the world
   C. Every website and web page in the world
   D. The global network of interconnected networks that use standardized communication protocols to exchange data and information between them
2. In the context of the Internet, what does WWW stand for?
   A. World Wide War
   B. Wild Wild West
   C. World Wide Web
   D. Who What Where
3. What is the World Wide Web? (Choose all that apply.)
   A. A part of the Internet
   B. The physical network of computers and devices (smartphones, tablets, etc.) all over the world
   C. Your company’s websites
   D. A system of websites connected by links
4. What is a URL? (Choose all that apply.)
   A. The address of a website or a web page on the WWW
   B. Uniform Resource Locator
   C. The network location of a computer
   D. The address of a webserver
5. What is a web browser? (Choose all that apply.)
   A. An application that you can use to access the Internet
   B. Software that is used to navigate websites and web pages that are found on the World Wide Web
   C. An application that you can use to send email messages
   D. An application that displays a web page on a computer or mobile device
6. What is a hyperlink?
   A. The network address of a website
   B. The address of a website or a web page on the WWW

C. A reference to data that can be accessed by clicking it

D. Text displayed in a different color by the web browser

7. Which of the following are examples of uploads? (Choose all that apply.)

A. Posting your pictures on Facebook

B. Posting a video on YouTube

C. Copying a file on your computer

D. Receiving an email message

8. What is a homepage for a web browser?

A. A page that is set as a favorite in the web browser

B. A page that is set as a bookmark in the web browser

C. A web page that is loaded each time you close a web browser

D. A web page that is loaded each time you open a web browser

9. What is the browsing history in a web browser?

A. A complete log of the websites and web pages that you have not visited on the Web

B. A complete log of the websites and web pages that you have visited

C. The websites that you have logged in to

D. A complete log of the emails that you have received

10. In the context of a web browser, what is a plug-in or add-on?

A. Something that you install to replace your web browser

B. A piece of software that you install on your computer

C. A software component that adds a specific feature to a browser and enables it to do more

D. A way of changing your web browser from Internet Explorer to something else

Chapter 2
Understanding Networking and Its Most Important Concepts

THE FOLLOWING IC3: LIVING ONLINE EXAM OBJECTIVES ARE COVERED IN THIS CHAPTER:

- ✓ **Internet Connection**
  - Speed
  - Explain the differences between Dial up and broadband connections and the process each uses to establish a connection.
  - Wireless
  - Security
- ✓ **Network Types and Features, Capabilities**
  - Explain the concepts associated with the Publicly switched networks.
  - Explain the concepts associated with DNS (Domain Name Server).
  - Explain the concepts associated with Addressing.
  - Explain the concepts associated with and the difference between LAN vs. WAN.
  - Explain the concepts associated with VPN.
- ✓ **Network Troubleshooting**
  - Demonstrate the ability to solve simple networking connectivity problems in various settings.
  - Explain methods of identifying common network problems.
  - Explain the concepts associated with Define IP Addressing.

This chapter is a lot more technical than others, so arm yourself with some patience. You will need a bit more time to digest and understand everything. First, we are going to talk about networks and the different types that are available. Then, we will share the basics about how computers and devices get an address on a network so that they can communicate with other devices and exchange data.

Next, we will move on to security and discuss how to secure wireless networks in your home. We will also talk about important security products like firewalls and gateways. You surely have heard about them, but you may not understand what they are and why they are important. This chapter will clear up all that for you.

Then, we will talk about speed, factors that limit the speed of Internet connections, and how fast wireless networks are. And since almost everyone nowadays is connected to the Internet, we will share more details about the most important types of Internet connections that are available.

Finally, we will explore the basics that you need to know in order to troubleshoot network and Internet-related problems. Don’t be afraid; things are not as scary as they sound, and you can understand everything that’s shared in this chapter. Without further ado, let’s get started.

Understanding Networks: LAN vs. WAN

The networking industry is huge, encompassing hundreds of companies and a massive range of technologies. Practically every company in the world has a network, and almost all need a skilled individual to manage that network. Even if they cannot justify having a full-time administrator of their own, they are likely to have an arrangement with a computer company that does. For the past few years, computer networking has been, is now, and is forecasted to remain one of the primary growth areas of the IT industry.

When computer networking is discussed, it refers primarily to the process of connecting two or more computers together. The true meaning of a network is defined by answering a question: Why would you want to join two computers together in the first place?

In the early days of networking, the two main uses of a computer network were the sharing of data and the shared use of expensive peripherals, such as printers or other devices. Today, these two tasks still form a solid reason to use most networks. But networks are now used in many other and often elaborate ways. The explosive popularity of services such as email, cloud computing, centralized data storage, and much more means that a network infrastructure now underpins modern business.

Without a doubt, a defining point in the history of networking was the creation of the Internet. Although it is difficult to convey in just a few lines, the Internet is basically a massive collection of connected networks. In fact, the term *Internet* (with a capital *I*) is derived from the term *internetwork* (with a lowercase *i*), meaning a group of connected networks. Although it is obvious that the scale of the Internet makes for differences in the technology used, the basis for the Internet is the same as that of many of the networks used in businesses around the world.

Essentially, networking is a concept or principle that requires two kinds of products: hardware and software. There is a computer networking hardware industry (cables, devices for attaching PCs to a network, and the like), and there is a networking software industry (software for sharing files, email, and other data).

At the core, networks share resources among computer systems and centrally manage resources and data. The next question becomes what type of network is required to accomplish this. This is where acronyms like LAN, WAN, and VPN come into play. And then we need to dig a little deeper into the underlying technologies that make the magic happen: TCP/IP and DNS.

Not all networks are created equal. They vary in size, shape, and complexity. Networks are often distinguished by their location; for example, a network confined to a single geographical area is known as a *local area network (LAN)*. A single geographical location may be an apartment, a single building, an office, a school, or a library. LANs are created with network cables as well as wireless technologies. The advantages of a LAN include speed, ease of use, and low cost. In a local network you can find all kinds of devices ranging from desktop computers to laptops, tablets, printers, and so on. The downside is that it is confined to that single geographical location. Figure 2.1 shows an example of a LAN.

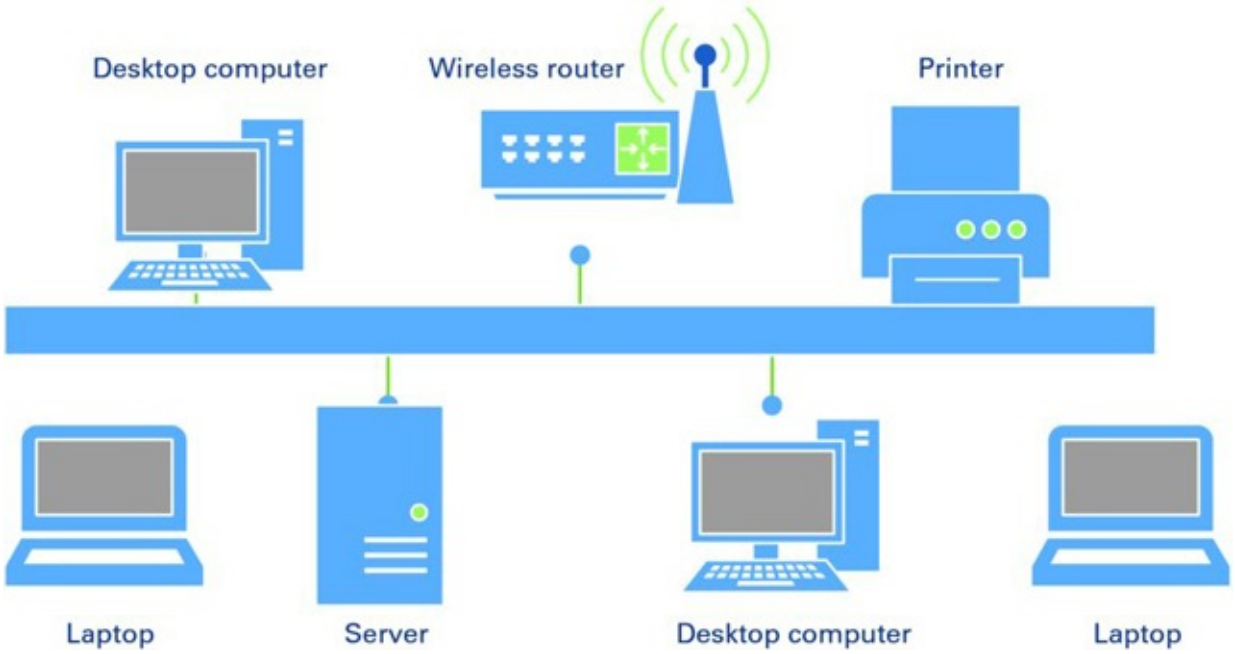


FIGURE 2.1 Example of a LAN

Networks that span multiple geographical locations are known as *wide area networks (WANs)*. They are generally used by businesses and government entities to relay data to employees, clients, suppliers, and business partners from various geographical locations. WANs may connect LANs together to create an internetwork, and the Internet can also be considered a WAN. They are considerably more expensive to support and maintain than LANs. Figure 2.2 shows an example of a WAN.

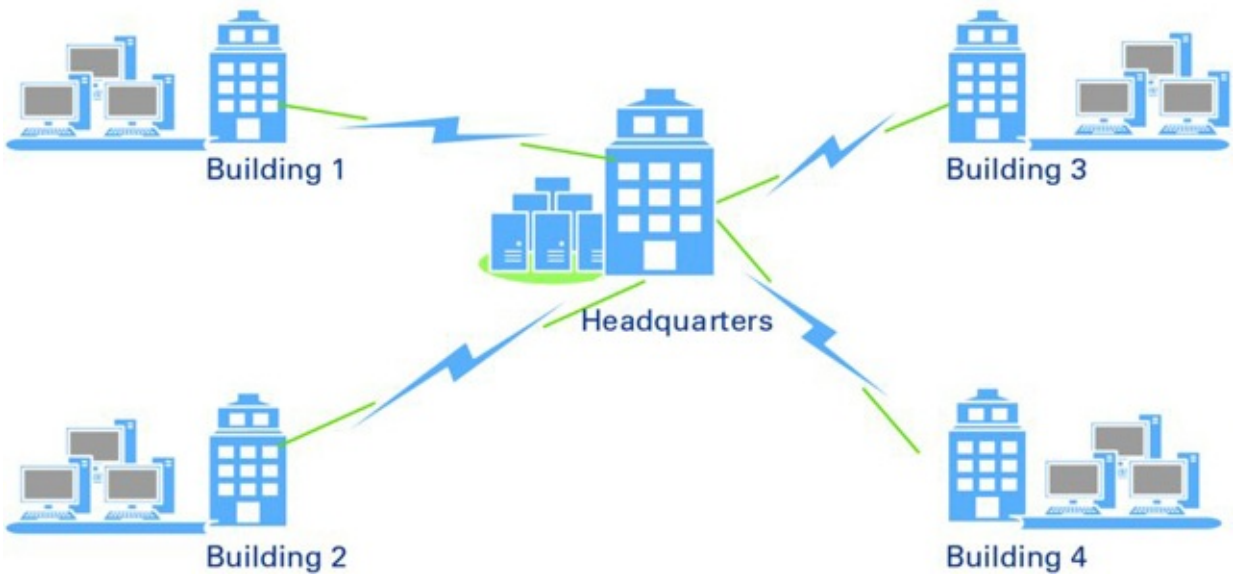


FIGURE 2.2 Example of a WAN

Other Types of Area Networks

In your travels you may encounter the terms PAN, MAN, CAN, and even more. These terms each loosely describe the size of different networks. Personal area networks (PANs) are small networks typically associated with one person. A PAN may be a network used to connect a smartphone using Bluetooth wireless in your car and other personal devices in close proximity. Campus area networks (CANs) are essentially LANs that encompass a larger area but not large enough to be considered a WAN. This may be a large single-location government agency or a large university campus. Finally, a metropolitan area network (MAN) is somewhat larger than a CAN but smaller than a WAN, perhaps a citywide network. So it is possible to configure a PAN, connected to a LAN, while transmitting to a WAN.

Understanding Network Addressing

In order to communicate in a network using the computers and devices that are part of it, you need to use a communication protocol that is understood by all devices. A *communication protocol* is collection of rules that establish how data is transmitted on a computer network. On the Internet and in many networks, everyone uses *TCP/IP*. It is a set of two protocols: the *Transmission Control Protocol (TCP)* and the *Internet Protocol (IP)*. Each of these protocols provides a different function, and together they provide the complete TCP/IP package. TCP provides reliable transmission between systems, and IP is responsible for addressing and route selection. TCP/IP has been with us since the early 1980s, and today it is the default protocol used in most modern networks and for the Internet.

There can be no argument that TCP/IP is a flexible and durable communication protocol. On the other hand, it can be very complex, specifically when it comes to IP addressing. Discussions of IP addressing have left more than one administrator scratching their head, and entire books have been dedicated to the topic. In this section we take a whirlwind tour through TCP/IP addressing with the intention of providing the basics of a complicated topic. For the IC3 exam, an in-depth knowledge of TCP/IP addressing is not required, but a general knowledge of addressing and how it works is certainly important.

IP Addresses

When a computer or device connects to a network, it receives an address, named *IP address* or Internet Protocol address. This is a numerical label assigned to each device participating in the network that uses the Internet Protocol for communication. The IP address actually tells us two things: the IP number of the network it is attached to and the address of the node (device) on that network.

IP addressing comes in two variations: IPv4 (Internet Protocol version 4) and IPv6 (Internet Protocol version 6). IPv4 has been in use for many years, but because more and more devices require addressing, IPv4 addresses are now in short supply. IPv6 was developed in response to IPv4's impending demise. However, IPv4 is still the dominant protocol in use at the time of writing this book.

In an IPv4 network, the IP address consists of four numbers called octets (8 bits), each separated by dots. If you do the math, this means that each IP address is 32 bits in length. An example of an IP address is 192.168.2.1.

The IP address alone is not enough to connect to the network. A subnet mask is also needed, which, like the IP address, is a four-octet number expressed in dotted-numerical format. With the subnet mask, each bit in the address that forms part of the network address is assigned a 1, and each bit that represents part of the node address is assigned a 0. Then, through a process called ANDing, the system is able to determine the necessary information.

To simplify things, let's use an example. Imagine you have an IP address of 167.54.122.12 and a subnet mask of 255.255.0.0. This means that the system would look at the first two octets to determine the network number and the last two octets to determine the node

number. In this case, the device would be on network 167.54 and have a node address of 122.12. Add a third octet's worth of bits to the subnet mask to make it 255.255.255.0, and the network address would become 167.54.122, and the node address would become 12.

The Domain Name Service

To gain network access, a client system needs only two key pieces of information:

- A unique IP address
- The corresponding subnet mask

While a system can gain access to the network with just an IP address and a subnet mask, other key information is necessary. This includes the DNS server address and the default gateway.

The *Domain Name Service (DNS)* server performs a relatively basic but vital role for network access: name resolution from hostnames to IP addresses. The *hostname* is the label that is assigned to a device connected to a network. In a LAN, the hostname can be the name of a computer connected to that network. On the Web, the hostname can be the domain name of a website. Rather than rely on flawed human memory to remember these addresses, we can use `www.sybex.com` or `www.disney.com` instead of their IP address. When we type `www.sybex.com` into a web browser, our configured DNS server takes the request and searches through a system of servers to find out the correct TCP/IP address that correlates to `www.sybex.com`.

After the DNS server has ascertained the correct TCP/IP address, that address is returned to the client, which then contacts the IP address directly. To speed up subsequent requests for the same address, the DNS server adds the address to its cache. For a workstation to send requests to the DNS server, the TCP/IP address of the DNS server must be provided to the workstations. This can be done manually, or the address can be included in the information supplied by a *Dynamic Host Configuration Protocol (DHCP)* server. DHCP does the job of assigning IP addresses, eliminating the need to individually assign IP addresses and in the process making the job of network administrators considerably easier.

When a DHCP server is running on a network, the workstation starts and requests an IP address from the server. The server responds to the request and automatically assigns an IP address to the computer. The workstation acknowledges the reception of the IP number, and the workstation has all the information it needs to become part of the network. This communication between the server and workstation happens automatically and is invisible to the computer user. When a workstation is logged off the network, the IP address is returned and made available to other machines wanting to log onto the network. Figure 2.3 shows the TCP/IP configuration screen of a Windows 7 computer.

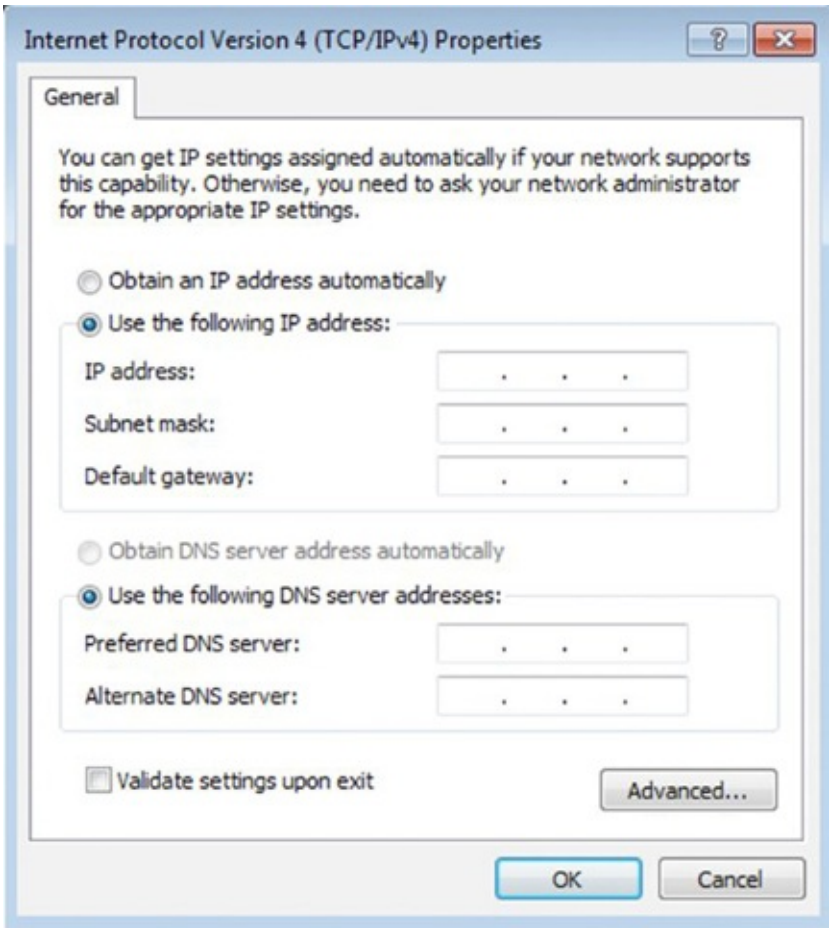


FIGURE 2.3 Internet Protocol Version 4 (TCP/IPv4) Properties

For a system to be able to communicate with another system on a different network, it must be able to find a way off the current network and onto the other one. This is the function of a default *gateway*, which routes data to other networks. It does not guarantee to know how to get to other networks (that is a function of routing tables and routing protocols), but it is where the journey starts. For a workstation to send information to the default gateway, it must have its IP address, and the address must be on the same network as it is.

So to recap, there are four key elements to IP addressing:

IP Address Each client system must have a unique IP address to log onto a network. Commonly the IP address is assigned via DHCP.

Subnet Mask All systems require a valid subnet mask that identifies the network and the node.

Default Gateway The default gateway allows the client system to communicate with systems on a remote network without the need to manually add routes to the client system.

DNS Server Address The DNS server resolves hostnames to IP addresses.

To review the current TCP/IP settings on a client system, you can issue the ipconfig /all command from the command prompt. The output from the command shown in Figure 2.4 shows the IP configuration from a Windows computer.

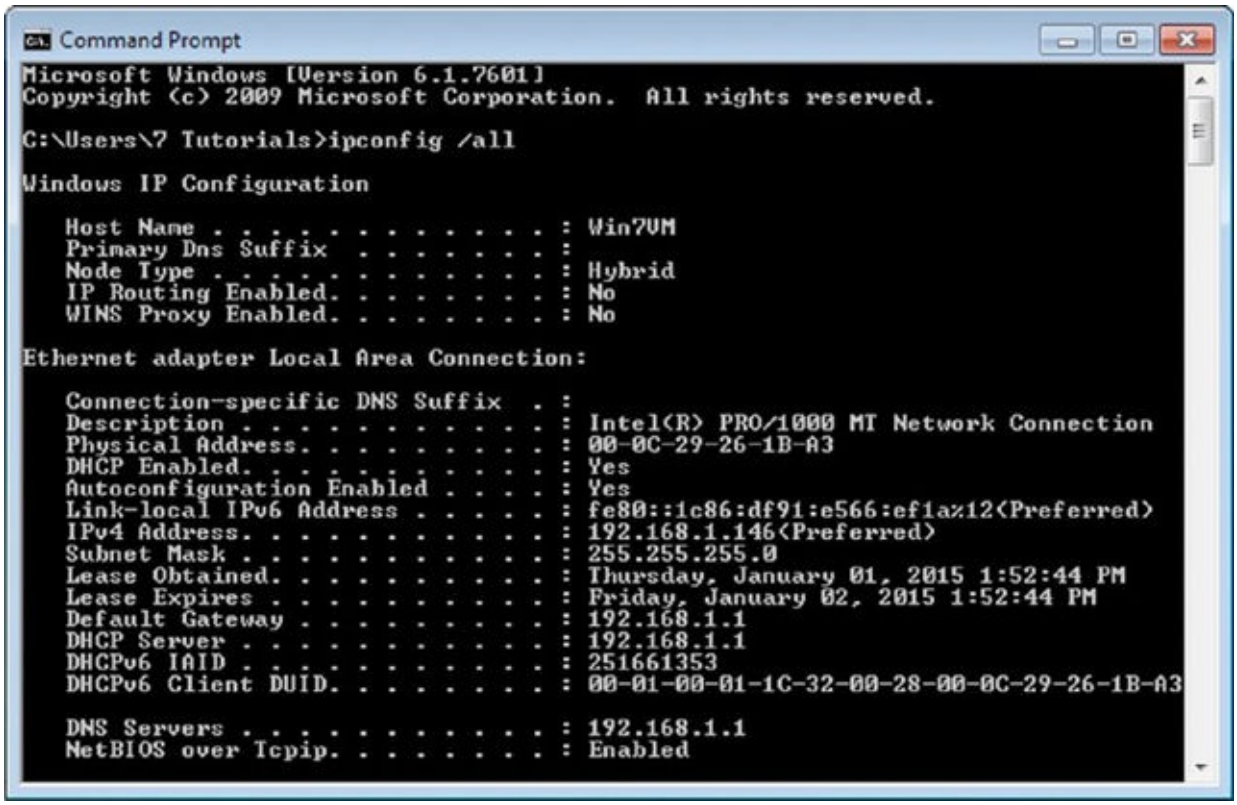


FIGURE 2.4 The TCP/IP configuration from a Windows computer

Private IPv4 Address Ranges

After years of loyal service, IPv4 addresses are running out. In the future, IPv6 is destined to overtake version 4 and bring with it enough IP addresses to last a lifetime (this was predicted with IPv4 as well). Until it is widely adopted, you need a method to stretch the IP addresses you currently have available.

The solution has come in the form of classes of nonroutable or private IP addresses. These nonroutable addresses are designed to be used within an organization, and because they are nonroutable, they can be used over and over and be unique to that organization. The caveat is that they cannot be used on the Internet.

The three ranges of nonroutable IP addresses and default subnet masks include the following:

- IP range 10.0.0.0 to 10.255.255.255, subnet mask 255.0.0.0
- IP range 172.16.0.0 to 172.31.255.255, subnet mask 255.255.0.0
- IP range 192.168.0.0 to 192.168.255.255, subnet mask 255.255.0.0

Many organizations use two sets of IP addresses: the private ones used on the internal network and external IP addresses obtained from an ISP that will allow traffic out to the Internet. In your own home network, you will have an external (public) IP address used to access the Internet on your router and private addresses for all of the devices used in the home that are connected to the router.

Using and Securing Wireless Networks

A *wireless network* is any type of computer network that uses wireless data connections for connecting network devices. Wireless networking is a method by which homes, telecommunications networks, and businesses avoid the costly process of introducing cables into a building or as a connection between various equipment locations. Wireless telecommunications networks are generally implemented and administered using radio communication; examples of wireless networks include cellphone networks as well as Wi-Fi local networks that are found in many public places.

If you have a broadband Internet connection at home, you likely have been provided a router that has a wireless access point built in. If not, many people buy an access point from a local retailer and connect it to the router. Either way, this device provides wireless Internet access to everyone in the home (and unfortunately also to the neighbors if it is not secured).

The wireless access point is both a transmitter and receiver of wireless signals and provides the connection point between the wireless device and the Internet. Out of the box the access point will typically work, but to secure and optimize its use, some configuration is typically required. The best place to start with this is the *Service Set Identifier (SSID)* or the network name. This is needed to connect to a wireless access point, and all client systems must choose the correct SSID to connect to the wireless network. Figure 2.5 shows the wireless network configuration parameters that are available on wireless routers manufactured by ASUS.

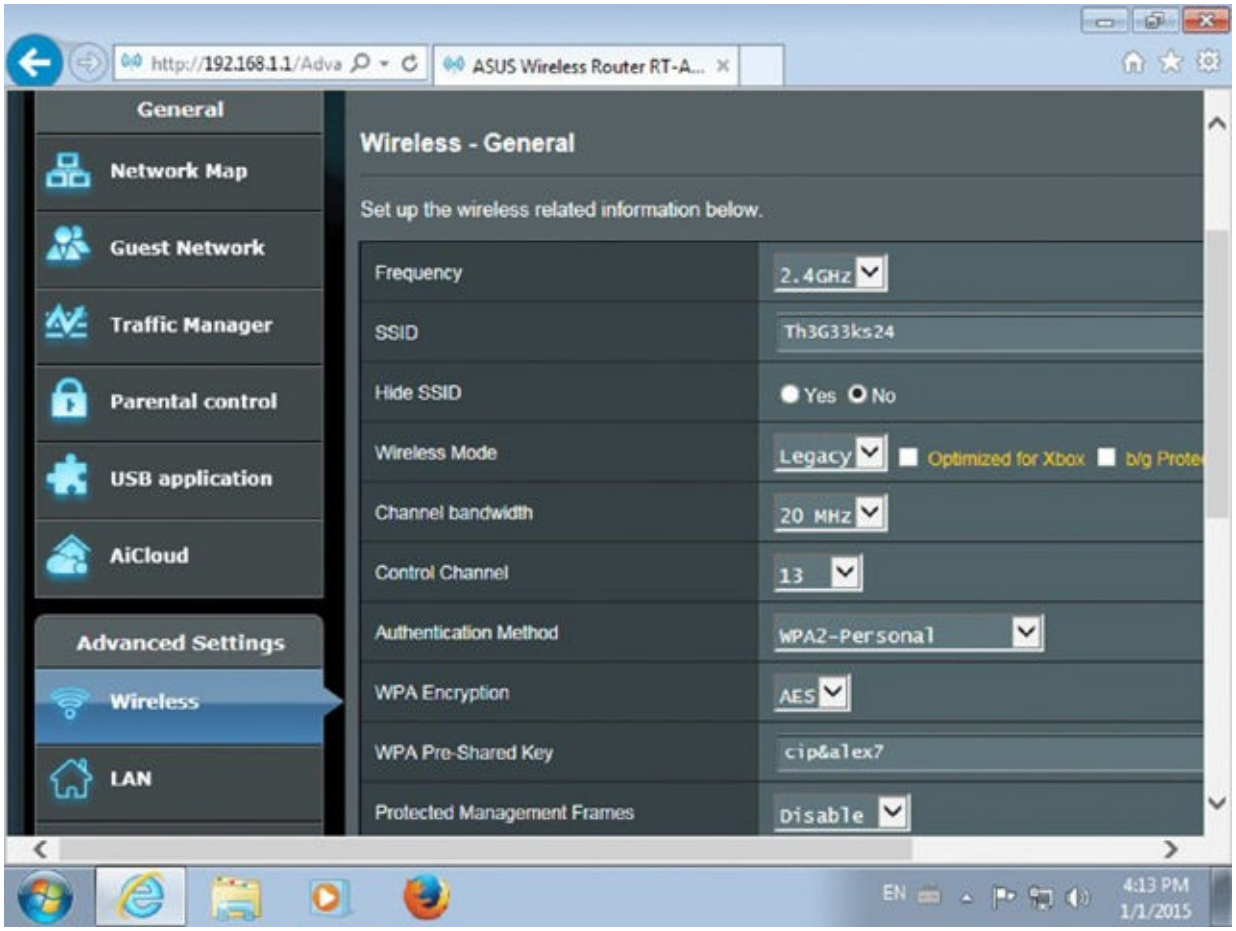


FIGURE 2.5 Wireless configuration parameters on an ASUS router

SSID configuration parameters include the following:

SSID Perhaps you have been on vacation or in a coffee shop and have seen a list of wireless networks. Or perhaps at home you see all of the other wireless networks in the neighborhood. These are all SSIDs. Client devices must choose the correct SSID to log onto the network. In Figure 2.5, the SSID is Th3G33ks24. All devices in that area need to select Th3G33ks24 in order to get onto that wireless network.

SSID Broadcast When you see lists of other wireless networks available, it is because SSID broadcast is enabled on the wireless access point. *Broadcast* simply means to display the SSID publicly. If the broadcast is not enabled, the name of the wireless network will not be displayed or shown as a wireless access point option on your device. However, you can disable the SSID broadcast and still connect wireless devices to it because you know the name, but this practice is not recommended because it lowers the security of your wireless network.

Configuring the security on a wireless network is an important task. An unsecured network may allow anyone to use your Internet connection. At best, they would then get Internet access for free; at worst, they could use your Internet connection for some unscrupulous activity, and you would be stuck with the consequences. Skilled hackers can also break into other computers and devices on your network and steal precious data. Even secured wireless networks are not immune to attacks. If a network is secured with poor encryption or a poor password, a skilled hacker can listen to the signals sent between a wireless network and its devices, analyze them, and steal the data that is being transferred.

Changing How You Authenticate to Wireless Access Points

The first way to secure your network is to configure the *authentication* for the wireless access point. Every access point is secured with a username and password, and every wireless router ships with a generic username and password like admin/admin. Changing this is critical for security. All generic usernames and passwords are readily available online for anyone to see, so when you first get a wireless device like a router, take the time to change these settings.

Most people do not access their router settings on a regular basis and therefore forget the username or password. If this happens, the access points have a reset button typically located on the side or bottom of the device. Press this to restore the device to its default factory settings.

Don’t try this at home! Right now there are several wireless routers in my neighborhood using the manufacturer’s original username and password. To access them I need only to type in the IP address of the wireless router in an Internet browser and search out the manufacturer’s generic username and password online. Within minutes it is possible to have complete control of the neighbor’s wireless router. If anyone in my neighborhood reads this book, this example is theoretical.

Setting the Encryption for Your Wireless Network

Encryption is a key part of wireless security and fortunately not difficult to configure on residential access points (APs). Essentially, encryption is the process of encoding messages or information in such a way that data is difficult or impossible to read should the wrong person get hold of it. Decrypting is the process of returning the data to its original form so it can be understood. There are plenty of protocols in the networking world to encrypt data, and in the wireless world the two primary encryption systems are Wired Equivalent Privacy (WEP) and Wi-Fi Protected Access (WPA).

WEP is the original wireless security standard, and it was designed to provide wireless networks with an equivalent level of security available with wired networking. With WEP a data packet that's sent is encrypted from the sending device all the way to the receiving device. In this way, if someone were to eavesdrop or capture the data in transmission, it could not be easily read. In a short time, WEP proved to be inadequate for complete wireless security. WEP security could be cracked, that is, read, with freely available online utilities.

WPA and *WPA2* were developed as enhancements to WEP security. WPA provided enhanced data encryption using something called the *Temporal Key Integrity Protocol (TKIP)*. A detailed discussion of TKIP is not required for the IC3 exam; however, it is important to know that TKIP is the protocol used to increase WPA security for wireless transmissions. It does this by creating a new 128-bit encryption key for each data packet. Like many other security technologies, WPA and TKIP have a few shortcomings. As a result WPA2 was developed. WPA2 uses a protocol known as *Counter Mode with Cipher Block Chaining Message Authentication Code Protocol (CCMP)* to replace TKIP. Further, WPA2 can use the *Advanced Encryption Standard (AES)* for additional security. This all may sound confusing when looking at configuring your wireless network security. The following summarizes the security options in order of most to least effective:

- WPA2 and AES
- WPA and AES
- WPA and TKIP/AES
- WPA and TKIP
- WEP
- No security

Security Networks with Firewalls and Gateways

Security is an essential consideration for today's networks, and when it comes to network security, *firewalls* and *gateways* play an integral role as part of a security plan for any network.

The function of a firewall is easy to understand but often complex to configure and maintain. A firewall can be either a hardware or software device that controls and protects data coming into and out of a network. To do this, firewalls are typically placed on the perimeter of the network to prevent intrusion from the outside. Figure 2.6 shows where a firewall would be located in a network.

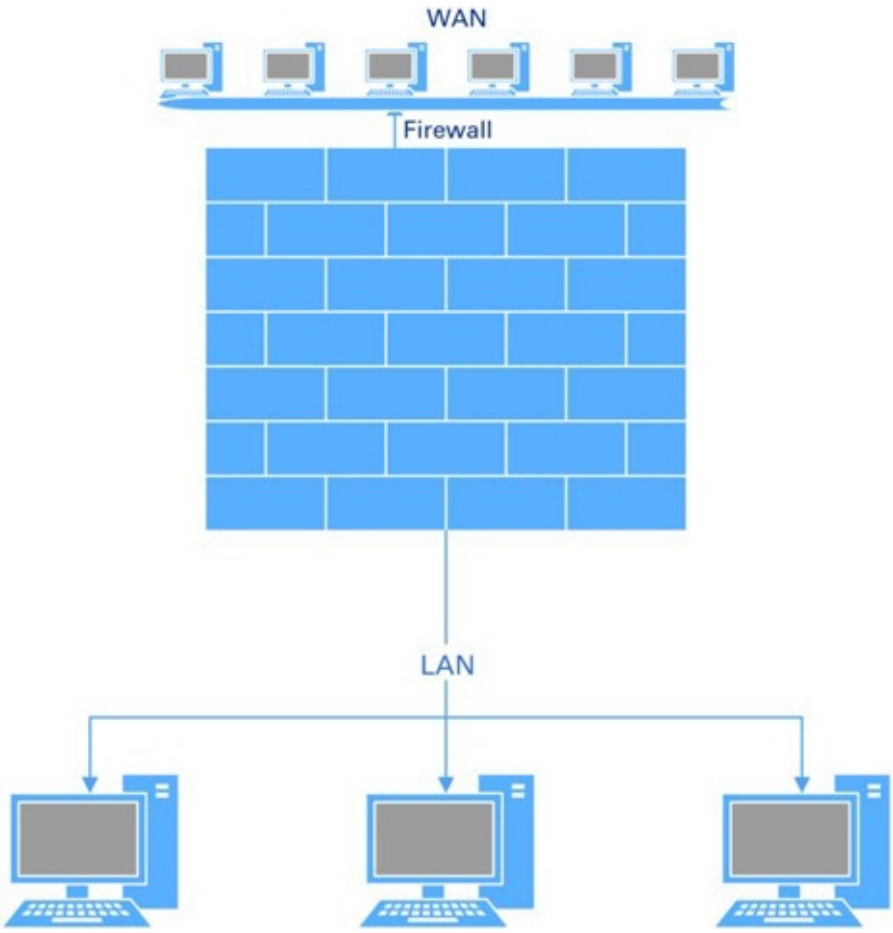


FIGURE 2.6 The location of a firewall in a network

A *gateway* in a network can be used for many different roles and functions. We will describe this concept later on in this chapter, after you become familiar with the firewall concept.

Using a Firewall

The firewall is a method used to control and monitor incoming and outgoing network access. It is the job of the firewall to prevent unauthorized network traffic, both from outside users and from inside network users. All data packets sent to and from the network pass through the firewall, and all of this data is checked to see whether it is allowed for transfer.

A firewall can even look inside a packet of data to determine if the contents are what they

say they are. Although the most common use of a firewall is that of protecting the boundary of an organization's network, some companies use firewalls internally as well. This approach is commonly used to protect areas of the network that may contain sensitive data, such as research or accounting data. In this way, security perimeters can be set up inside a network to protect sensitive areas.

Modern operating systems include a software firewall that has some limited capability and wireless routers with firewall capabilities. Figure 2.7 shows the firewall settings that are available on a wireless router manufactured by ASUS.

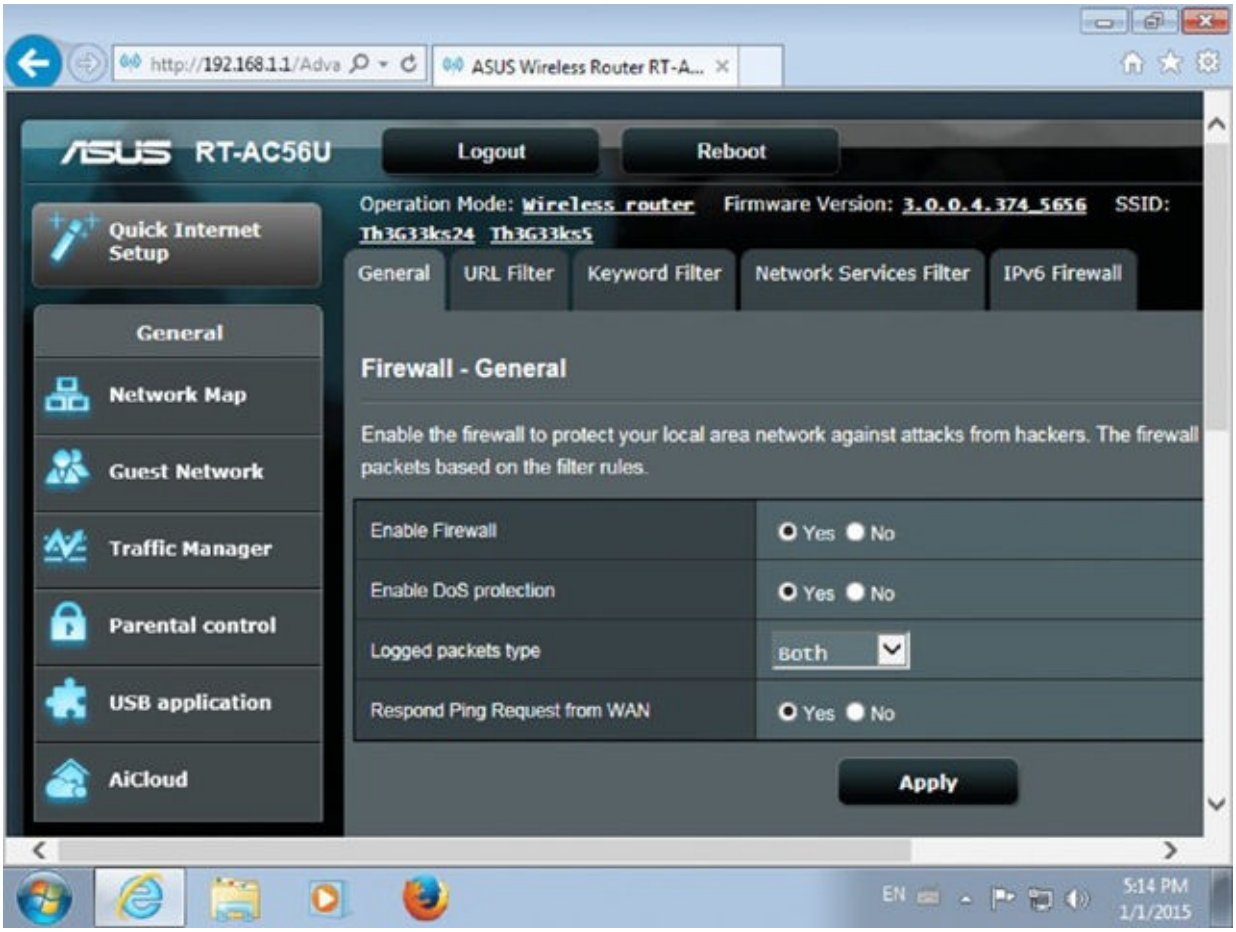


FIGURE 2.7 Firewall settings available on an ASUS wireless router

If you go to your workplace and want to "like" something on Facebook, update Twitter, or spend some time on Tumblr, you may be out of luck. These and other websites may not be part of your company's work environment. How does the company restrict access to these and other sites? This is another function of the firewall. By using the firewall, the company can restrict access to the entire Web or just portions of it.

When you configure a firewall, you need to know which ports are assigned to the various protocols. The networking protocol we use, TCP/IP, is actually a protocol suite with numerous individual protocols combining to create the entire TCP/IP suite. Each of these services within TCP/IP has a port association. As an example, HTTP is a TCP/IP protocol and uses port 80. When a web browser requests a web page, the request is sent through

port 80 on the target system and returned to the requester using the same port. During communication, the target port is checked to see which protocol or service is the intended destination. The request is then forwarded to that protocol or service.

