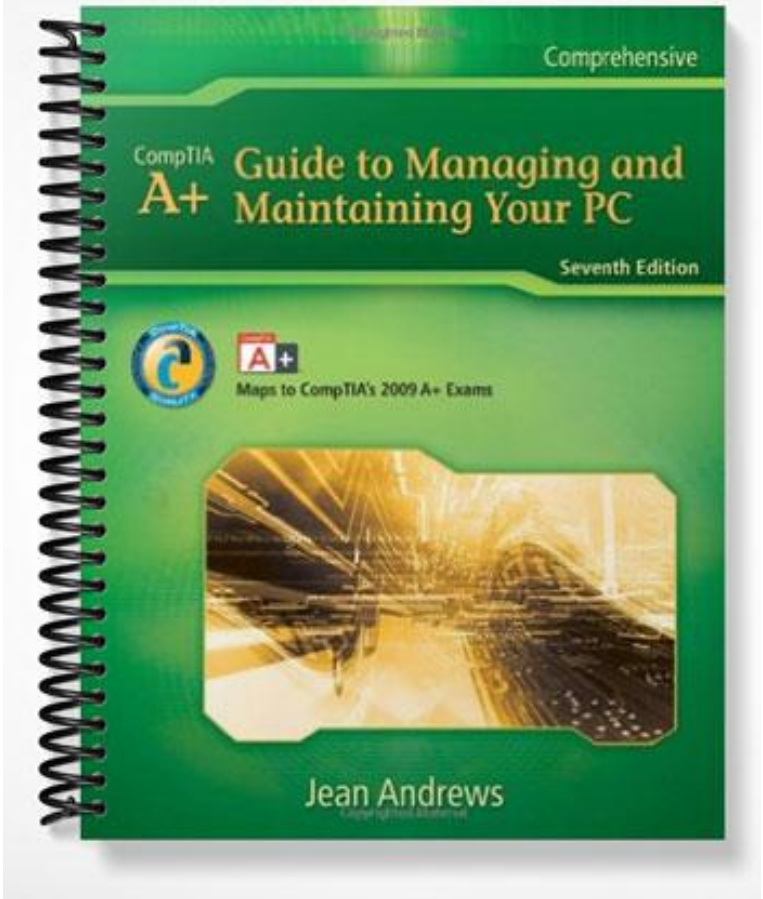
SOLUTIONS MANUAL



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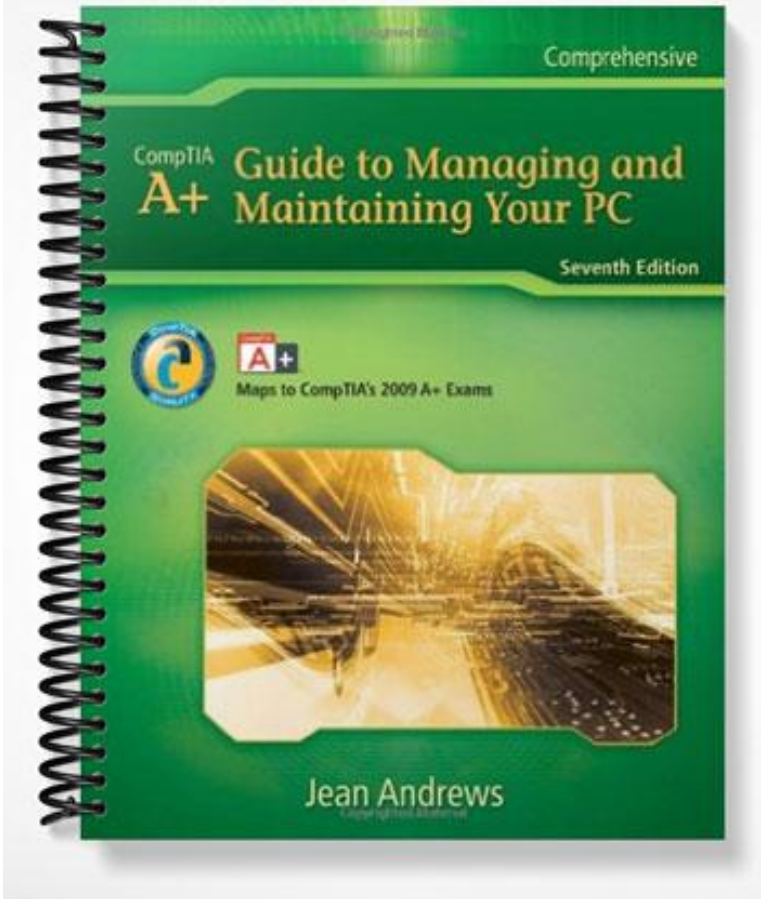

Reviewing the Basics

1. Which Microsoft operating system was the first to use all 32-bit processing?

Windows NT

2. What are the hardware requirements to use the Vista Aero user interface?

Requires 1 GB of RAM and a video card that supports the technology. The video card must support DirectX 9 graphics and must have at least 128 MB of graphics memory.