A *port* is essentially a doorway that one of the protocols uses. If we block the port, the associated service will be unavailable. Therefore, if we block port 80, all web-browsing traffic is blocked because it goes through that port; 65,535 ports are available. These are broken down into three distinct designations:

Well-known ports: 1–1023

Registered ports: 1024–49151

Dynamic ports: 49152–65535

Fortunately, on the exam you will not need to know how all these ports are assigned, but you may need to know commonly used TCP/IP port assignments and the service associated with those ports.

Table 2.1 shows some common TCP/IP services and their associated port and purpose.

TABLE 2.1 Common port numbers and their purpose

Protocol	Port	Purpose
File Transfer Protocol (FTP)	21	Large file transfers
Hypertext Transfer Protocol (HTTP)	80	Web browsing
Hypertext Transfer Protocol Secure (HTTPS)	443	Used for secure browsing, such as banking sites
Post Office Protocol version 3 (POP3)	110	Downloading email from a server
Domain Name System (DNS)	53	Hostname resolution
Simple Mail Transfer Protocol (SMTP)	25	Sending email

Understanding the Gateway Concept

Defining exactly what the function of a *gateway* is can be difficult, not because of the complexity of the topic but because a gateway can be used for different roles. It is one of the terms that can be used to describe several functions. For the most part, however, the function of the network gateway is to convert one thing into another or provide access from one system to another. If that sounds a little vague, it's supposed to. *Gateway* is a term that can apply to a number of scenarios.

For example, a gateway server can act in the conversion of a protocol, allowing dissimilar networks to communicate. One practical application for such a gateway is allowing information to be passed between Macintosh-based and PC-based networks. The gateway translates protocols—from AppleTalk to TCP/IP.

Translating protocols is only one possible application for a gateway. A network gateway is also a doorway to another network. When you log onto the Internet from home or work, you will be using a gateway to make the transition from one network to the other. For example, at work it is likely that a server acting as a gateway, often a function of a firewall

server, will be forwarding your client requests for retrieving web pages to the appropriate websites.

Measuring the Speed of Your Internet Connection

It's hard to imagine life without the Internet. In the workplace it is used for everything from videoconferencing to email, connecting remote users, marketing, research, and more. At home we rely on the Internet to stay in touch with family and friends using social media, pay bills online, plan trips, and shop from the comfort of an armchair.

In any business environment, it is important to be able to access data and applications quickly. As more businesses move services and data into the *cloud*, the speed at which this information can be accessed becomes very critical.

Similarly at home, watching movies, streaming video, and more all require a certain amount of consistent and reliable Internet access. So how does the Internet provide adequate and timely access to the increasing demand for more and more applications? The first thing you need to understand is how Internet capacity is measured.

When you see Internet capacity advertised by an *Internet service provider (ISP)*, you may see it measured in kilobits per second (Kbps), megabits per second (Mbps), and even gigabits per second (Gbps). A *bit* refers to a single unit of information sent in a communication stream, which is represented in binary as a 1 or a 0. Kilo means 1,000; mega 1,000,000; and giga 1,000,000,000. Therefore, Kbps represents 1,000 bits per second transfer rate; mega refers to 1,000,000 bits per second, and so on.

You also see transfer rates listed as kilobytes per second (KBps), megabytes per second (MBps), and gigabytes per second (GBps). A byte is equivalent to 8 bits, and 1 KBps is the equivalent of 1,000 bytes per second. This may sound incredibly fast, and that much data moving at that speed really is amazing. However, depending on what you are doing on the Internet or any other network, it may not be fast enough. Table 2.2 compares transfer speeds.

TABLE 2.2 Comparing transfer rates

Measurement	Also Known As	Transfer Rate
1 Kbps	kbps, kbit/s, kb/s	1,000 bits per second
1 Mbps	mbps, mbit/s, mb/s	1,000,000 bits per second
1 Gbps	gbps, gbit/s, gb/s	1,000,000,000 bits per second
1 KBps	kBps, kB/s	1000 bytes per second
1 MB/s	MBps	1,000,000 bytes per second
1 GB/s	GBps	1,000,000,000 bytes per second

So how do these transfer rates affect what you do at home and work? Let's suppose you have an ISP offering 10 Mbps download for $30 per month, 25 Mbps download for $40, 50 Mbps for $55, and 100 Mbps for $100. How much do you need to spend to get the right access level? It all depends on how many users are connected, what the Internet is used for, and how many devices are on at the same time.

In general, more bandwidth is better, but paying for unused capacity is not good practice, especially in the workplace. Table 2.3 approximates how differing speeds will impact the

wait times for what you do on the Internet.

TABLE 2.3 Transmission speeds and approximate Internet response times

Download	56 KBps	2 MBps	10 MBps	25 MBps
Website (300 KB)	42s	1s	<1s	<1s
Download PowerPoint presentation (2 MB)	4m 42s	7s	1s	<1s
Image from digital camera (6 MB)	14m 17s	23s	4s	1s
Complete music CD (650 MB)	25h 47m 37s	42m 17s	8m 40s	3m 23s
Movie (1.5 GB)	59h 31m 25s	1h 37m 39s	20m	7m 48s

Bandwidth vs. Data Throughput

Imagine buying a car that advertised an amazing 60 miles per gallon. Now imagine driving this car from Spokane to Seattle. Would you expect to get 60 MPG for the entire trip? Probably not. More likely, your actual gas mileage would be much less due to idling in the city, going up hills, and extra weight in the vehicle. In fact, unless you were going downhill with a tail wind, you may not hit 60 MPG even once.

This is a little like bandwidth. Bandwidth represents the maximum capacity of a medium and correlates to the total amount of data that is possible to traverse that medium in theoretical ideal conditions. So your Internet service provider may advertise an 8 MBps upload capacity and a 40 MBps download capacity for your Internet connection, but other factors prevent this from happening. So if you send data from Spokane to Seattle, don't expect the advertised speed from start to finish. Data throughput, on the other hand, is defined as the successful movement of data from one location to another in a specified period of time. So you may have 8 MBps capacity but an actual data throughput of 5–7 MBps for your Internet.

Factors Limiting the Speed of Your Internet Connection

Even with a 10 MBps or 20 MBps Internet connection, you may find that your response times are too slow or slower than normal at certain times. There are many factors that can decrease Internet access times and have you wondering if your Internet service is adequate.

The following is a list of five things you can do if your Internet is lagging:

Talk to your ISP. It may be that your Internet usage is too high for the Internet connection package you have purchased. If you stream video, download significant data, or more, your current package may not suffice. If you are a heavy user at work or at home, your monthly costs can be quite high.

Check your applications. Many applications that run in the background may be using valuable bandwidth. Windows updates, Skype, and the like may be working in the background limiting resources. You can always turn them off when not in use. Also, the number of Internet browsers or tabs you have open may also affect the resources.

Many applications such as Skype may start up automatically when the computer boots up. For some applications it is a good practice to turn the autostart feature off. However, for background applications such virus scanners, it's best to leave those set to autostart but schedule their updates for a time when they are unlikely to interfere with Internet use. Remember to close down unneeded browser tabs. It is a good practice to streamline this by adjusting the browser to open only a couple of tabs at the same time.

Share your bandwidth. Many households have tablets, smartphones, laptops, desktops, and gaming consoles all operating at the same time. Your Internet is a shared resource, and this type of heavy use can slow down the connection. In this case you may need to increase available bandwidth with a different package from the Internet service provider.

Check for viruses and malware. If you notice a sudden drop in Internet and overall computer response times, you may have a virus or malware problem. These programs can work in the background accessing the Internet and generally tie up system resources. Keep your antivirus software up to date and ensure it autoscans your system.

Maintain your system. Poor performance, not enough memory, a full hard disk, and other general system state issues can certainly reduce your computer's ability to process online requests. General system maintenance is required to keep your system efficient and functioning.

When you look at the properties of your Internet connection in Windows, it tells you the maximum speed that is supported by your connection. However, it won't tell you how fast your actual data transfers are right now. This can be measured using all kinds of applications and online services. One of the most popular websites for measuring the speed of your Internet connection is http://www.speedtest.net. This website automatically tracks your location, chooses a test server that's close to you, and then downloads and uploads data to it. At the end, you are shown the actual speed of those data transfers, and you can compare them with what your ISP promised you in terms of speed.

Wireless Networking Standards and Speeds

An organization known as the *Institute of Electrical and Electronics Engineers (IEEE) is* responsible for the development of networking standards. These standards determine the speed of a network, the type of media used, and more. In the wireless networking world, the IEEE *802.11* wireless standards are the ones commonly used.

Under the 802.11 standards a number of wireless specifications are identified. These include 802.11a, 802.11b, 802.11g, 802.11n, and 802.11ac. Each of these has its own speeds and characteristics. When configuring your wireless router, you may need to choose one. Table 2.4 shows the characteristics of the 802.11 specifications.

TABLE 2.4 802.11 wireless standards

802.11 Standard	Speed	Transmission Range
802.11a	1 to 2 Mbps	20 feet indoors
802.11b	Up to 11 Mbps	Up to 150 feet indoors
802.11g	Up to 54 Mbps	Up to 150 feet indoors
802.11n	Up to 600 Mbps	175+ feet indoors
802.11ac	Up to 2600 Mbps	175+ feet indoors

Not all of these standards are compatible with each other. To access a wireless network, the client system must use the same wireless standard as the access point. If a wireless device was not designed to work with wireless networks using a certain standard, that device won't be able to identify and connect to wireless networks using that standard.

Even if a wireless standard advertises 54 Mbps or 2600 Mbps, it is a difficult benchmark to reach. Wireless signals are susceptible to a range of interferences. In the home there are plenty of potential wireless interference causes and even more in a work environment. The following is a list of some of the common wireless interference trouble spots:

Radio Frequency Interference Certain 802.11 wireless standards use a radio frequency of 2.4 GHz. Normally this is not a problem, but many other devices around the house including cordless phones and microwave ovens can also use the range of 2.4 GHz. This can cause significant interference with the wireless signal.

Physical Objects Physical objects can cause a real problem with wireless signals. Trees, concrete walls, buildings, mirrors, and so on, can prevent wireless signals from traveling through them. Troubleshooting wireless signals will often require checking the location of the wireless access point to verify that physical objects are not causing the wireless signal problems.

Environmental Conditions Wireless signals that have to travel outside the house can experience integrity loss due to lightning, heavy fog, rain, wind, and so on.

Understanding the Different Types of Internet Connections

While most of us use the Internet daily, the way we access it may vary. Not many years ago, dial-up access was king. Dial-up was a reliable method of Internet access, but as web pages became more complex and communication needs increased, dial-up access was just too slow. However, there are people today who are still using dial-up either because their Internet needs are very basic (checking the occasional email, for example) or because they live in an area where higher-speed Internet options are not available.

Today, many homes and business use *broadband Internet access,* which is often provided by an ISP. In this section we look at the various Internet access methods starting with a closer look at dial-up service.

Dial-up Internet Access

Dial-up, also known as *plain old telephone service (POTS),* is the oldest and slowest form of Internet access. While it is too slow for most applications today, it may be used where no other option is available and sometimes as a backup Internet access option should another method fail. Even so, dial-up has a maximum speed of either 56 Kbps or 128 Kbps, which is far too slow for day-to-day Internet use.

Internet access using a dial-up connection needs a few things to make the connection happen. Key components include the following:

Hardware In order to access the remote dial-up server, the client system must have the correct hardware installed to make the connection. Most dial-up remote connections require a modem on the client and a server to connect to. The modem is responsible for converting digital signals to analog that can travel over traditional phone lines. The dial-up server is at one end of the connection and authenticates the client request to establish the dial-up link.

Phone Line/Number To connect to a remote access server over a dial-up connection, you need to have the phone number of the remote server, the IP address or the hostname, and of course a phone line. When the Internet is connected, the phone is not available for regular voice communication.

Transmission Protocols You will have to choose the transmission protocol (TCP/IP) and security protocols used by the remote server. This configuration falls outside of the scope of IC3, but it’s enough to know that properly configured protocols are required. The transmissions protocols are used to ensure that the systems communicate with each other, and the security protocols ensure that communication is protected. The provider provides settings for both, which are configured on the client system.

Security On the client system, you may need to establish security information so it can be authenticated by the server. The security information includes a username and password combination to be verified by the remote server and data-encryption options.

If anyone has ever used a dial-up connection or continues to do so, you will certainly know that it doesn’t always connect. Fortunately there are only a few areas to check to

find where the problem lies. These include the following:

- Verify that you have correct authentication information. To access the remote access server, you require a valid username and password for the remote network and permissions to access the server.
- Confirm that you are calling the correct number or trying to connect to the correct server. Oftentimes, connection issues are traced to something simple, and in the case of dial-up, they can be caused by using the wrong phone number. If you are expecting beeps and other sounds and you hear “hello,” check the number.
- Check all physical connections. Is the phone jack plugged into the modem?
- Check for a dial tone. This is as easy as picking up the phone and listening.

If all else fails, keep the number to your provider handy. They have trained technicians who can resolve most issues quickly.

Broadband Internet Access

As far as Internet connectivity goes, broadband is a very popular choice. *Broadband* refers to high-speed Internet access that includes cable, digital subscriber line (DSL), wireless broadband, and satellite Internet. Broadband technologies allow businesses and home users access to bandwidth-intensive applications such as videoconferencing, online gaming, streaming audio, and much more. Unlike dial-up connections where dialing into an ISP is required every time you want Internet access, broadband is largely an always-on service.

For example, DSL Internet access uses a standard phone line to provide high-speed access. In fact, DSL technologies offer phone and data transmissions over a standard phone line, but unlike dial-up you can make a phone call while using the Internet. To connect to home DSL broadband, a standard phone cable is plugged into the phone wall jack and to the DSL router provided by the ISP. A modern DSL router has multiple physical ports that devices can be plugged into, but more importantly for today’s users, it has wireless capability.

Whether wired or wireless, the DSL router can automatically assign IP addresses and allow multiple devices in the home access to the Internet. Depending on your area, you can buy Internet access plans from 1.5 Mbps to 50 Mbps and up.

Cable Internet access is a robust access method available from most cable TV providers. Cable Internet access is an attractive option to home users and businesses because it is both reliable and cost effective. Internet access requires a router provided by the cable provider and uses a coaxial cable connection. Like DSL, cable Internet is an always-on connection. That means that as long as your computer is on, it’s connected to the Internet. Both cable and DSL offer a range of packages for both home and business use, and both have far slower upload speeds than download speeds.

DSL and cable are attractive Internet access technologies but unfortunately are not available everywhere. Satellite offers an access alternative that is a bit more costly but can be accessed from virtually anywhere. With satellite Internet, download speeds are considerably faster than upload speeds, and the packages get expensive quickly. For

example, for a 300 Kbps upload and a 2 Mbps download, depending on the provider, you may have to pay between $130 and $160 per month. Satellite access requires a special dish that mounts on the outside of the building to communicate with a satellite, and the information is transmitted between devices. Satellite broadband has some special communication considerations that DSL and cable do not, including the following:

Line of Sight Satellite access is a line-of-sight technology, meaning that the satellite dish you have must have some degree of sight between the sending and receiving devices. Heavy cloud cover and other weather can cause Internet interruption.

Rain Fade Rain fade refers to signal interference caused by moisture in the atmosphere. It generally takes a significant amount of moisture and the interruption is over quickly, but it can happen.

Latency As you can imagine, it is a long way from a dish on the side of a house to a satellite in space. Latency refers to the time it takes a signal to travel. If the latency is too high, requests may time out and the communication may fail. As with rain fade, high latency can be an issue from time to time, but it is just part of using satellite Internet.

Satellite is more costly and slower than both cable and DSL, but it does provide access where the others do not.

Broadband Warning

Broadband Internet access is often an always-on service. Unlike dial-up, where a connection must be made every time to connect to the service, broadband such as DSL and cable is just waiting for us to use it. This means that when you are away from the computer, your system could be accessing the Internet for updates or other reasons. Unfortunately, today's operating systems and applications may have security holes that can be exploited. Combine this with an always-on technology and problems may arise.

To help combat this, it is important to use a firewall between you and the Internet to help protect your system from unwanted visitors. There are software firewalls that are part of the operating system, and the routers that are used with cable and DSL provide some firewall features. Another important security must is to ensure your operating system and applications are up to date with the latest security patches. Most applications have automatic updates, but this option must be enabled.

Today, part of the responsibility of owning and using a computer at home or work is to have a basic understanding of security and security threats. Without it, you could find yourself vulnerable.

Virtual Private Networks

In the mid-1990s Cisco, IBM, and Microsoft began working on a new technology known as *tunneling*. Essentially, the tunneling technology uses special protocols to create a point-to-point connection for data to be transported over a public network. *Virtual private networks (VPNs)* use tunneling to establish links over a public network such as the Internet or even a public switched telephone network (PSTN). VPNs are widely used in the business world to securely connect mobile users to the corporate network. With their help, the employees of a company can connect to the company network while they are traveling or when working from home.

The advantages of using a VPN link is that it can create a secure and economical connection between remote users and a corporate network. Without a VPN option, it may be necessary to install and maintain your own hardware to create such a link. A VPN allows you to use the hardware and software of the Internet to do the same thing. Figure 2.8 shows a visual overview of VPN connectivity.

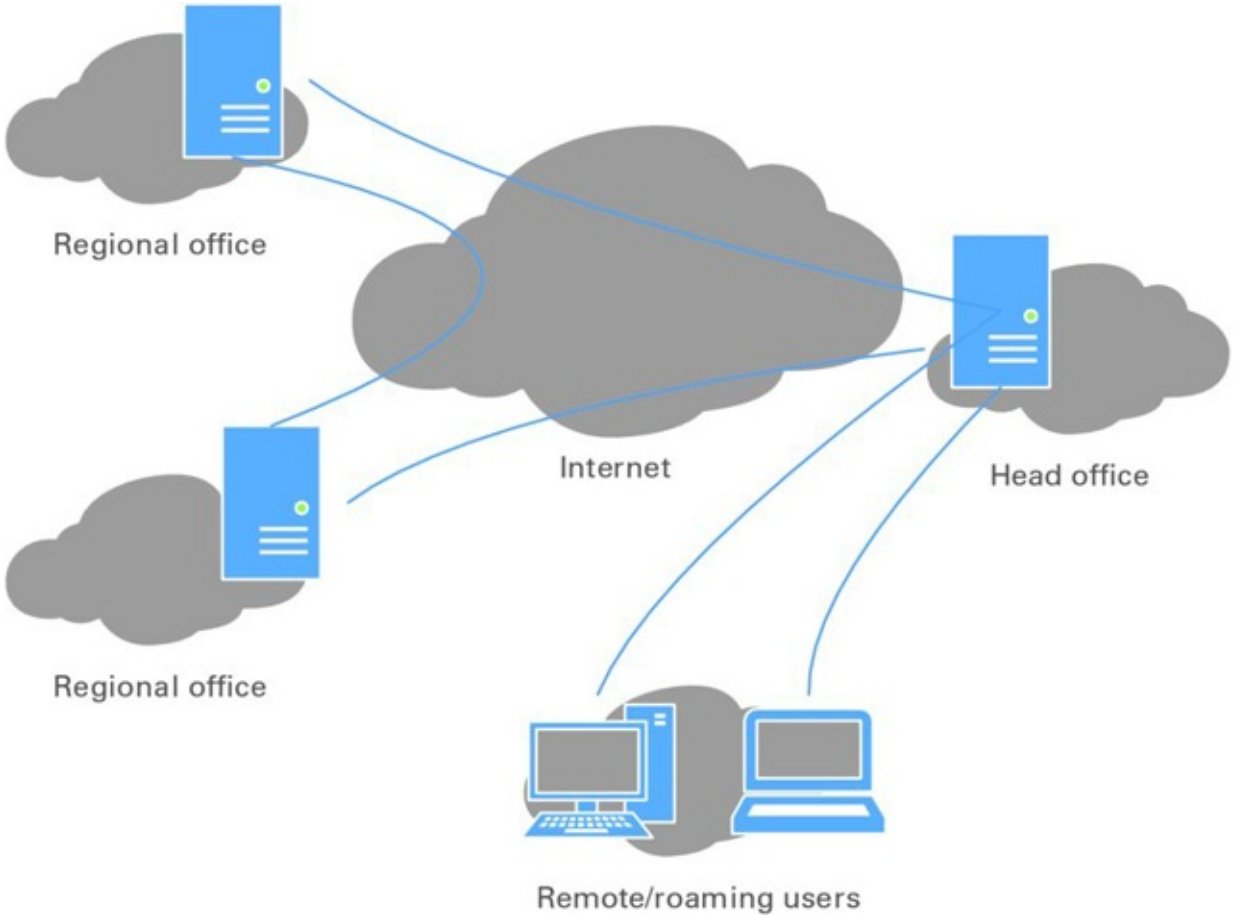


FIGURE 2.8 VPN connectivity overview

Other advantages offered by VPN connections are that they can be used to bypass region restrictions imposed by some websites or services (e.g. Netflix, Hulu), they provide better security than normal Internet connections, and they can be used to hide your real online identity.

Most operating system software today, including that on tablets and smartphones, has VPN capability built in. In addition to the client-side software required to establish a VPN, the following are all parts of establishing a VPN connection:

VPN Servers The VPN server is at one end of the connection and authenticates the client request to establish the VPN link.

VPN Clients A VPN client can be any remote system such as a laptop, smartphone, tablet, or other device that has VPN client software installed.

Tunneling Protocols As mentioned earlier, VPN connections use tunneling protocols to create the point-to-point link over a public network. The tunneling protocols include the Point-to-Point Tunneling Protocol (PPTP) and the Layer 2 Tunneling Protocol (L2TP).

Public WAN The VPN link is established over the Internet.

Principles for Troubleshooting Networking Problems

Troubleshooting can be very complex, since hardware, software, protocols, and more combine to create a sea of settings, configurations, and switches. Despite the different approaches to troubleshooting and the complexity of technologies, some basic troubleshooting guidelines can be applied in most scenarios. Naturally, the exact approach to troubleshooting a situation will vary depending on many elements such as urgency, number of users affected, the type of problem, and many more, but the general guidelines apply.

So in a nutshell, here are five troubleshooting rules:

Rule #1: Get the Right Information It may sound unusual, but some people start clicking around changing settings without really understanding the problem. Critical information can be gathered from computer users, system log files, other administrators, or error messages generated by the system. In your information gathering you are looking to answer several questions, including these:

- Who does the problem affect?
- What computers are affected?
- What was the computer doing at the time of failure?
- How often does the problem happen?
- What has been done in the past to try to fix the problem?

Answers to questions like these really help pinpoint the location of the error and help ensure an accurate and timely response to troubleshooting.

Rule #2: Keep It Simple Networks, hardware, and software can be very complex, but the solution to most troubleshooting issues is often the simplest. If you are troubleshooting a situation where you cannot log onto the Internet at home, make sure that the cables are attached and check to see if the power is on at the wireless router before you try anything else. You may make the situation worse if you change settings or modify the system when what you really needed to do was plug something in.

Rule #3: Establish What Has Changed Seldom does a computer stop working on its own. Often when you get into the troubleshooting you will find that an application was recently installed, a new device was added, something was uninstalled, or an upgrade was performed. The point is, if you can isolate a recent change of settings, either hardware or software, this is a great place to start.

Rule #4: Test the Results It may happen that you fix something and leave before testing it or do not test thoroughly and the problem persists. It is really important to test a system or device to verify that the fix has worked and that in fact you have not made the situation worse.

Rule #5: Document the Solution Documentation is as important as any of the other troubleshooting steps. If a problem happens once, it may happen again; the difference is, the next time the problem happens you can simply refer to your documentation and apply the fix. Unfortunately, proper documentation is very low on many troubleshooters' list of

priorities.

So with some general guidelines, we can now look at some of the common tools you can use to troubleshoot systems.

Troubleshooting Network Problems with the Help of Windows Troubleshooting Tools

To make troubleshooting easier, Windows 7 includes a set of wizards that you can use to help fix all kinds of problems: programs that don’t work well, problems with hardware, issues with the network and the Internet, and so on.

These wizards are found in the Control Panel and can be used by anyone. When a wizard runs, it checks for problems in the specific area you have chosen, and if problems are identified, it proposes solutions that can fix those problems. By following the recommendation of a troubleshooting wizard, you can actually fix many problems that may arise during everyday computing activities.

To help you learn how these troubleshooting wizards work, in Exercise 2.1 you will learn how to use the Internet Connections troubleshooting wizard that specializes in fixing problems that are related to Internet connectivity. Other wizards work in a similar manner.

EXERCISE 2.1

Using the Internet Connections Troubleshooting Wizard

1. Click Start, Control Panel, and then the Find And Fix Problems link found in the System And Security section (Figure 2.9).

   The list of available troubleshooting wizards is shown (Figure 2.10).

2. Click Network And Internet and then Internet Connections.

   The troubleshooting wizard with the same name opens (Figure 2.11).

3. Click Next (Figure 2.11) and wait for the wizard to detect problems.

   It will give you a list of suggestions.

4. Click Troubleshoot My Connection To The Internet (Figure 2.12), and wait for the wizard to make its diagnostics and propose solutions.

5. Follow the instructions proposed by the troubleshooting wizard and then click Check To See If The Problem Is Fixed (Figure 2.13).

6. The troubleshooting wizard will verify whether the problem is fixed and show you a summary of its findings (Figure 2.14).

7. Click Close.

FIGURE 2.9 The Find And Fix Problems link in the Control Panel

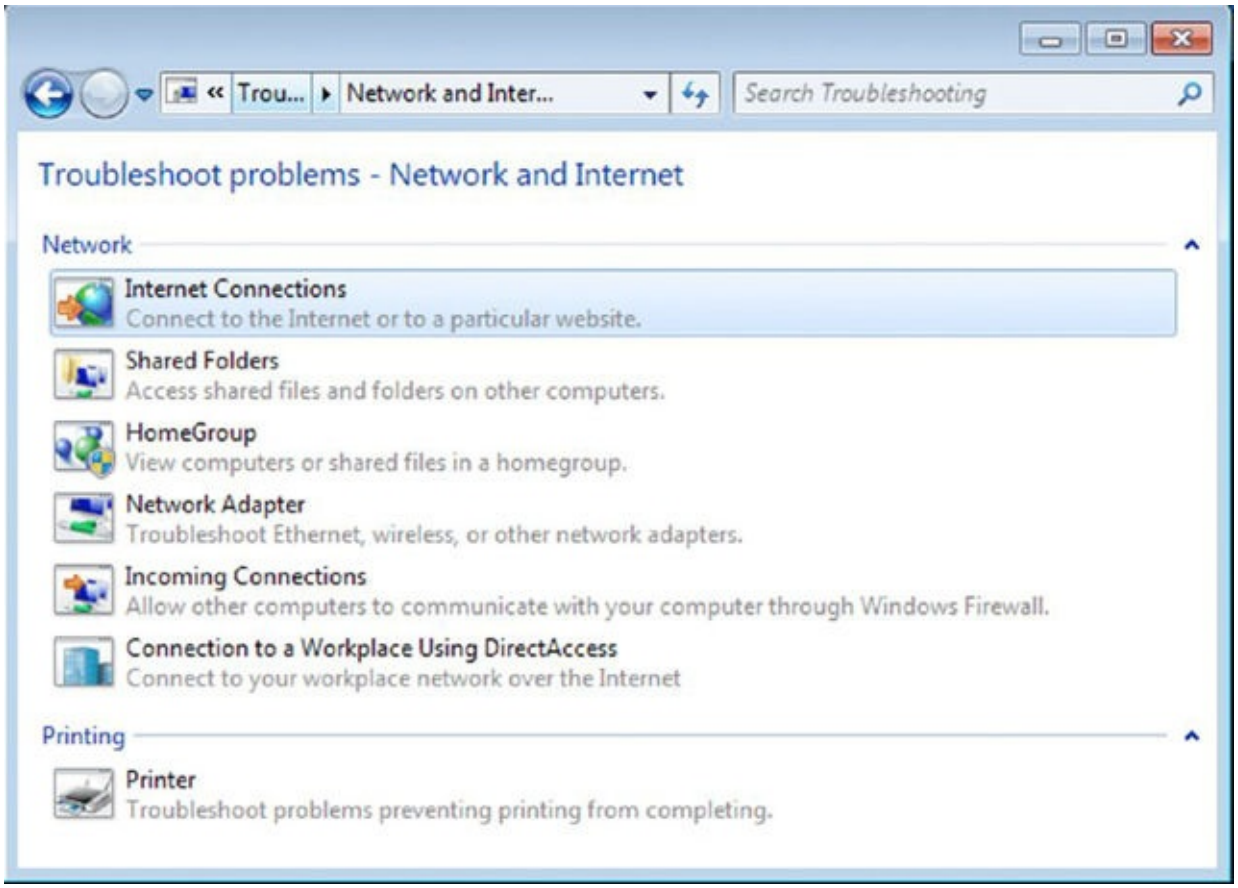


FIGURE 2.10 The link to the Internet Connections troubleshooting wizard

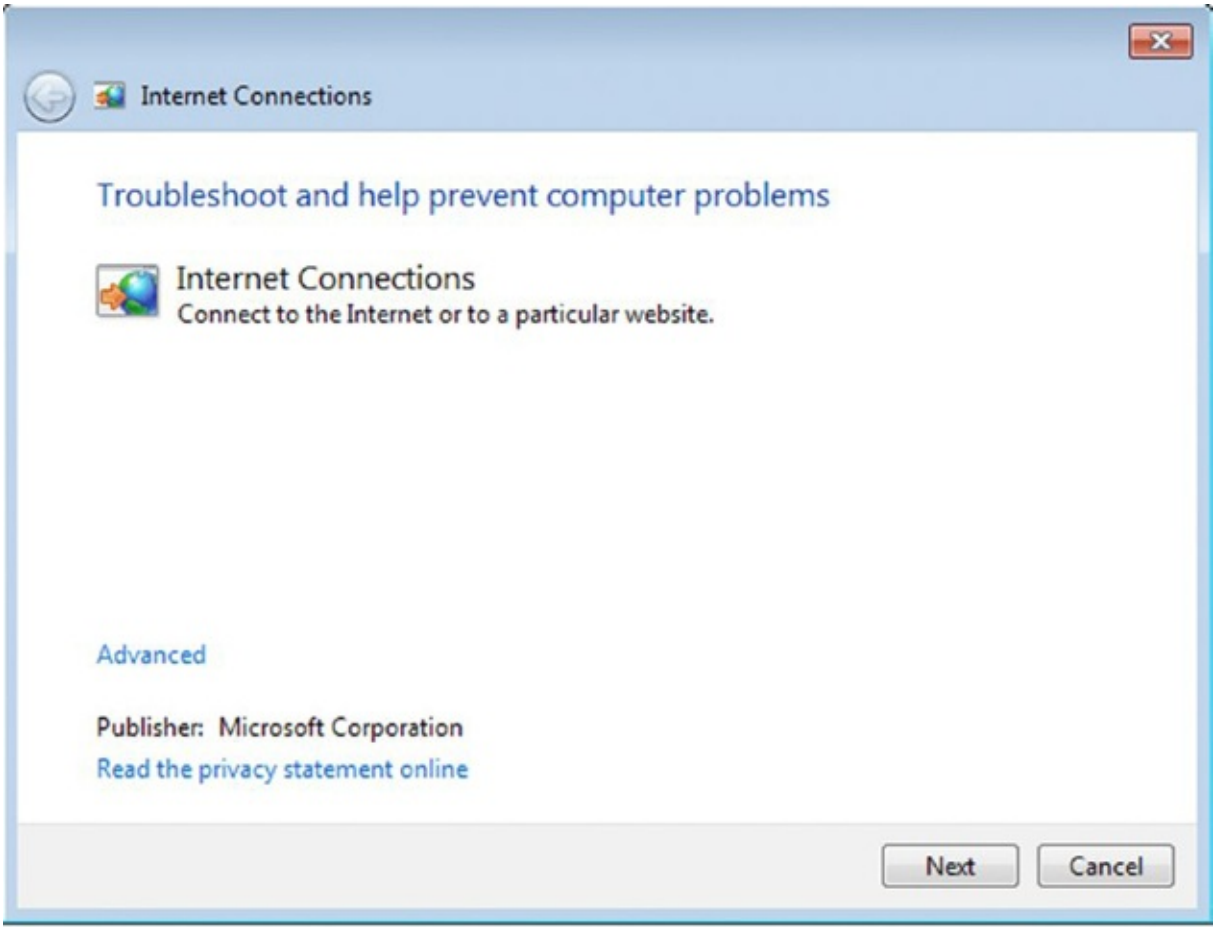


FIGURE 2.11 The Internet Connections troubleshooting wizard

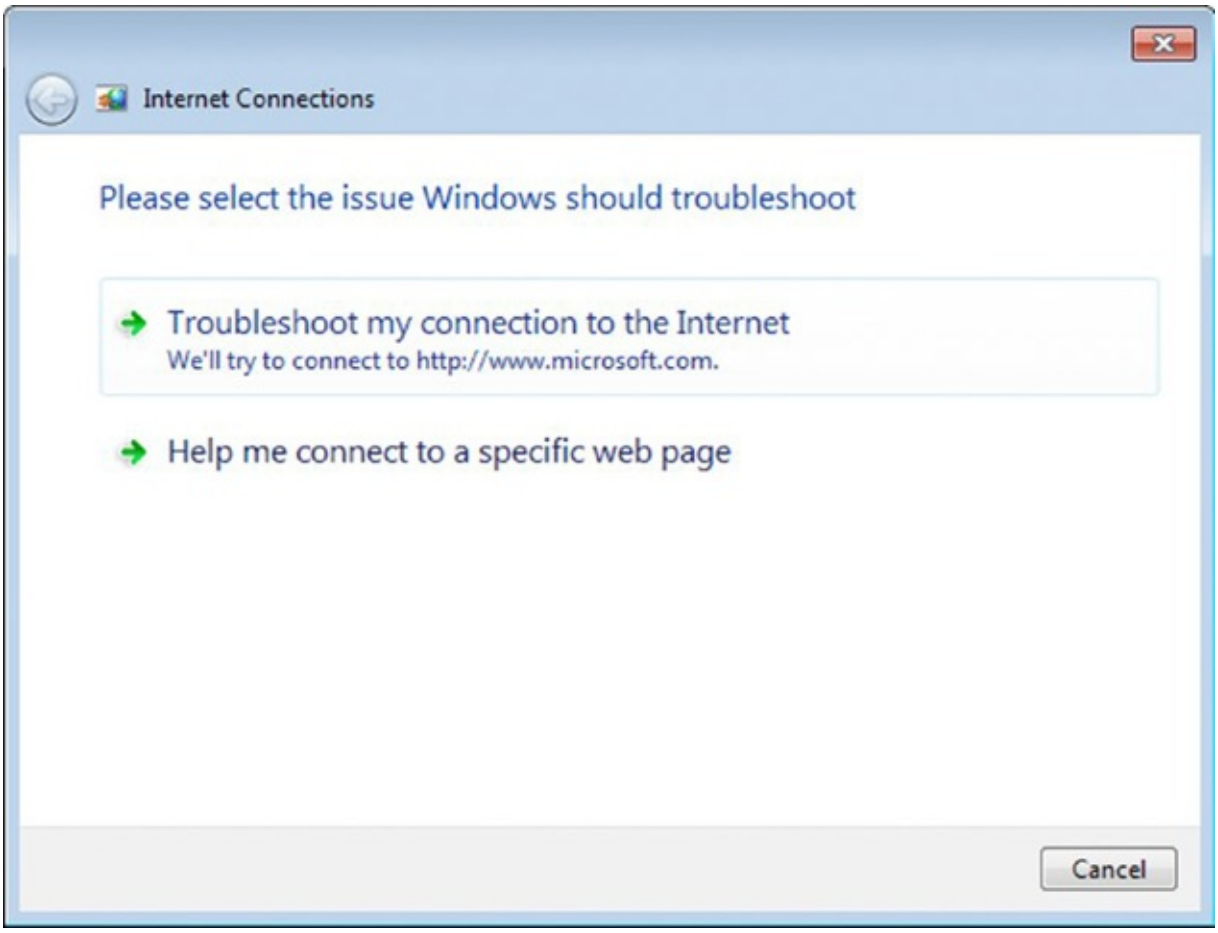


FIGURE 2.12 Troubleshooting suggestions

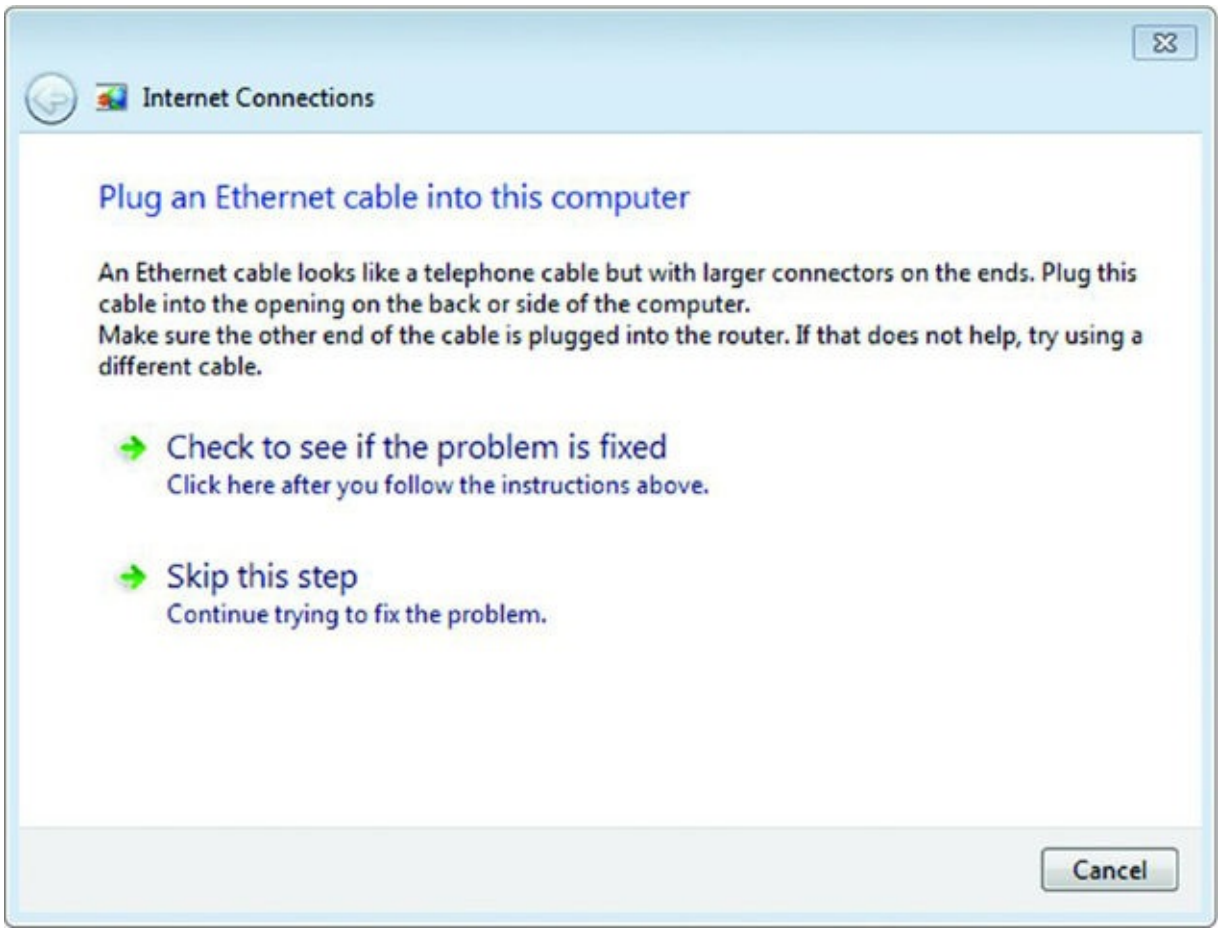


FIGURE 2.13 Checking to see if the problem is fixed

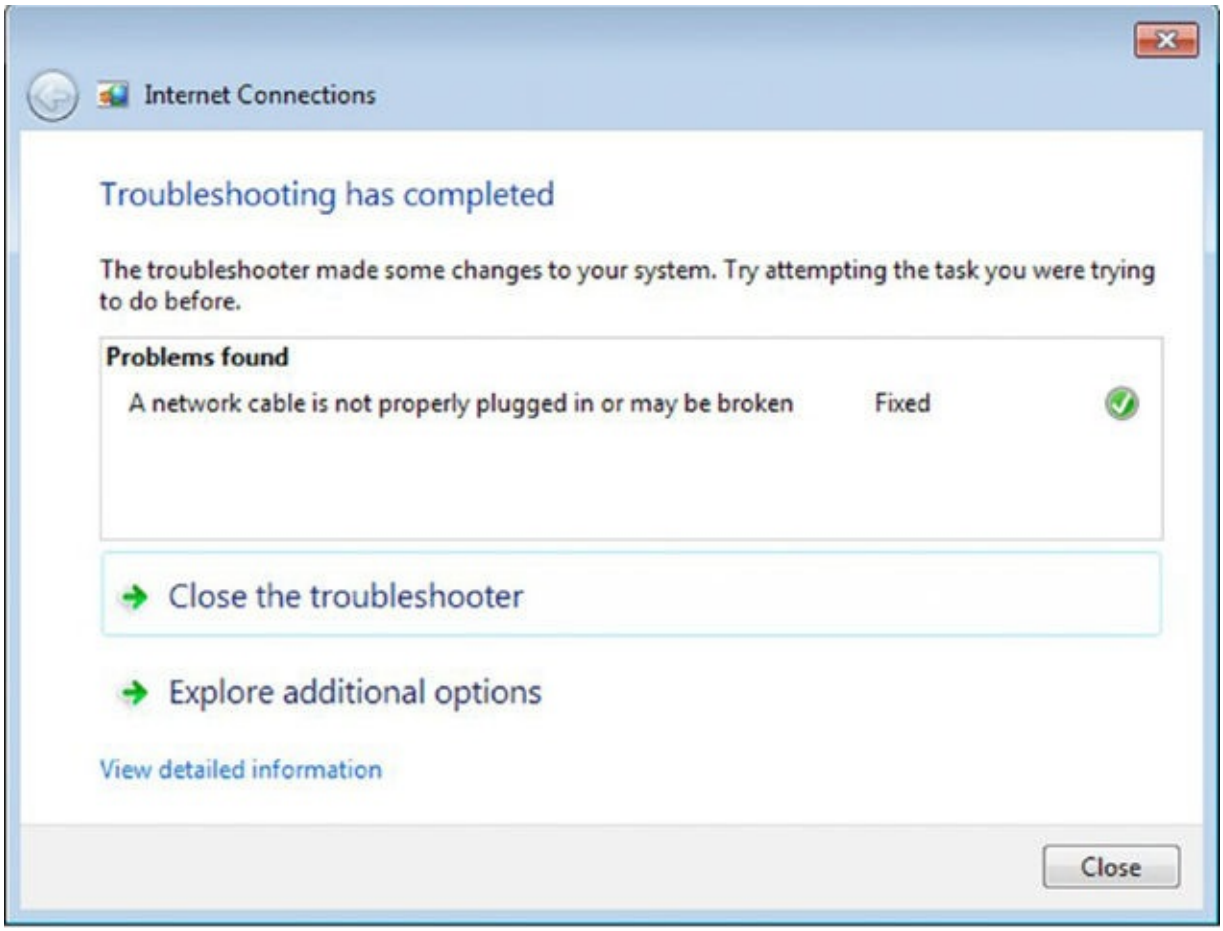


FIGURE 2.14 The summary shown by the Internet Connections troubleshooting wizard

Troubleshooting Network Problems from the Command Prompt

When troubleshooting network and Internet-related problems, it is often necessary to view, test, and configure the TCP/IP configuration of the system. For that reason, a complete suite of tools is supplied with Windows client systems. Most of these tools are used from the command prompt. To access the command line in a Windows client system, click Start ➢ All Programs ➢ Accessories ➢ Command Prompt. Alternatively, you can click Start, type **cmd**, and press Enter on your keyboard. This will open the command prompt utility, as shown in Figure 2.15.

FIGURE 2.15 The command prompt

You may need many command-line tools to troubleshoot the network configuration. The following are three of the more common command tools used for troubleshooting TCP/IP.

Ping

Of all the tools discussed here, `ping` is perhaps the most used and the most useful. The `ping` tool allows you to test the connectivity between two devices on the network. When the `ping` command is issued, special packets called echo packets are generated and sent to the remote system. If the remote host is able to respond to the packets, it returns each of them, and the `ping` utility on the system that generated the query displays the amount of time, in milliseconds, that it took to complete the round-trip. You can see an example of the output from a successful `ping` command in Figure 2.16.

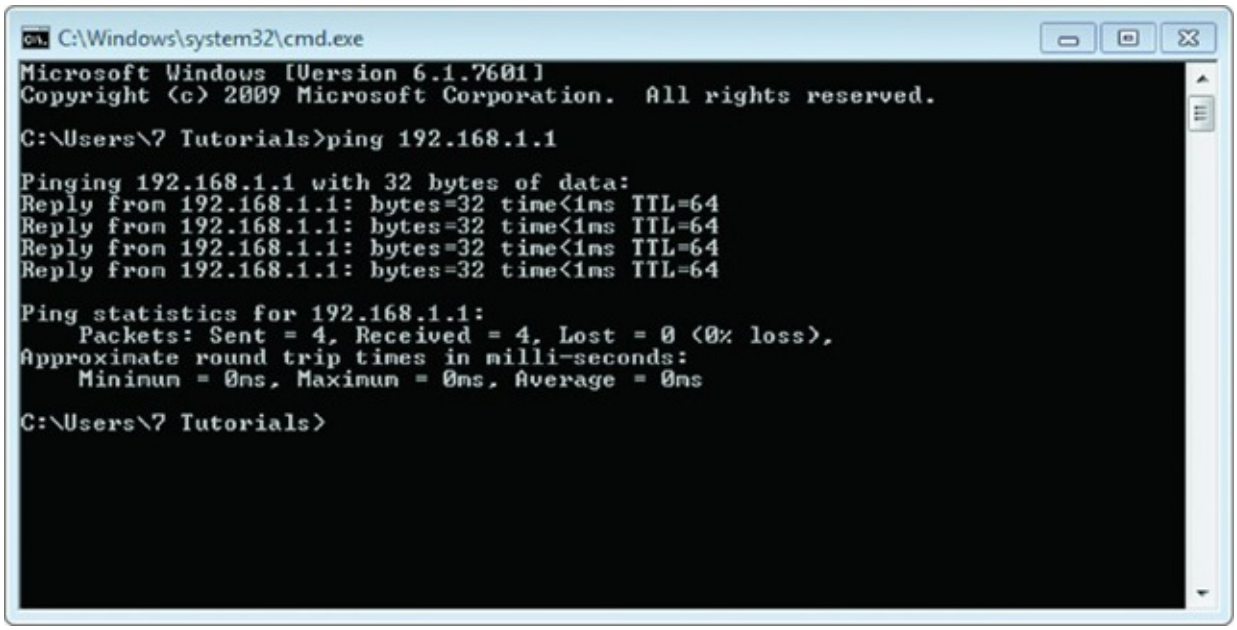


FIGURE 2.16 Running the `ping` tool

When using `ping` to locate a communication problem, there is a specific order in which to proceed. The following numbered steps define the process normally taken, but it is possible to skip straight to the last step and then, if that doesn't work, work your way back to determine the location of the problem.

1. `ping` the address of the local loopback.

   The local loopback is a special function built into the TCP/IP stack that allows it to be tested. It is basically the internal IP address of your computer. You can use any valid address in IP address range of 127.0.0.1–127.254.254.254 in your test, although 127.0.0.1 is most commonly used. If the ping of the local loopback is successful, it indicates that TCP/IP is loaded correctly on your computer and bound to the network interface properly. What it does not test is the physical network connectivity of the system because the loopback is a software function.

2. `ping` the IP address of the computer you are testing.

   It tests the connectivity between your computer and another computer on the network.

3. `ping` the IP address of the default gateway.

   As well as testing that the TCP/IP configuration of your system is valid, this tests the physical connectivity.

4. `ping` a host on a remote network.

Tracert

When you are unable to access a remote computer whether on a local network or on the Internet, one tool that can assist in determining where the problem lies is the `tracert` command. The function of `tracert` is to trace the path to the destination IP address and record the results. The `tracert` display shows the succession of IP routers used in the delivery of packets and how long the process took. You can also use it to trace the path to a website on the Web. Figure 2.17 shows the output of a `tracert` command.

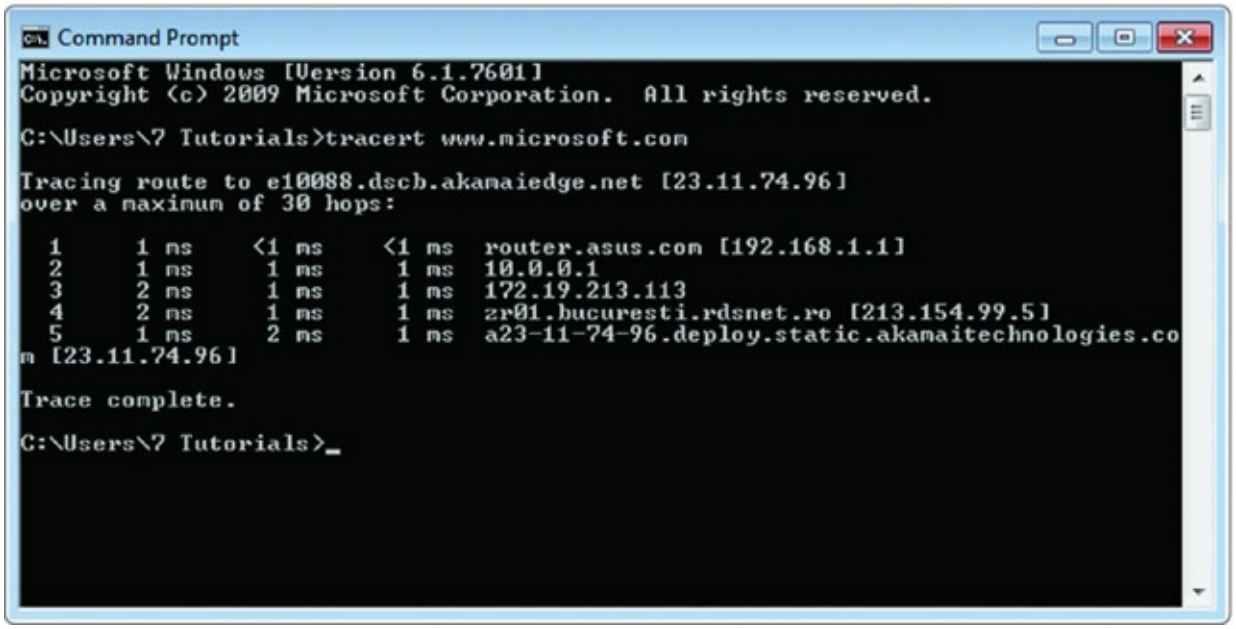


FIGURE 2.17 Running the `tracert` command

As far as troubleshooting with `tracert` is concerned, as the path to the destination IP address is traced, the command will display the last router that successfully forwarded the data packets. Such information is helpful in pinpointing where the communication failure is.

Ipconfig

The `ipconfig` command is the troubleshooter's main tool. `Ipconfig` is a Windows utility that is used to show the IP configuration of a machine on the network. The `ipconfig` command will display configuration information for all network cards installed within the system. Figure 2.18 shows the output screen from an `ipconfig` command.

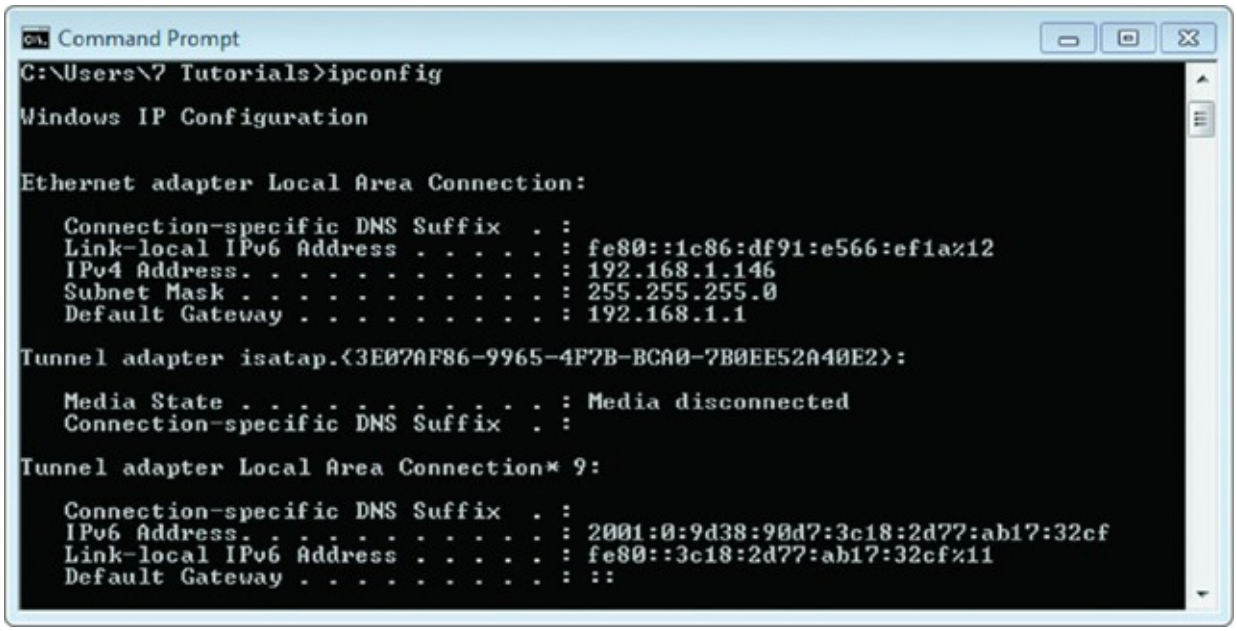


FIGURE 2.18 Running the `ipconfig` command

The information provided includes the IP address, subnet mask, current default gateway, MAC address, and more. The `ipconfig` command is often used with the `/all` switch, which provides additional information including the DNS configuration and the MAC

address of the interface and whether DHCP is enabled.

All commands have a number of switches that can be used, but `ipconfig` has three very important ones for troubleshooting:

`ipconfig /all` Used to review all TCP/IP information on a system

`ipconfig /renew` Releases all TCP/IP information and then gets new DHCP information from the server

`ipconfig /release` Releases all TCP/IP information

Table 2.5 summarizes these tools and others that are available for TCP/IP troubleshooting.

TABLE 2.5 TCP/IP troubleshooting utilities

Command-Line Utility	Function
`ARP`	Shows the Address Resolution Protocol table for the local system
`ipconfig /all`	Shows entire IP configuration information on a system
`ping`	Used to test connectivity between two devices on the network
`route`	Displays a copy of the local routing table for the system and provides the ability to modify the local routing table
`netsh`	Allows you to configure a computer's network remotely or locally
`tracert`	Tracks and displays the entire route between two systems

Summary

In this chapter we covered a lot of ground and explained concepts like LANs, WANs, IP addresses, VPNs, and others. While it may all seem very technical to you, the basics are simpler than you think, and you should not have any issues with learning them. Yes, computer networking is a very complex and advanced topic, but for the IC3 exam, you won't need to go into a lot of detail. What we have covered here is more than enough.

Security is very important in the world of networks, so we also showed the basics that you should keep in mind when securing a wireless network.

Then we discussed how speed is measured on the Internet, the factors that limit the speed of your Internet connection, and what to pay attention to when choosing an offer from an ISP for an Internet connection.

Finally, we discussed the basic troubleshooting tools that you can use to identify and solve problems with network and Internet connectivity. Some of them are easy to use and don't require any technical background from your side. Check them out, experiment with them, and learn how they work. They will surely come in handy at some point.

In the next chapter we will cover a friendlier topic that's less technical and a lot more fun: communicating over the Internet, using media like email, chat, and telepresence.

Exam Essentials

Understand LANs and WANS. You should know the most common types of computer networks that you can encounter and what's different about them.

Know what an IP address is and what it does. One of the most important concepts in computer networks is the IP address. You should know what it is, what it does, and how an IP address is assigned.

Learn the best practices for securing networks. Security is very important in computer networks. You should learn the basics of securing a wireless network as well as how to secure networks in general with the help of firewalls and gateways.

Know how to measure the speed of your Internet connection. Many ISPs promise fast Internet connections, but most of them are not as fast as advertised. You should know how speed is measured on the Internet as well as the factors that can limit the speed of your connection.

Know what a virtual private network is. VPNs are widely used in business environments. You should know what they are and why they are useful.

Learn how to troubleshoot networking problems. Even though you are not a network administrator or an IT professional, you can troubleshoot and fix basic problems that are related to network and Internet connectivity. You should learn the basic tools that are available in Windows and how you can use them to fix problems.

Key Terms

Before you take the exam, be certain you are familiar with the following terms:

802.11	Internet Protocol (IP)
Advanced Encryption Standard (AES)	Internet service provider (ISP)
authentication	IP address
bit	local area network (LAN)
broadband	plain old telephone service (POTS)
broadband Internet access	port
cloud	Service Set Identifier (SSID)
Counter Mode with Cipher Block Chaining Message Authentication Code Protocol (CCMP)	TCP/IP
dial-up	Temporal Key Integrity Protocol (TKIP)
Domain Name Service (DNS)	Transmission Control Protocol (TCP)
Dynamic Host Configuration Protocol (DHCP)	virtual private networks (VPNs)
firewalls	WEP
gateway	wide area networks (WANs)
Institute of Electrical and Electronics Engineers (IEEE)	wireless network
	WPA
	WPA2

Review Questions

1. Which of the following commands is used to display *all* of the IP configuration on a Windows system?
   A. `ipconfig`
   B. `tracert`
   C. `ipconfig /all`
   D. `ping`
2. What is the function of a VPN?
   A. Protect one network from another
   B. Encrypt data packets from the sending and receiving device
   C. Encrypt data packets from the receiving and sending device
   D. Create a point-to-point connection over a public network
3. What is result of blocking port 80 on a firewall?
   A. FTP is not available.
   B. HTTP and HTTPS are not available.
   C. HTTPS is not available.
   D. HTTP is not available.
4. How is IP configuration information assigned automatically?
   A. DNS
   B. DHCP
   C. Subnet mask
   D. Gateway
5. During a troubleshooting procedure, you decide to ping Sybex.com and the IP address 208.215.179.132 is returned. What protocol manages this function?
   A. DNS
   B. DHCP
   C. Subnet mask
   D. `tracert`
6. You have just purchased a new wireless router and want to increase security. Which of the following offers the greatest level of security?
   A. TCP/IP
   B. WPA
   C. WEP

D. WPA2

7. You are reviewing available wireless standards on your wireless router. Which of the following are valid 802.11 standards? (Choose all that apply.)
   A. 802.11ac
   B. 802.11cd
   C. 802.11t
   D. 802.11n
8. Which of the following are examples of LANs? (Choose all that apply.)
   A. A computer network on the floor of an office building
   B. The computer network of an international corporation
   C. The computer network in your house
   D. The Internet
9. Which troubleshooting wizard can help you diagnose and fix Internet connection problems?
   A. The Network Adapter troubleshooting wizard
   B. The Incoming Connections troubleshooting wizard
   C. The Internet Connections troubleshooting wizard
   D. The Shared Folders troubleshooting wizard
10. Which of the following are characteristics of broadband Internet access? (Choose all that apply.)
    A. An always-on Internet service
    B. An Internet connection with a maximum speed of either 56 Kbps or 128 Kbps
    C. Allows for bandwidth-intensive applications
    D. High-speed Internet access

Chapter 3
Communicating Online with Others

THE FOLLOWING IC3: LIVING ONLINE EXAM OBJECTIVES ARE COVERED IN THIS CHAPTER:

- ✓ **E-mail Communication**
  - E-mail Account Settings
  - Appropriate use of e-mail
  - Managing e-mail communications
- ✓ **Real-Time-Communication**
  - Text communication
  - Audio Visual communication
  - Telepresence (Social Media)

Now that you know what the Internet and the World Wide Web are, it is time to put them to good use. First, we will talk about email, what it is, and the basics of using it to communicate with others. We will also share some tips and tricks about how you could automate it and make your life easier in certain situations.

Then we will move on to other forms of online communication. First, we will show you how to communicate with others using text, with the help of technologies like SMS and chat services like Skype.

The beauty of the Internet is that you can also communicate with others using sound and video. With the right tools, you can easily turn your computer into a phone or a videoconferencing system. These subjects will also be covered in this chapter.

Finally, many people use social networks to keep in touch with friends, family, co-workers, and others. We will discuss the major social networks that are available today, how they can be useful, and how to protect your privacy when using them.

Sound like fun? Let’s get started!

Creating and Securing Email Accounts

Electronic mail is a method of exchanging digital messages from an author to one or more recipients. This service is commonly referred to as *email* or *e-mail*. The storage and the delivery of email messages is handled by email servers that are specialized for this task. In order to send an email, you will need to have an email account registered with an email service. Email services are both public (for example, Gmail.com, Outlook.com, Yahoo.com) and private. Many businesses have their own internal email services that serve their employees and allow communication between them and with their business partners. An email address has the following format: `username@domain name`. One example is `John.Smith@example.com`, where `John.Smith` is the username, `example.com` is the domain name, and `@` is a symbol for the word *at*. When creating an email account, you are asked to provide several details:

Your Name This is the name that should be associated with your email account. If you are creating a business email account or a personal account that you want to use to communicate with others, you should use your real name. If you are using your email account only for subscribing to newsletters at several websites or for other miscellaneous uses, it is fine to provide a nickname or something else instead of your real name.

The Username This is the name of the user account that you want to use. The username must be unique and not already chosen by other users of the same email service. You should try to use a username that represents you and is easily remembered by others.

The Password You must have a password to authenticate to your email account. Short passwords are very easy to crack by hackers and security professionals. To keep your email account as safe as possible, you should use a password that contains at least eight characters and mixes letters with numbers and special characters like !, &, #, and so on. Also, you should use a mix of lowercase and uppercase letters.

Other Personal Details Many email services ask for other personal details like your birthday, gender, mobile phone number, and other email addresses that you are using. This information may be used to identify you or to help you recover your password in case you forget it later on.

Password Recovery Information Some email services ask you to select a method for recovering your password in case you forget it later on. Such methods include providing answers to more personal questions (for example, the name of your dog or the name of your school). You are asked to select the recovery method that you want to use before creating the email account and provide the necessary answers that will help you recover your password.

In Figure 3.1 you can see the details that are asked when creating an email account with Gmail.com. As you can see, the email service automatically checks whether the username that you have provided is taken by others and returns the necessary warning, if applicable. Also, it analyzes the password that you have provided and lets you know whether your password is easy to guess, too short, or too weak. Always follow the recommendations that you receive, in order to be able to create an email account and generate a secure password for it.

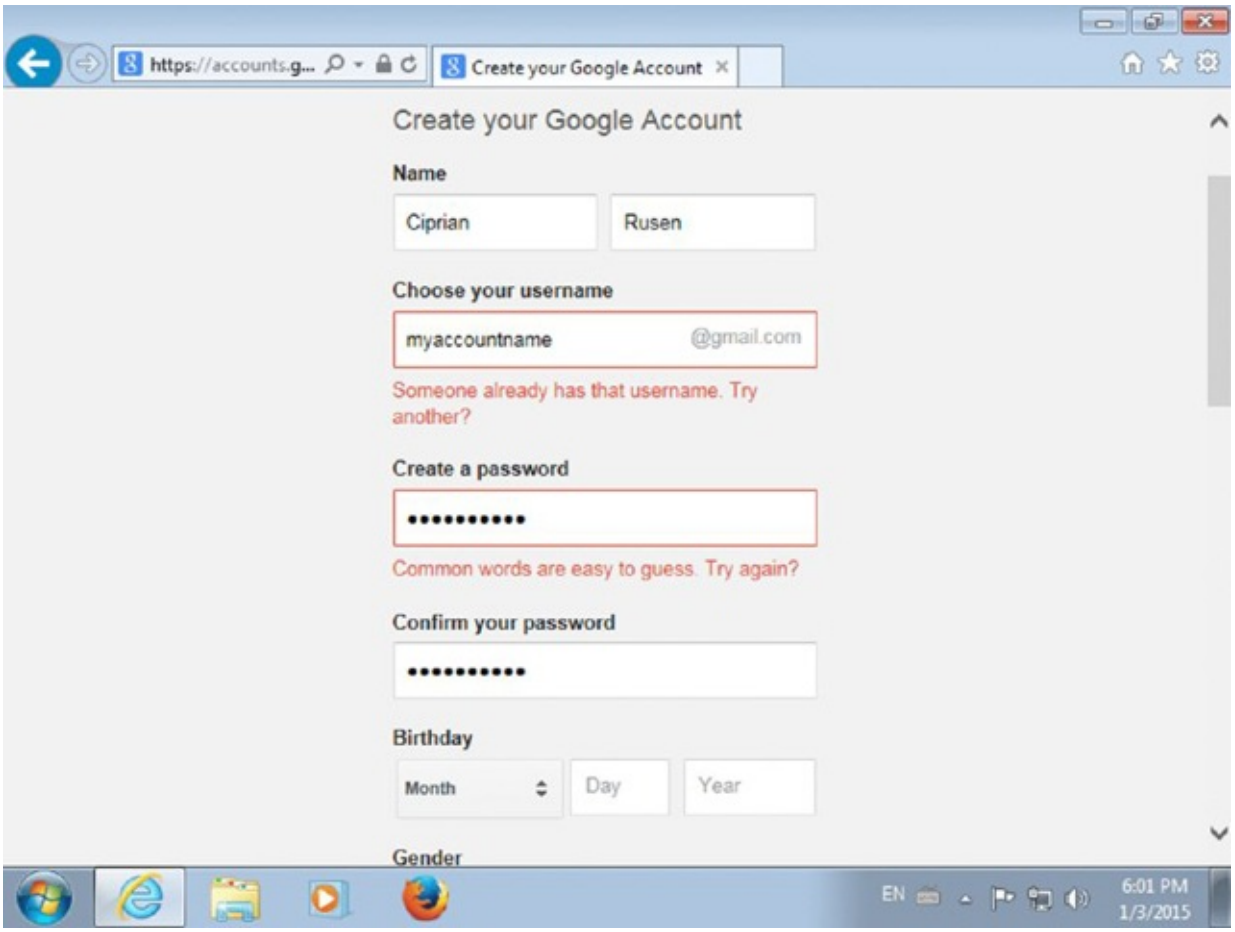


FIGURE 3.1 Creating an email account with Gmail.com

The username and the password are called *credentials*. They are the details that will be asked of you in order to authenticate to the email service that you are using.

There are three methods that you can use to increase the security of your email accounts:

- Create strong passwords.

  Strong passwords contain at least eight characters and mix letters with numbers and special characters like !, &, #, and so on. Here are a few examples of passwords that are both strong and easy to remember: This1sMyPa$$w0rd, HappyB1rthday, 1L0veCar$. As a general recommendation, do not use passwords that are easy to guess, like your birthday, your home address, your birthplace, and so on. Passwords should be long, memorable for you, and a mix of the types of characters mentioned earlier.

- Don’t store your password in plain text and don’t share it with others.

  Some people store their passwords in Microsoft Word documents or in text files on their computer. This practice is very insecure and makes it easy for others to access those files and learn your passwords. Instead, try to use professional services for storing, encrypting, and synchronizing passwords across computers and devices, like LastPass, RoboForm, 1Password, and others.

- Enable and use two-factor authentication when available.

  Two-factor authentication or *two-step verification* is a security process that involves two stages for verifying the identity of a person or entity that is trying to access a

service of any kind (email, social networking, banking, and so on). This concept requires two or more of these three authentication factors: a knowledge factor, a possession factor, and an inherence factor.

Traditional verification involves only one or two of the three factors mentioned earlier. For example, if you want to use a digital service like email, traditional verification involves knowing the username and the password. As we all know, knowledge can be stolen in a variety of ways, and people can learn both your username and password, use the same services as you do for all kinds of purposes, and pose as you.

When using two-step verification, a third factor is added: the possession factor, usually your smartphone or mobile phone. This device is used for the second stage of verifying your identity. For example, when you sign in to your email account, you first provide your username and password. Then, you are asked to provide a time-based password that expires in 30 seconds. This password can be sent to your mobile phone via SMS or can be displayed by a mobile app like Google Authenticator or Microsoft Authenticator.

Sending Email Messages

Email messages consist of two major sections:

The Header Each email message has one header, which is structured into the following fields:

From The email address and optionally the name of the author of the email message. This field is automatically filled by the email service you are using with the details of your account.

To The email address(es) and optionally name(s) of the message's recipient(s). You can send an email message to one or more recipients.

CC The abbreviation means carbon copy. It indicates those who are to receive a copy of a message addressed primarily to another. The list of CCed recipients is visible to all other recipients of the message.

BCC The abbreviation means blind carbon copy. This field is available for hidden notification. Recipients listed in the BCC field receive a copy of the message but are not shown any other recipients of the message, including other BCC recipients. By default, this field is hidden by email clients, but it can be enabled and used.

Subject A brief summary of the topic of the message.

Date The local time and date when the message was written. Most email clients fill this in automatically when sending the message. The recipient's client may then display the time in the format and time zone local to them.

The Body This is the content of the message that you are sending, exactly the same as the body of a regular letter.

In Figure 3.2 you can see an example of an email message that's written and sent using Microsoft Outlook 2010. There you can see the standard fields that are shown by a typical email client: To, CC, Subject, and Body.

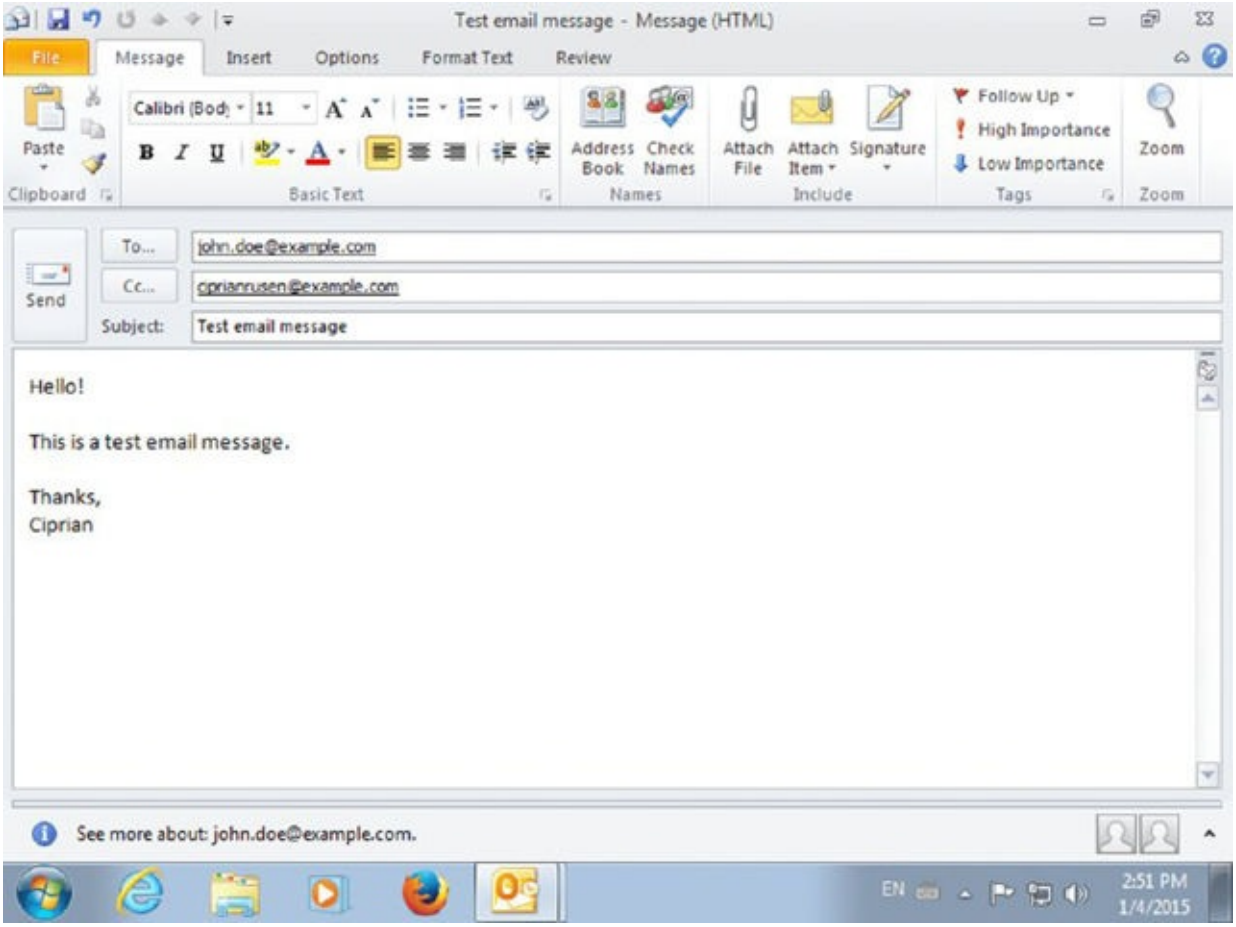


FIGURE 3.2 Writing an email message in Microsoft Outlook 2010

In Exercise 3.1 you will learn how to create and send a simple email message using Microsoft Outlook.

EXERCISE 3.1

Sending an Email Message in Microsoft Outlook

1. Click Start ➢ All Programs ➢ Microsoft Office ➢ Microsoft Outlook 2010.
2. Click the Home tab on the ribbon (Figure 3.3) and then the New E-mail button found in the New section.
3. In the To field, complete the email address of a friend or family member.
4. In the Subject field, type the desired subject.
5. In the body area, type a message that you want to send to that person.
6. Click the Send button and wait for the email to be sent.
7. Close Microsoft Outlook.

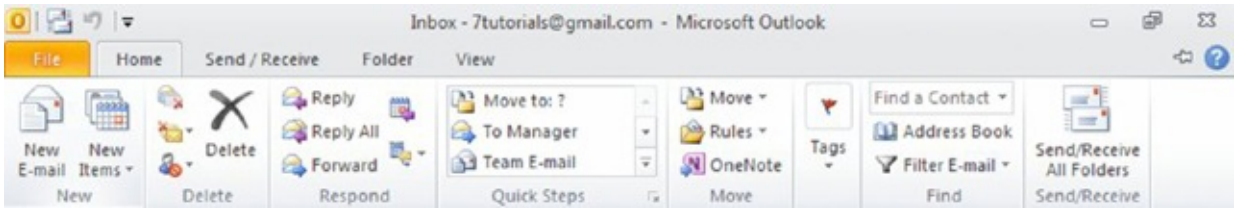


FIGURE 3.3 The Home tab in Microsoft Outlook

Attaching Files to Email Massages

You can also attach one or more files to your email messages. This practice is widely used in business environments where co-workers and business partners exchange information by attaching presentations, documents, or Microsoft Excel worksheets.

In principle there are no restrictions as to how many files you can attach and how large they can be, but most email service providers implement various limitations. For example, many companies limit the size of email attachments to small files of up to 10 or 20 MB. Other email service providers do not allow users to attach executable files to their emails (with the extension `.exe`) because they can be used to distribute malware. In Figure 3.4 you can see an example of an email message with several files attached, in Microsoft Outlook 2010.

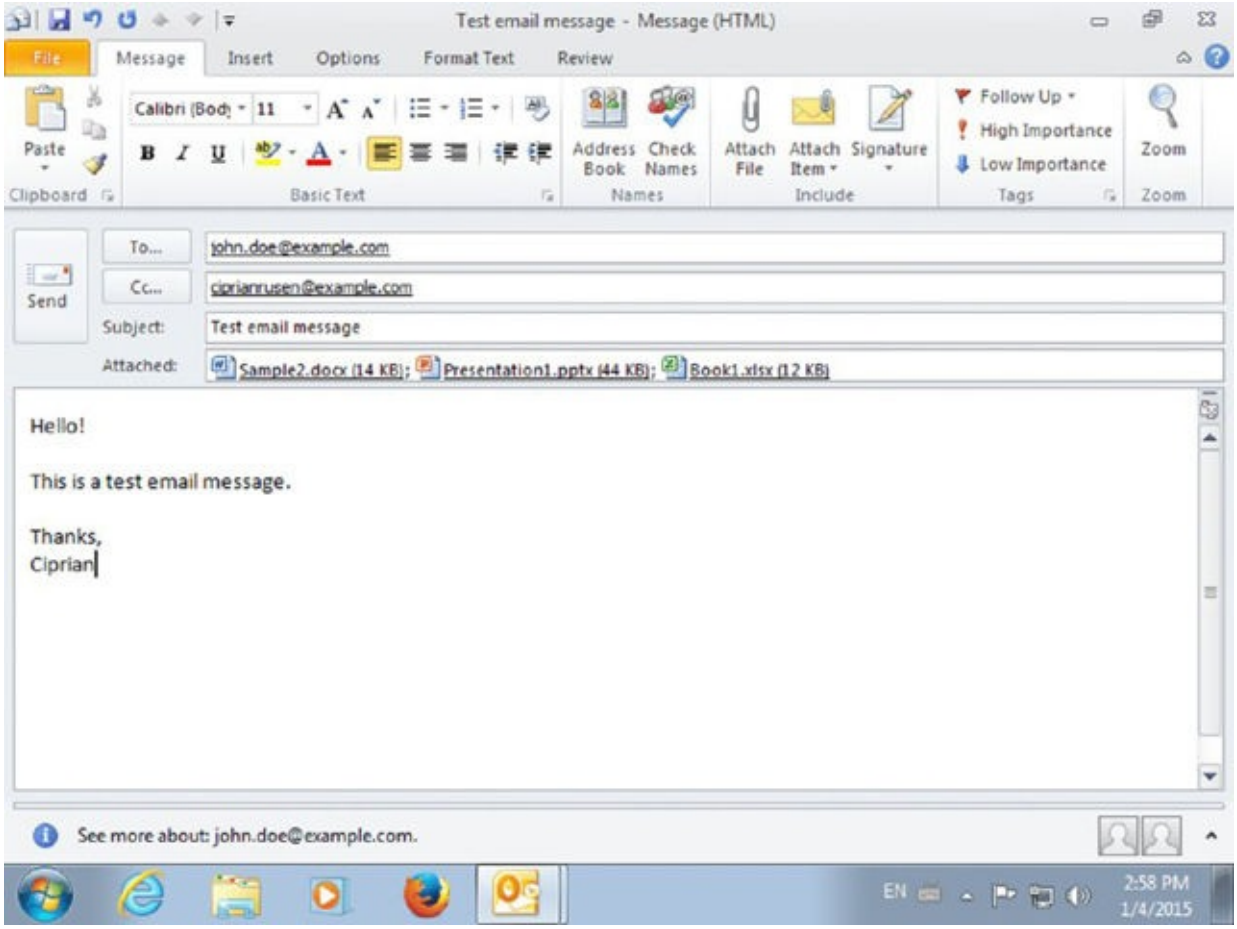


FIGURE 3.4 An email message with several files attached

Building a Contacts List

In order to make it easier to keep track of the people you are emailing with, it is a good idea to build a contact list or address book. All email clients have the necessary features to build and maintain a contact list. When adding a new contact, you can store details like their name, email address, company, job title, phone numbers, and addresses. In Figure 3.5 you can see an example of a contact that's added into Microsoft Outlook 2010 and the fields of data that are available for a contact.

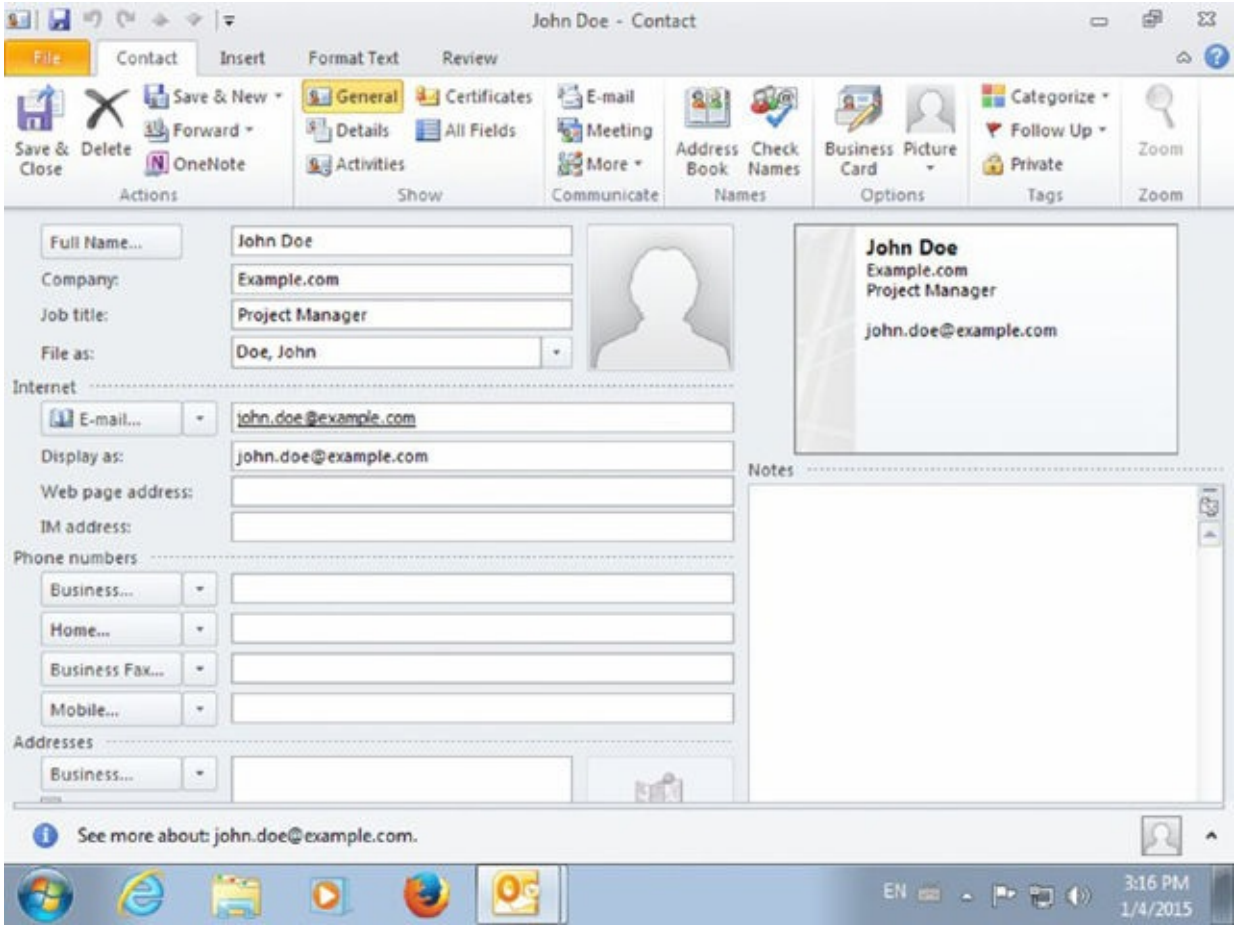


FIGURE 3.5 Creating a contact in Microsoft Outlook 2010

Creating a contact list with the people who you are emailing makes it easier to find them when you create a new email message and allows you to store and find information about them in one place. Contact lists are useful because they can be synchronized across devices. For example, if you have a Gmail.com email account and a smartphone with Android, your contacts are synchronized with your smartphone. Therefore, it is easy to find, call, or email people directly from your phone. The same is true for other platforms and email services. For example, Microsoft's Outlook.com email service and contact list are automatically synchronized with Windows Phone smartphones as well as Windows computers. Many companies synchronize a user's email account and contact list with their work phone and so on.