3. What is the application mentioned in the chapter that creates a virtual machine on a computer?

VMWare

4. List four major functions of an OS.

It manages hardware, runs applications, provides an interface for users, and stores, retrieves, and manipulates files

5. What is the next Microsoft operating system for desktop computers to be released in 2010?

Windows 7

6. The Windows shell operates in ____ mode and the kernel operates in ____ mode.

User, kernel

7. How many bits does an x86-based operating system process at one time?

32 bits

8. What term does Intel use to describe a processor technology that uses all 64-bit processing?

IA64

9. What term does AMD use to describe the processor technology that uses a 64-bit instruction set with 32-bit internal core processing?

AMD64

10. In question 9 above, what term does Intel use to describe the same technology?

EM64T

11. Which Windows XP operating system is a 64-bit OS?

Windows XP Professional x64 Edition

12. Which version of Vista comes packaged with a 32-bit DVD as well as a 64-bit DVD?

Vista Ultimate

13. What is the memory limitation for a 32-bit operating system?

The OS can address no more than 4 GB of memory

14. On the Vista Start menu, where might you expect to be able to access user files?

In the left, black column under Recent Items

15. How can you add the sidebar to the Vista desktop?

Click Start and click Control Panel. In the Control Panel window, click Appearances and Personalization and then click Windows Sidebar Properties. From the properties box, you can choose to start the sidebar each time Windows starts.

16. When is the Vista flip 3D view available to Vista?

When the Aero user interface is running

17. What is the keyboard shortcut to the flip 3D view?

Win+Tab

18. The taskbar notification area includes icons for currently running services. What is another term for this area?

System tray or systray

19. What part of a file name does Windows use to know which application to open to manage the file?

The file extension

20. When does a user need to enter a password into the UAC box in order to continue?

When the user is logged on as a standard user

21. What extension is used to name a compressed folder?

zip

22. What is the path and folder name to the desktop folder for the user Jane when Windows Vista is installed on drive C?

C:\Users\Jane\Desktop

23. List five file attributes. Which attribute applies only to Vista?

Read-only, archive, hidden, system, and indexing. Indexing applies only to Vista.

24. How do you access the Properties box for a file to change an attribute?

In Explorer, right-click the file and select Properties from the shortcut menu.

25. What is the program name for the System Information utility?

Msinfo32.exe

Thinking Critically

1. If your printer is giving you trouble, what is the best way to obtain an update for the device driver?

Download the latest driver from the device manufacturer's Web site

2. What Windows tool can you use to know how much RAM is installed on your system?

Possible answers: System window, System Properties window, System Information

3. Why is 16-bit Windows software considered to be legacy software?

16-bit Windows software is considered to be legacy software because it is software written for DOS or Windows 3.x and data is accessed 16 bits at a time, whereas computers running Windows 2000 or later OSs use 32-bit or 64-bit programs written to be able to access 32 or 64 bits of data at a time.

4. Can you install Vista Ultimate 32-bit version or 64-bit version on an Intel Quad Core system manufactured in 2008?

Either OS can be installed, but the 64-bit version requires 64 bit device drivers.

5. Mary wants her x86-based version of Windows Vista Business edition to run faster. She has 4 GB of memory installed on the motherboard. She decides more memory will help. She installs an additional 2 GB of memory for a total of 6 GB,

but does not see any performance improvement. What is the problem and what should you tell Mary?

a. She should use Device Manager to install the memory in Vista. After it is installed, performance should improve. Tell Mary how to open Device Manager.
b. A 32-bit OS cannot use more than 4 GB of memory. Tell Mary she has wasted her money.
c. A 32-bit OS cannot use more than 4 GB of memory. Tell Mary to upgrade her system to the 64-bit version of Vista Business.
d. A 32-bit OS cannot use more than 4 GB of memory. Explain to Mary the problem and discuss with her the possible solutions.

Answer: d. A 32-bit OS cannot use more than 4 GB of memory. Explain to Mary the problem and discuss with her the possible solutions.

6. Jack needs to email two documents to a friend but the files are so large his email server bounced them back as undeliverable. What is your advice?

a. Tell Jack to open the documents and break each of them into two documents and then email the four documents separately.
b. Tell Jack to put the two documents in a compressed folder and email the folder.
c. Tell Jack to put each document in a different compressed folder and email each folder separately.
d. Tell Jack to put the documents on a USB drive and snail mail the drive to his friend.

Answer: c. Tell Jack to put each document in a different compressed folder and email each folder separately.

Chapter 2 Solutions

Lab 2.1

1. What command displays a list of files and directories at the command line?
   Answer: DIR displays a list of files and directories at the command line.

2. Does Windows display all system files by default?
   Answer: Yes, when they are common file extensions, such as .exe or .txt.

3. How can you change the way Windows displays file extensions?
   Answer: Change the setting in the Folder Options dialog box.

4. In Computer, what type of graphic displays information about a drive?
   Answer: A pie chart displays information about a drive.

5. How does Windows graphically distinguish between different file types?
   Answer: It uses different icons to represent different file types.

Lab 2.2

1. How long, in bits, is a typical MAC address?
   Answer: 48 bits represented by 6 x 8 bit hex numbers.

2. Computers often express numbers in _____ format, which is a base 16 numbering system.
   Answer: hexadecimal

3. Most people are more comfortable when working with a(n) _____, or base 10, numbering system.
   Answer: decimal

4. In the hexadecimal system, what decimal value does the letter A represent?
   Answer: 10

5. Hexadecimal numbers are often preceded by _____ so that a value containing only numerals is not mistaken for a decimal number.
   Answer: 0x

Lab 2.3

1. What is one advantage of using an Apple computer instead of a PC?
   Answer: It has better hardware-to-software compatibility and, in many cases, more reliability.

2. What is one disadvantage of using an Apple computer instead of a PC?
   Answer: They can be more expensive or less upgradable, and may not run the same software.

3. Why do you think it's easier for Apple to provide compatibility between hardware and the operating system than it is for Microsoft or Linux?
   Answer: Apple maintains tighter control over hardware production and often provides both hardware and software.

4. Why can't OS X run on a typical PC?
   Answer: It is intended to be installed on Apple hardware and is not licensed to run on other computers.

Lab 2.4

1. What are some of the "costs" associated with installing a "free" operating system such as Linux?
   Answer: Answers may vary but can include the cost of:
   - Additional user training
   - Manuals and support documentation
   - Technical support
   - Trouble finding drivers and compatible hardware

2. Why might a company not want to use Linux on its desktop computers?
   Answer: Fewer applications are available, it is not yet regarded as having enough industry support, and it is difficult to install.

3. What is one advantage of using Linux rather than a Windows operating system on a desktop?
   Answer: The cost is lower and it uses fewer resources.

4. Based on what you learned from the Linux Web site, how do you think companies that provide Linux make the most profit?
   Answer: They make the most profit providing documentation and supporting the distribution.

Lab 2.5

1. Research OS timelines on the Internet (or refer back to Figure 2-4) then, based on the OS timelines that you find, answer this question: Why do you think Linux and UNIX share more commands than Windows XP and UNIX?
   Answer: Linux is more directly inspired by UNIX and has gone through fewer transitions than Windows has.

2. Which line of operating systems has recently become more similar to UNIX?
   Answer: Mac OS X has recently become more similar to UNIX.

3. Which line of operating systems split into two lines, only to merge again later?
   Answer: Answers may vary but could include examples such as Windows NT/2000 and Windows 9x merging into a single Windows XP line of products.

4. Why do you think most versions of Linux and Windows use the CD command to change directories?
   Answer: The CD command comes from UNIX.

Lab 2.6

1. What key is universally used to launch Help?
   Answer: F1
2. How many Windows logo keys are usually included on an enhanced keyboard?
   Answer: Two

3. What shortcut combination can you use to paste a block of text?
   Answer: Ctrl+V

4. What key combination can you use to switch between open applications?
   Answer: Alt+Tab

5. Is it possible to open the Start menu by pressing only one key?
   Answer: Yes, the Windows logo key opens the Start menu.

Chapter 2

Introducing Operating Systems

At a Glance

Instructor's Manual Table of Contents

- Overview
- Objectives
- Teaching Tips
- Quick Quizzes
- Class Discussion Topics
- Additional Projects
- Additional Resources
- Key Terms

Lecture Notes

Overview

Chapter 2 covers different operating systems, how they are designed and work, and what they do. After introducing the concept of an operating system (OS), a brief evolution of operating system advancements is presented. Emphasis is placed on DOS, Windows, Linux, and Mac OS X. Next, system components and functions are presented including an explanation of how operating systems provide the interface that user and applications need to command and use hardware devices. Subsequently, the four main OS functions are explained. Finally, significant features of operating system software, various graphical tools are reviewed.

Chapter Objectives

After reading this chapter and completing the exercises, the student will learn:

- About the various operating systems and the differences between them
- About the components of Windows operating systems
- How operating systems interface with users, files and folders, applications, and hardware

Teaching Tips

Operating Systems Past and Present

1. Introduce and define an operating system.

2. Describe the services and components managed by an operating system.

3. Use Figure 2-1 to illustrate the relationship between users, applications, hardware components, and the operating system.

4. Point out that computer support technicians should be aware of older and current operating systems and how these operating systems have evolved.