Many email services allow you to organize contacts into groups or create mailing lists. They can be useful when you need to send the same message to a large group of people. Instead of emailing each person individually or manually adding each person in the To field, you can type the group's name, and that message is sent to all the people who are part of that group.

When emailing a group of people, you should pay attention to whether the message should reach all the people who are part of it. If a message is not suitable to everyone in that group, it is best to spend the effort necessary to select only the email addresses of those people who are an appropriate target audience.

In Exercise 3.2 you will learn how to create a contact in Microsoft Outlook.

EXERCISE 3.2

Creating a Contact in Microsoft Outlook

1. Click Start ➢ All Programs ➢ Microsoft Office ➢ Microsoft Outlook 2010.
2. Click Contacts in the column on the left, just below Mail and Calendar.
3. Click the Home tab on the ribbon and then the New Contact button found in the New section, shown in Figure 3.6.

   A window named Untitled - Contact appears, where you can add the details of your contact.
4. In the Full Name field (Figure 3.7) type the name of the person whom you want to add as a contact.
5. In the E-mail field, type the email address of that person.
6. Complete other details that you may consider important, like the company, job title, mobile number, and so on.
7. When finished adding all the details, look for the Actions section in the Contact tab of the ribbon and click the Save & Close button.
8. Notice that the new contact has been added. Close Microsoft Outlook.

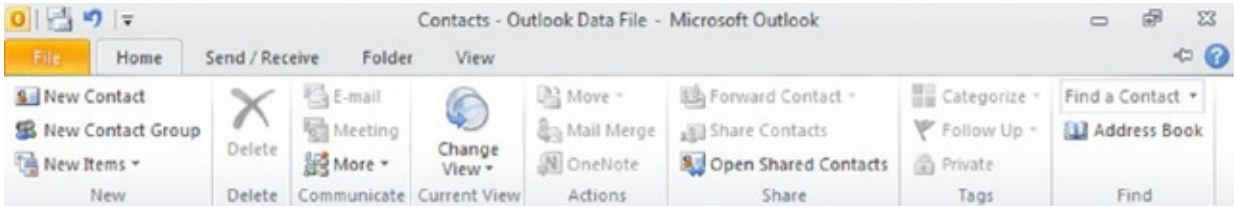


FIGURE 3.6 The buttons for creating new contacts and contact groups

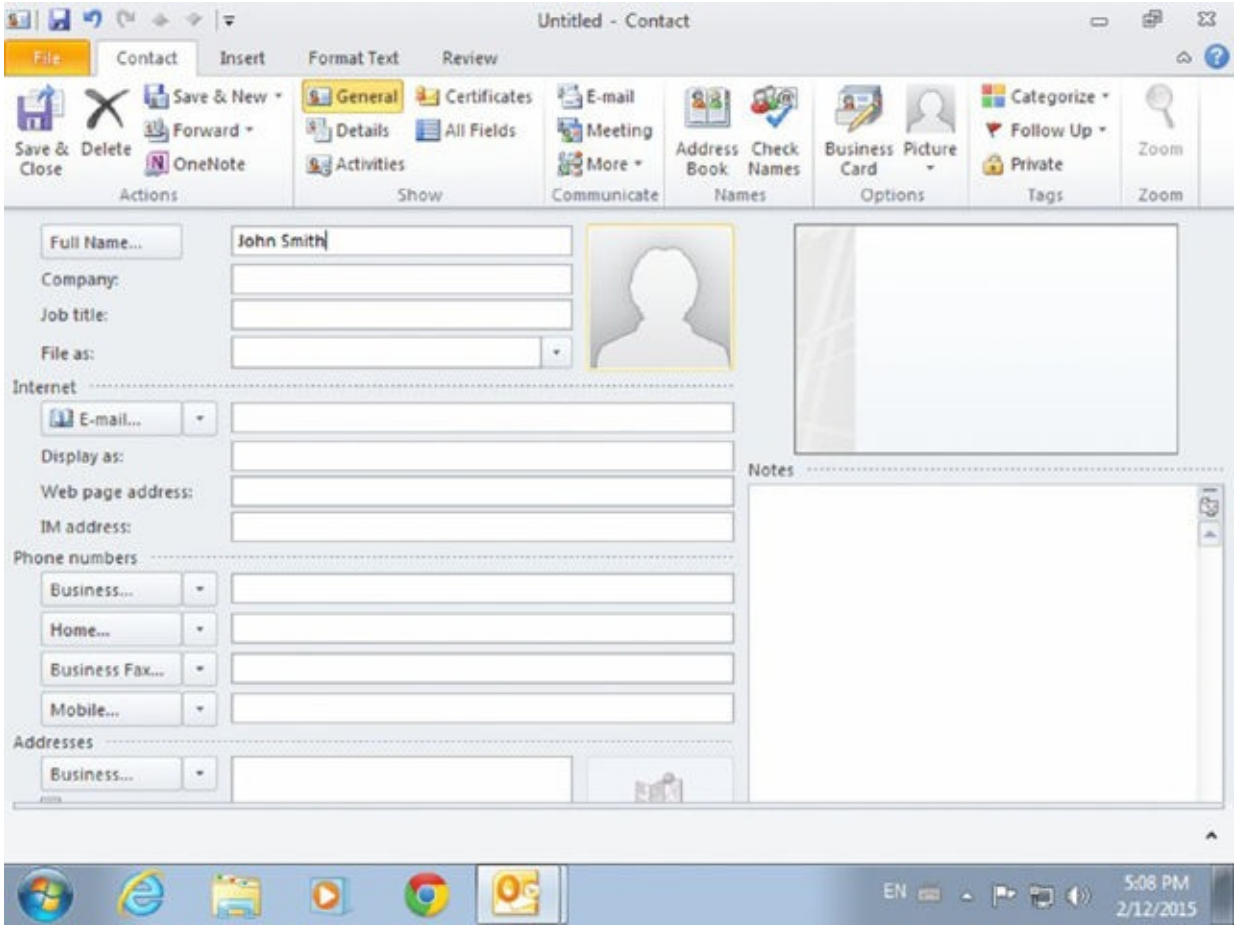


FIGURE 3.7 Creating a new contact in Microsoft Outlook

Replying to and Forwarding Email Messages

Not all email messages require a reply, because you receive them just to be informed about something, without your having to take any action. If that is the case for one of the messages that you receive, simply close it or delete it. If further action is required, you have the following options:

Reply You reply only to the sender of the message that you received (Figure 3.8). A new email message is created automatically with the same subject as the one used by the sender but prefixed by the term *RE:*. Also, the body of the reply includes the original message that was received from the sender as well as any other messages that were sent earlier in the same conversation. You can then type your message in the Body field, just above the original message. You can also choose to delete all the included text, so your email message isn't overloaded with information the recipient already has.

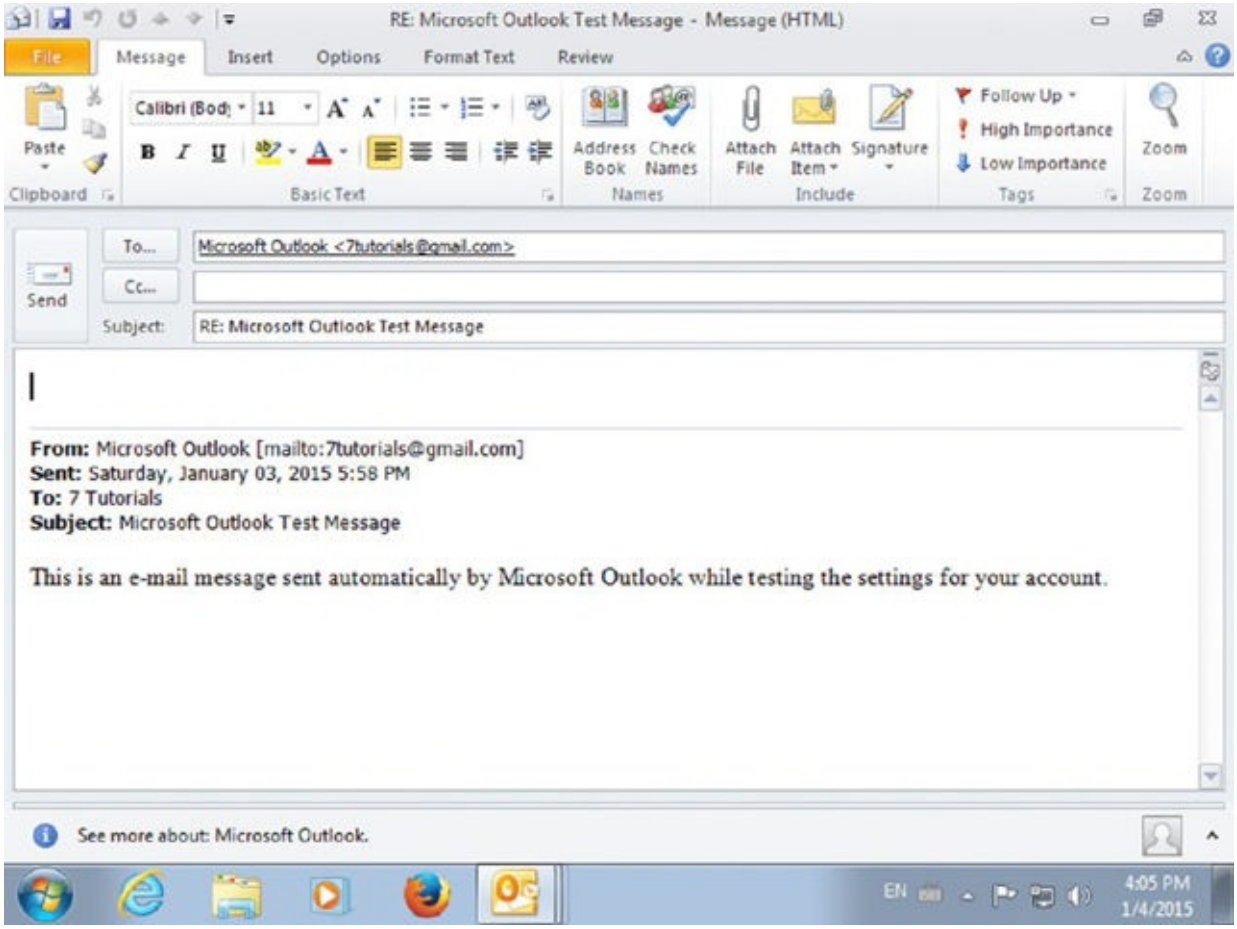


FIGURE 3.8 Replying to an email message in Microsoft Outlook

Reply All This works the same as Reply with the difference that you reply to all the people who were included in the email distribution list, in the To and CC fields, including the sender of the message that you received. This option is useful when you need to reply to a conversation and include a whole group of people in that conversation. But be sure you really need to reply to everyone before you click Reply All. It's easy to annoy a lot of people very quickly.

Forward This option allows you to resend an email message you received to a possibly different email address (Figure 3.9). A copy of the initial email message is created automatically with the same subject as the one used by the sender but prefixed by the term

FW:. Also, the body of the email includes the original message that was received from the sender as well as any other messages that were sent earlier in the same conversation. You can then type a message in the Body field if desired, just above the original message.

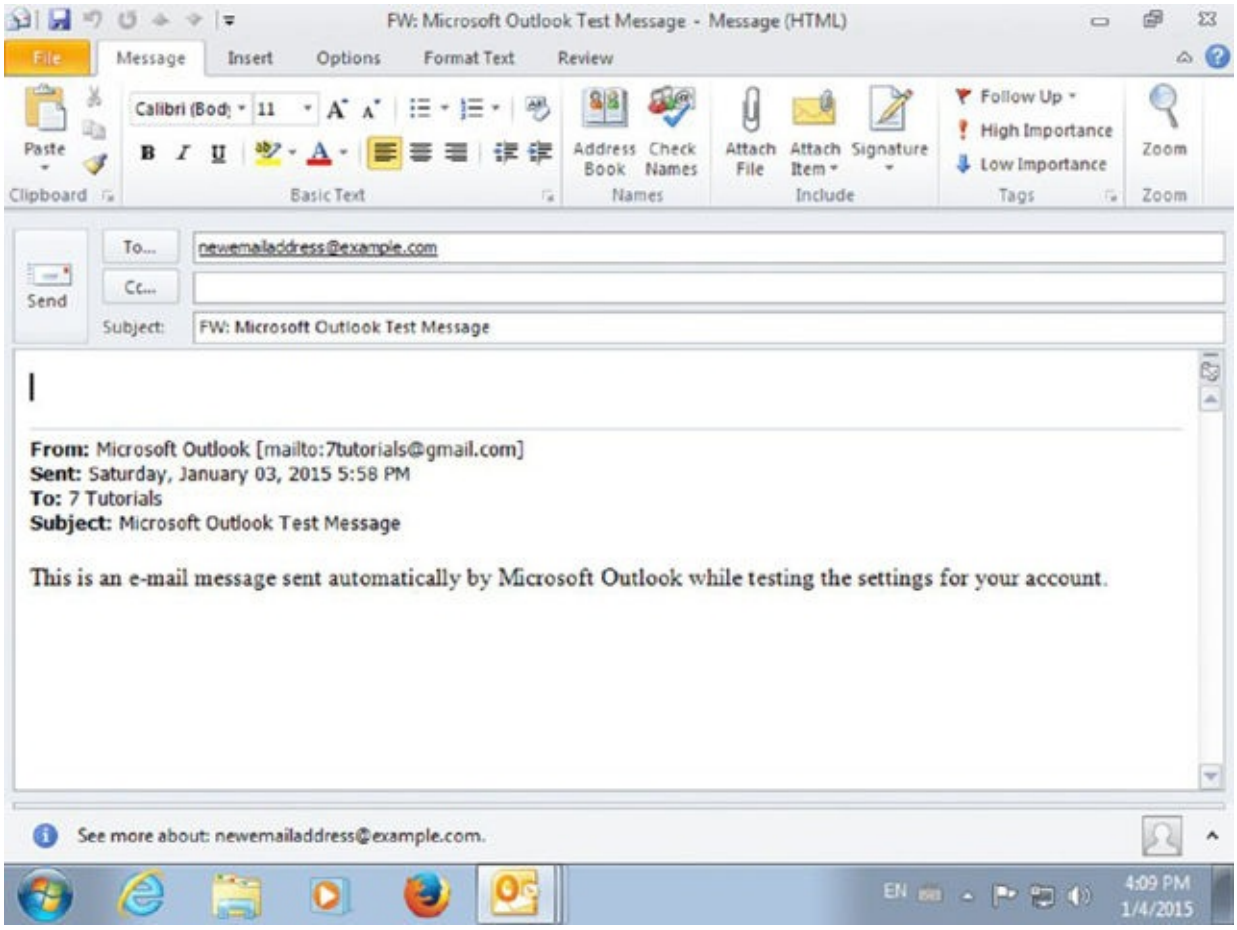


FIGURE 3.9 Forwarding an email message in Microsoft Outlook

Automating Your Email Account

All email services offer several automation tools that can be useful when using your email account. These tools include the following:

Auto-responders Each time you receive an email message you can have a reply sent automatically. This reply can be an Out of Office notice that's sent to inform people that you are away on vacation or on a business trip and you can't reply to their message right away. You can also use auto-responders to inform people that you no longer use some email account and that they should be writing to you at a new one.

Auto-forwarding You can have your emails automatically forwarded to another email address. You can forward all of your new messages or just specific kinds of messages. You set this up by editing your email account's settings, and the procedure for doing this varies greatly among email services.

Signatures You can attach a standard signature to all of your email messages. This signature can include anything from alternative contact details to pertinent job titles to company names, which help the recipient get in touch when emails are not responded to. You can also use professional signatures like a letterhead, signatures that show that you run a business (in some countries, you're required to do so), and so on.

An email signature shouldn't increase the length of your messages too much. Make it as short as possible (three lines is usually enough). The purpose of a signature is to let the recipient see who you are and how to get in touch with you. Make sure to include your name, your company and position, and other vital contact information.

In some European countries, laws dictate what items you must put in your email signature if you are a registered company. For example, UK law requires private and public limited companies to include the following: company number, address of registration, and VAT number.

You should avoid sharing your personal social media accounts (such as Twitter or Facebook), personal details like your home phone number or address, random quotes, or other details that are not useful to the recipients of your emails.

When setting an Out of Office reply, you should configure the time period during which it will be sent as an automated reply, as well as the subject and the body of the message. In order for the reply to be effective, you should specify when you will be out of the office, when you will be able to reply, how people can contact you in case of emergencies, and, if applicable, your stand-in for the period when you are away and how the recipient can contact them. In Figure 3.10 you can see an example of an Out of Office reply being set for the Gmail.com email service.

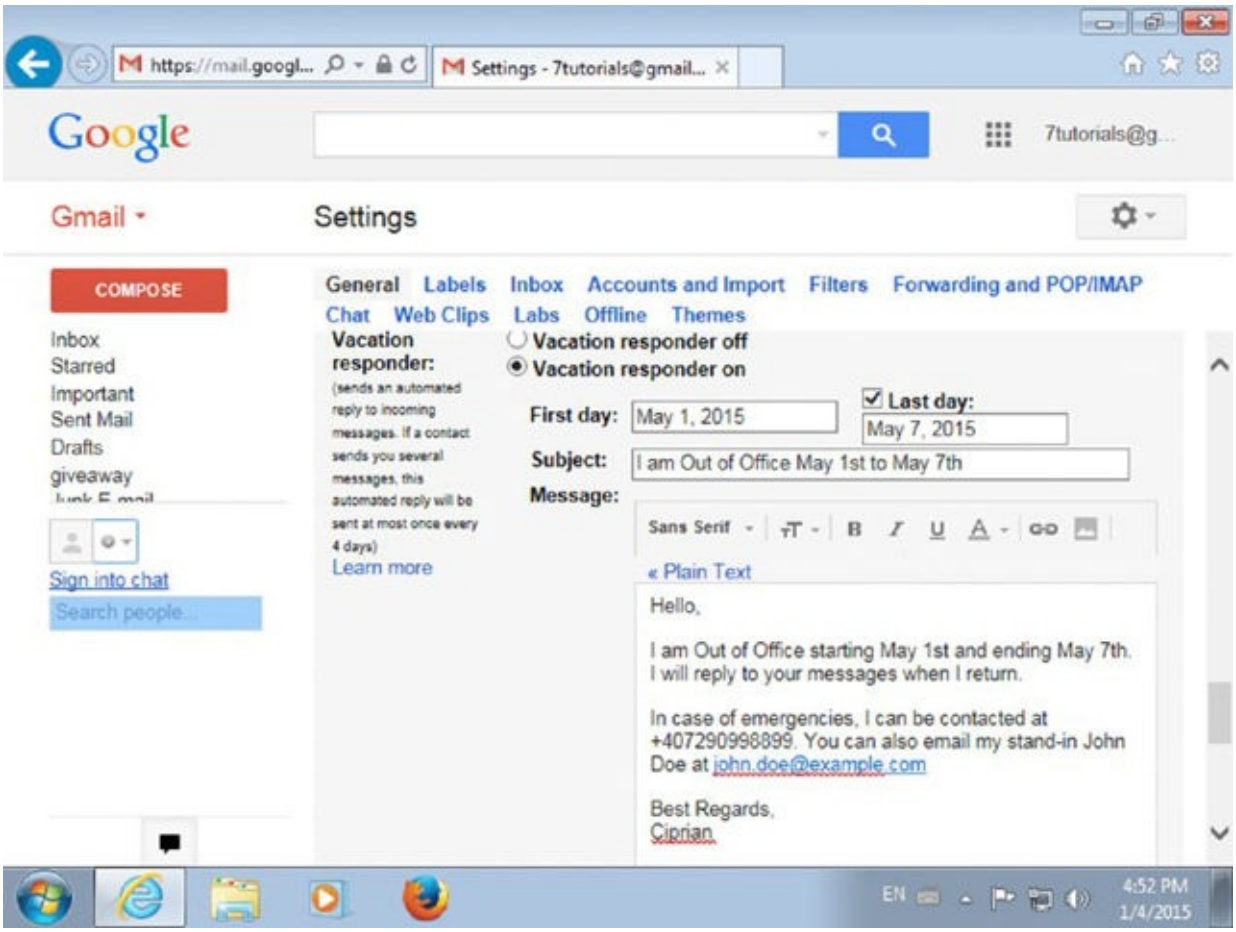


FIGURE 3.10 Setting an Out of Office reply in Gmail.com

Organizing and Archiving Your Inbox

All email services and clients allow you to organize your email messages into folders. By default, you will encounter a folder named Inbox where all your received emails are stored, a Sent Mail folder where your sent messages are stored, and a Trash folder where your deleted messages are stored for a while. You will also find a folder named Spam or Junk where email spam is automatically stored when detected by the email service or the email client that you are using.

Email spam, also known as junk email or unsolicited bulk email, is a subset of electronic spam involving nearly identical messages sent to numerous recipients by email. Clicking links in spam email may send you to malicious websites that are hosting malware or to phishing websites that try to trick you into sharing important financial information like your credit card details. Spam email may also include attachments with infected files.

While most email services do a good job at filtering legitimate emails from email spam, there are times when legitimate emails are incorrectly marked as spam. That's why you should not forget to check the Spam folder from time to time and look for email messages that might not be spam. However, always be wary of opening the attachments of messages that are marked as spam, as well as clicking the links found in these messages.

In Figure 3.11 you can see an example of email folders displayed for a Gmail.com account that's accessed using Microsoft Outlook 2010.

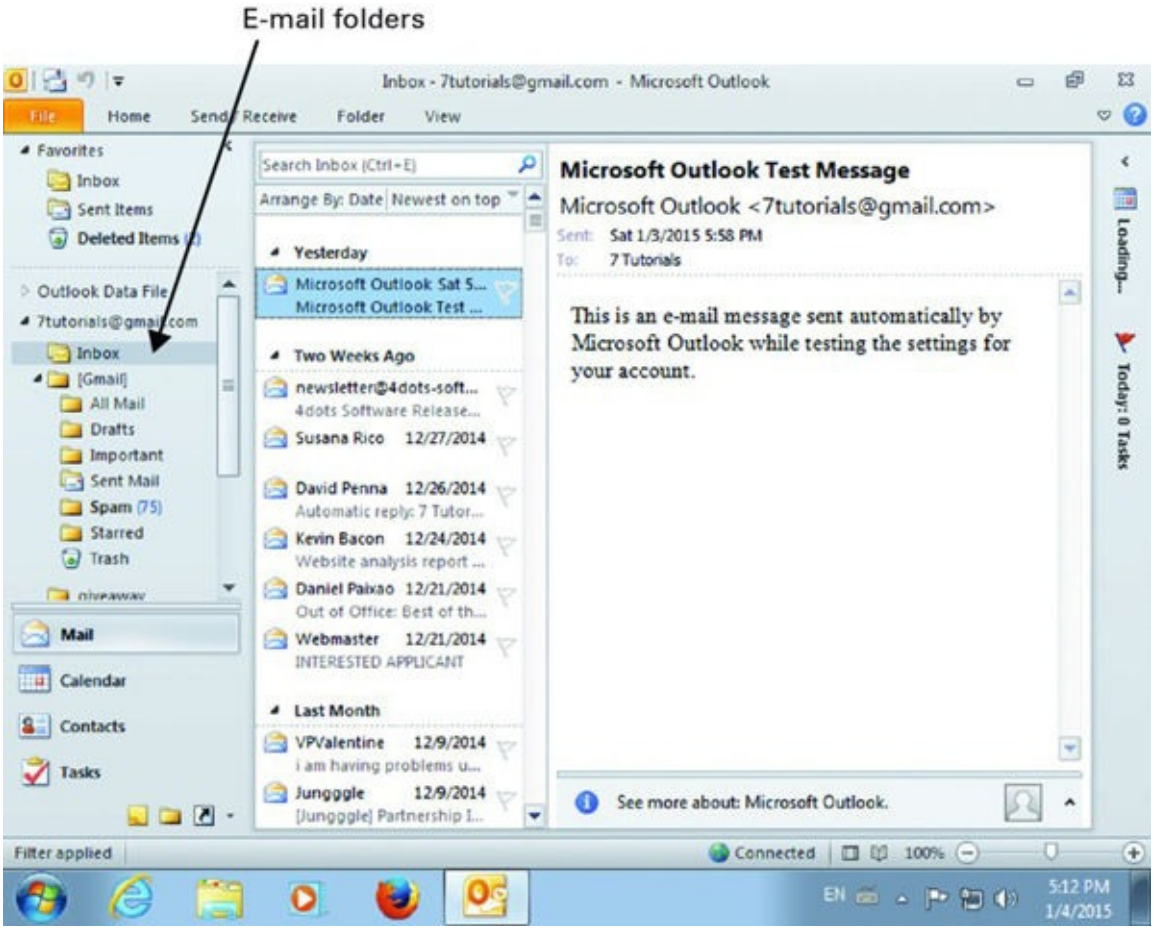


FIGURE 3.11 Email folders in Microsoft Outlook

The standard number of folders that are available for an email account differ from service

to service. However, you can always create your own custom folders and use them to better organize the messages that you are exchanging with others. Most email clients and services allow the use of folders for organizing your email.

When using email, especially in a business environment, you will encounter the term *email archiving*. This is the act of preserving and making searchable all the email messages that were sent and received by an individual. Email archiving tools capture the email content either directly from the email client used by the user or during transport. The messages are typically then stored on the computer's hard disk. The benefits of email archiving include the recovery of lost or accidentally deleted emails, accelerated audit response, preservation of the intellectual property contained in business email and its attachments, as well as an important discovery tool in the case of litigation or internal investigations (what happened when or who said what).

All email clients offer tools for archiving your email, according to a given set of rules. In Figure 3.12 you can see the options that are available for archiving your email in Microsoft Outlook 2010.

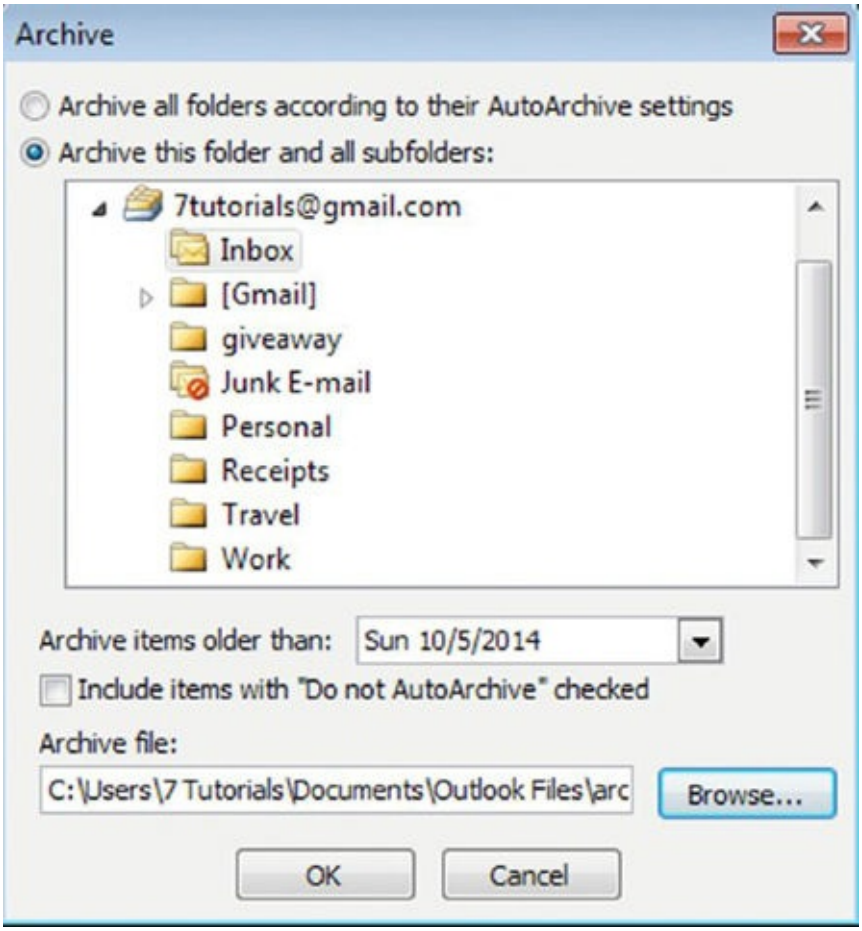


FIGURE 3.12 Archiving your email in Microsoft Outlook

You can select the folders that are included in the archive, the rule used to archive email messages (emails that are older than a specified date), and the file where the archive is stored on your computer.

Communicating through Text Messages

Many people communicate a lot through text messages. They use not only email but also other ways of communication like SMS on their phones or chat clients on their computers.

The most widely used way of communicating through text messages is *Short Message Service (SMS)*—a text messaging service that is available on phones, the Web, and other mobile communication systems. It uses standardized communications protocols to allow devices to exchange short text messages. When sending an SMS message, you need to provide the number of the person you send it to and then write the actual message. One SMS can include up to 160 characters. If you send a message that's more than 160 characters, that message is split into as many SMS messages as needed in order to send it to the recipient. In Figure 3.13 you can see the fields that you must complete in order to send an SMS message on a Windows Phone smartphone.

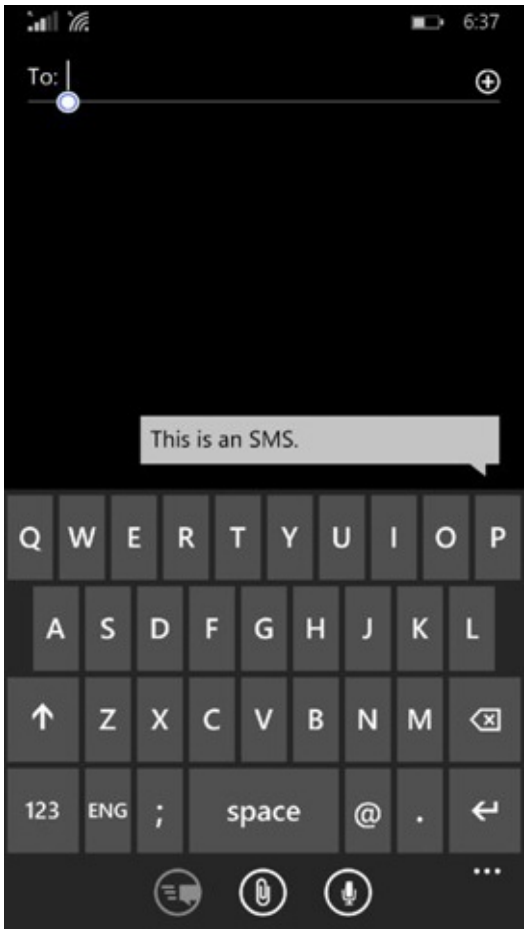


FIGURE 3.13 Sending an SMS in Windows Phone

Another popular form of communication is *text messaging*. This is a type of online chat that offers real-time text transmission over the Internet. Short messages are typically transmitted bi-directionally between two parties, when each user chooses to complete a thought and click Send. More advanced instant messaging clients can add file transfer, clickable hyperlinks, voice, or video chat.

Instant messaging systems facilitate connections between specified known users, using a contact list also known as a buddy list or friend list. There are many chat services available worldwide, with new ones appearing every year. At the time of writing this book, the most popular chat services are the following:

Skype An application that specializes in providing chat services using both text and video, as well as voice calls from computers, tablets, and mobile devices via the Internet to other devices or smartphones. Skype is available to download onto computers running Windows, Mac, or Linux, as well as Android, Blackberry, iOS, and Windows Phone smartphones and tablets. Much of the service is free, but users must have Skype Credit or a subscription to call landline or mobile numbers.

Google Hangouts An instant messaging and video chat platform developed by Google. It replaces other messaging products that Google had implemented, including Google Talk and Google+ Messenger. In current versions of Android, Google Hangouts is the default application for text messaging. This service is available on Windows, Mac, Linux, Chrome OS, Android, and iOS.

Facebook Messenger An instant messaging service and software application that provides text and voice communication. It is integrated with Facebook's web-based chat feature, and it is also available as a chat app for mobile platforms like Android, iOS, Windows Phone, and Blackberry. Messenger lets Facebook users chat with friends both on mobile and on the main website.

Each chat service and client application looks and works differently. However, some principles remain the same across all services and applications:

- Text messaging services require an Internet connection in order to work.
- You must have a user account registered with the chat service that you want to use. Just like with email, you need an account in order to authenticate yourself and chat with others.
- In most cases you can talk only with people who are in your contact lists and who have approved that they are your contacts. Very few text messaging services allow you to send messages to people who aren't listed as your friends or contacts.
- In order to chat with someone, you select that person's account, type your message, and click Send or press Enter on your keyboard.
- When that person reads your message, they can reply to you in real time.

Figure 3.14 shows the Skype window where you can send messages to a selected contact. The left side of the window contains the list of contacts that you have, and on the right, after selecting a person, you can send and receive text messages.

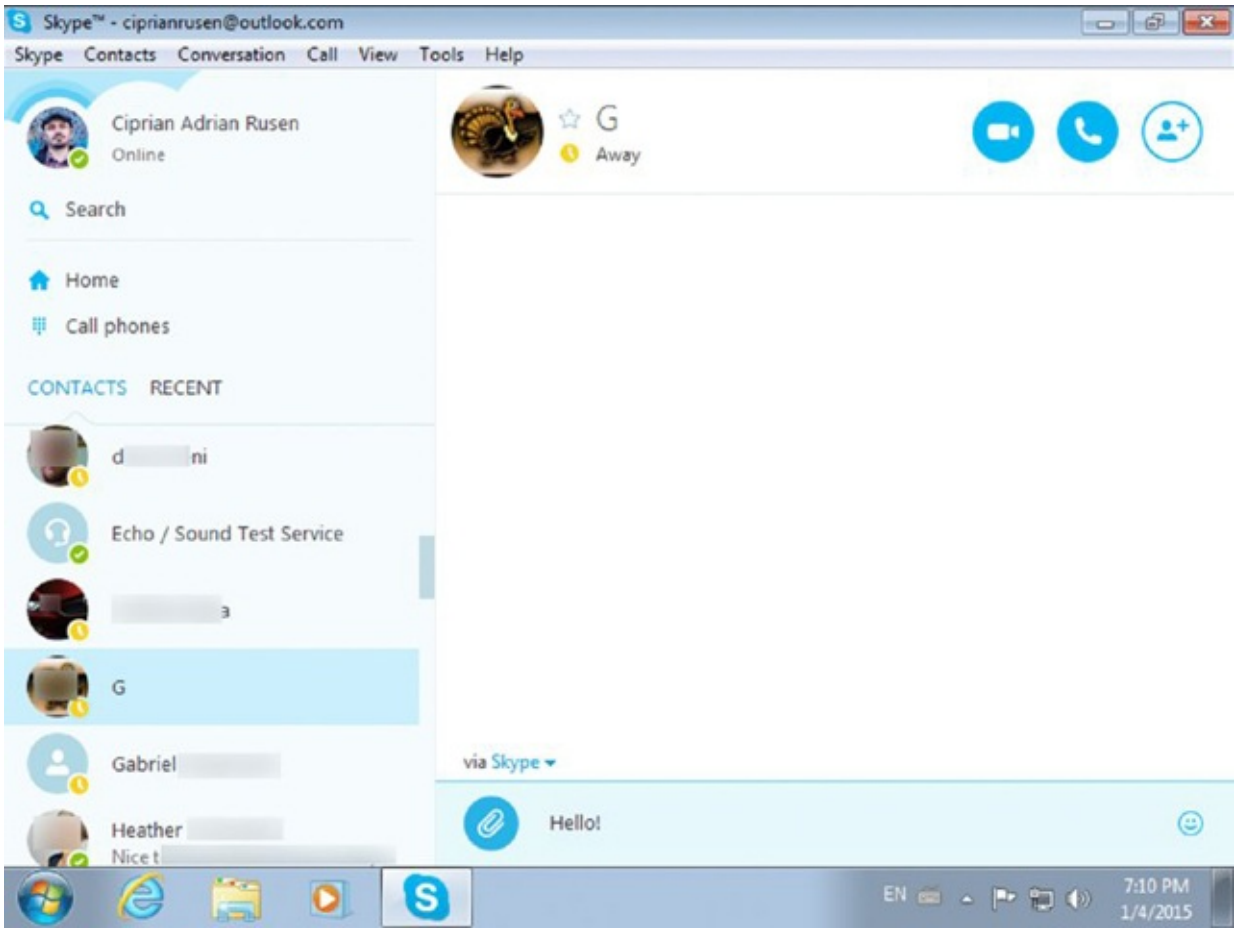


FIGURE 3.14 Sending a text message on Skype

Communicating through Multimedia

A more modern form of communication is through the use of multimedia, which includes text, pictures, audio and video content. One of the most popular forms of communication through multimedia is *Multimedia Messaging Service (MMS)*. This is a standard way to send messages that include multimedia content to and from mobile phones. It extends the core SMS capability that allowed exchange of text messages only up to 160 characters in length by allowing users to use more characters in their messages and also add attachments to their messages.

The process for sending MMS messages is the same as for SMS messages, with the difference that you can write more text and attach files. If the receiver's handset is not MMS capable, the message is usually delivered to a web-based service from which the content can be viewed from a normal web browser. The URL for the content is usually sent to the receiver's phone in a normal text message. This behavior is usually known as the legacy experience since content can still be received by a phone number, even if the phone itself does not support MMS.

You can do audioconferencing as well as videoconferencing using specialized apps and services like Skype or Google Hangouts, which allow for videoconferencing between multiple users for free.

Each audio and videoconferencing service and client application looks and works differently. However, some principles remain the same across all services and applications:

- These services require an Internet connection in order to work.
- You need to have a user account registered with the service that you want to use. Just like with email, you need an account in order to authenticate yourself and talk with others.
- In most cases you can talk only with people who are in your contact lists and who have approved that they are your contacts. Very few services allow you to talk to people who aren't listed as your friends or contacts.
- In order to talk with someone, you select that person's account and press the Call button in order to start an audio conversation or the Video call button in order to start a video conversation.
- While talking with others, you can also send text messages, exchange files, and so on.

In Figure 3.15 you can see the Skype video chat window where you can have an audio and video conversation with another person. As you can see, the Skype window shares the video of the other person and hides the text chat window. However, you can also exchange text messages easily, send attachments, and so on, using the buttons that are available in the video chat window.

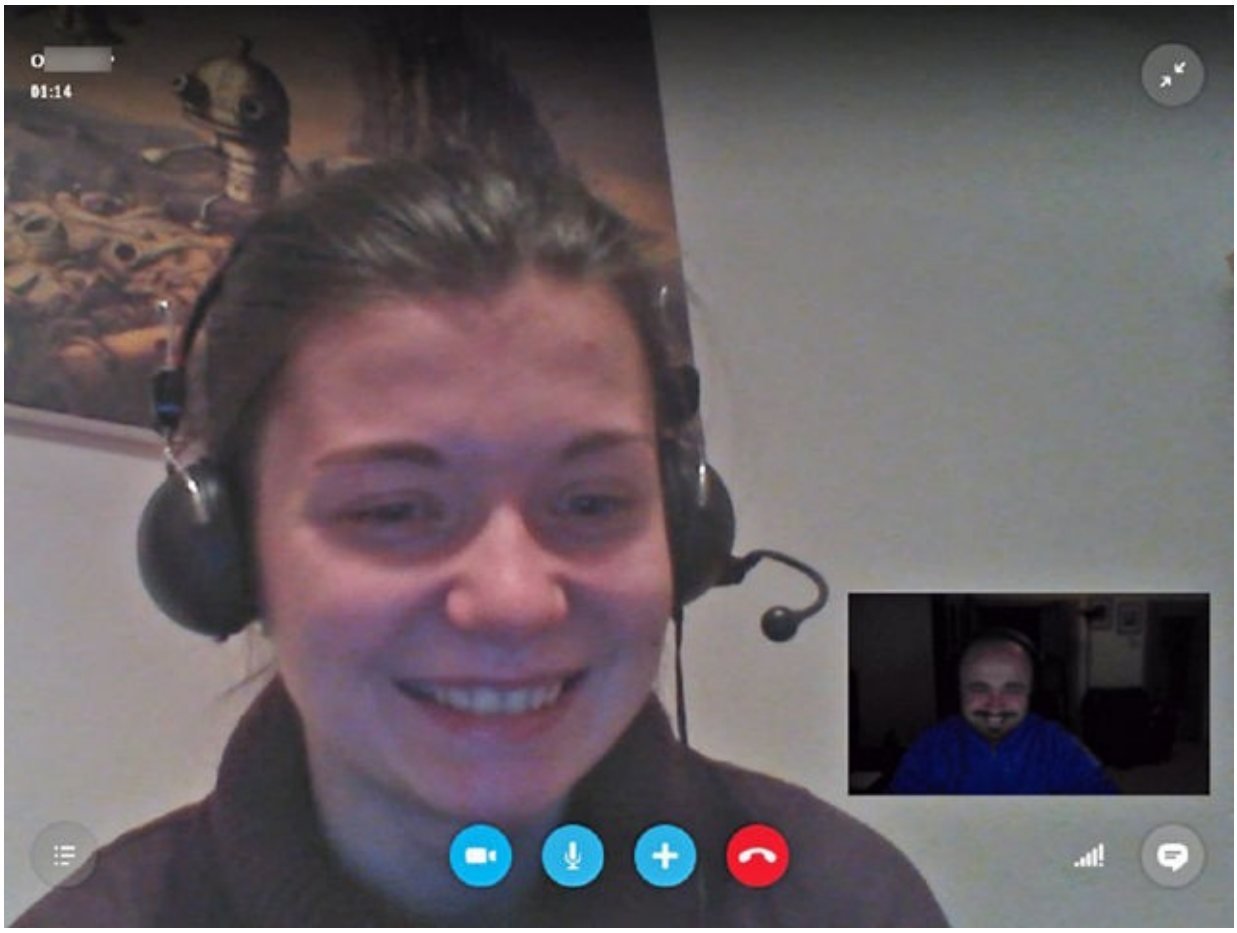


FIGURE 3.15 Having a video conversation on Skype

Most audio and video chat clients use *Voice over IP (VoIP)* for the delivery of voice communications and multimedia sessions. This is a group of technologies that work over Internet Protocol (IP) networks like the Internet. VoIP systems employ session control and signaling protocols to control the signaling, setup, and teardown of calls. The audio streams are transported over IP networks using special media delivery protocols that encode the voice, audio, and video with appropriate codecs. These codecs optimize the media stream based on application requirements and network bandwidth. VoIP is available on smartphones, personal computers, and many other devices with Internet access such as tablets, TVs, or gaming consoles.

Using Social Media and Social Networks

You may have heard the terms *social media* and *social networks*. You surely have heard about Facebook. What are these concepts, and why are they important?

Social media are computer-mediated tools that allow people to create, share, or exchange information, ideas, pictures, and videos in virtual communities and networks. These tools depend on mobile and web-based technologies to create highly interactive platforms through which individuals and communities share, co-create, discuss, and modify user-generated content.

Social-media technologies take on many different forms including magazines, Internet forums, weblogs, social blogs, microblogs, wikis, social networks, podcasts, social bookmarking, and more. The most popular technologies are social networks and blogs.

Social Networks

A *social network* is a platform where people can build social relationships with others who share interests, activities, backgrounds, or real-life connections. A social network service consists of a representation of each user (also known as a profile), their social links, and a variety of additional services.

Social network sites are web-based services that allow individuals to create a public profile, designate a list of users with whom to share connections, and view and cross the connections within the system. Social networking sites allow users to share ideas, pictures, posts, activities, events, and interests with people in their network.

The most popular social networks are Facebook, LinkedIn, and Twitter, with many more showing up on a regular basis. Even though they share many features and tools, they are different in the way they are used: Facebook is mostly for keeping in touch with family, friends, and acquaintances; LinkedIn is for keeping in touch with co-workers and other business professionals; while Twitter is a very public social network where you can exchange short messages of a maximum of 140 characters with just about anyone using Twitter.

You can do many things on a social network, from sharing your current status, having conversations with others, uploading pictures and videos, sharing links to interesting articles and blogs, and much more. The most basic of activities is sharing your status, and it is a very simple activity. Let’s take Facebook as the first example. In Exercise 3.3 you’ll learn how to update your status on this social network.

EXERCISE 3.3

Updating Your Status on Facebook

1. Click Start ➢ All Programs ➢ Internet Explorer.
2. Type **facebook.com** in the Address bar and press Enter on your keyboard.

   Wait for Facebook to load.
3. Type the email address and password that you use for your Facebook account, and click Log In.
4. Once you're logged into Facebook, type a status in the Update Status field (Figure 3.16).
5. Click the button that says with whom you are sharing your status and select the group of people that you want to share this with (Public, Friends, and so on).
6. Click Post.

   Notice that your Facebook status has been updated accordingly and only the people in the group that you have set can view it.
7. Sign out of Facebook and close Internet Explorer.

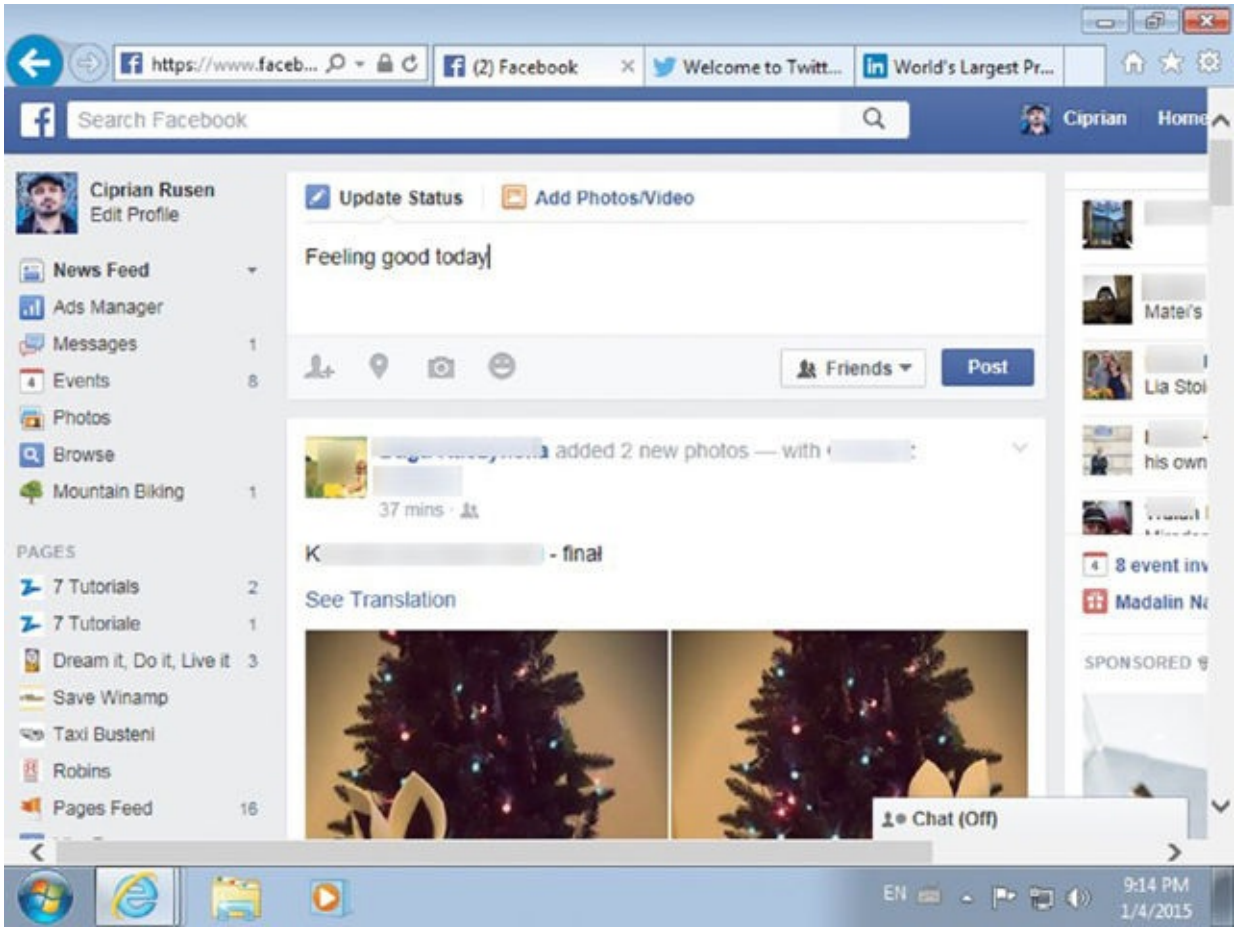


FIGURE 3.16 Updating your status on Facebook

On Twitter, updating your status is done in a similar way: log into your account, and on

the top of the Twitter window type your current status or message (Figure 3.17). Then, click the Tweet button.

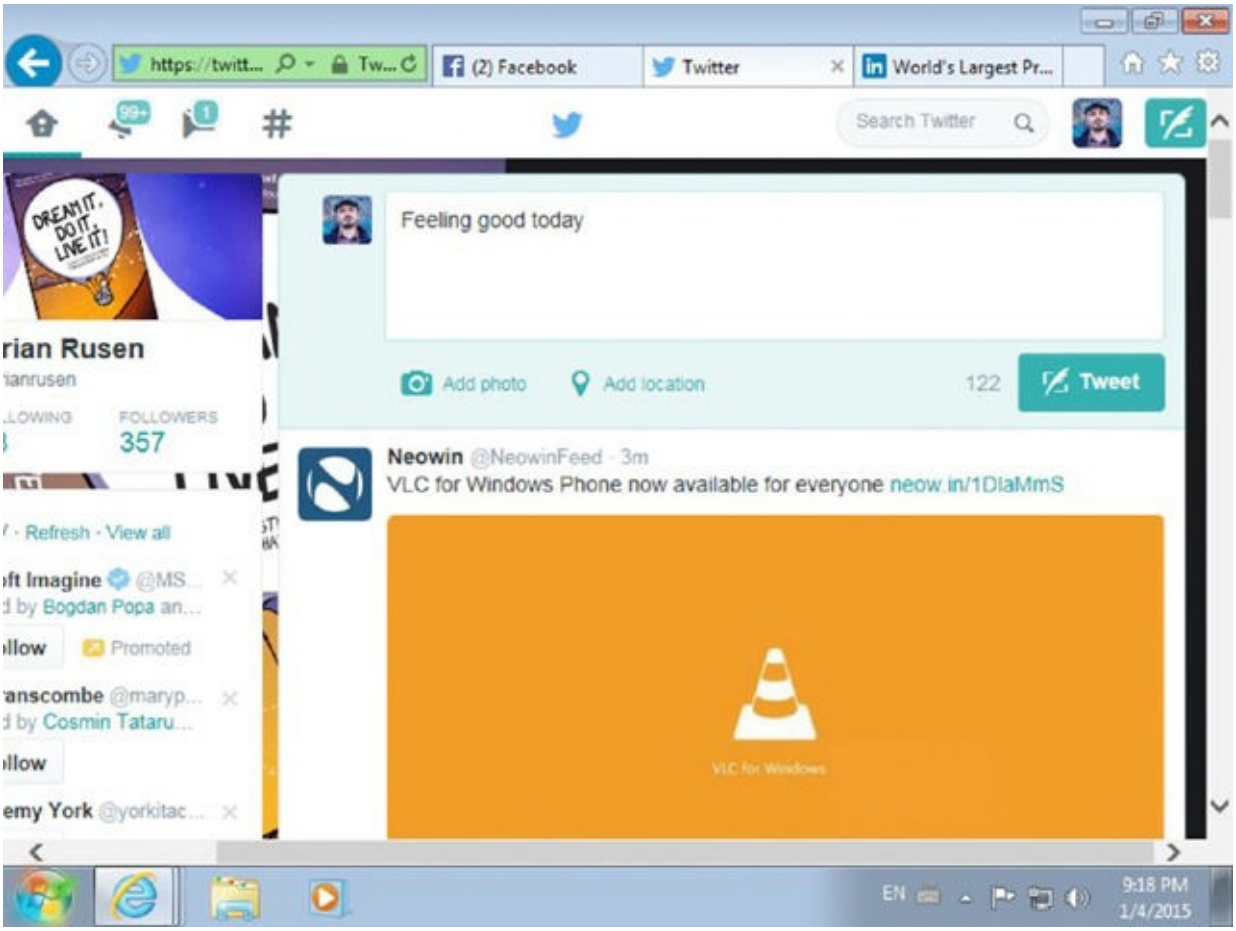


FIGURE 3.17 Updating your status on Twitter

A similar process works for LinkedIn too: log in, and on the top of the window type your current status, choose with whom you want to share it, and click Share (Figure 3.18).

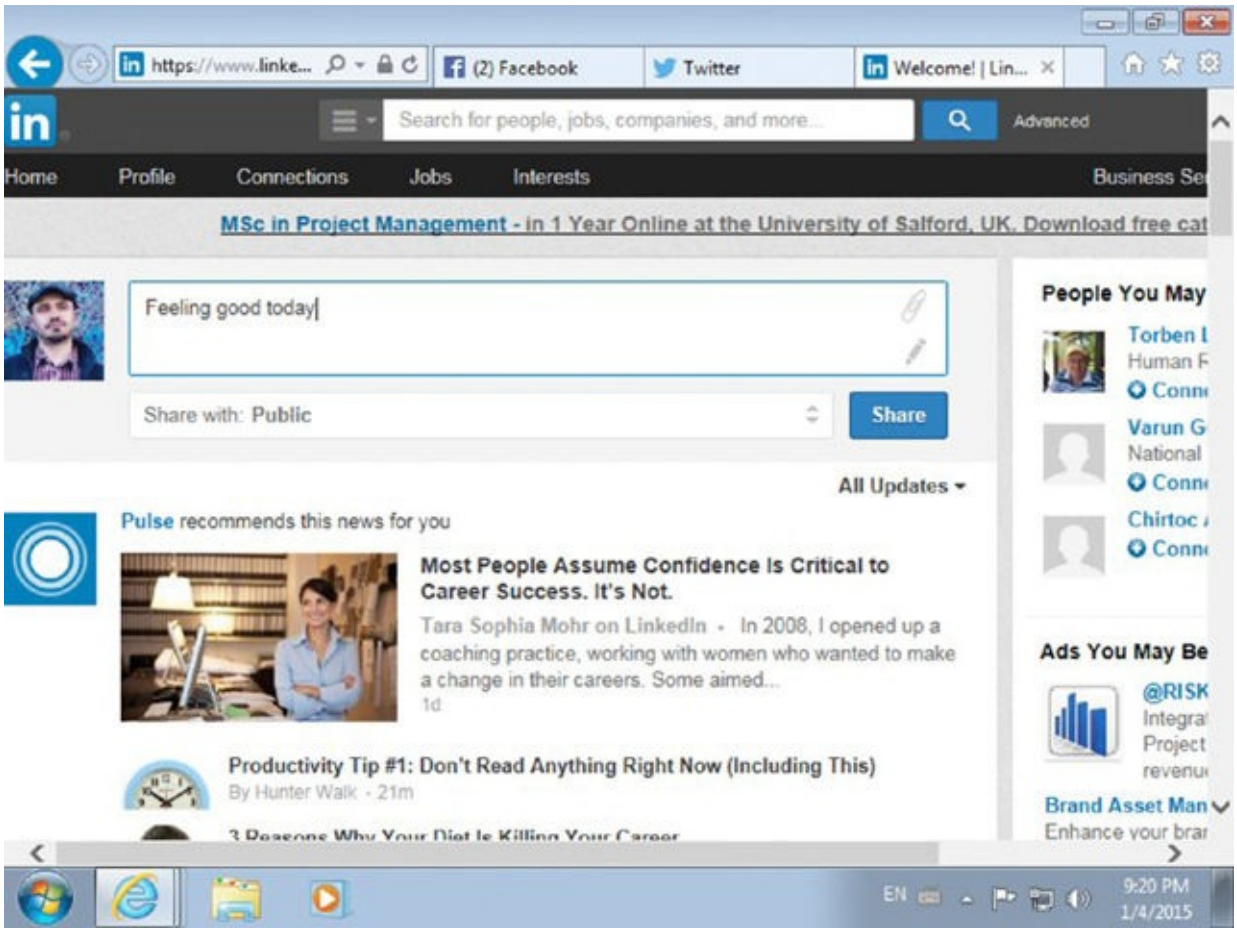


FIGURE 3.18 Updating your status on LinkedIn

Special Social Networks

Some social networks serve specialized interests. A big one is LibraryThing (https://www.librarything.com/). It's for book lovers who want to catalog their libraries. By entering an ISBN or ASIN on the Add Books page, the site will look up the book and place it into your library catalog, complete with author, title, and publication details. You also have the option of adding custom tags to each book entry, such as fiction, mystery, history, and so on—as many as you like.

LibraryThing has experienced exponential growth in membership since its inception in 2005 and boasts that its members have cataloged more books than are in the Library of Congress. Going beyond cataloging books, the site also hosts a wide variety of discussion groups—some about books, of course, but also about ideas, history, sports, and even alcoholic beverages.

Another popular social network for book lovers is http://goodreads.com.

Blogs

A *blog* is a discussion or informational site published on the Web and consisting of posts typically displayed in reverse chronological order with the most recent post appearing first. Some blogs are the work of a single individual, while others are the work of a small group and often cover a single subject. Bloggers not only produce content to post on their

blogs but also build social relations with their readers and other bloggers.

Many blogs provide commentary on a particular subject; others function as personal online diaries; still others function as online brand advertising of a particular individual or company. A blog generally combines text, images, and links to other blogs, web pages, and other media related to its topic. Readers generally have the ability to leave comments in an interactive format. Most blogs are primarily textual, although some focus on art, photographs, videos (known also as *vlogs*), music, and audio (podcasts). Microblogging is another type of blogging, featuring very short posts that can be read in just a couple of seconds.

With the help of modern technologies, nearly everyone can create a blog and publish content online, without requiring too much technical knowledge. On the Web you can find many free blogging tools that require minimal knowledge to set them up. With the help of tools like WordPress (`https://wordpress.com`), Tumblr (`https://www.tumblr.com`), or Blogger (`https://www.blogger.com`), anyone can create a personal blog in just a couple of minutes, for free.

Increasing the Privacy of Your Social Networking Activity

When using any social network, it is important to be aware of how and with whom you are sharing information, pictures, videos, and conversations. If you do not pay attention to your privacy, you risk sharing things that should be private with the wrong audience and that can end up causing you harm. That's why each social network provides the necessary tools to control whom you are sharing content with. These tools are generally not hard to find and they are easy to use.

When posting a status update on Facebook, you can easily select who should see your update. You can make the status update public, share it with only your friends, or share it with your friends but not your acquaintances, and so on. In Figure 3.19 you can see the privacy controls that were available on Facebook at the time this book was written.

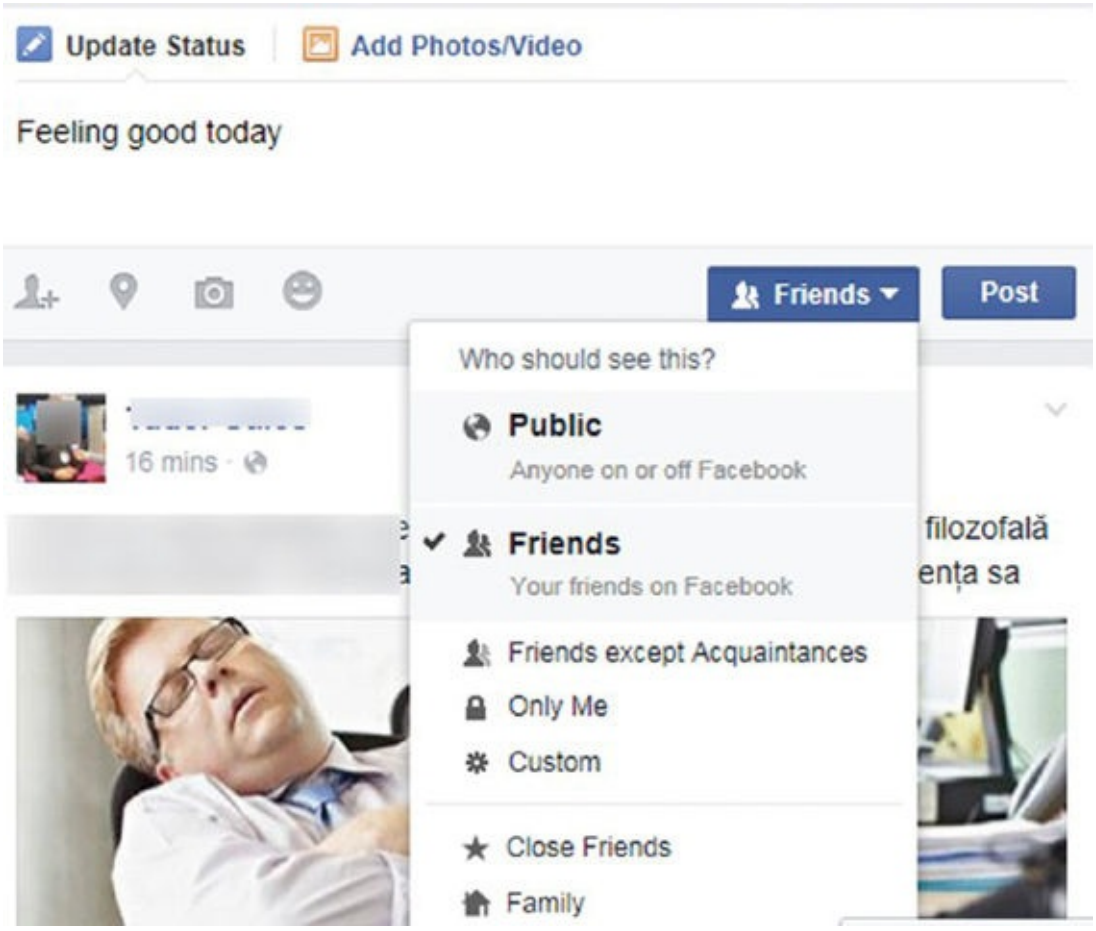


FIGURE 3.19 Privacy controls on Facebook

Twitter has a very different approach to privacy because it was created as a public social network where it's easy to exchange information with people whom you do not necessarily know personally. That's why your posts are automatically posted as public. However, Twitter does offer some privacy controls that allow you to set whether others can tag you in photos, stop making your updates (tweets) public and have them visible only to people that you approve, specify whether you want your location added to your tweets, and indicate whether you want others to find you by using your email address. Figure 3.20 shows the privacy settings that were available on Twitter at the time this book was written.

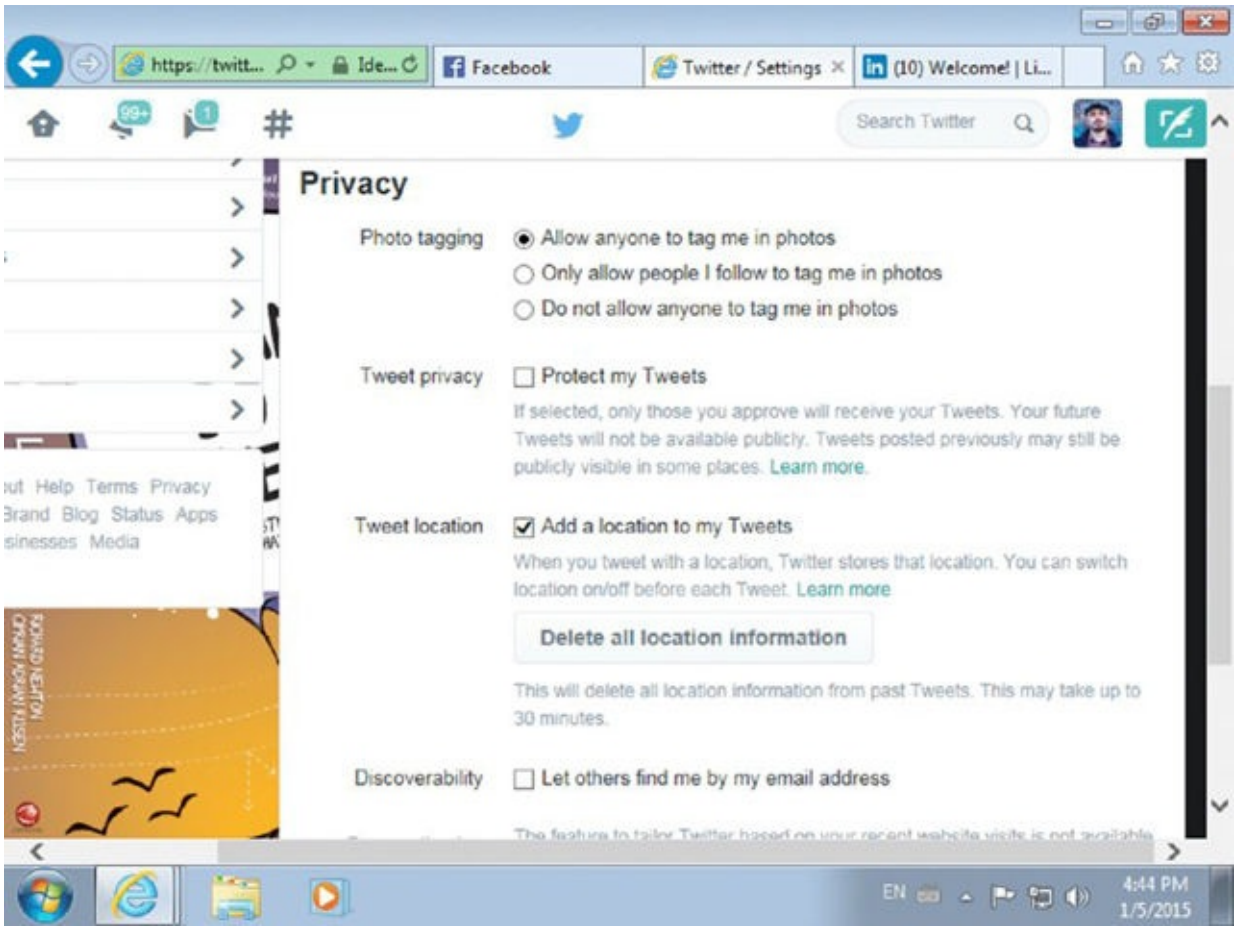


FIGURE 3.20 Privacy controls on Twitter

When sharing something on LinkedIn, you have very simple controls for configuring whom you are sharing with. By default, your posts are public, meaning that they can be seen by anyone. However, you can click Share With, and a drop-down list appears where you can select that you want to share your post only with your connections. In Figure 3.21 you can see the privacy controls that were available on LinkedIn at the time when this book was written.

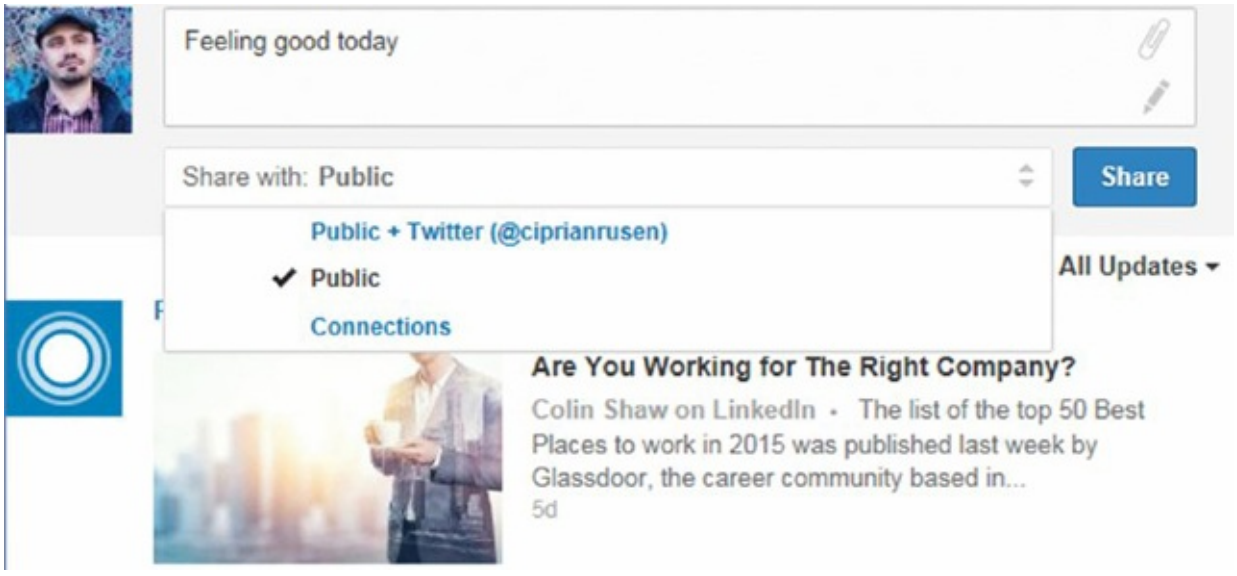


FIGURE 3.21 Privacy controls on LinkedIn

To help you a bit more, here are a few recommendations that you should keep in mind when using social networks:

- Avoid sharing personal details like your home phone number or address, your credit card details, and so on.
- Never share your password with others.
- Keep an eye out for scams or people who try to scam you.
- Do not post details about others, including pictures and videos without their consent.
- Do not reveal your location publicly so that unwanted persons won’t have access to this information.
- Don’t post abusive content of any kind.

Summary

In this chapter we discussed how to communicate with others online. The most popular communication medium is email, so we started by explaining what it is and the basics of using it. You also learned some tips and tricks about automating certain aspects of your email account when required.

Then we moved to other forms of communications: SMS, chat services, MMS, and audio and videoconferencing. Technology makes it easy to communicate with others through several apps, services, and channels, so we covered the most important of them.

Finally, we shifted our focus to social media in general and social networks in particular. You learned what the major social networks are, what's different about them, and how to protect your privacy when posting content on them.

In the next chapter we will explain what it means to be a good digital citizen and how to communicate on the Internet. Then we will cover important concepts like licensing, intellectual property, piracy, copyrights, and so on.

Exam Essentials

Know how to use email. Email is the most popular form of communication, especially in business environments. You should know what it is and how to use it.

Understand how to automate your email account. Most email services offer useful tools to automate your account. You can create rules, set Out of Office notifications, and more. You should understand these features and how they are useful to you.

Learn how to use chat to communicate with others. Another way of communicating with others is through chat services like Skype, Google Hangouts, or Facebook Messenger. You should learn the basics of using them.

Understand how to communicate with others through audio and videoconferencing. With the help of technology, you can easily communicate with others through audio and video-conferencing. You should know the most important services that allow such forms of communication and the principles involved when using them.

Understand how to use social networks and how to protect your privacy on them. Social media and social networks are another way we communicate with others on a daily basis. You should know what the major social networks are, how they differ, and the basics of protecting your privacy when using them.

Key Terms

Before you take the exam, be certain you are familiar with the following terms:

blog	social media
credentials	social network
email	text messaging
e-mail	two-factor authentication
email archiving	two-step verification
email spam	Voice over IP (VoIP)
Short Message Service (SMS)	Multimedia Messaging Service (MMS)

Review Questions

1. Which of the following are characteristics of email? (Choose all that apply.)
   A. Allows you to do video chat with others
   B. Allows you to exchange digital messages with others
   C. Requires a username and password in order to be used
   D. Requires you to provide the email address of the people that you want to send messages to
2. Which of the following are examples of strong passwords? (Choose all that apply.)
   A. 1234567
   B. hellokitty
   C. H3Ll0K1ttY
   D. Th1s1$Year2015
3. What does BCC mean when referring to email? (Choose all that apply.)
   A. A blind carbon copy
   B. A carbon copy
   C. Recipients listed in the BCC field receive a copy of the message but are not shown on any other recipient's copy, including other BCC recipients.
   D. Recipients listed in the BCC field receive a copy of the message and are shown on other recipients' copy.
4. Which fields of data are automatically populated by the email client or service when sending an email message? (Choose all that apply.)
   A. To
   B. Date
   C. Subject
   D. From
5. What happens when you use the Reply All button instead of Reply for sending a reply to an email message that you received?
   A. You reply only to the sender of the message.
   B. You reply to all the people who were included in the email distribution list, including the sender.
   C. You reply to yourself.
   D. You reply to everyone included in the email distribution list, excluding the sender.
6. What happens when you forward an email message? (Choose all that apply.)
   A. The subject of the forwarded message is prefixed by the term *RE:*.

B. The subject of the forwarded message is prefixed by the term *FW:*.
C. A new email message is created automatically.
D. A copy of the email message is created automatically.

7. What should an Out of Office reply contain? (Choose all that apply.)
   A. How you can be reached in case of emergencies
   B. Who your stand-in is and how they can be reached
   C. Why you are out of office
   D. The time period when you are unavailable
8. Which of the following are characteristics of SMS? (Choose all that apply.)
   A. SMS stands for Short Message Service.
   B. An SMS can include up to 160 characters.
   C. SMS stands for Standard Message Service.
   D. An SMS can include up to 1000 characters.
9. Which of the following are examples of chat services/clients? (Choose all that apply.)
   A. LinkedIn
   B. Facebook Messenger
   C. Twitter
   D. Skype
10. Which of the following are examples of social media tools? (Choose all that apply.)
    A. Blogs
    B. Facebook
    C. OneDrive
    D. Internet forums

Chapter 4
Being a Responsible Digital Citizen

The following IC3: Living Online Exam Objectives are covered in this chapter:

- ✓ **Communication Standards**
  - Explain the difference between personal and professional communication and the importance of spelling and use of abbreviations in each type of communication.
  - All capitals vs. standard capitalization
  - Verbal vs. Written, Professional vs. Personal communication
  - Explain the terms: Spamming, flaming, bullying and the harm that each can cause. Explain how they are not faceless, harmless electronic actions.
  - Explain the terms Libel and Slander and the real life legal consequences of each.
- ✓ **Legal and Responsible Use of Computers**
  - Explain what censorship is. Contrast its benefits and drawbacks.
  - Explain what filtering is. Contrast its benefits and drawbacks.
  - Explain Intellectual Property, its real value and the implications of its misuse.
  - Explain Piracy, how to protect yourself from it and the ethical issues surrounding it.
  - Explain what a copyright is, how it is obtained, the legal ramifications surrounding a copyright and its value to its holder.
  - Licensing
  - Explain what Creative Commons is, the licensing availability and legal issues surrounding it, as well as the benefits to the community.

Communication is part of everyday life, even more so in the digital era, where we have more communication devices and channels than at any time in our history. That's why it is important to get the basics right and understand the different forms of communication channels that are available and the do's and don'ts of each. In this chapter we will start by discussing the differences between personal and professional communication, both verbal and written, in the online world. We will also share examples and recommendations on the right way to communicate as well as some negative examples on how not to communicate.

In the second half of this chapter we will discuss intellectual property, copyrights, and

licensing in the digital world. While the use of technology makes it easier than ever to get access to original works of all kinds, there are many ethical and legal matters to keep in mind. Also, piracy is a widespread problem that affects creators of original works all over the world. That’s why it is important to understand concepts like copyright, digital rights management, and newer licensing models like Creative Commons.

Personal vs. Professional Communication

Personal communication can take place at any time, at any place, and on a variety of devices, such as a cellphone, tablet, or laptop. You can send instant messages, text, email, and even photos to friends and family as long as you have an Internet connection. How you speak with them often differs from how you are expected to speak to colleagues, supervisors, business partners, and customers. Personal communication depends on the reader of the message; for example, if the reader is a friend, then you can construct your message just as you would say it to them if they were standing right next to you. If you want your reader to think you are yelling or are very excited, then you can use all capital letters to express that, for example, “HEY MATE! I GOT THE JOB! THANKS FOR YOUR HELP, MAN!” Or another example could be writing to your son not to take the car or there will be trouble when you get home: “John: do NOT take the car. DO YOU HEAR ME? DO NOT TAKE THE CAR!!!!” This is parental “yelling” done through the use of capital letters and multiple exclamation marks. Also, good grammar may not be as important in your dialogue as in a professional environment.

You may speak with your friends using slang, abbreviations, and other forms of casual language. The widespread use of electronic communication through mobile phones and the Internet allowed for a marked rise in colloquial abbreviation. This is due largely to increasing popularity of textual communication services like Short Message Service (SMS), which supports message lengths of 160 characters at most. This brevity gave rise to an informal abbreviation scheme sometimes called *textese*, where 10 percent or more of the words in a typical message are abbreviated. More recently Twitter began driving abbreviation use with 140-character message limits, making textese even more popular.

Professional communication, however, is neither as simple nor as spontaneous or emotive as using all capital letters and multiple exclamation marks. Business or professional audiences expect a certain level of reserve, decorum, and courtesy as conveyed through the medium and structure chosen (an email as opposed to an instant message), the tone and mechanics used (informal or formal), and the level of detail provided in the message. A colleague will expect some kind of acknowledgment to the previous message as a way to prepare them for what this new email message relates to. This is called *bridging information*. Here’s an example:

> Thanks for requesting more information about our travel reimbursement policy, Jane. This policy was recently changed, so here is the most current information you will need to assist you as you complete your expense report.

This is a courteous way to acknowledge the request, personalize the message, and provide the answer to the question that may have been asked informally in the hallway or formally via voicemail or email. The form and the content of the message follow the rules of grammar, spelling, mechanics, punctuation, and overall stylistic expectations of courtesy and clarity.

Abbreviations may be used in a professional communication but mostly when referring to academic or professional titles like Dr. for Doctor, Prof. for Professor, and so on. In more conservative professional environments, abbreviations might be mandatory when communicating with others.

Unlike personal communication, in professional environments textese is not accepted as an appropriate way of communicating with others, and you should avoid it as much as possible.

The Pitfall of Mixing Friends and Business Associates

Social networks represent a challenge for many people in terms of how and what they should be communicating when using them. For example, on Facebook you might have as friends both close friends and family as well as co-workers and business partners. If you are very personal in your updates and you use textese, for example, that may be fine with your friends, but it might not be acceptable with your business partners, and this may damage your image as a professional. That’s why when you post on social networks, you should always use the tools that are available for sharing posts and content, and you should filter who can see what. For example, you should not keep your real friends and your co-workers in the same group.

If you are a heavy LinkedIn user, you should always use the standards of professional communication because this social network is designed for business professionals who expect a certain standard from you. Twitter, on the other hand, is a very public social network. Yes, textese is allowed and expected on Twitter due to its enforced brevity, but you should be careful about what kind of content you post. If it is not suitable for anyone in the world to see it, then you should not post it.

Verbal vs. Written Communication

Spoken or verbal communication reflects your personality and the type of relationship shared with the receiver of your message or audience. How you speak is typically more colloquial than how you are expected to write at work, so your *tone* must fit the expectations of the audience. Vocal inflections, facial expressions, and body language add to the overall delivery and resulting interpretation of the spoken message by the audience.

Written communication, however, is faceless, so what you write needs to be as clear as possible. If it is not, the message may be misinterpreted as you being rude or even insubordinate. *Emoticons* (symbolic facial expressions expressed through smiley faces made with a colon and a right parenthesis, for example) can be helpful, but even these can be misinterpreted, so use emoticons with caution and only if you know your audience is aware what each emoticon means. Unless you know your audience appreciates these, limit their use to personal communications, which includes only social media, personal texting, and personal email. Always remember that what you write online can potentially last forever, so present your best self at all times.

Professional communication also exists in verbal or written forms, and knowing your audience's expectations and preferences is also essential for effective communication. Verbal communication includes giving an oral presentation, for example, and professional written communication ranges from writing simple emails to creating more complex research reports and informal and formal proposals.

The most effective form of communication to use depends on the context and the purpose of your message. For instance, written communication works better for giving long directions, while verbal communication works better for obtaining direct feedback from your audience. When deciding how to communicate with others, always think about your purpose, which form of communication is more effective in achieving it, and which form of communication is preferred by the person or the people you are about to communicate with.

Inappropriate Ways of Communicating Online

Just like in real life, there are also many inappropriate ways of communicating online. Here are some things that you should avoid doing.

Spamming *Spamming* is the act of sending unsolicited messages to others, especially advertising and self-promotion. On a personal level, some people use their personal email accounts to spam friends with unsolicited updates about what they do, promote their personal blogs, or send presentations and other materials that the recipients don't need or are not interested it, without their consent. On a business level, some companies use spam as a method of blatant self-promotion and send unsolicited advertising materials to people all over the world, without their consent.

Spamming can be done through all kinds of media, from email to instant messaging clients, to forums, to social networks, and so on. While spam is used because it has some degree of success and very low costs, you should avoid being a spammer. First of all, it creates a bad personal and/or business image that may do you more harm than good. Second, in some countries it is illegal, and spam may cause you legal problems.

Flaming *Flaming* is a hostile, insulting interaction between users on the Internet, often involving the use of profanity. This is mostly encountered in the context of Internet forums, chat, email, and online games. Flaming is mostly the result of the discussion of heated issues such as politics, religion, and sports but can also be provoked by seemingly trivial differences like what character you and your team want to play in an online game.

There are also people who do deliberate flaming, as opposed to flaming as a result of emotional discussions. These individuals are referred to as flamers, and they specialize in starting heated, insulting interactions with others. For example, a common way of flaming someone is to pick on incorrect spelling and grammatical mistakes. Flamers may try to impugn their opponents' intelligence by highlighting their errors in grammar or spelling.