DOS (Disk Operating System)

1. Introduce and describe the DOS (disk operating system).
   a. Note that it is a command-line driven set of programs.

2. Use Figure 2-2 to illustrate a DOS command-line prompt to receive future commands.

3. Explain the need to study DOS because of its use in legacy systems and support of various system utilities.

Teaching Tip	For more information on IBM PC-DOS, access the Redbook titled "PC DOS 7 Technical Update" at http://www.ibm.com/redbooks. Search for "PC DOS" or Redbook number GG24-4459-00.

DOS with Windows 3.X

1. Introduce and describe the Windows 3.x operating systems.
   a. Note that Windows 3.x. refers to the Windows 3.1 and Windows 3. 11 operating systems.

2. Explain how the DOS operating system was utilized in the Windows 3.x operating systems.

3. Define the term graphical user interface (GUI).

4. Define the term desktop.

5. Use Figure 2-3 to illustrate how Windows 3.x. was layered between DOS and the user and applications to provide a graphics interface for the user and a multitasking environment for applications.

Windows 9X/ME

1. Explain that Windows 9x/Me refers to the Windows 95, Windows 98, and Windows Me operating systems.

2. Emphasize that these operating systems are true operating systems that provided a user-friendly interface on a DOS core.

3. Use Figure 2-4 to illustrate a Windows 98 SE desktop.

Windows NT

1. Introduce and describe the Windows NT (New Technology) operating system.

2. Describe the two versions of Windows NT (New Technology): Windows NT Workstation and Windows NT Server.

3. Emphasize that Windows NT replaced the DOS core with a new core operating system. Note that this introduced many new problems that were resolved in later versions of Windows.

4. Point out that Windows NT was the first Windows operating system that did all its processing using 32 bits at a time.
   a. Compare this to DOS and Windows 9x/Me.

Windows 2000

1. Introduce the Windows 2000 operating system.
   a. Note that Windows 2000 is an upgrade of Windows NT and comes in versions for desktops and high-end servers.
   b. Highlight the improvements over Windows NT: a more stable environment, support for Plug and Play, Device Manager, Recovery Console, Active Directory, better network support, and features specifically targeting notebook computers.

2. Use Figure 2-5 to illustrate the Windows 2000 Professional desktop.

3. Describe the intended market for Windows 2000.

4. Explain what is meant by the term backward-compatible.
   a. Describe how Windows 2000 lacked this feature and the issues it caused for users.

5. Point out that Windows 2000 is considered a dying operating system and Microsoft no longer supports it.

Windows XP

1. Point out that Windows XP is an upgrade of Windows 2000 and attempts to integrate Windows 9x/Me and 2000.
   a. Note that Windows XP added support for multimedia and networking technologies.

2. Describe the two main versions of Windows XP.

3. Use Figure 2-6 to illustrate the Windows XP desktop.
   a. Describe the differences between Windows XP and previous Windows operating systems.

4. Emphasize that Windows XP is considered to be an extremely stable operating system.

5. Define the term service pack.

6. Define the term patches.

7. Define and describe what is meant by an original equipment manufacturer (OEM) license.

Windows Vista

1. Point out that Windows Vista is an upgrade to Windows XP.

2. Describe and explain the many features added to Windows Vista.
   a. Describe the Aero user interface and the requirements for using it.

3. Use Figure 2-7 to illustrate the Windows Vista desktop and Start menu.
   a. Point out the differences from earlier versions of Windows desktops.

4. Mention that although Vista was better tested than XP before its release, the biggest complaints regarding Vista are the lack of compatibility with older hardware and software, the large amount of computer resources Vista requires, and the slow performance.

5. Describe the five versions of Vista.

Teaching Tip	Refer to the following Web site to learn more about Vista: http://www.microsoft.com/windows/windows-vista/default.aspx

Windows 7

1. Introduce and describe Windows 7.
   a. Note that consumers are expecting Windows 7 to correct the frustrations encountered in Windows Vista.

2. Define the term netbook.

3. Mention that Windows 7 is expected to run on netbooks that currently run only Windows XP or Vista.

Teaching Tip	Refer to the following Web site to learn more about the Windows 7 operating system: http://www.microsoft.com/windows/windows-7

Teaching Tip	Refer to the following Web site to learn more about the history of Windows operating systems: http://www.microsoft.com/windows/WinHistoryIntro.mspx

Mac OS

1. Introduce and describe the Mac OS.

2. Explain that Mac OS X is the latest operating system and the latest release is called Mac OS X Leopard.

3. Use Figure 2-8 to illustrate the Mac OS X Leopard desktop and browser window.

4. Describe how to install Windows on a Mac computer as a dual boot with Mac OS X.
   a. Define and explain a virtual machine (VM).

5. Describe the markets for the Mac OS.

Teaching Tip	Refer to the following Web site to learn more about the Mac OS: http://www.apple.com/macosx

Linux

1. Introduce and describe the Linux operating system.

2. Emphasize that both the Linux OS kernel and kernel's source code are freely distributed.

3. Define and explain Linux distributions.

4. Point out that the Linux OS is used in both server platforms and desktop platforms; however, it is more prevalent on servers.