Bullying *Bullying* is not new form of negative behavior, but in the modern era it has moved to the digital world. As you know, bullying is the activity of repeated, aggressive behavior intended to hurt another person. Bullying can be physical (hitting, punching, or kicking), verbal (name-calling or taunting), relational (destroying peer acceptance and friendships), and cyberbullying (using electronic means to harm others).

Unlike other forms, cyberbullying can go undetected because of a lack of parental/authoritative supervision. Because bullies can pose as someone else, they can remain anonymous. Cyberbullying includes but is not limited to abuse using email, instant messaging, text messaging, websites, social networking sites, and so on.

Libel and Slander Other forms of inappropriate ways of communication are *libel* and *slander*. They are similar in the sense that they represent the communication of a false statement that harms the reputation of a person or an entity. They are generally irrational, unprovoked criticism that has little or no factual basis and whose only aim is the defamation of another. Slander is the spoken type of defamation, while libel is defamation made on printed media like newspapers and magazines, images, or the Web. Obviously, just because you have a personal blog or a Facebook profile, it doesn't mean that it is acceptable to libel others, and you should be mindful of what you communicate.

Censorship and Filters in the Digital World

International human rights law covering freedom of speech now extends to the Internet. This means that communications must not be interfered with in any way, either by employers or governments or even Internet service providers themselves, for example. The United Nations holds freedom of speech as a fundamental human right, allowing every individual to participate in public discourse without fear of reprisal. *Censorship* results when access to the Internet is denied or curtailed in any way as well as when any unauthorized editorial activity changes or deletes someone's writing or transmissions.

Governments that manipulate the Internet's infrastructure or force its intermediaries for the sole purpose of censoring information before it has a chance to be transmitted are attempting to control who has access to that information as a way to mitigate intercultural conflict or sociopolitical unrest. One example of this is China's Great Firewall, which filters all the Internet traffic going in and out of China and also monitors Internet access of individuals. Other governments may be more reactive in that an offense must be committed first before punitive actions result. In Figure 4.1 you can see a world map with Internet censorship and surveillance by country, published by Wikipedia in 2014, based on data from the OpenNet Initiative and Reporters Without Borders.

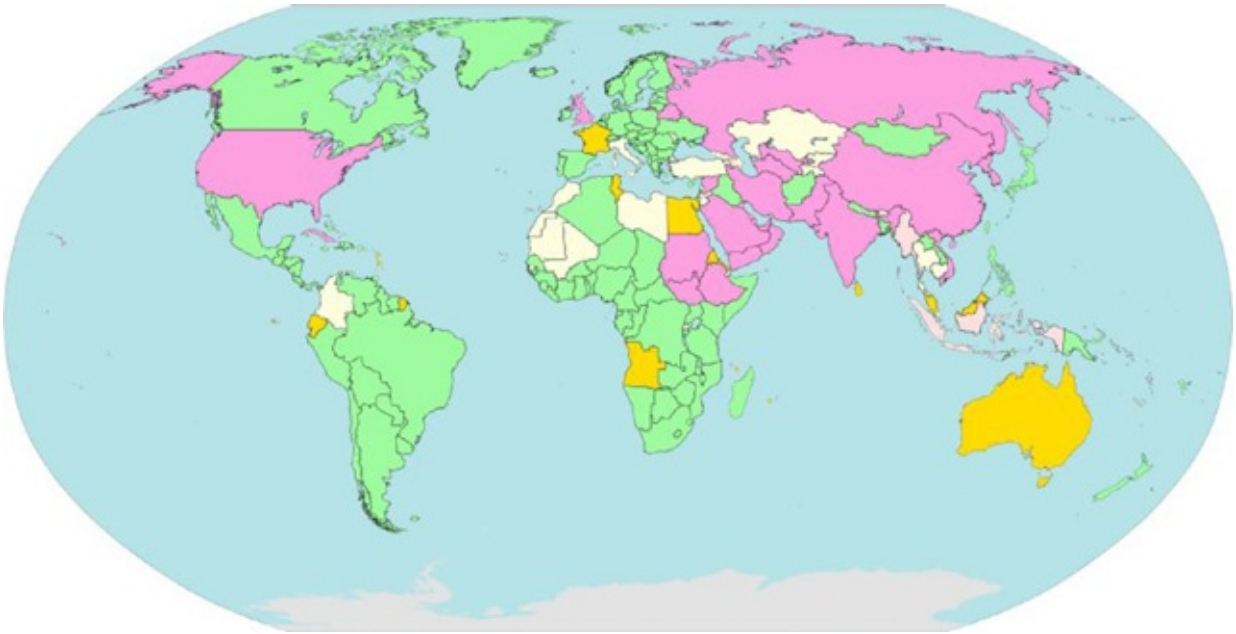


FIGURE 4.1 Internet censorship and surveillance by country

Figure 4.2 gives you information on how each country is classified in the previous figure.

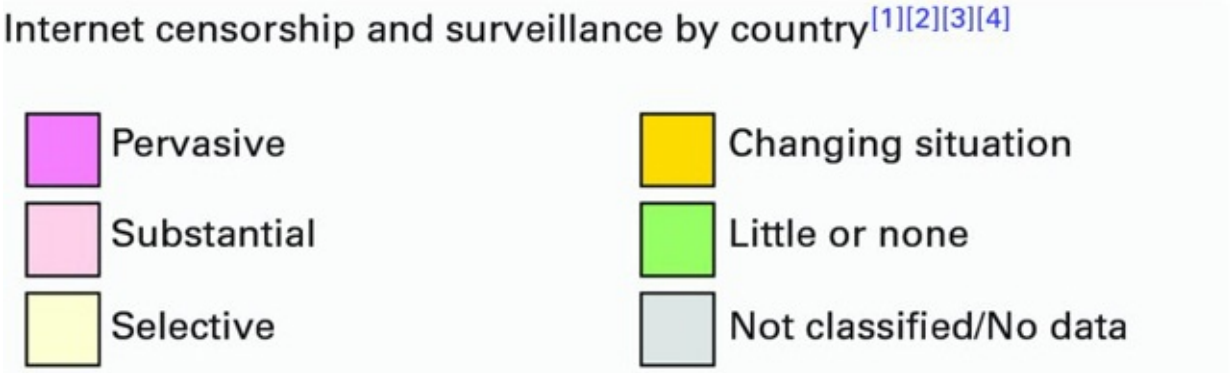


FIGURE 4.2 The legend for Figure 4.1

In the absence of governmental controls, companies have instead become the moral arbiters of portions of the Internet; for example, YouTube has Community Guidelines, which prevents hate speech from being spread, and this includes anything deemed to be devaluing of any human being and/or glamorizing crime and injustice. Google and Bing (Microsoft's search engine) similarly try to prevent sexually explicit material from being returned in any of their searches by using the same SafeSearch technology.

Although the freedom of speech that the Internet enables so quickly can thereby promote democracy, it can also challenge cultural, political, and religious norms, thereby provoking social and political unrest. In many countries, if what is posted incites hatred, then the writer can be charged with hate speech offenses.

In the United States, freedom of speech is covered most robustly by the First Amendment to the U.S. Constitution; however, many countries do not enjoy similar protections. As a result, private worldwide organizations, such as the World Wide Web Consortium (W3C), the Internet Engineering Task Force (IETF), and the Internet Corporation for Assigned Names and Numbers (ICANN), have developed to govern the Internet, to protect freedom of speech, and also to prevent the proliferation of hate propaganda. Because the Internet enables global communications at a speed and low cost never seen before, any specific international law will need to protect freedom of speech with the UN's Universal Declaration of Human Rights as its foundation. Currently, the Internet does fall under traditional media and its protections and limitations under international law, but international law cannot be used to control social media companies or to force any country to censor online content or speech originating from within its borders.

In order to censor content on the Internet, *filters* have been designed. They are programs designed to screen any content deemed inappropriate or illegal for its end users. They do this by checking the origin of the content against a rubric of rules designed by the programmer, usually in response to a government request. Such filters should catch materials that depict the exploitation of children, for example, as well as malware or viruses. They are usually part of a firewall or proxy server, and some filters can report what has been filtered and who requested it. Filters can also be soft, in that automatic warning pages are issued instead of blocked access, and blocked access can still be overridden by an administrator.

The obvious benefits of filtering include that it can be used to catch pedophiles and track down pornographers and proponents of violence and cruelty to animals and people. Parents can also exercise more control over what their children may be exposed to on their

home computing devices using parental control products, which make extensive use of filtering technologies. Further, when applied to email, filters act as spam monitors. However, a drawback is that, when used inappropriately, filters can hinder one’s freedom to access information on any given subject.

Intellectual Property, Copyright, Licensing, and Piracy

Within the relatively new information economy, *intellectual property* has taken on a new importance. It refers to knowledge and creative ideas or expressions that are protected by copyright, patent, trademark, industrial design rights, or trade secret laws. Intellectual property rights are themselves a form of property, called intangible property. Such material must not be imitated, diluted, or infringed upon in any way.

Examples of intellectual property within the digital marketplace include software, formulas, songs, stories, essays, movies, art work of all kinds, and so on. Websites that provide intellectual property assets, particularly for knowledge-intensive and high-innovation areas, offer more value to the user than those that do not. However, the widespread downloading and distribution of intellectual property, such as music and movie sharing, have forced lawmakers to keep up with the times by extending laws to the Internet. Australia and the United States have each passed laws to cover intellectual property on the Internet, but enforcing the laws presents unique challenges. For example, even though the United States has its Digital Millennium Copyright Act of 1998 (DMCA) codified as section 1201 of the Copyright Act, the law has acted more to stifle many legitimate activities such as security research and free speech than to mitigate piracy. Fair use is also circumscribed in that a user may legally make copies for personal use of a movie on DVD, for example, but physically cannot because of movie companies using encryption that prevents any copying at all.

Under the larger area of intellectual property law, industrial property refers broadly to inventions, and *copyright* refers primarily to literary and artistic creations, including computer programs and electronic databases. A copyright gives the creator exclusive rights to it, usually for a limited time. The copyright does not cover ideas and information themselves but the form or the manner in which they are expressed in the marketplace. Countries that have signed onto the Berne Convention for the Protection of Literary and Artistic Works treaty agree that such creations include books, pamphlets, and other writings as well as drawings, photographs, music, dance, plays, and so on. Although computer programs and multimedia productions are not specifically listed, the Berne Convention treaty still includes such newer items under Article 2. While a creator has copyright protection automatically, it is better to file for copyright protection if violations seem likely, so that the copyright can be used also as an effective protection tool against piracy. In the United States, for example, the electronic U.S. Copyright Office (eCO) provides an online application form at http://www.copyright.gov/eco/ for a small processing fee.

Avoiding Piracy

Intellectual property laws and copyrights exist to protect creators from theft or copyright infringement. On the Internet it is very easy to distribute copyrighted work without the creator's consent and without the creator receiving any benefit from their original work. The whole phenomenon of copyright infringement is known as *piracy*, and it has a very large negative impact on content creators of all kinds, from independent authors to software developers to the movie and music industries. The reasons why people choose to pirate works that are protected by intellectual property laws are many and varied. Some of

the most important are these:

Pricing This is a valid problem especially in less-developed countries where people don't earn enough money and can't pay for products at the price requested by legitimate sellers.

Unavailability This problem plagues many industries but especially the movie and the music industries. For example, in many countries there are no legitimate services for renting and viewing movies, similar to Netflix in the United States. Because people don't have easy access to the newest movies, they may revert to the use of piracy to get access to the movies they are interested in.

Usefulness Some products include annoying copy protection systems that restrict legitimate use. Others include irritating advertisements and disclaimers that cannot be skipped, making the user experience less desirable than when using pirated versions of the same products.

Videos, music, online games, and software are the usual booty for online pirates. Piracy laws protect content creators from losing money on sales that have been redirected because their product has been stolen and given away either for free or for a fee to the pirate. The main problem with piracy laws is enforcement, but antipiracy software, antipiracy campaigns, and antipiracy reporting systems have been instrumental in charges being laid against online pirates. In the United States, this means up to five years in prison and fines up to $250,000. Even if the pirated booty was given away for free, civil penalties can add up to thousands of dollars in fines.

To prevent being charged with piracy, do not share or resell any copyrighted material, such as movies, music, games, and software. To do so is to steal from the content creator's potential earnings. If you are unclear about whether something online is protected, familiarize yourself with your country's intellectual property and copyright laws. Also, you should not be using websites that distribute copyrighted works for free. Use legitimate sources instead. For example, if you don't want to purchase lots of music CDs, you can pay a monthly subscription fee to a legitimate music-streaming service like Spotify or Deezer and listen to the music that interests you at any time. You can also buy music from dedicated services such as iTunes, Google Play Music, or Amazon Prime Music.

To counter online piracy of copyrighted materials, *digital rights management (DRM*) has been adopted as a solution. DRM is a class of technologies used by hardware manufacturers, publishers, copyright holders, and individuals with the intent of controlling the use of digital content and devices after their sale. DRM can be used to control the copying of a work, its execution, viewing, printing, or altering, depending on the product and the intent of its creator. For example, when you buy a DVD of a video game or a movie, that DVD is protected by DRM so that you can't make unauthorized copies of it and give it to others or sell it without the creator's consent.

Creative Commons: A Less Restrictive Form of Licensing

We have talked extensively about licensing both in this chapter and also in Chapter 3 of *IC3: Internet and Computing Core Certification Global Standard 4 Study Guide.* If there's one takeaway from all these discussions, it is that licensing is a complex and nuanced subject, which sometimes can be very restrictive on legitimate users of a copyrighted

product. As a response to these issues, Creative Commons, a U.S. non-profit corporation founded in 2001, decided to create its own licensing system that allows the free distribution of an otherwise copyrighted work.

This license is used when the creator wants to give people the right to share, use, and build upon their work. Creative Commons provides the creator flexibility (for example, to allow only noncommercial uses of their own work) and protects the people who use or redistribute the work from concerns of copyright infringement as long as they abide by the conditions that are specified in the license by which the creator distributes the work.

There are four types of Creative Commons conditions that you can use to create your own license:

Attribution Licensees may copy, distribute, display, and perform the work and make derivative works based on it only if they give the licensor the credits in the manner specified.

Share-Alike Licensees may distribute derivative works only under a license identical to the license that governs the original work.

Noncommercial Licensees may copy, distribute, display, and perform the work and make derivative works based on it only for noncommercial purposes.

No Derivative Works Licensees may copy, distribute, display, and perform only verbatim copies of the work, not derivative works based on it.

You can learn more about Creative Commons and create your own licenses by going to `https://creativecommons.org/`.

There are several positive aspects to using Creative Commons licenses, the most important being the fact that they are easy to create, understand, and use. Second, they are generally recognized as legitimate licenses in many countries around the world. Thus, they are widely used online on many websites and blogs, with many content creators choosing to protect their work using Creative Commons.

Summary

In this chapter we discussed what it means to communicate correctly in the digital world. As in real life, you should always pay attention to the context you are in, the people you are talking to, and the tools that you have available. While some norms work well in personal communication, they may not apply to professional communication and vice versa. That’s why we have shown you the basics of what it means to communicate effectively in the digital world, as well as a few do’s and don’ts that you should keep in mind.

Also, knowing the communication tools that are available and how to use them goes a long way in communicating effectively with others. Don’t hesitate to use them to your advantage.

Finally, when using a computer or a mobile device, you will use products that are protected by intellectual property laws, ranging from hardware to software to original content like music, movies, games, and so on. It is very important to be mindful of copyrights and licenses and to use products responsibly, from legitimate sellers and not from online pirates. This will not only benefit the creators of the products that you are using but also protect you from legal issues.

In the next chapter we will discuss security and how to stay safe when online. We will also show you how to correctly use a computer from a health standpoint. You will learn how things like posture, lighting, the position of your chair, and other factors may negatively affect your health in the long term, if you don’t pay attention to them.

Exam Essentials

Know the differences between personal and professional communication. Professional communication has different standards from personal communication. You should be aware of them and apply them in your work.

Understand how you should not communicate online. Just like in real life, there are inappropriate ways of communicating online. You should know what they are and avoid using them.

Understand censorship and filtering. Censorship is a real problem that affects people all over the world. Filtering technologies are also used to block access to certain types of content online. You should know the basics about these concepts and how they can affect you.

Learn what intellectual property and copyright are. Original works and content that you find on the Internet are usually protected by intellectual property laws and copyrights. You should know what these concepts are and how they impact the way you use original products and content online.

Learn about piracy and its negative effects. You should know what piracy is, its negative effects on content creators and users, and how to protect yourself from it.

Key Terms

Before you take the exam, be certain you are familiar with the following terms:

bullying	intellectual property
censorship	libel
copyright	piracy
digital rights management (DRM)	slander
filters	spamming
flaming	textese

Review Questions

1. On which occasion would it be acceptable to type your message in all capital letters?
   A. Resume to a potential employer
   B. Text message to a friend
   C. Email communication to your supervisor
   D. An important email to fellow colleagues
2. Which of the following are examples of spam? (Choose all that apply.)
   A. Sending an unsolicited email about your product to a distribution list with a large number of people
   B. Sending an SMS about your upcoming product launch to a large number of people, without their prior consent
   C. Advertising your product on your company's blog
   D. Posting a photo with yourself on Facebook
3. Why does tone matter in professional communications?
   A. It meets the expectations of the audience.
   B. It does not matter at all.
   C. Tone determines if copyright is needed.
   D. Tone may allow filters not to work.
4. What are symbolic facial expressions like called?
   A. Filters
   B. Digital licenses
   C. Emoticons
   D. Short messages
5. Where are emoticons typically acceptable to use?
   A. Formal progress reports
   B. Informal proposals
   C. Personal communications
   D. Cover letters
6. Which of the following are examples of censorship? (Choose all that apply.)
   A. Creative Commons
   B. Parental controls
   C. Bandwidth

D. Government-blocked websites

7. What do DRM technologies try to control? (Choose all that apply.)
   A. The copying of a work
   B. Spam attacks
   C. The altering of a work
   D. Censorship
8. What is the term for knowledge and creative ideas or expressions that have commercial value and are protected either by copyright, patent, trademark, industrial design rights, or trade secret laws?
   A. Copyright
   B. Intellectual property
   C. Digital licenses
   D. Piracy
9. What is Creative Commons? (Choose all that apply.)
   A. A license used when the creator gives people the right to share, use, and build upon their work
   B. A license used when the creator doesn’t give people the right to share, use, and build upon their work
   C. A flexible kind of license that protects only the people who use or redistribute the work
   D. A flexible type of license that protects the people who use or redistribute the work from concerns of copyright infringement as long as they abide by the conditions that are specified in the license
10. What is it called if you make copies of a movie to sell online without the permission of the creator?
    A. Piracy
    B. Fraud
    C. Censorship
    D. Digital license

Chapter 5
Maintaining Your Health and Safety While Using Computers

THE FOLLOWING IC3: LIVING ONLINE EXAM OBJECTIVES ARE COVERED IN THIS CHAPTER:

- ✓ **Secure Online Communication or Activity**
  - Identity Protection
  - Explain how to completely remove data from hard drives, portable memory, digital devices.
  - Explain how to secure the data on your computer and keep it updated by backing up data to other sources – cloud, backup hard drives.
  - Describe how to use protection programs and the value of these services. Also describe the harm that can come from not using these products and services.
- ✓ **Ergonomics**
  - Explain and demonstrate proper ergonomics. Problems that come from improper ergonomics in relation to monitor height and angle.
  - Explain and demonstrate proper ergonomics. Problems that come from improper ergonomics in relation to mouse and keyboard shapes and use.
  - Explain the ergonomics around proper chair height and settings, arms, lumbar support, etc.
  - Explain the issues around poor lighting, short term and long term eye problems.
  - Explain the physical issues surrounding poor body posture, especially with prolonged time in the same position(s).

In this chapter we will start by discussing how to protect both your identity and your data when you are online. On the Internet you expose yourself to many threats and perils. People may try to trick you into sharing personal details about yourself like your home address, while some may try to steal your financial data like your credit card number. Others may try to make you a victim of a hoax and purchase things you do not need or simply give them money while promising you an unbelievable return on your "investment." In order to keep yourself as safe as possible, you should learn and apply several principles that will help you in most situations. Also, knowing how to keep your computer secure goes a long way toward having a good computing experience, without exposing yourself to problems that can be avoided, like virus infections.

Finally, you should pay attention to your own health. Prolonged and incorrect computer use may cause health problems. We are going to offer several recommendations for creating an ergonomic workspace and how to use the computer so that you don’t negatively affect your health. You will also learn about several ailments that are common to computer users, so that you can recognize them and take action in case you start having health issues caused by prolonged computer use.

Protecting Your Identity and Your Data

Protecting your identity and your data involves many important choices. First, you should know several principles for protecting your identity online. Then, you should know how to keep the data on your computer as safe as possible.

When you use the Internet and browse the Web, it is important to know, apply, and use several principles that will help you protect your identity:

- Use different passwords.

  You should use a different password for every website and service that you are accessing online. Over the years, you will end up using lots of websites and you will have many accounts, which may prove difficult to manage on your own. To help you keep track of all your passwords, it is best to use a password manager like LastPass, RoboForm, 1Password, or other similar service.

- Use strong passwords.

  In Chapter 3, we talked in detail about using strong passwords for your email accounts and what makes a password strong. This is another area where a password manager can help you generate unique strong passwords for each website and service that you are using on the Internet.

- Share personal details only with people you know.

  You should avoid turning personal details into public information. Share things like your email address or home address only with people you know. Also, avoid sharing financial details like your credit card number with anyone other than your family.

  Use a secondary email address for less-important online activities.

  Ideally, you should not use your personal email address for things like signing up to newsletters, forums, and online communities of any kind. It is best to use a secondary email address for these activities. That’s because hackers have an easier time hacking into less-known websites and communities, which may not benefit from the same security that a big company like Facebook does. It is easy enough for them to steal your email address from an online forum and then hack into your email account if you have a weak password.

- Purchase items online only from websites that use secure connections.

  Avoid buying merchandise from websites that do not use the Hypertext Transfer Protocol Secure (HTTPS), which encrypts the data that you are sending. Transfers that take place without using a secure connection are easily intercepted, and your financial details can be stolen without you realizing it has happened. HTTPS provides authentication and encryption. It protects against man-in-the-middle attacks, eavesdropping, and tampering with the data that is being sent.

- Use the privacy settings available on the social networks that you are using.

  In Chapter 3 we talked about social networks and the fact that they offer tools and settings for protecting your privacy. Don’t hesitate to use them, and make sure that

your social networking activity is not public and easily accessible to anyone.

- Regularly check your bank statements.

  You should check your banks statements regularly and look for purchases that were not made by you. If a hacker manages to steal your credit card details, they may be trying to use that information to purchase things online without your approval.

- Pay attention to what you click on or to whom you reply.

  If you are contacted by people you don't know, about some crazy offer that's too good to be true, then most likely they are trying to scam you. Also, pay attention to whom you reply via email or social networks like Facebook. If something feels dodgy, then it most probably is, and you should listen to your instincts. Also, don't click every link you receive from others or all the ads that you see online. Some links and ads are a form of spam and take you to websites that are trying to make you pay for something that you should not be buying or, even worse, trying steal your personal and financial data.

No matter how careful you are, there's no guarantee that others won't manage to steal your identity, portions of it, or some of your personal data and misuse it. However, if you apply these principles, you can protect yourself quite well and limit your chances of being the victim of an online scam or hoax.

Keeping your personal data safe is another aspect that you should pay attention to. On your business laptop or desktop, most probably your employer has enabled encryption using solutions like *BitLocker*—the encryption tool that's built into Windows. Encryption is very important because, should your computer be stolen, others will have a very difficult time accessing the data found on it. While encryption is not foolproof and data can be decrypted, the whole process is so complex and resource intensive that most people won't be able to do anything with the data stored on an encrypted computer. If you have very important personal data on your computers at home, you may also want to enable encryption so that it is protected if someone else gets unauthorized access to your computer.

Another aspect of keeping your data safe involves having a backup system in place. In Chapter 4 of *IC3: Internet and Computing Core Certification Global Standard 4 Study Guide* we discussed the principles involved in creating your own backup system and how to use the built-in Backup and Restore tool that's available in Windows. If you don't like the tools that are available in Windows, you can find many other products that were developed by other companies. Don't hesitate to try them out and choose the one that works best for you. When your computer crashes, your backup system will be very handy in recovering your data and making sure that you lose as little as possible.

Removing Data from Your Computer

In Windows, in order to delete a file or folder, you first select it and then press the Delete key on your keyboard. Alternatively, you right-click it and select Delete from the context menu. When you do this, a prompt is shown asking for your confirmation to delete that file or folder (Figure 5.1). Click Yes and the item is deleted.

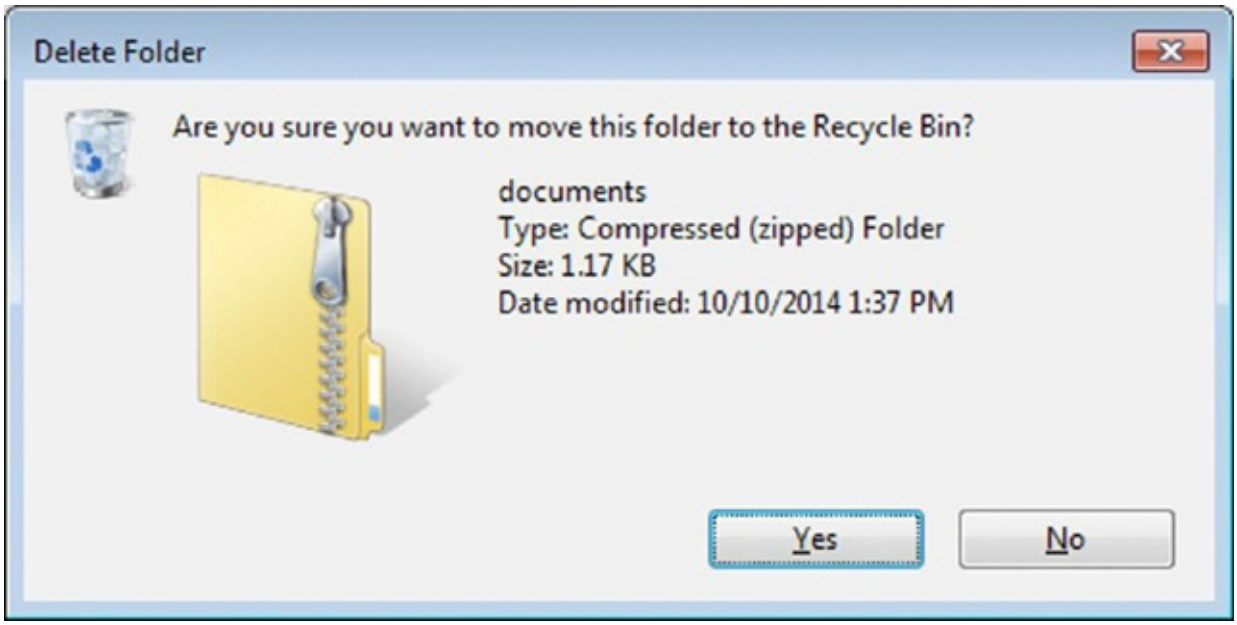


FIGURE 5.1 The Delete Folder prompt

However, it is not deleted for good. It is only moved to a special area named the *Recycle Bin*. This is the place where the references to your deleted files and folders are kept. Physically, your deleted items still occupy the same location on the hard disk. You just can't use them or open them when they are in the Recycle Bin. Windows keeps track of where they came from, so you can restore them if you want to. Each partition of your hard drive has a Recycle Bin, but the fun thing is all the files you delete appear in this one folder with the Recycle Bin icon on your Desktop, shown in Figure 5.2.

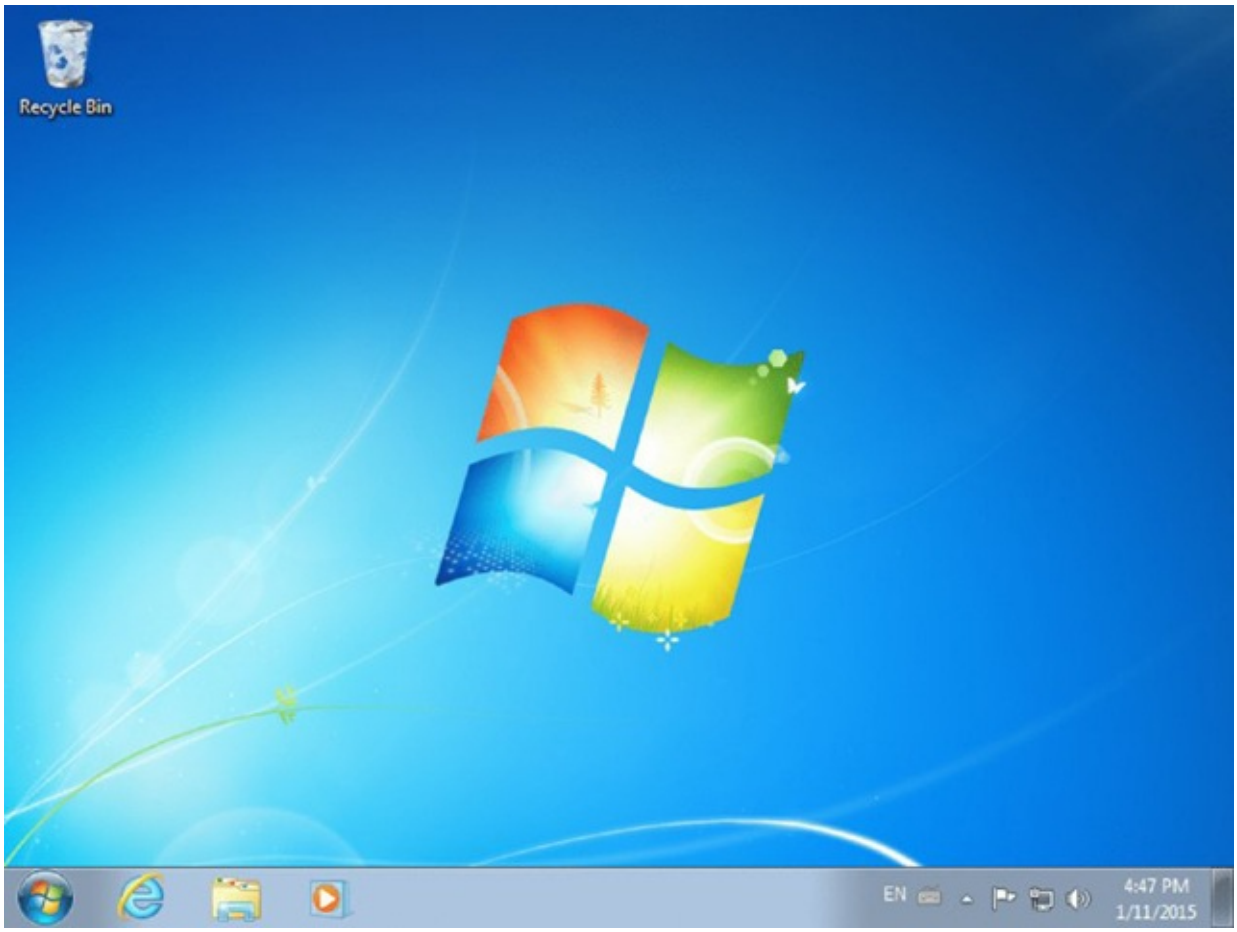


FIGURE 5.2 The Recycle Bin shortcut on the Desktop

When you double-click the Recycle Bin shortcut, you can view all the files and folders that were deleted on your computer (Figure 5.3). You can select any of them and restore them to their original location, or you can empty the Recycle Bin and delete all the references to your deleted items. This is done by clicking the Empty The Recycle Bin button at the top of the Recycle Bin window and making the necessary confirmations.

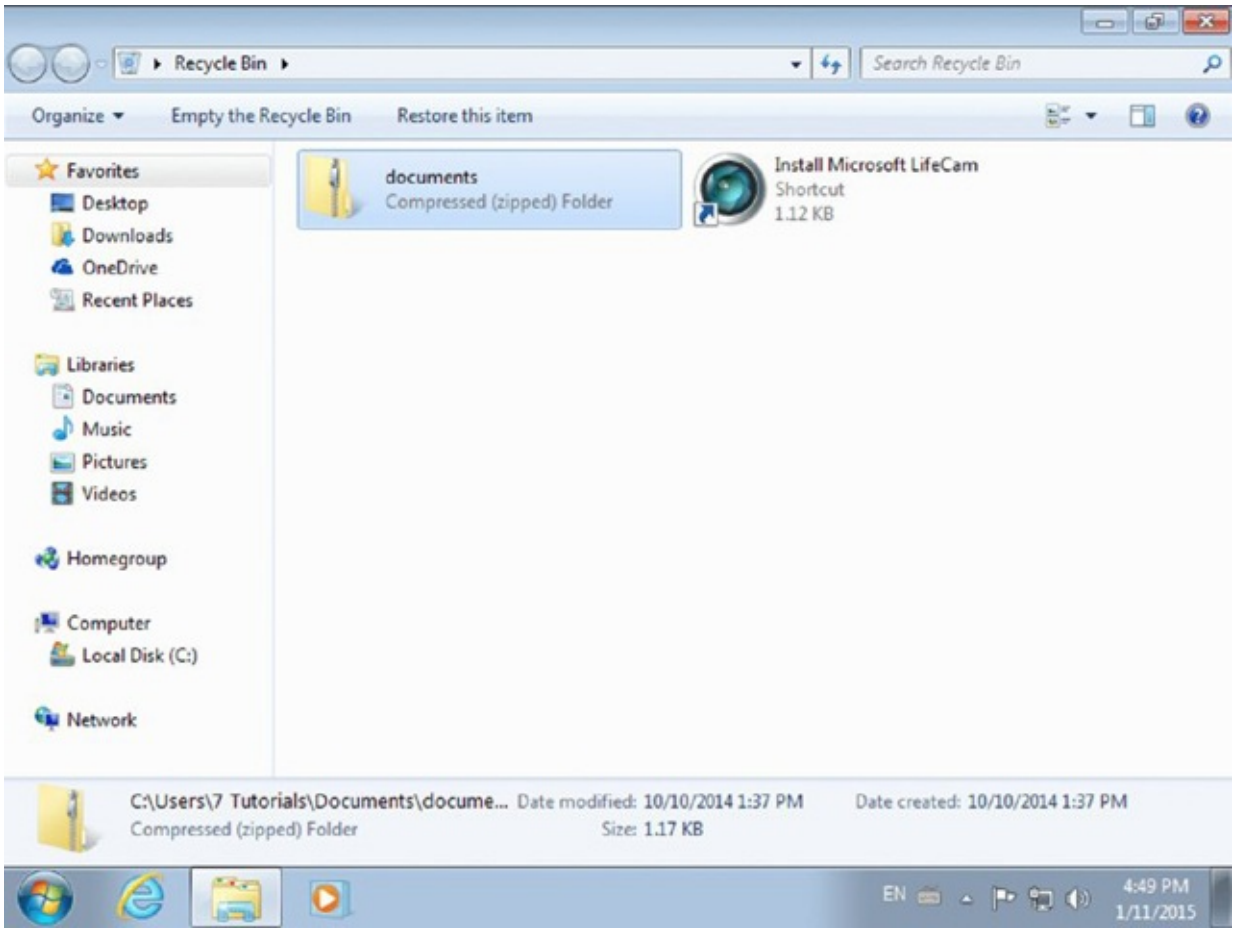


FIGURE 5.3 Viewing the contents of the Recycle Bin

As long as deleted files are found in the Recycle Bin, they continue to take up space on your computer. If you want that space freed up, then you should empty the Recycle Bin so that the space they occupy is unlocked by Windows and used for saving other files on your computer.

If you want to remove a file or folder without having it move to the Recycle Bin and automatically free the space it uses, you should select it in Windows Explorer and then press Shift+Delete on your keyboard. You are then asked if you are sure you want to permanently delete this file (Figure 5.4). Click Yes and the file is deleted for good, without being moved to the Recycle Bin.

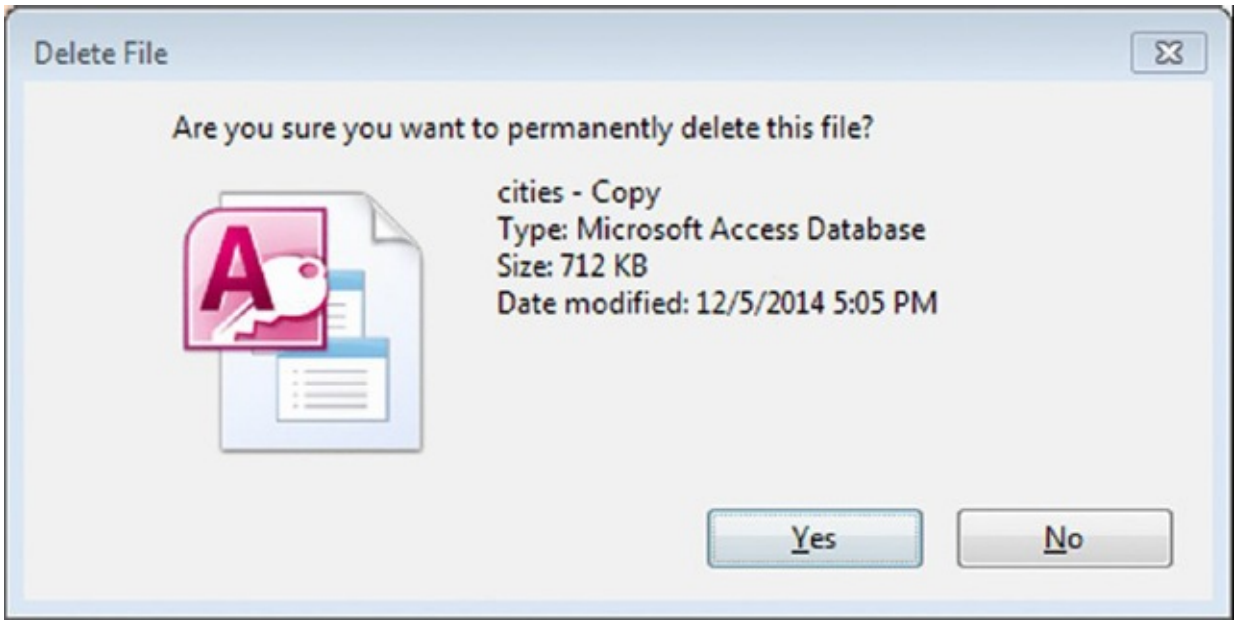


FIGURE 5.4 Deleting a file in Windows

If you then open the Recycle Bin, you will notice that the file you removed with Shift+Delete is not available.

The trouble with deleting files in Windows and any other operating system is that even though you use Shift+Delete, files still remain physically on your computer's hard disk. Yes, the references to them are deleted and they cannot be recovered without using special data-recovery tools like Recuva (http://www.piriform.com/recuva). However, if no files are written on top of them, in the space that they used to physically occupy on the hard disk, they can be easily recovered with appropriate tools.

In order for a file to be completely deleted from your hard disk and completely unrecoverable, you must overwrite the part of the drive containing the data from that file a dozen times with the contents of other files. This is difficult for a computer user to do, and operating systems don't tend to include tools for complete data wiping. That's why a whole niche exists of software applications that specialize in complete data wiping. There are plenty of tools available, both free and commercial. One of the most popular ones is CCleaner Free (http://www.piriform.com/ccleaner). It is a complex application that specializes in finding and removing unnecessary files that take up space on your computer (Figure 5.5). It is also capable of wiping the free space that's available on your computer so that all the data that used to be on it can no longer be recovered.

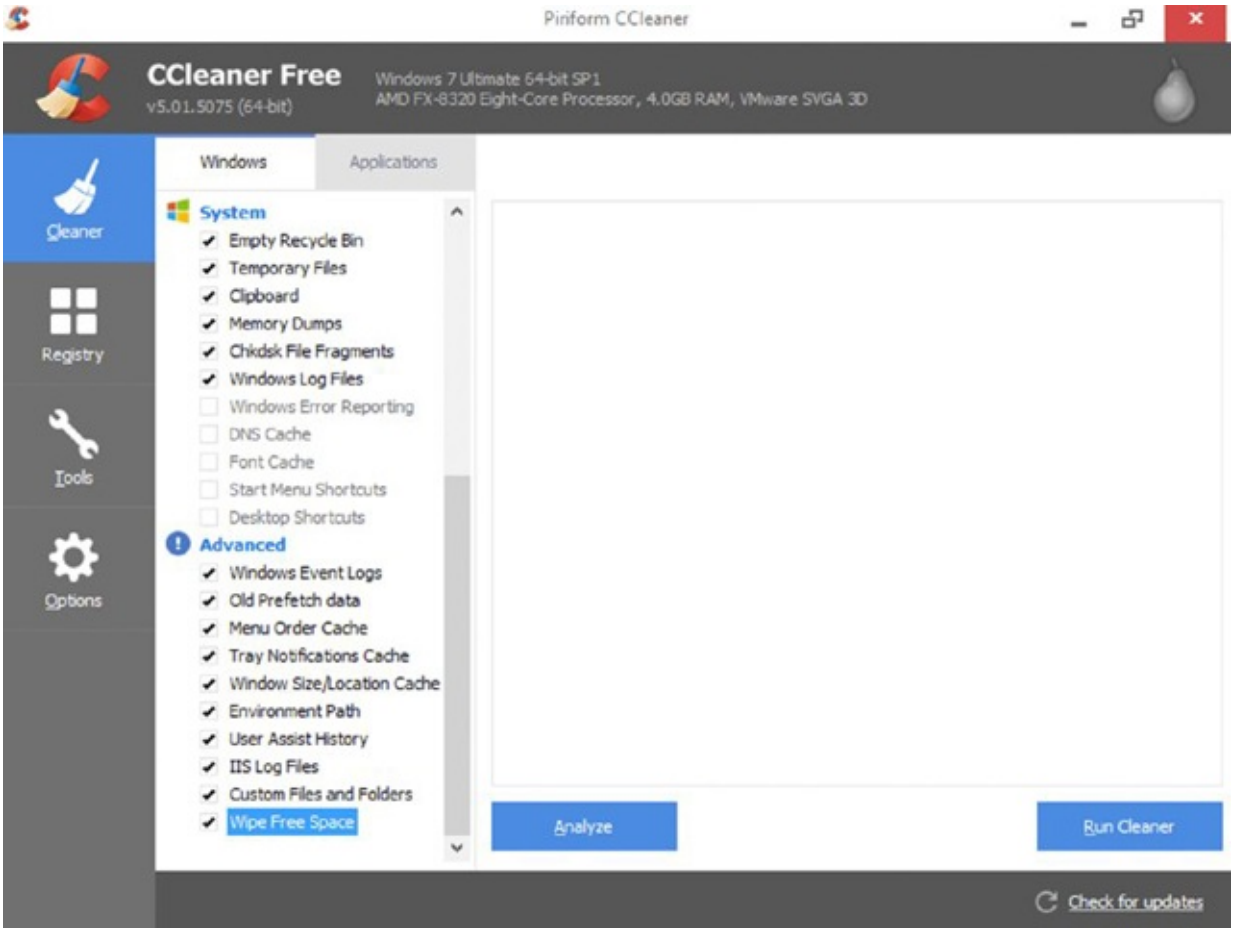


FIGURE 5.5 The CCleaner Free application

Another popular tool is File Shredder (`http://www.fileshredder.org`). This application deletes files and folders in a way that makes them unrecoverable, not even with specialized software (Figure 5.6).