5. Describe the advantages and disadvantages of Linux.

6. Note that Linux is a robust operating system that is a good training tool for UNIX.

7. Define the term shell and explain how they are used in Linux.

8. Use Figure 2-9 to illustrate a typical Linux desktop.

Teaching Tip	Refer to the following Web site for an overview of the Linux operating system: http://www.linux.org/info

Teaching Tip	Refer to the following Web site for a Computer History Museum software timeline): http://www.computerhistory.org/timeline/?category=sl

Quick Quiz 1

1. A(n) _____ is software that controls a computer.
   Answer: operating system (OS)

2. True or False: Windows 9x/Me operating systems are built on a DOS core that provides a graphical user interface.
   Answer: True

3. _____ is the next generation of Microsoft operating systems.
   Answer: Windows 7

4. The latest Mac OS X (ten) release is called Mac OS X _____.
   A. Tiger
   B. Leopard
   C. Jaguar
   D. Lion
   Answer: B

5. True or False: UNIX is a robust operating system that is a good training tool for Linux.
   Answer: False

How Windows 2000/XP/Vista Works

1. Emphasize that Windows 2000, XP, and Vista are three evolutions of the same basic operating system.

2. Note that the four main functions of any operating system will be discussed next.

What an Operating System Does

1. Introduce and discuss the four main functions of an operating system.
   - Provide a user interface
   - Manage files
   - Manage hardware
   - Manage applications

Components of Windows

1. Emphasize that every operating system has three main internal components: the shell, the kernel, and configuration data.

2. Review the definition of a shell.

3. Define and explain the term kernel.

4. Explain what is meant by configuration data.

5. Use Figure 2-10 to illustrate how the shell and kernel relate to users, applications, and hardware.

6. Describe and discuss the Windows shell.
   a. Highlight specific services provided by the shell.
   b. Introduce and define the term user mode.
   c. Introduce the concept of subsystems. Use the Win32 security subsystem as an example.

7. Describe and discuss the Windows kernel.
   a. Define and explain the term kernel mode.
   b. Discuss the two main components of the kernel: the hardware abstraction layer (HAL) and the executive services.

8. Describe and discuss configuration data.
   a. Describe the role of the registry database and initialization files in Windows.

How Windows Manages Applications

1. Discuss how applications are launched.
   a. Define and explain the term process. Note that sometimes a process is called an instance.
   b. Define and explain the term thread.
   c. Use Figure 2-11 to illustrate multitasking.

Teaching Tip	Refer to the following Web site to learn more about process scheduling policies: http://docs.hp.com/en/5965-4642/ch01s13.html

How Windows Manages Hardware

1. Discuss how the kernel communicates with a hardware device.
   a. Define and explain device drivers.

2. Explain how device drivers are provided.

3. Emphasize that when the computer turns, on some devices are required before the device drivers are available. In this case, the system BIOS provides the instructions to the CPU to communicate with these devices.
   a. Use Figure 2-12 to illustrate how the kernel may communicate with the operating system devices.

4. Point out that a device driver is written to work for a specific operating system.

5. Use Figure 2-13 to illustrate devices that may provide their own drivers.
   a. Emphasize that the student needs to use the operating system to install device drivers so the operating system will have the necessary software to control the device.

How Many Bits at a Time?

1. Note that the Central Processing Unit (CPU), also called a processor, partly determines which operating system can be installed.

2. Emphasize that a major consideration is the number of bits a CPU processes at a time.

3. Point out that today's processors are manufactured by Intel or AMD and can process 64 bits at a time.

4. Describe the three categories of processors, currently used on desktop and laptop computers and explain why they influence which operating system to install.
   - 32-bit processors
   - Processors that use underlying 32-bit processing with 64-bit instructions
   - 64-bit processors

5. Review the number of bits modern Windows operating systems can support.

6. Explain the discussion points on page 49 to keep in mind when deciding which operating system to install when a processor can handle either a 32-bit or 64-bit operating system.

7. Review the steps to determine the processor running on a given laptop or desktop computer.
   a. Note that this information provides insight into which operating system can be installed.
   b. Use Figure 2-14 to illustrate the CPU installed on a laptop running Windows Vista.

8. Explain why patches on the Windows Web site can be confusing for 64-bit computing, and explain the guidelines to follow when reading the error messages for documentation on the Microsoft site.

Teaching Tip	Refer to the following Web site to learn more about Intel's 64-bit architecture: http://developer.intel.com/technology/intel64/index.htm

Teaching Tip	Refer to the following Web site to learn more about AMD's 64-bit architecture: http://en.wikipedia.org/wiki/X86-64

Using Windows 2000/XP/Vista

1. Describe the tools computer support technicians use as a power user of Windows.

The Windows Vista Desktop

1. Emphasize that the Windows desktop is the primary tool provided by the Windows shell.
   a. Note that the desktop has various sections, shortcuts, and icons.

2. Introduce and describe the Start menu.
   a. Use Figure 2-15 to illustrate and explain the Vista Start menu.
   b. Describe how applications are displayed within the Vista Start menu.

3. Introduce and describe the Windows Sidebar and gadgets for the Vista desktop.
   a. Explain how to display the sidebar if it is not installed.
   b. Explain how to customize the Windows Sidebar properties and add new gadgets.
   c. Use Figure 2-16 to illustrate a window with gadgets.

4. Discuss how to launch an application.
   a. Explain and discuss the four options to open an application.
      - Use Figure 2-17 to illustrate the Start Search box and how to launch an application.
      - Use Figure 2-18 to illustrate the Computer window and how to launch an application.

5. Introduce and discuss the taskbar and notification area (system tray).
   a. Define and describe the taskbar.
   b. Use Figure 2-21 to illustrate the taskbar.
   c. Explain what is in the taskbar.
   d. Note that if a user is using the Aero interface, when the user hovers over the title, a thumbnail of the open application appears.
   e. Use Figure 2-22 to illustrate how a user can open applications in a flip 3D view when using the Vista Aero interface.
   f. Review Quick Launch icons and their location.
   g. Define and explain the notification area. Point out that it is also called the system tray or systray.
   h. Define and explain a service. Describe how Windows handles services.
   i. Explain how to control the Start Menu, taskbar, notification area, and open applications.
   j. Use Figure 2-23 to illustrate and explain the Taskbar and Start Menu Property dialog box.

6. Explain how to personalize the Windows desktop.
   a. Use Figure 2-24 to illustrate the Personalization window.

7. Introduce and discuss default programs and file associations.
   a. Explain how to access the Default Programs window.
   b. Refer to Figure 2-15 to illustrate the default browser and e-mail programs for the given computer system.
   c. Point out that a user can use the Default Programs window to define default application programs for many applications.
   d. Define and explain the term file extension.
   e. Use Figures 2-25 and 2-26 to illustrate the steps to change the program associated with a file extension using the Default Programs window.

Teaching Tip	Refer to the following Web site for information on Windows gadgets: http://pcsupport.about.com/od/windowsvista/tp/vistagadgetssu.htm

Teaching Tip	Refer to the following Web site for information on the Vista Aero interface: http://www.microsoft.com/windows/windows-vista/features/aero.aspx

Quick Quiz 2

1. True or False: The operating system shell is responsible for interacting with hardware.
   Answer: False

2. True or False: A process is a program running together with the system resources assigned to it.
   Answer: True

3. The _____, also called a processor, partly determines which operating system can be installed.
   Answer: Central Processing Unit (CPU)

4. True or False: The Windows desktop is the primary tool provided by the Windows shell.
   Answer: True

5. The term _____ refers to one or more characters following the last period in a filename.
   Answer: file extension

Differences in the Windows XP/2000 Desktop and the Vista Desktop

1. Use Figure 2-27 to illustrate the Windows XP desktop and Start menu.

2. Compare the Windows XP desktop to the Vista desktop.

3. Use Figure 2-28 to illustrate the default entries for system tools.
   a. Note that Windows Vista provides a new tool: Internet Explorer (No Add-ons) and explain how he computer technician can use this tool.

4. Emphasize that Windows 2000 menus are organized similar to those of Windows XP.

5. Explain how to control the Start menu and taskbar in Windows XP/2000.
   a. Use Figure 2-29 to illustrate a Windows XP Display Properties window.

6. Explain how to access the Personalization window of Vista.

7. Note that for Windows 2000, the Taskbar and Start Menu Properties window and the Display Properties window are organized slightly differently than for Windows XP, but both work about the same as in XP.

8. Explain that when you first install Windows XP, only the Recycle Bin shows on the desktop by default.

9. Describe how to add other shortcuts by using the Display Properties window.

10. Use Figure 2-32 to introduce and describe the Vista User Account Control (UAC) dialog box feature.
    a. Note that in Vista, there are two types of user accounts: an administrator account and a standard account.
    b. Describe the purposes of the UAC box.
    c. Note that it is possible to disable the UAC box, however it is not recommended.
    d. Review the color codes that the UAC box uses to help a user decide if software being installed is safe.
    e. Use Figure 2-31 as an example.

Windows Explorer and the Computer Window

1. Emphasize that the two most useful tools to explore files and folders on your computer are Windows Explorer and the Vista Computer window. (Windows 2000/XP calls the Computer window the My Computer window.)

2. Describe three ways to access to access the Computer or My Computer window.
   a. For Windows Vista, click Start and click Computer.
   b. For Windows XP, click Start and click My Computer.
   c. For Windows 2000, double-click My Computer on the desktop.