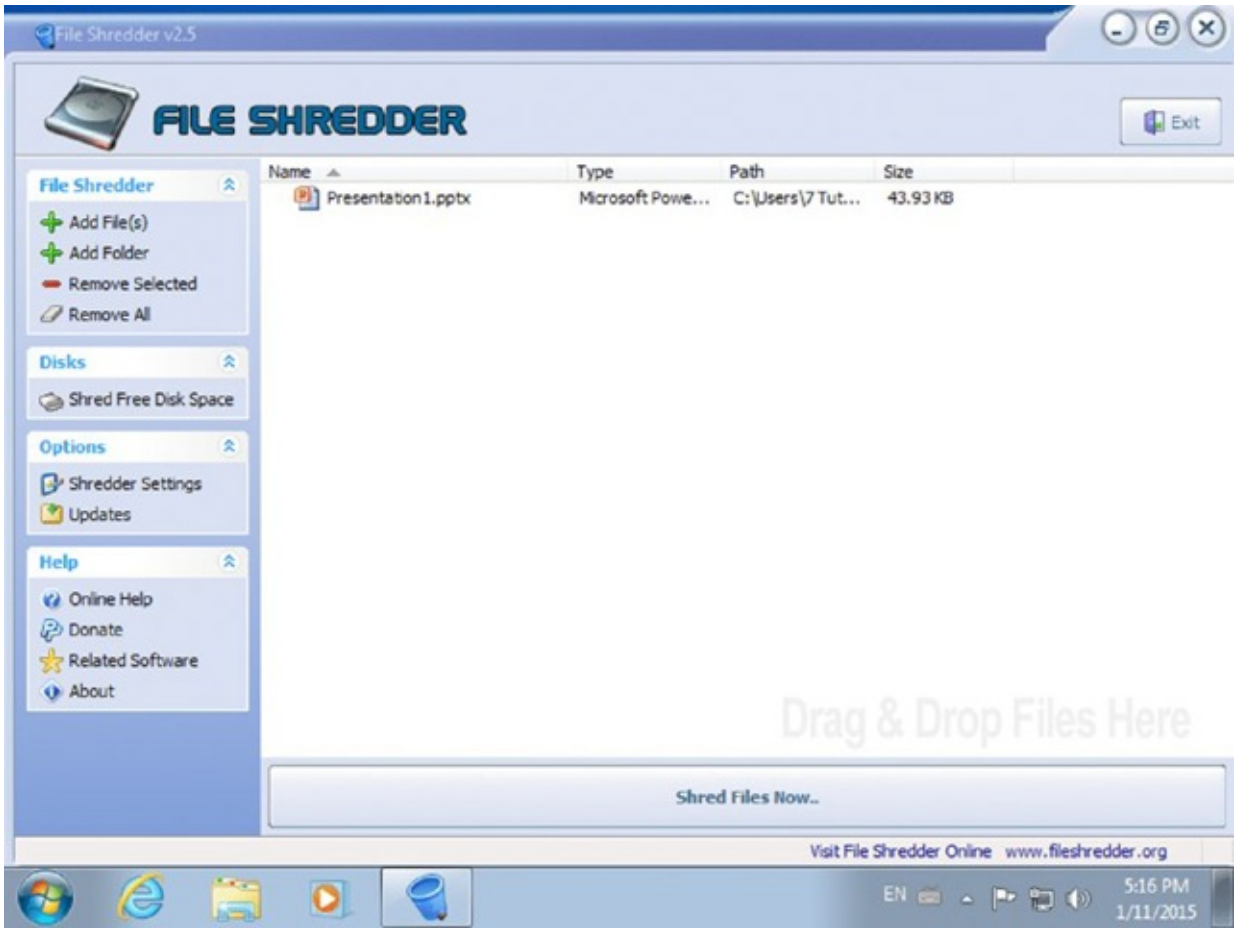


FIGURE 5.6 The File Shredder application

While removing data in a way that makes it unrecoverable by others is important in business environments that work with classified information, you may also want to use similar tools on your personal computers when removing sensitive data.

Keeping Your Computer Safe from Threats and Malware

A good practice for having a safe computing experience on a Windows PC is to keep Windows Update enabled and running automatically in the background at all times. In Chapter 1 of *IC3: Internet and Computing Core Certification Global Standard 4 Study Guide* we discussed the benefits of having your operating system and applications up to date. Also, we showed you how Windows Update helps in having a safe experience and the reasons why you should have it always enabled. Don't hesitate to go through that chapter again and review the section on software and system updates.

Modern operating systems like Windows offer some security tools such as antivirus and firewall protection, but they may not be enough in today's complex technological landscape. That's why it is a good practice to invest in commercial security products like antivirus or Internet security suites. An antivirus actively monitors what is going on with a computer, and if it detects any unusual activity, it blocks it or it informs the user. Antivirus software also regularly scans your computer for malware, and if it finds any infected files, it removes them.

There are also more complex security products called Internet security suites. They include the protection modules offered by antivirus products, as well as firewall protection and other advanced features like ad blockers, virtual keyboards that cannot be intercepted by keyloggers, safe browsing modes for performing protected financial transactions online, and others. To learn more about malware, its potential negative impact, and how to protect yourself from it, don't hesitate to read the section "Protecting Yourself from Malware" from Chapter 3 of *IC3: Internet and Computing Core Certification Global Standard 4 Study Guide*.

The Ergonomics of Using the Computer in a Healthy Way

People all over the world spend a lot of time in front of computers. We use them at work, while on the road, and also at home. Some people may end up spending more than eight hours a day in front of a computer. Because of that, it is very important to pay attention to how you sit in front of a computer and how much you do it.

It is essential to have a workspace that is well organized and arranged so that you have the correct position when using the computer. Also, you should keep an eye on your posture, and don't forget to take breaks on a regular basis. Here are a few things to consider when working in front of a computer and arranging your workspace:

- Use an ergonomic chair that's optimized for computer use.

  When you choose a chair for sitting in front of a computer, you should make sure that it has the following elements: a comfortable cushion to sit on, arm rests for when you aren't typing, the ability to swivel or roll around, adjustable seat height so that you can match the chair to the height of the desk, adjustable back rest height, and lumbar support. The lumbar support is very important because our backs are slightly curved inward, meaning that the chair's back shouldn't be directly vertical. It should support your lower back by coming forward (Figure 5.7).

- Place your keyboard and mouse close together.

  You should position the mouse and keyboard as close together as possible. When positioning the keyboard, pay attention to the keys, not the keyboard. You want the B key to be positioned directly in front of you, in the center of the desk.

- Position the top of the computer's monitor at eye level.

  This will help you avoid tilting your head forward or back, which would stress your neck and shoulder muscles when sitting in front of the computer. You can place your monitor on top of the computer if you need to raise it up to meet this height requirement, or you could manipulate your chair up or down accordingly. With a monitor that is larger than 20 inches (50.8 cm), consider positioning the top of your monitor 3 inches (7.6 cm) above eye level. Also, the screen should be at least 20 inches (50 cm) from your eyes.

- Pay attention to your posture.

  You want to be sitting up, with your back about a 100-degree angle to your legs. Keep your elbows close to your body and your wrists straight. Also, try to keep your shoulders and back relaxed. Your keyboard should be at a level where you don't need to use the armrests.

- Protect your eyes.

  In order to do this, you should first eliminate glare on the monitor. While some monitors can tilt, many can't, and you're likely going to have to solve this problem with strategic lighting placement instead of monitor tweaks.

Another common problem that's related to prolonged computer use is eyestrain. If you experience dizziness, headache, lightheadedness, or twitching/spasms around your eyes, you're likely suffering from eyestrain. Tired or irritated eyes, burning eyes when closed, headache, and even nausea are indications as well. The problem is that most people who experience these symptoms shrug them off as a hard day at the office. Instead, pay attention to the signals your body is sending you and do something about it.

Consider taking frequent breaks. There's rule called *20-20-20* that was made to help people protect their eyes in office environments that involve a lot of sitting in front of the computer. The rule says that for every 20 minutes you spend staring at the computer, you should spend 20 seconds looking at objects 20 feet away—or at least far enough away that your eyes aren't working to focus. While most of us can't get up from the computer every half hour while we work, it is important to stop for a few minutes and do something that doesn't involve looking at the screen. Go get a glass of water, or just do a lap around your cubicle, or talk to a colleague. Your eyes will thank you.

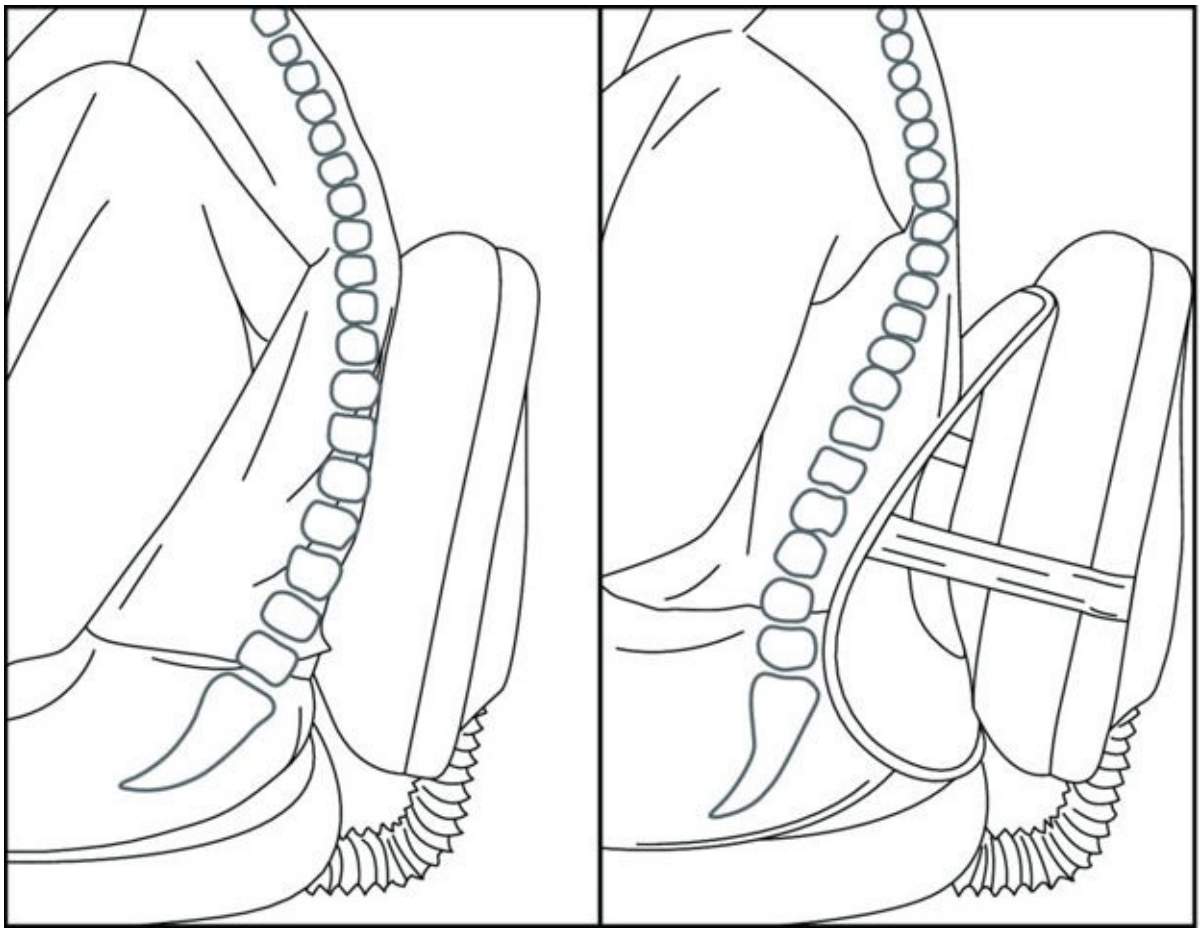


FIGURE 5.7 Lumbar support (on the right) versus missing lumbar support (on the left)

Common Problems That Are Generated by Incorrect Computer Use and Posture

It doesn’t matter how ergonomic your desk may be, you still need to be mindful of your body when you work or you’ll never reap the benefits of your properly set-up workspace. For example, if you don’t pay attention to your posture and you slouch in front of the computer, over a period of time this may have a long-lasting impact upon your posture. Developing and maintaining the correct habits can go a long way in avoiding chronic pains associated with poor posture.

Long-term computer users may also suffer from *repetitive strain injury (RSI)*, which is a common condition where pain and other symptoms occur in an area of the body that has done repetitive tasks, such as the arms or the hands. It is usually related to a task or occupation, but leisure activities can also be a cause, including sports overuse. Unlike a normal strain following a sudden injury, symptoms of RSI can persist well beyond the time it would take symptoms of a normal strain to ease. The main cause is frequent and repetitive movements of a part of the body, for example, typing, using a computer mouse a lot, and so on.

Other factors may contribute, such as poor posture while doing the movement, using excessive force to perform the task, and not taking enough breaks from the task. Some research suggests that psychosocial workplace factors (like stress) can also contribute to RSI. Symptoms in the affected area can include pain, tightness, dull ache, throbbing, numbness, or tingling. The symptoms tend to develop gradually. At first the symptoms may occur only while you do the repetitive task and ease off when you rest. In time the symptoms can be present all the time but tend to be made worse by doing the repetitive task. If you have these symptoms, you should see a doctor. The earlier the problem is recognized and dealt with, the better the outcome.

Summary

An important part of being a digital citizen who uses the Web and the Internet on a daily basis is knowing how to protect yourself. Many people will try to learn personal and financial information about you in order to use it for all kinds of malicious activities. Others may try to extort money from you through numerous means, including computer viruses. Knowing and applying the basics about how to protect yourself when online will do you a world of good. That’s why you should follow the recommendations that we shared at the beginning of this chapter.

Unfortunately, when we use computers we tend to ignore things like good posture, setting up our workspace so that we have the correct body position when working on the computer, and so on. That’s why, in this chapter, we have given you several recommendations for setting up your workspace correctly and maintaining good posture in front of the computer. Using these recommendations will go a long way toward avoiding health issues caused by long-term computer use.

Finally, we also discussed the most common health issues that are experienced by computer users so that you can recognize them in case you start suffering from them and can take corrective action as early as possible.

In the next chapter we will discuss the use of search engines on the Web, how to find the information that you need, finding trusted sources, and more.

Exam Essentials

Understand how to protect yourself when online. Know and apply the principles we shared for protecting your identity when online.

Know how to remove data from your computer. You should know how deletion works, how to delete files from your computer, and the tools that you can use to make sure that your deleted data is no longer recoverable.

Learn how to set up your workspace correctly. In order to avoid health problems, you should learn how to set up your workspace, position your computer, use the correct posture, and so on. This will help you avoid health problems caused by incorrect computer use.

Know common health problems caused by incorrect computer use. Know the common health problems that are caused by incorrect computer use so that you recognize them early and take action, in case you have similar issues.

Key Terms

Before you take the exam, be certain you are familiar with the following terms:

20-20-20	Recycle Bin
BitLocker	repetitive strain injury (RSI)

Review Questions

1. Which of the following are examples of what not to do when online? (Choose all that apply.)
   A. Use the same password for all your email accounts.
   B. Share your home address publicly on Facebook or Internet forums.
   C. Use passwords of eight characters or more, which include both lowercase and uppercase letters as well as numbers and symbols.
   D. Reply to emails from people you don’t know, promising an incredible deal.
2. Which of the following are good recommendations for protecting your financial data? (Choose all that apply.)
   A. Make purchases only on websites that use HTTPS.
   B. Make purchases when connected to public wireless networks.
   C. Purchase online only things that you like.
   D. Don’t share your credit card details with others online.
3. Which of the following are examples of protecting the data on your computer? (Choose all that apply.)
   A. Using a strong password for your user account
   B. Using encryption tools like BitLocker
   C. Creating a backup system with Backup and Restore
   D. Deleting the data on your computer
4. What happens when you select a file, press Delete on your keyboard, and confirm that you want to delete the file? (Choose all that apply.)
   A. The file is removed from your computer.
   B. The file can no longer be recovered.
   C. The file remains on your hard disk, using up disk space.
   D. The file is moved to the Recycle Bin, where you can recover it if needed.
5. Which of the following are characteristics of the Recycle Bin? (Choose all that apply.)
   A. A place where Windows stores recovered files
   B. A place where Windows stores references to deleted files and folders
   C. A folder from where you can recover deleted files
   D. A folder used for recycling files
6. How do you delete a file without moving it to the Recycle Bin?
   A. Select the file and press Delete on your keyboard.

B. Right-click the file and then click Delete.

C. Select the file and press Shift+Delete on your keyboard.

D. Select the file and press Ctrl+Delete on your keyboard.

7. Which of the following are ways of completely removing a file from your computer so that it can no longer be recovered? (Choose all that apply.)

   A. Select the file and press Shift+Delete on your keyboard.

   B. Select the file, press Shift+Delete on your keyboard, and overwrite that part of the drive a dozen of times with the contents of other files.

   C. Use an application like CCleaner or File Shredder to wipe the free space on your hard disk several times so that deleted data is no longer recoverable.

   D. Empty the Recycle Bin.

8. Which of the following are characteristics of an ergonomic chair? (Choose all that apply.)

   A. It is black and it looks great.

   B. It has a comfortable cushion.

   C. It has lumbar support.

   D. It has adjustable height and back rest height.

9. How should you position the computer monitor on your desk? (Choose all that apply.)

   A. Position it at eye level.

   B. Place it directly on your desk.

   C. If the computer measures 20 inches or more, position the top of it 3 inches above eye level.

   D. Place it at least 20 inches from your eyes.

10. What does the 20-20-20 rule stand for?

    A. For every 20 days spent working on a computer, take 20 days off doing 20 things that do not involve using a computer.

    B. For every 20 minutes spent staring at the computer, spend 20 seconds looking at 20 objects.

    C. For every 20 minutes spent staring at the computer, spend 20 minutes taking a break.

    D. For every 20 minutes spent staring at the computer, spend 20 seconds looking at objects 20 feet away.

Chapter 6
Searching the World Wide Web

THE FOLLOWING IC3: LIVING ONLINE EXAM OBJECTIVES ARE COVERED IN THIS CHAPTER:

- ✓ **Using Search Engines**
  - Explain how to use search engines to acquire information. The value of the resources available on the internet.
  - Demonstrate how to use search engines to answer questions and solve problems by using good search terms to get specific information from reputable sources.
- ✓ **Evaluate Search Results**
  - Forums
    - Explain the value and problems with internet forums.
  - Explain that ads are paid messages from companies that want to interest you in their products. Messages are not necessarily factual.
  - Explain that sponsored links are a form of advertising and not to be relied on as an informational resource.
  - Explain that a knowledge base is a collection of data around a particular subject. Include examples like Help menus available from software and hard good manufacturers.
  - Explain how to determine the validity of various sources, including but not limited to domain names/domain, published journals, government sites and documents vs. forums, blogs, personal websites.
  - Explain that articles can be both factual and made up. Articles are created for a number of reasons including, reviews of products that may or may not have been given to the reviewer, personal opinion, or well researched documenting of fact.
- ✓ **Using Advanced Features of Search Engines**
  - Search types

We have arrived at the last chapter of this book, and it’s time to talk about finding information online. The Web is a huge place that’s growing every day. Finding information online can be a challenge, even if you are using a good search engine like Google or Bing. That’s why we will show you how to make effective searches online and how to create more advanced queries using things like symbols and operators so that

you can find what you need more easily. We will also show you how to search for files online, not just information. As you will see, the procedure involved when searching for files is not that different from searching for information.

Toward the end of the chapter we will discuss concepts like online advertisement and the most common forms of advertising that are found on the Web. We will also show how you can block many ads that you find online.

Finally, we will talk about finding information on Internet forums and knowledge bases. Then, we will share some principles that you can use to validate the information that you find online to make sure that it is as complete and as accurate as possible.

Using Search Engines to Find Information Online

One of the most common ways of finding information online is through the use of a *search engine*. This is a software system in a web browser that is designed to search for information on the Web. In order to use a search engine, you need to type what you want to learn, press Enter, and then review the results that are displayed. Search results can be a mix of web pages, images, videos, and other types of files and information.

The first search engine that appeared on the Web was the W3Catalog, which was released on September 1993. It was a very primitive engine that periodically mirrored pages that existed on the Web at that time and rewrote them into a standard format that could be used for performing searches and finding information. Since then, many search engines have been created, and today's most important engines are Google, Baidu (it serves only China), Bing, and Yahoo!.

In order to use a search engine, you must visit its page and then type what you want to find. You can type a word or more, a full sentence, or a question describing what you are looking for. As you type, search engines make suggestions for popular keywords that are used by others, which may help you fine-tune your search. When you have finished typing, press Enter and review the list of results. Generally, for each search result, you are shown a title, the URL of the page, and a small description.

In Exercise 6.1 you will learn how to make a simple search using Google.

EXERCISE 6.1

Searching the Web Using Google

1. Click the Internet Explorer shortcut on the Windows taskbar.
2. In the Address bar at the top of the Internet Explorer window, type **google.com** and press Enter on your keyboard (Figure 6.1).
3. Type **windows 7 tutorials** as the key words for your search (Figure 6.2).

   Notice how Google automatically suggests other popular key words to fine-tune your search and automatically loads search results that are appropriate to the key words that you are using.
4. When finished typing, press Enter on your keyboard.
5. Look at the information displayed for each search result.
6. Click the first search result that is displayed by Google.
7. Close Internet Explorer.

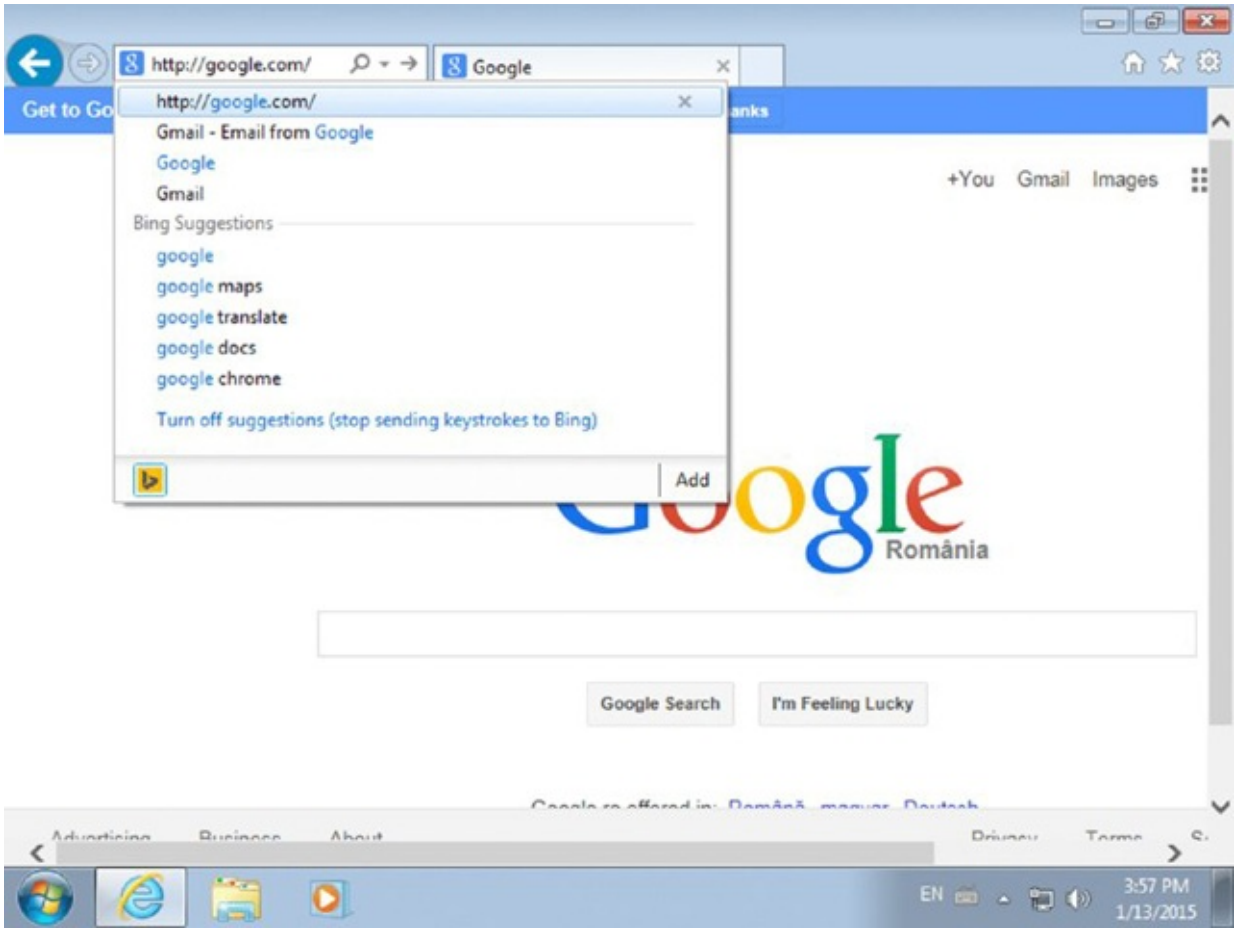


FIGURE 6.1 Typing google.com in Internet Explorer's Address bar

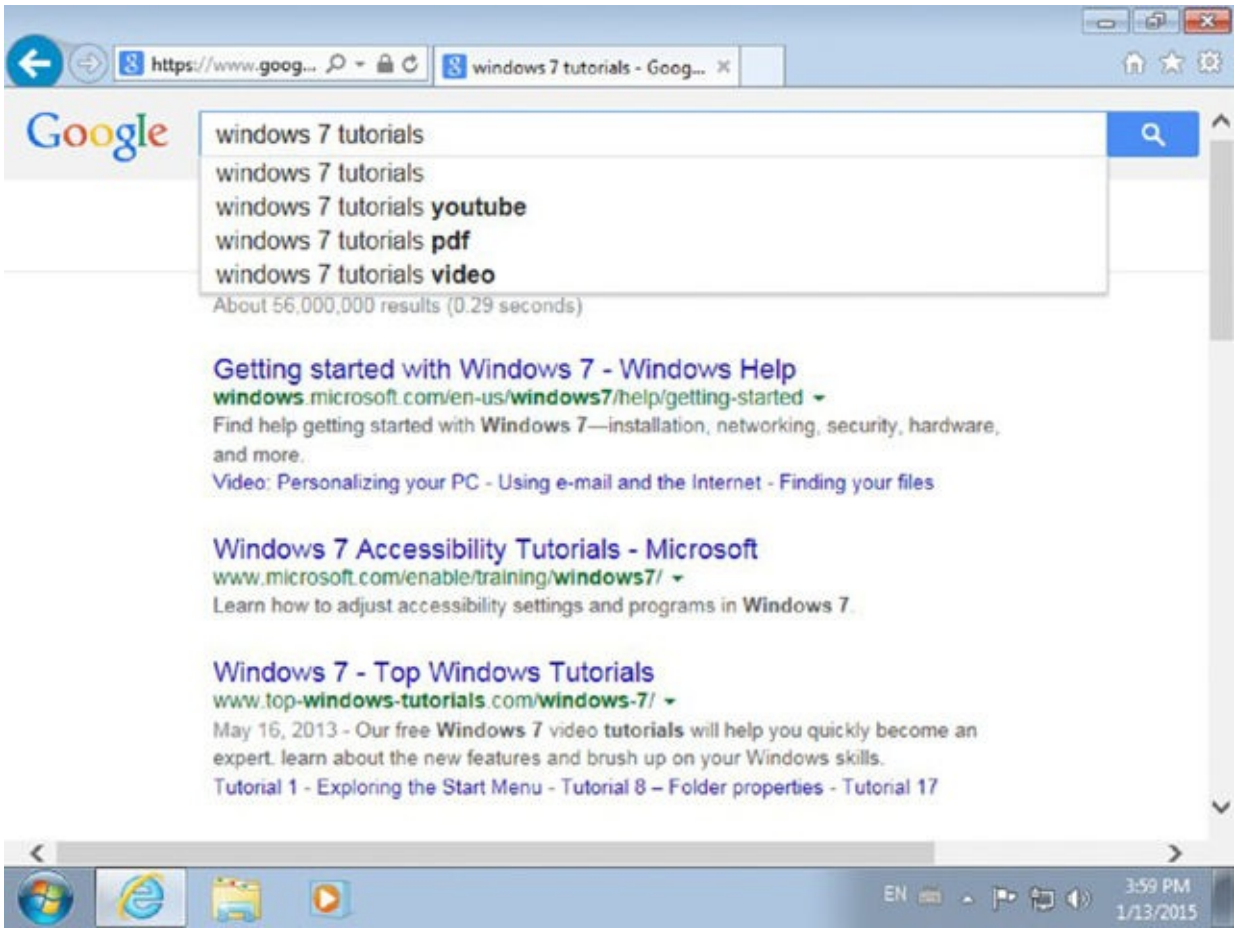


FIGURE 6.2 Searching for windows 7 tutorials on Google

We mentioned earlier that there are many search engines available on the Web. To familiarize you with the concept of making simple web searches, Exercise 6.2 will share how to make a search using Bing, Microsoft's search engine.

EXERCISE 6.2

Searching the Web Using Bing

1. Click the Internet Explorer shortcut on the Windows taskbar.
2. In the Address bar at the top of the Internet Explorer window, type **bing.com** and press Enter on your keyboard (Figure 6.3).
3. Type **windows 7 tutorials** as the key words for your search (Figure 6.4).

   Notice how Bing automatically suggests other popular key words to fine-tune your search.
4. When finished typing, press Enter on your keyboard.
5. Look at the information displayed for each search result.
6. Click the first search result that is displayed by Bing.
7. Close Internet Explorer.

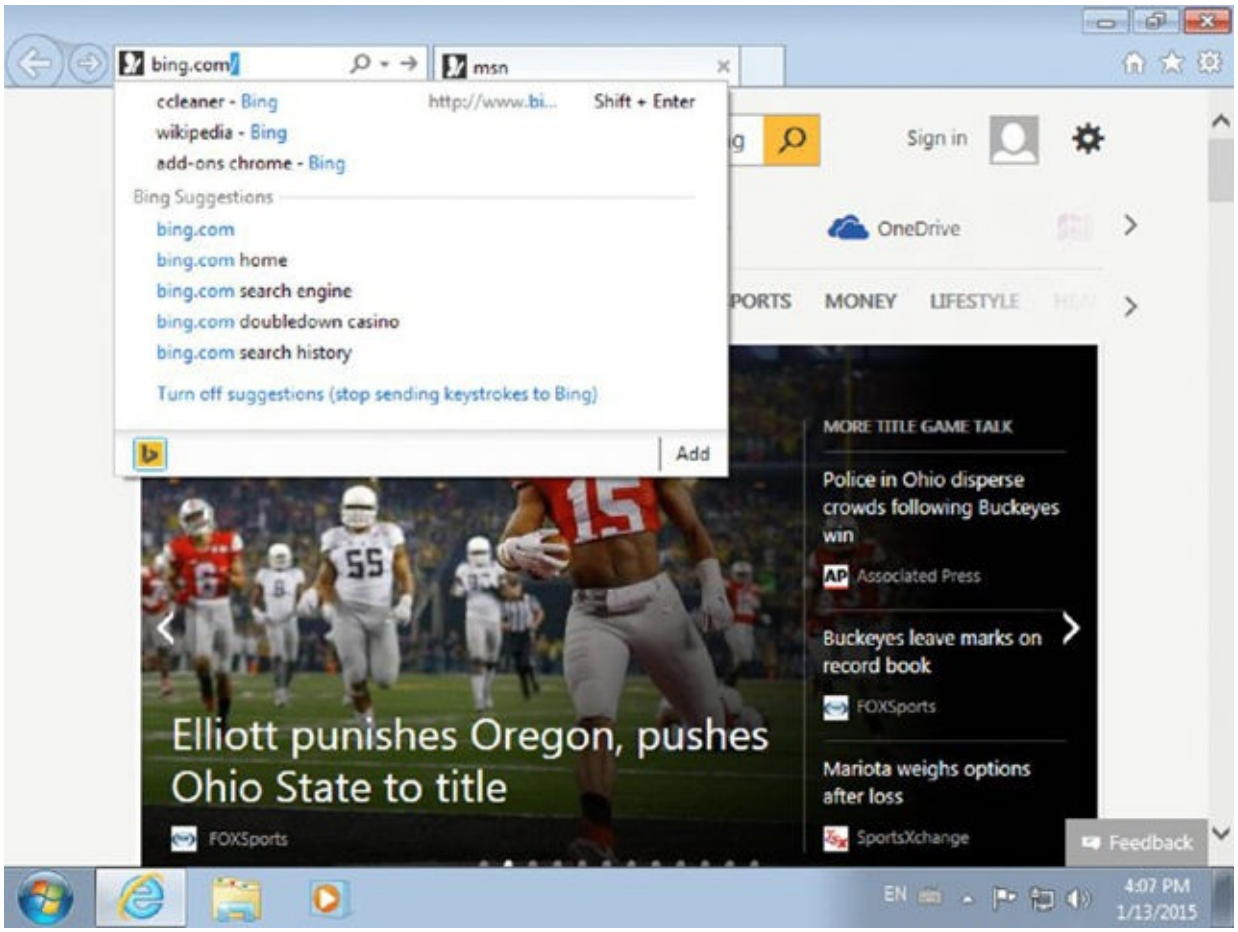


FIGURE 6.3 Typing bing.com in Internet Explorer's Address bar

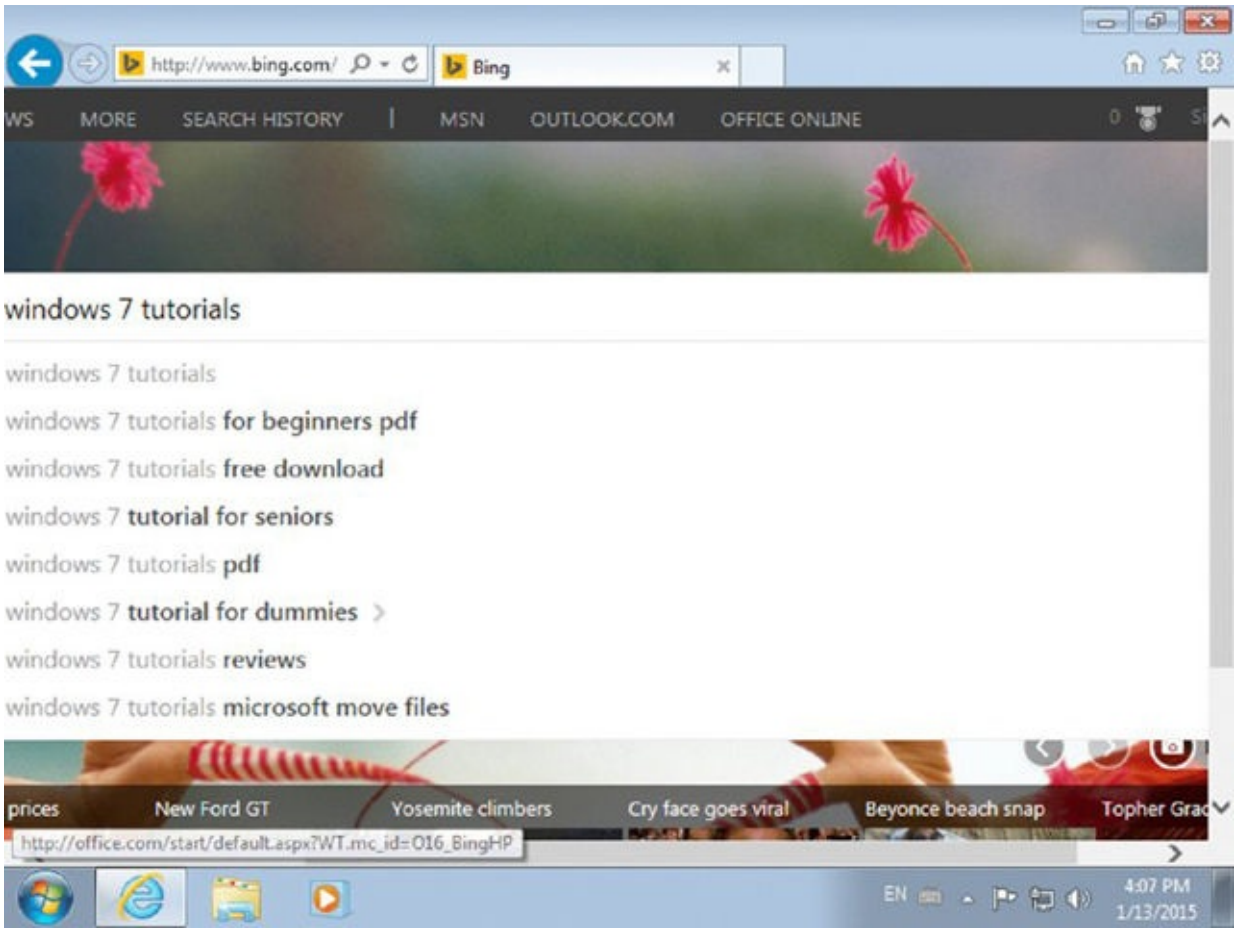


FIGURE 6.4 Searching for windows 7 tutorials on Bing

As you can see from these two simple exercises, the way search engines function is very similar. Yes, they look different and sometimes display different search results, but the process for finding information is the same.

Performing Advanced Searches Using Symbols and Search Operators

Very few people know that modern search engines allow you to create advanced searches using symbols or search operators, which allow you to get very specific results. Since Google is the most popular search engine, let's take a look at what symbols you can use and what they do when making a search:

+ (plus sign) Search for Google+ pages or blood types. Examples: **+Chrome** and **AB+.**

@ Find social tags. Example: **@ciprianrusen** returns my Twitter account.

$ Find prices. Example: **Samsung $400.**

Find popular hashtags for trending topics on social networks like Twitter. Example: **#blackfriday.**

- (minus sign) It can be used to remove words or to connect words. When you use a dash before a word or a site, it excludes results that include that word or site. This is useful for words with multiple meanings, like Jaguar the car brand and jaguar the animal. Examples: **jaguar speed -car** and **dogs -site:wikipedia.org**. When the dash is in between multiple words, the search engine will know the words are strongly connected. Example: **two-year-old cat**.

_ (underscore) Connect two words like **quick_sort**. Your search results will find this pair of words either linked together (quicksort) or connected by an underscore (quick_sort).

" " (quotes) When you put a word or phrase in quotes, the results will include only pages with the same words in the same order as what's inside the quotes. Example: **"Not everyone can become a great artist, but a great artist can come from anywhere."**

*** (asterisk)** Add an asterisk as a placeholder for any unknown or wildcard terms. Use with quotation marks to find variations of that exact phrase or to remember words in the middle of a phrase. Example: **"a * saved is a * earned."**

.. (two dots) Separate numbers by two periods without spaces (..) to see results that contain numbers in a given range of things like dates, prices, and measurements. Example: **smartphone $100..$200**.

Some of the symbols mentioned in the list also work on other search engines like Bing in the same way, while others do not.

Earlier, we mentioned the term *search operators*. They are words that can be added to searches to help narrow down your results. Here are the search operators that work with most search engines:

site Get results from certain sites or domains. For example, you can find all mentions of *football* on the CNN website by typing **football site:cnn.com**.

link Find pages that link to a certain page. For example, you can find all the pages that link to wikipedia.org by typing **link:wikipedia.org**.

related Find sites that are similar to a URL you already know. If you search for related sites to the nytimes.com, you'll find other news publication sites you may be interested in.