3. Review Figure 2-18 illustrating the Vista Computer window.

4. Use Figure 2-32 to illustrate the Windows XP My Computer window, which looks the same as the Windows 2000 My Computer window.

5. Describe the two methods to open Windows Explorer.
   a. Right-click Computer or My Computer and select Explore from the menu.
   b. Right-click Start and select Explore from the menu.

6. Introduce files and directories.
   a. Note that every OS manages a hard drive, optical drive, floppy disk, or USB drive by using directories (also called folders), subdirectories, and files.
   b. Use Figure 2-33 to define how a drive is organized.
   c. Explain that a hard drive does not use the top-down hierarchical structure of subdirectories, because he can be divided into partitions.
   d. Point out that the root directory can hold files or other directories.
   e. Define the terms subdirectory, child directory, and folder.
   f. Note that any directory can have files or other subdirectories listed in it.
   g. Define and describe the term path.
   h. Use Figure 2-34 to illustrate a path.
   i. Define and describe the term filename.

7. Explain how to navigate that directory structure.
   a. Review the tips listed on page 65.
   b. Use Figure 2-35 to illustrate how to right-click the column heading to select columns to display.
   c. Describe the default layout where Windows puts important user files and folders.

8. Discuss the need for changing folder options.
   a. Explain how to view hidden files and file extensions.
   b. Use Figure 2-36 to illustrate the Folder Options window to display hidden system files.

9. Describe how to create a file.
   a. Use Figure 2-37 to illustrate how to create a new file using Windows Explorer.

10. Describe how to create a folder.
    a. Explain that in Vista, there are three choices for folder types and describe them.
       - Folder creates a regular folder.
       - Compressed (zipped) Folder creates a compressed folder with a .zip extension.
       - Briefcase creates a Briefcase folder, which is a folder that can be used to sync up files in this folder with its corresponding Briefcase folder on another computer.
    b. Use Figure 2-38 to illustrate a newly created folder with the default name.
    c. Note that a user can create folders within folders within folders up to a limit.
    d. Point out that the Windows desktop is itself a folder.

11. Describe how to copy or delete files or folders.

a. Explain what happens when files and folders are sent to the recycle bin.

12. Describe how to change file attributes.
    a. Use Figure 2-39 to illustrate the Properties window.

Teaching Tip	Refer to the following Web site to learn more about file organization: http://www.cim.mcgill.ca/~franco/OpSys-304-427/lecture-notes/node53.html

The Control Panel

1. Explain that the Control Panel is a window containing several small utility programs called applets that are used to manage hardware, software, users, and the system.

2. Explain how to access the Control Panel.

3. Use Figure 2-40 to illustrate the Windows Vista Control Panel.

4. Use Figure 2-41 to illustrate the Windows XP Control Panel in Category View.

5. Explain how to switch to Classic View.

6. Point out that each applet in the Control Panel window can be accessed directly.

System Information Utility

1. Use Figure 2-42 to illustrate the System Information utility.

2. Review the wealth of information provided by the utility.

3. Describe how to run System Information in Windows Vista.

4. Describe how to run System Information in Windows 2000/XP.

5. Note that System Information can be useful when strange error messages appear during startup.

Teaching Tip	Refer to the following Web site to learn more about how to troubleshoot configuration errors in Windows XP by using the System Configuration utility (Msconfig.exe): http://support.microsoft.com/kb/310560

Command Prompt Window

1. Remind students that individual commands can be entered in the Vista Search box or the Windows 2000/XP Run box.

2. Describe how a user can also open a command prompt window and use it to enter multiple commands to perform a variety of tasks.

3. Use Figure 2-43 to illustrate the Vista Command Prompt window.
   a. Explain how to clear the text in the window.

4. Point out that Windows Vista has two levels of command prompt windows: a standard window and an elevated window.

5. Explain how to get an elevated command prompt window.
   a. Use Figure 2-44 to illustrate an elevated command prompt window.

Quick Quiz 3

1. The right side of the taskbar is called the notification area, which some call the _____.
   Answer: system tray or systray

2. True or False: Windows uses the file extension to know which application to open to manage the file, which is called the file association.
   Answer: True

3. True or False: The Vista UAC box is used to protect the system against malware.
   Answer: True

4. True or False: In Windows XP, Briefcase creates a Briefcase folder, which is a folder that can be used to sync up files in this folder with its corresponding Briefcase folder on another computer.
   Answer: False

5. Control Panel holds a group of _____ to manage the system.
   A. Applets
   B. Apples
   C. Applications
   D. Apps
   Answer: A

Class Discussion Topics

1. Why do all major operating systems include a shell layer between the application and user on one end and the kernel on the other?

2. What are the major advantages to running operating systems in the protected mode? Are there are performance tradeoffs associated with using a protected mode over a real mode?

Additional Projects

1. Research the latest version of Microsoft Windows 7. Look for new features, system requirements, versions, and costs. Report your results in one to two paragraphs.