Example: **related:nytimes.com**.

OR If you want to search for pages that may have just one of several words, include OR between the words. Without the OR, your results would typically show only pages that match both terms. Example: **Olympics location 2016 OR 2020**.

info Get information about a URL, including the cached version of the page, similar pages, and pages that link to the site. Example: **info:microsoft.com**.

When you search using operators that include a colon (:), don’t add any spaces between the operator and your search terms. For example, a search for **site:microsoft.com** will work, but **site: microsoft.com** will not. OR is the only exception to this rule.

Searching for Files Online

You can also search for files online. For example, you may want to find pictures of a certain person like a movie star, or you may want to find the video of a hit from your favorite band, or you may want to find the latest album of a band you like. All this is possible with the help of search engines.

When you make a search, your results are split by type into several tabs: Web, Images, News, Videos, Maps, and so on. Let's assume that you are working on a paper and you need to find information about the American president Barack Obama. At first, when you type his name, you get a list of web pages that are talking about him. If you click the Images tab, you'll get a gallery with pictures of him and his family (Figure 6.5). If you click the Videos tab, you'll get a list of videos with Barack Obama.

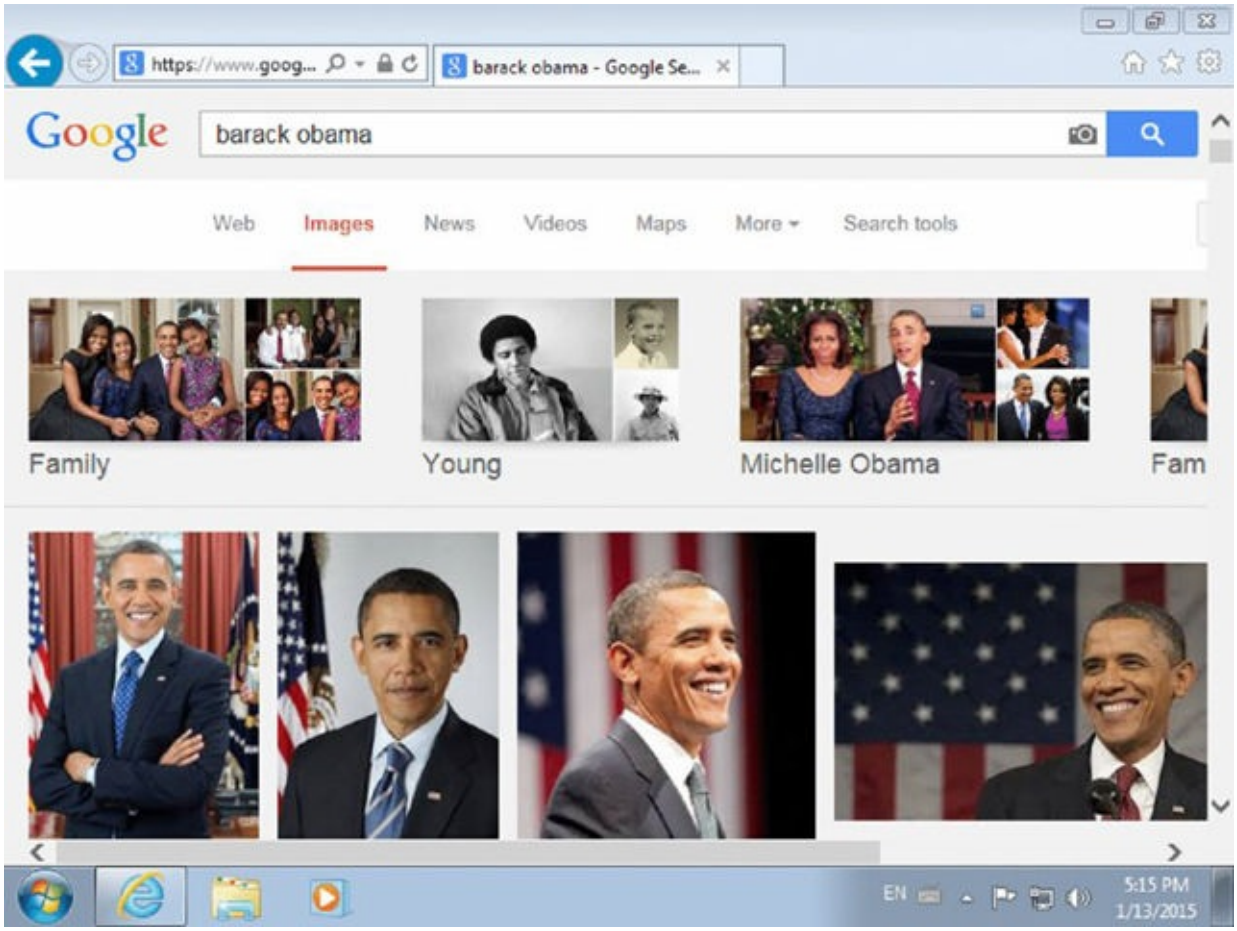


FIGURE 6.5 Searching for pictures of Barack Obama

If you are interested in finding only a specific type of files, like pictures or videos, you can also use websites that are specialized databases of that type of files. For example, `https://www.flickr.com/` is one of the world's largest databases of pictures and images taken by people all over the world (Figure 6.6). You can use it not only to publish and store your own pictures but also to find pictures made by others. You type the keywords that you are interested in and press Enter, and then you will get access to thousands of pictures that are representative for your search.

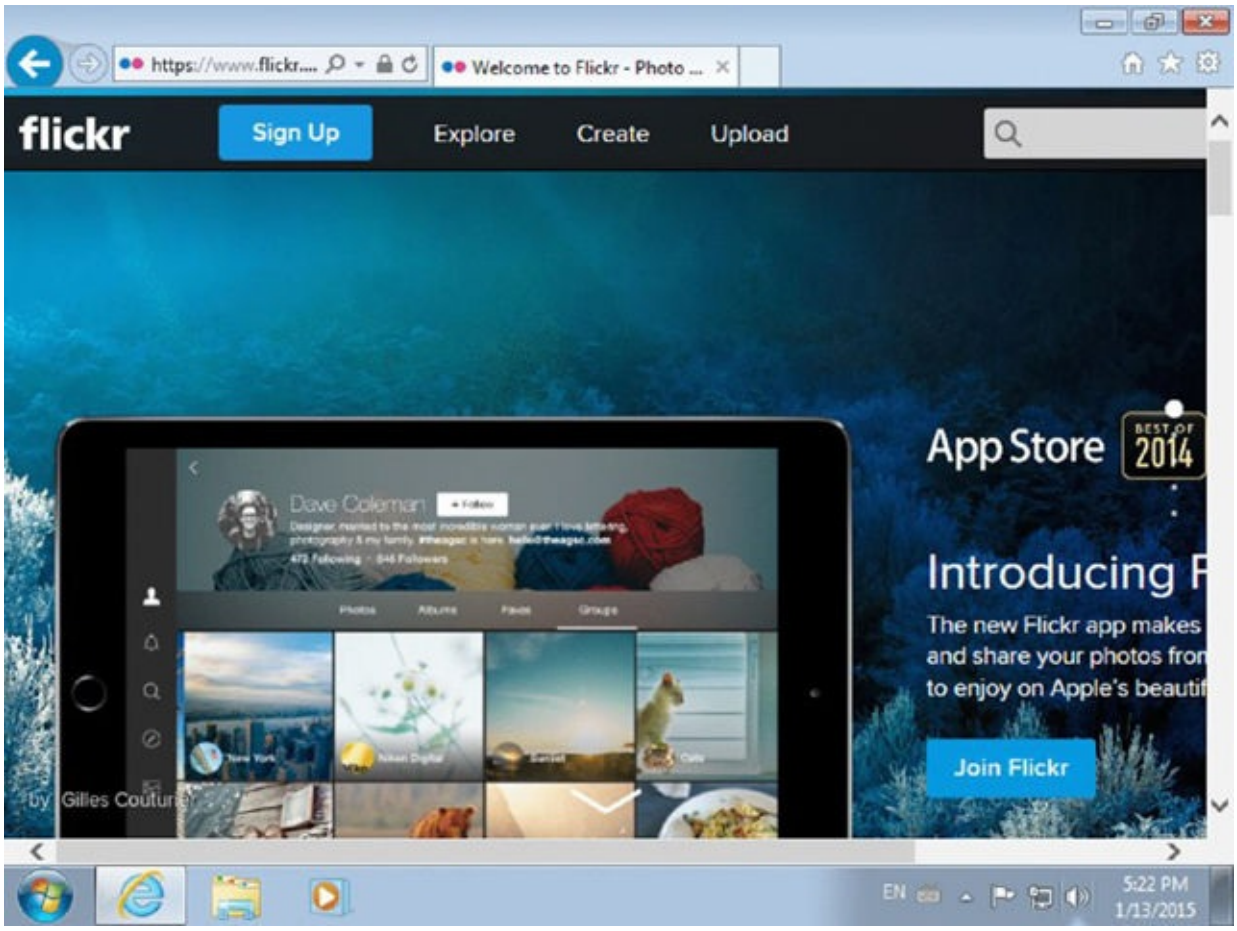


FIGURE 6.6 A screenshot of Flickr.com

If you are looking for video content, YouTube and Vimeo are some of the best locations on the Web. Visit https://www.youtube.com/ or https://vimeo.com/ and search for the videos that interest you (Figure 6.7). Many artists launch their official videos for their songs on YouTube, and you can use this website to stay up to date with their work. You can also find how-to guides, movie trailers, and all kinds of video content. The principles that you use for searching video content on these websites are the same as those used by search engines.

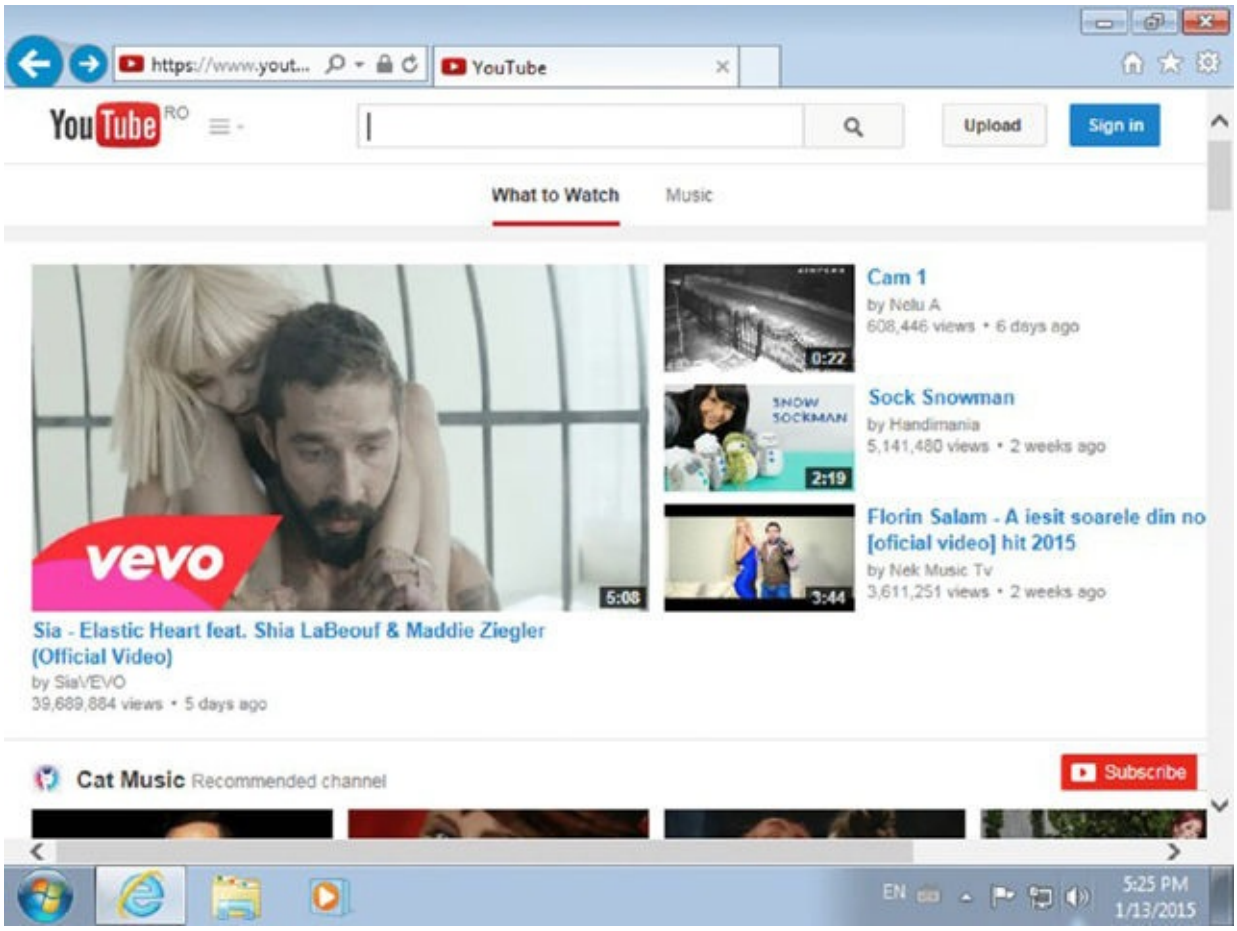


FIGURE 6.7 A screenshot of YouTube

Dealing with Online Advertisements

We see ads every day: on the subway, in airports, in train stations, on streets, and also on TV. As soon as the Web gained in popularity and number of users, ads also moved online. They take many forms and shapes, and you encounter them on almost every website.

For starters, you encounter ads and sponsored links when using a search engine like Google or Bing (Figure 6.8). For example, if you search for “buy a computer,” you will first see a long list of search results that are ads or sponsored links. These results are marked with the word *Ad*, and they are presented differently when compared to search results that are not paid for by a company or another organization.

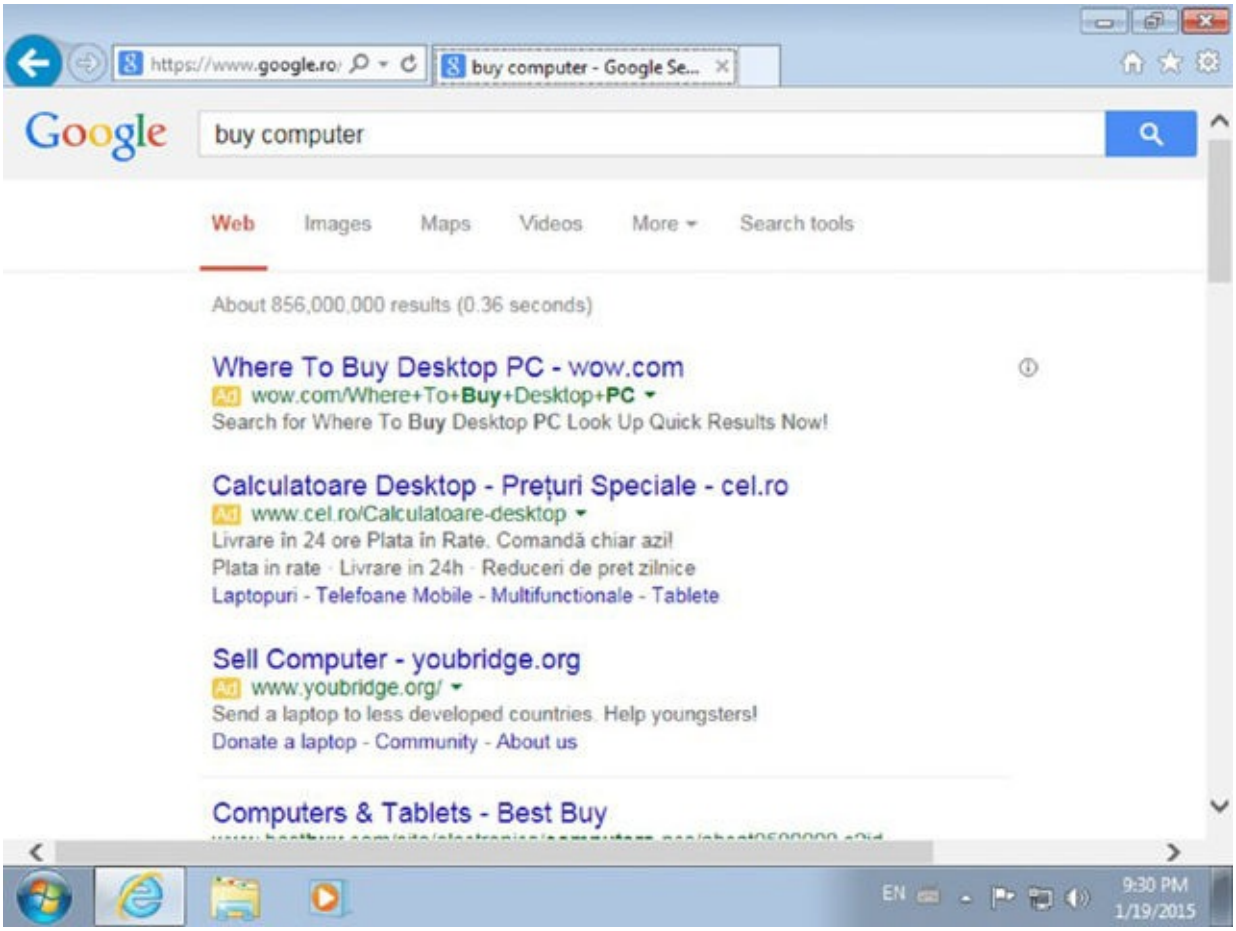


FIGURE 6.8 Ads displayed by Google when searching online

While clicking ads returned by a search engine will take you to relevant web pages, they are not necessarily the best result for your search. In the end they are commercial offerings that are sponsored by a certain company. The best offer may be found on another site that did not pay for a sponsored link to show up in your search results. That’s why it is best to scroll down a bit and also check some of the unsponsored results that are returned.

Another form of advertising that’s often encountered on the Web is sponsored posts. Some websites correctly highlight these posts as being sponsored while others do not. Sponsored posts can be informational articles that present a product or service made by a company, or they can be one of their special offers. They tend to present what is being sold in a flattering manner in order to convince the reader or the viewer to buy. It is best to take sponsored posts with a grain of salt and document your results from other sources before purchasing what is being sold.

Another popular format for advertising is the *web banner* or *banner ad*. This is basically an advertisement that is embedded into a web page. Web banners are used to attract traffic to the website of the advertiser. Web banners function the same way as traditional advertisements: notifying consumers of the product or service and presenting reasons why the consumer should choose the product in question. When the advertiser detects that a web user has visited the advertiser's site from the content site by clicking the banner ad, the advertiser sends the content provider a small amount of money. This is a very common monetization method used by websites around the world.

Banner ads come in all kinds of shapes and sizes, which are optimized for the web page that is viewed and the size of the display the user is using. Unfortunately, many websites choose to add so many web banners on their web pages that users find them highly frustrating. As a result, ad blockers have been created. They can be manually installed by users so that banners are automatically blocked when browsing the Web. The most popular ad blocker is Adblock Plus (`https://adblockplus.org/`). It works with all web browsers, and it can be easily installed and used by anyone.

Unfortunately there's also a downside to using ad blockers—they are so effective that they cause financial problems to the websites that are using ad banners as a way of financing their work. If everyone were to use ad blockers when browsing the Web, many websites would go bankrupt and would not be able to generate revenue from their work.

A good principle for using products like Adblock Plus is to enable it only for those websites that overuse banner ads and provide a bad user experience because of them. Disable it for those websites that provide a good user experience and valuable content.

Finding Valuable Information on Internet Forums and Knowledge Bases

When you search for solutions to all kinds of problems, especially those that are computer related, you will often find great information in more unusual places like Internet forums and knowledge bases.

An *Internet forum* or *message board* is a discussion site where people can hold conversations in the form of posted messages. These messages are automatically stored and displayed by the site in a conversation-like format. Forums have a specific jargon associated with them. For example, a single conversation is called a *thread*, or topic. A forum can contain a number of *subforums*, each of which may have several topics. Within a forum's topic, each new discussion started is a thread, and it can be replied to by any number of people. Depending on the forum's settings, users can be anonymous or have to register and then subsequently log in to post messages. On most forums, users do not have to log in to read existing messages.

Forums tend to be specialized based on interests; whatever your heart desires, there's probably a forum dedicated to it. Many companies tend to use forums in order to provide support to their customers. For example, Microsoft uses their Microsoft Answers forums (`http://answers.microsoft.com`) to provide support to customers using products like Windows, Microsoft Office, and so on. If you are having issues with any of their products, all you have to do is to register an account, log in, and post your questions.

However, when posting on Internet forums, be mindful of the basic communication rules that were shared in Chapter 4. Be polite, don't flame other users, and describe your problem(s) as clearly and as completely as possible so that you get to the desired resolution as soon as possible.

A *knowledge base* is a way of storing complex data about a computer system or product in a structured format that's easily accessible to a computer user. Knowledge bases can be found both on the Web in the form of websites that are created to store data about a product or on your computer in the form of help files that are installed by the applications that you are using. Their main purpose is to help users understand how to use a product when they cannot figure it out on their own. For example, when you use any Microsoft Office application, if you press F1 on your keyboard, you will access its Help documentation (Figure 6.9). You can search for what you are trying to do with that application, and Help will return information from its database. The Help from Microsoft Office is a knowledge base. Many other applications have similar knowledge bases, and they can generally be accessed by pressing F1 on your keyboard.

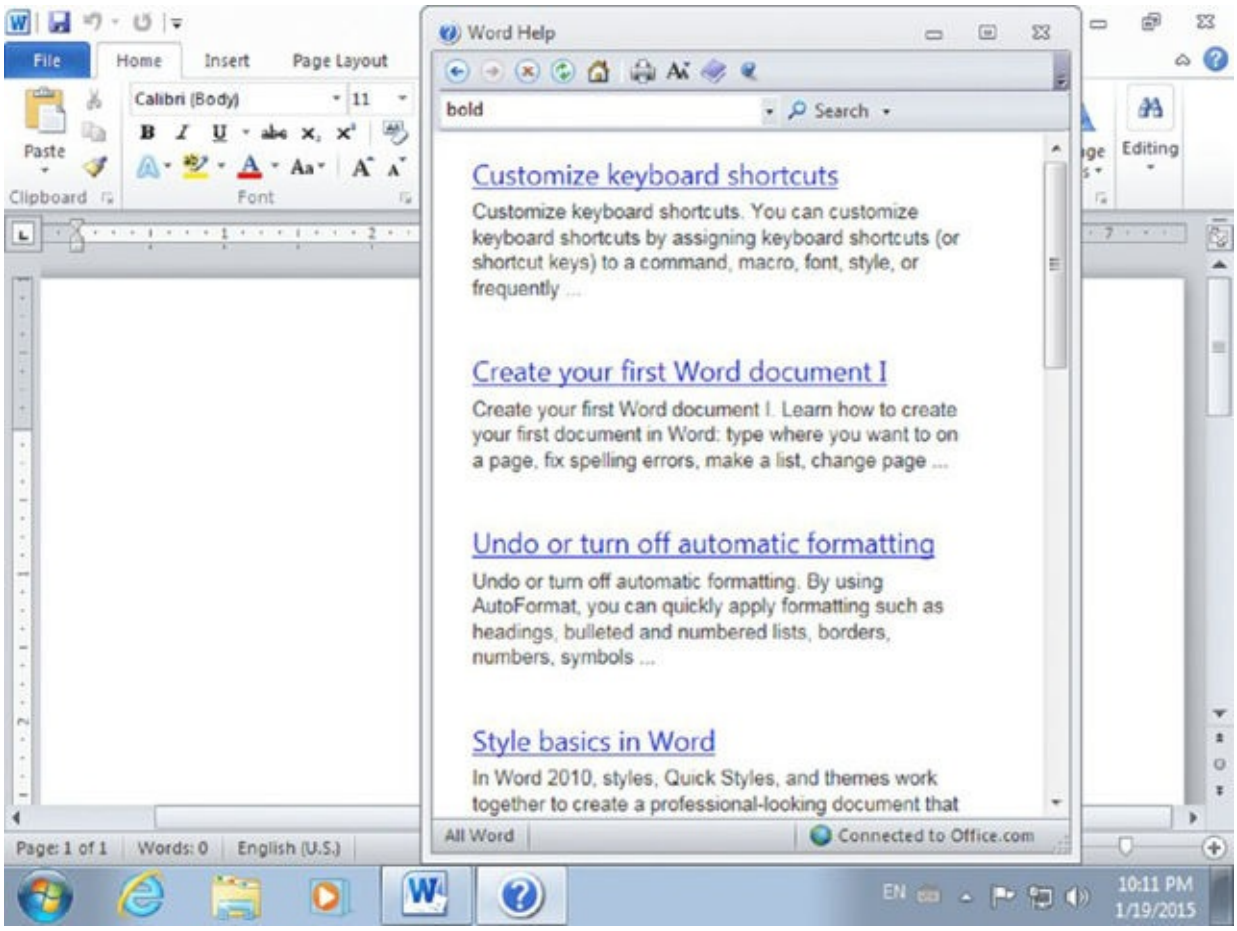


FIGURE 6.9 The Help for Microsoft Word

Some software manufacturers have moved their knowledge bases online. Therefore, when you press F1 on your keyboard, a website loads with the complete documentation that is available for their product.

Evaluating the Information That You Find on the Web

When browsing the Web, you will find tons of information. Knowing whether an item is true or false can be quite a challenge. Also, some information might be incomplete, or it may present the perspective and the interests of a certain group and ignore the others. Just like news channels on TV, many websites present information in a way that represents the interests of a certain group or entity, while few will be truly neutral and present all facts from an impartial perspective.

So, who do you believe on the Web? That's a tough question to ask, and nobody can answer it with 100 percent accuracy. But, to help you out, let's share a couple of principles that will certainly be useful:

- Don't read news just from one source.

  Try to follow more than one news site that covers similar subjects. This way you will have more information and you will receive more than one perspective on the topics that interest you.

- Read more than one review of the same product.

  Reviews online can be legitimate but also paid or fake. For example, many companies buy positive reviews on less-reputable websites that try to fool people into buying certain products or services. Some small websites without many resources publish fake reviews without having access to the product that they are reviewing. They make up reviews based on user comments found online, the description, and the specifications of the product they pretend to be reviewing. That's why it is best to read more than one review of the same product before purchasing it and to check reviews on more reputable websites that have a history of publishing relevant reviews.

- Many articles online are jokes or satire.

  There are many websites that publish news and articles in a professional format, which are actually satire. *The Onion* (`http://www.theonion.com/`) is a very popular example of this type of website. *The Onion*'s articles comment on current events, both real and fictional. It parodies traditional news websites with stories, editorials, op-ed pieces, and interviews, using a traditional news website layout and editorial voice. Its humor often depends on presenting mundane, everyday events as newsworthy, surreal, or alarming.

  Before believing a certain news article from an unknown source, don't hesitate to do a quick background check and see whether that website is actually publishing satire or fake news or real news and facts. A good place to check on the truth or falsehood of a story is Snopes.com.

- User-generated content is fun but not necessarily true.

  You will find plenty of websites with user-generated content, like 9GAG (`http://9gag.com/`). On such websites, anyone can upload and share user-generated images, videos, or articles. The content is promoted based on its popularity and the votes it receives from other users, and you'll often find such content being shared on social networks like Facebook. While this type of content may be very entertaining, it

doesn’t mean that it is true, so be wary of taking data from these websites as fact.

- Value data from official sources more than data from random blogs and forums.

  Yes, you may find individuals who have great information on a certain subject, and they publish it online on their blog or on a forum where they are active. But as a general rule, data shared by individuals online may not always be accurate, complete, or true. Depending on what you are looking for, try to also get data from official sources like published journals, government sites, research institutes, and so on. Compare the data that you get and the different views that you find, and you will have a more accurate interpretation of the subject that interests you.

Summary

We have covered a lot of ground together since the start of this study guide. In this final chapter we showed you how to find information and files using search engines like Google or Bing. You learned how to make a basic search and also how to build more advanced search queries that help you find more specific things on the Web.

Then, we talked about the many forms of advertising that you encounter on the Web, how they work, and how to block banner ads when there are too many of them.

Lastly, we discussed finding information from Internet forums and knowledge bases and how to evaluate the information that you find online. Remember, using more than one source is always the way to go.

Exam Essentials

Know how to use a search engine. Know how to find information and files using a search engine like Google or Bing.

Learn how to perform advanced searches. With the help of symbols and operators you can fine-tune your searches so that you are more effective in finding the information that you are interested in.

Know the most common types of online advertising. When browsing the Web, you will encounter many forms of advertising, ranging from ads to sponsored links, sponsored posts, and banner ads. You should know what they are and what their purpose is.

Know what forums and knowledge bases are. You should know what forums and knowledge bases are and how they can be useful to you when solving problems.

Understand how to evaluate the information found on the Web. The Web is filled with information of all kinds. You should understand and use several basic principles that will help you evaluate the accuracy of the information that you find on the Web.

Key Terms

Before you take the exam, be certain you are familiar with the following terms:

banner ad	**search engine**
Internet forum	search operators
knowledge base	web banner
message board	

Review Questions

1. What is a search engine?
   A. A software system that is designed to search for information on the Web
   B. A way to search for information on your computer
   C. A computer program that you install to find files on your computer
   D. A software system that is designed to search for information in your email account
2. Which of the following are search engines? (Choose all that apply.)
   A. Facebook
   B. Google
   C. Bing
   D. Yahoo!
3. Which of the following information is displayed for each search result when searching on Google or Bing? (Choose all that apply.)
   A. The title
   B. The color
   C. The URL
   D. The description
4. Which of the following symbols can be used to make searches on Google? (Choose all that apply.)
   A. $
   B. \
   C. ^
   D. “ ”
5. What is the correct use of the * (asterisk) symbol when making a search on Google or Bing?
   A. Add it to put a word or phrase in quotes.
   B. Add it as tool to find prices.
   C. Add it as a placeholder for any unknown or wildcard terms.
   D. Add it to find trending topics on social networks like Twitter.
6. What are search operators in the context of search engines?
   A. Words that can be added to searches to increase the number of search results
   B. Words that can be added to searches to make the search more complex
   C. Words that can be added to searches to find prices online

D. Words that can be added to searches to help narrow down your results

7. What does the site: search operator do?
   A. Gets results on a certain subject
   B. Gets results from a certain site or domain
   C. Excludes results from a certain site or domain
   D. Helps you find prices on a certain domain
8. Which of the following are characteristics of a banner ad? (Choose all that apply.)
   A. An advertisement that is embedded into a web page
   B. An advertisement that is embedded into a website
   C. A tool to attract traffic to the website of an advertiser
   D. A tool to reduce the traffic of the website of an advertiser
9. Which of the following are characteristics of a message board? (Choose all that apply.)
   A. It’s a site where people can create, share, and vote on user-generated content.
   B. It’s a discussion site where people can hold conversations in the form of posted messages.
   C. It’s a site where messages are displayed in a conversation-like format.
   D. Each new discussion started is called a thread and can be replied to by any number of people.
10. What is a knowledge base? (Choose all that apply.)
   A. A way of storing complex data about a product in a structured format
   B. A way of finding information online
   C. A way of storing complex data in an unstructured format
   D. A way of storing complex data about a product in a format that’s accessible to users

Appendix A
Answers to Review Questions

Chapter 1: Using the Internet

1. B, D. The Internet is the global network of interconnected networks that use standardized communication protocols to exchange data and information between them. In a simpler manner, it is also considered the physical network of computers and devices (smartphones, tablets, and so on) all over the world.
2. C. WWW stands for World Wide Web.
3. A, D. The World Wide Web is a system of websites connected by links. It is a part of the Internet but not the entire Internet.
4. A, B. URL stands for Uniform Resource Locator, and it is the address of a website or a web page on the WWW.
5. B, D. A web browser is an application that displays a web page on a computer or mobile device. The first web browser was called WorldWideWeb, to suggest that it is software that is used to navigate websites and web pages that are found on the World Wide Web.
6. C. A hyperlink is a reference to data that can be accessed by clicking it.
7. A, B. Posting your pictures on Facebook or a video on YouTube are the only examples listed here of performing an upload of data.
8. D. The homepage is the web page that is loaded each time you open a web browser.
9. B. The browsing history is a complete log of the websites and web pages that you have visited in a web browser.
10. C. A plug-in or an add-on is a software component that adds a specific feature to a web browser and enables it to do more.

Chapter 2: Understanding Networking and Its Most Important Concepts

1. C. In a Windows network environment, the `ipconfig` command with the `/all` switch is used to view all IP configuration information of a system.
2. D. A VPN uses tunneling protocols to create a secure point-to-point connection over a public network such as the Internet.
3. D. Each protocol within the protocol suite is associated with a specific port. If that port is blocked, then the associated service will be unavailable. The HTTP service uses port 80, and if this port is blocked on a firewall, HTTP and web services will not be available.
4. B. A DHCP server is used to automatically assign TCP/IP information to a client system. This includes the IP address, the subnet mask, and the default gateway.
5. A. DNS is responsible for translating hostnames to IP addresses. Pinging the hostname returns the IP address associated with Sybex.com.
6. D. Securely setting up a wireless router or access point involves configuring the security protocols used. WEP was the original wireless security protocol but proved ineffective as tools were created that could easily get around WEP security. WPA followed WEP and increased security using TKIP. Today, WPA2 is commonly used for security, and it increases the security over WPA.
7. A, D. The IEEE specifies the 802.11 wireless standards. Under this designation there are a number of specifications that you may see on an AP, including 802.11a, 802.11b, 802.11g, 802.11n, and 802.11ac.
8. A, C. LANs are the computer network from the floor of an office building and the computer network in your house.
9. C. Windows offers several troubleshooting wizards for solving network and Internet-related problems. The one that helps you solve Internet connection problems is named Internet Connections.
10. A, C, D. Broadband is a form of high-speed Internet access, with maximum speeds that go beyond the 128 Kbps provided by dial-up connections. Broadband is largely an always-on Internet service that allows for bandwidth-intensive applications.

Chapter 3: Communicating Online with Others

1. B, C, D. Email is a method of exchanging digital messages with others. In order to use email you must have a registered username and password, and you need to provide the email address of the people whom you want to communicate with through this medium.
2. C, D. C and D are strong passwords because they contain at least eight characters and mix letters with numbers and special characters.
3. A, C. BCC means blind carbon copy. This field is available for hidden notification, and recipients listed in the BCC field receive a copy of the message but are not shown on any other recipient's copy, including other BCC recipients.
4. B, D. To and Subject are fields that you have to fill in yourself. Date and From are automatically populated by the email client or the email service that you are using.
5. B. When using Reply All, you reply to all the people who were included in the email distribution list, in the To and CC fields, including the sender of the message that you received. This option is useful when you need to reply to a conversation and include a whole group of people in that conversation.
6. B, D. When using Forward, a copy of the initial email message is created automatically with the same subject as the one used by the sender but prefixed by the term *FW:*. Also, the body of the email includes the original message that was received from the sender as well as any other messages that were sent earlier in the same conversation.
7. A, B, D. In order for the reply to be effective, you should specify when you will be out of office, when you will be able to reply, how people can contact you in case of emergencies, and, if applicable, who your stand-in is for the period when you are away and how the recipient can contact them.
8. A, B. SMS means Short Message Service, and one message can include up to 160 characters.
9. B, D. Facebook Messenger and Skype are examples of very popular chat clients.
10. A, B, D. Social media tools can take many forms, including blogs, social networks like Facebook, or Internet forums. OneDrive is a cloud storage solution provided by Microsoft.

Chapter 4: Being a Responsible Digital Citizen

1. B. Using all capital letters is interpreted by readers as excitement or yelling, depending on the context, so it is best to avoid such stylistic decisions in professional communications.
2. A, B. Spamming is the act of sending unsolicited messages to others, especially advertising and self-promotion. It applies to all kinds of media, including email and SMS.
3. A. Professional audiences expect courtesy and cultural sensitivity, and this is achieved through the tone the writer sets by the words they choose.
4. C. Emoticons help to share the emotion that accompanies a statement.
5. C. Emoticons help readers process the emotion that goes along with the sentence but are typically used in only personal communications, such as texting, social media postings, and email. Professional communications achieve tone through accurate and emotionally appropriate diction.
6. B, D. Censorship can take the form of blocked access, filtering of certain types of sites, and filtering with a firewall against any site that uses certain key words. Parental controls are solutions that censor access to content based on rules set by the parents.
7. A, C. DRM technologies can be used to control many things, including the copying of a work or its altering.
8. B. Intellectual property refers to knowledge and creative ideas or expressions that have commercial value and are protected either by copyright, patent, trademark, industrial design rights, or trade secret laws.
9. A, D. Creative Commons is used when the creator wants to give people the right to share, use, and build upon their work. Creative Commons provides the creator flexibility and protects the people who use or redistribute the work from concerns of copyright infringement as long as they abide by the conditions that are specified in the license by which the creator distributes the work.
10. A. Piracy is also known as copyright infringement, and it is a criminal offense in most countries.

Chapter 5: Maintaining Your Health and Safety While Using Computers

1. A, B, D. When online, you should not use the same password on all your email accounts, share your home address publicly on the Internet, or reply to people you don’t know, who promise you incredible deals.
2. A, D. When making purchases online, you should avoid websites that do not use HTTPS, which encrypts the data that is sent between you and the website where you make the purchase. Also, you should not share your credit card details with others online.
3. B, C. You can protect your data by encrypting it with solutions like BitLocker, which makes it hard for others to access it and use it, and by setting up your own backup system with tools like Backup and Restore.
4. C, D. When you delete a file using this method, the file remains on your computer, and it continues to take up disk space. Its reference is moved to the Recycle Bin, where it can be recovered later on and you can resume using it.
5. B, C. Recycle Bin is a folder where the references to your deleted files and folders are kept. You can use the Recycle Bin to view a list of your deleted items and recover any of them.
6. C. You delete a file without moving it to the Recycle Bin by selecting it and then pressing Shift+Delete on your keyboard.
7. B, C. You completely wipe a file so that it is no longer recoverable by deleting it with Shift+Delete and rewriting the space it took on the disk several times with data from other files. Also, you can use specialized applications like CCleaner or File Shredder, which help you remove a file forever.
8. B, C, D. An ergonomic chair should have many characteristics, including but not limited to a comfortable cushion, lumbar support, adjustable height, and adjustable back rest height.
9. A, C, D. The best practices for positioning the computer monitor on a desk are the following: position it at eye level unless it measures 20 inches or more, in which case you should position the top of it 3 inches above eye level. Also, you should place it on the desk at least 20 inches from your eyes.
10. D. The rule says that for every 20 minutes you spend staring at the computer, you should spend 20 seconds looking at objects 20 feet away—or at least far enough away that your eyes aren’t working to focus.

Chapter 6: Searching the World Wide Web

1. A. A search engine is a software system that is designed to search for information on the Web.
2. B, C, D. Google, Bing, and Yahoo! are search engines. Facebook is a social network.
3. A, C, D. For each search result, a search engine like Google and Bing will display the title, the URL of the page, and a small description.
4. A, D. $ can be used to find prices, and “ ” (quotes) are used to put a word or phrase in quotes. The results of using quotes will include only pages with the same words in the same order as what’s inside the quotes.
5. C. The asterisk acts as a placeholder for any unknown or wildcard terms.
6. D. Search operators are words that can be added to searches to help narrow down your results.
7. B. The search operator site: gets results from certain sites or domains.
8. A, C. The banner ad or web banner is an advertisement that is embedded into a web page. Web banners are used to attract traffic to the website of the advertiser.
9. B, C, D. An Internet forum or message board is a discussion site where people can hold conversations in the form of posted messages. These messages are automatically stored and displayed by the site in a conversation-like format. Within a forum’s topic, each new discussion started is called a thread and can be replied to by any number of people.
10. A, D. A knowledge base is a way of storing complex data about a computer system or product in a structured format that’s easily accessible to a computer user.

Appendix B
Using the Practice Files

This appendix lists the practice files that accompany the book. The information is organized by chapter for easy reference. You can find all practice files online, in the “Other Study Tools” section of the interactive learning environment that was created for this book. Before going through all the exercises that are offered, please register and download all the practice files.

IC3—Module 3: Living Online

Part III	
Chapter	**Practice Files**
Chapter 1: Using the Internet	None
Chapter 2: Understanding Networking and Its Most Important Concepts	None
Chapter 3: Communicating Online with Others	None
Chapter 4: Being a Responsible Digital Citizen	None
Chapter 5: Maintaining Your Health and Safety While Using Computers	None
Chapter 6: Searching the World Wide Web	None

Index

A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R

S

T

W

Y

Free Online Learning Environment

Register on Sybex.com to gain access to the free online interactive learning environment and test bank to help you study for your IC3 Internet and Computing Core Certification Global Standard 4 exam.

The online test bank includes:

- Assessment Test to help you focus your study to specific objectives
- Chapter Tests to reinforce what you learned
- Practice Exams to test your knowledge of the material
- Electronic Flashcards to reinforce your learning and provide last-minute test prep before the exam
- Searchable Glossary to give you instant access to the key terms you'll need to know for the exam
- Practice Files for you to use in chapter exercises and activities

Go to http://sybextestbanks.wiley.com to register and gain access to this comprehensive study tool package.

WILEY END USER LICENSE AGREEMENT

Go to www.wiley.com/go/eula to access Wiley’s ebook EULA.