2. The operating system kernel in Windows NT completely replaced the DOS core in Windows 9x/Me. Research Microsoft's rationale for overhauling the design of the OS core. List 3 - 5 features in the Windows NT core that represent an improvement over the DOS core.

Additional Resources

1. DOS description and developmental timeline
   http://en.wikipedia.org/wiki/MS-DOS

2. Microsoft's home page for Windows
   http://www.microsoft.com/windows/

3. Kernel.org
   http://www.kernel.org

4. Linux-directory.com
   http://www.linux-directory.com/

5. Information about Mac OS X
   http://www.apple.com/macosx

6. Overview of Operating System Functions
   http://computer.howstuffworks.com/operating-system.htm

Key Terms

- **administrator account** - An administrator account has more privileges than a standard account and is used by those responsible for maintaining and securing the system.
- **Aero user interface** - A new 3D user interface available in some version of Vista.
- **backward-compatible** - A term referring to the ability of older components to work with newer technologies.
- **Briefcase** - Briefcase creates a Briefcase folder, which is a folder that can be used to sync up files in this folder with its corresponding Briefcase folder on another computer.
- **child directory** - Another term for a subdirectory.
- **command prompt window** - A window that enables a user to enter multiple commands to perform a variety of tasks.
- **compressed (zipped) Folder** - A compressed folder with a .zip extension.
- **CMOS setup** - (1) The CMOS configuration chip. (2) The program in system BIOS that can change the values in CMOS RAM.
- **desktop** - The initial screen that is displayed when an OS has a GUI interface loaded.
- **device driver** - A program stored on the hard drive that tells the computer how to communicate with an input/output device such as a printer or modem.
- **file extension** - A three-character portion of the name of a file that is used to identify the file type. In command lines, the file extension follows the filename and is separated from it by a period. For example, Msd.exe, where exe is the file extension.
- **filename** - The first part of the name assigned to a file. In Windows, a filename can be up to 255 characters.
- **folder** - another term for directory or subdirectory.
- **graphical user interface (GUI)** - A core Windows component responsible for building graphics data to display or print. A GDI printer relies on Windows to construct a page to print and then receives the constructed page as bitmap data.
- **HAL (hardware abstraction layer)** - The layer of the kernel closest to the hardware.
- **initialization files** - Configuration information files for Windows. System.ini is one of the most important Windows 9x/Me initialization files.
- **kernel** - The portion of an OS that is responsible for interacting with the hardware.
- **logical drive** - A portion or all of a hard drive partition that is treated by the operating system as though it were a physical drive. Each logical drive is assigned a drive letter, such as drive C, and contains a file system. Also called a volume.
- **Multitasking** - Doing more than one thing at a time. A true multitasking system requires two or more CPUs, each processing a different thread at the same time. Compare to cooperative multitasking and preemptive multitasking.
- **operating system (OS)** - Software that controls a computer. An OS controls how system resources are used and provides a user interface, a way of managing hardware and software, and ways to work with files.
- **original equipment manufacturer (OEM) license** - Software licenses purchased by manufacturers of hardware.
- **partition** - A division of a hard drive that can be used to hold logical drives.
- **path** - (1) A drive and list of directories pointing to a file such as C:\Windows\command. (2) The OS command to provide a list of paths to the system for finding program files to execute.

- **registry - A** database that Windows uses to store hardware and software configuration information, user preferences, and setup information.
- **root directory -** The main directory created when a hard drive or disk is first formatted. In Linux, it's indicated by a forward slash. In DOS and Windows, it's indicated by a backward slash.
- **sector -** On a disk surface one segment of a track, which almost always contains 512 bytes of data.
- **service -** A program that runs in the background to support or serve Windows or an application.
- **shell -** The portion of an OS that relates to the user and to applications.
- **shortcut -** An icon on the desktop that points to a program that can be executed or to a file or folder.
- **startup BIOS -** Part of system BIOS that is responsible for controlling the PC when it is first turned on. Startup BIOS gives control over to the OS once it is loaded.
- **subdirectory -** A directory or folder contained in another directory or folder. Also called a child directory or folder.
- **system BIOS -** The bus between the CPU and memory on the motherboard. The bus frequency in documentation is called the system speed, such as 400 MHz. Also called the memory bus, front-side bus, local bus, or host bus.
- **system tray -** An area to the right of the taskbar hat holds the icons for running services; these services include the volume control and network connectivity.
- **taskbar -** A bar normally located at the bottom of the Windows desktop, displaying information about open programs and providing quick access to others.
- **thread –** A single task.
- **User Account Control (UAC) dialog box -** A new security feature introduced with Windows Vista.
- **user mode** – A mode by which a subsystem has only limited access to system information and can access hardware only through other OS services.
- **Virtual machine -** software that creates one or more logical computers on a physical computer.
- **volume -** Another term for a logical drive.