CHAPTER 3

# Introducing Windows Operating Systems

**In this chapter, you will learn:**

- How to use Windows to interface with users, files and folders, applications, and hardware
- About some Windows tools that you can use to examine and support the system

A computer needs both hardware and software to work. In Chapters 1 and 2, you learned about important hardware components and how to safely take a computer apart and put it back together. Those two chapters were your introduction to becoming a hardware technician. This chapter takes your PC support technician skills to the next level by introducing you to the operating system tools and skills you'll need to maintain, support, and troubleshoot Windows, hardware, and applications.

In this chapter, you'll learn about Microsoft Windows and how this operating system provides the interface between users and applications and between applications and hardware devices. You'll learn to use several Windows tools and utilities that are useful to change desktop settings, view and manage storage devices, examine a system, and troubleshoot simple problems with hardware and applications.

**Notes** As a PC support technician, you should be aware of the older and current operating systems and how they have evolved over the years. Appendix A, *Operating Systems Past and Present*, gives you this quick history of operating systems.

## USING WINDOWS

An **operating system (OS)** is software that controls a computer. In general, you can think of an operating system as the middleman between applications and hardware, between the user and hardware, and between the user and applications (see Figure 3-1).

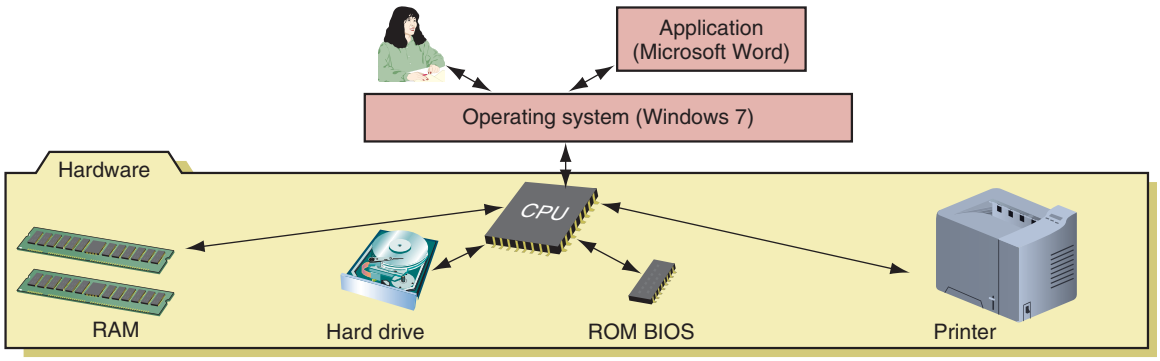




**Figure 3-1** Users and applications depend on the OS to relate to all applications and hardware components

Several applications might be installed on a computer to meet various user needs, but a computer really needs only one operating system. Although there are important differences among them, all operating systems share the following four main functions:

- ***Function 1***: Provide a user interface
  - Performing housekeeping procedures requested by the user, often concerning storage devices, such as reorganizing a hard drive, deleting files, copying files, and changing the system date
  - Providing a way for the user to manage the desktop, hardware, applications, and data
- ***Function 2***: Manage files
  - Managing files on hard drives, DVD drives, CD drives, USB flash drives, and other drives
  - Creating, storing, retrieving, deleting, and moving files
- ***Function 3***: Manage hardware
  - Managing the BIOS (programs permanently stored on hardware devices)
  - Managing memory, which is a temporary place to store data and instructions as they are being processed
  - Diagnosing problems with software and hardware

- Interfacing between hardware and software (that is, interpreting application software needs to the hardware and interpreting hardware needs to application software)

◢ *Function 4*: Manage applications

- Installing and uninstalling applications
- Running applications and managing the interface to the hardware on behalf of an application

Windows 7 is the latest Microsoft operating system and is an upgrade to Windows XP. Every PC support technician needs to be a power user of Windows 7 and also be familiar with Vista and XP. This part of the chapter covers the two most important tools for using Windows 7/Vista/XP: The Windows desktop and Windows Explorer.

**Notes** This chapter primarily covers Windows 7 and a little about Windows Vista and Windows XP. If you want to know more about Windows Vista, see Appendix B. If you want to learn more about Windows XP, see Appendix C. Vista and XP icons in the margin of a chapter tell you that related content about these OSs can be found in the appendices.

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## THE WINDOWS DESKTOP

The **desktop** is the initial screen that is displayed after the user logs on and Windows is loaded. The Windows desktop provides a **graphical user interface (GUI**; pronounced "GOO-ee") that uses graphics as compared to a command-driven interface.

In this section, you will learn about the features of the desktop, including the Start menu and taskbar. You will also learn how to manage shortcuts and icons on the desktop. We use Windows 7 as our primary OS for learning. Minor differences about Vista and XP are noted here in the chapter. But don't forget that additional major differences about Vista are covered in Appendix B, and major differences about Windows XP are covered in Appendix C.

**A+ Exam Tip** The A+ 220-802 exam covers Windows 7, Windows Vista, and Windows XP.

### AERO USER INTERFACE

The Windows 7 and Vista desktop provides a 3-D user interface called the **Aero user interface** that gives a glassy appearance and is sometimes called Aero glass (see Figure 3-2). Windows 7 comes in several editions and each edition offers a different set of features. The Aero interface is not available for the Windows 7 Starter and Home Basic editions and is available on the Home Premium, Business, Enterprise, and Ultimate editions. To support the Aero interface, Windows 7 requires 1 GB of RAM and a video card or onboard video that supports the DirectX 9 graphics standard that has at least 128 MB of graphics memory.

### THE START MENU

The Windows 7 Start menu is shown in Figure 3-3. Notice in the figure that the username for the person currently logged on is shown at the top right of the Start menu.

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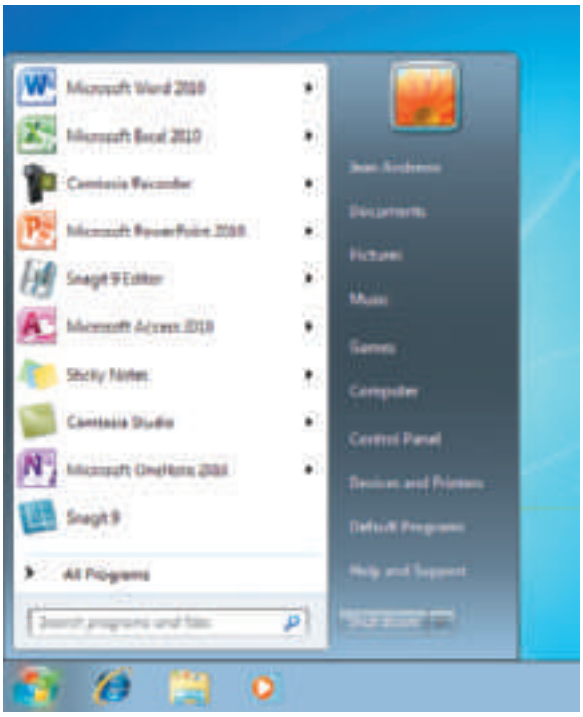
Source: Microsoft Windows 7

**Figure 3-2** The Windows 7 desktop using the Aero interface has a glassy transparent look



Source: Microsoft Windows 7

**Figure 3-3** The Windows 7 Start menu

User-oriented applications that are used often are listed in the white left columns (as shown in the figure) and can change from time to time. Items in the dark right column give access to user libraries and files and to OS utilities.

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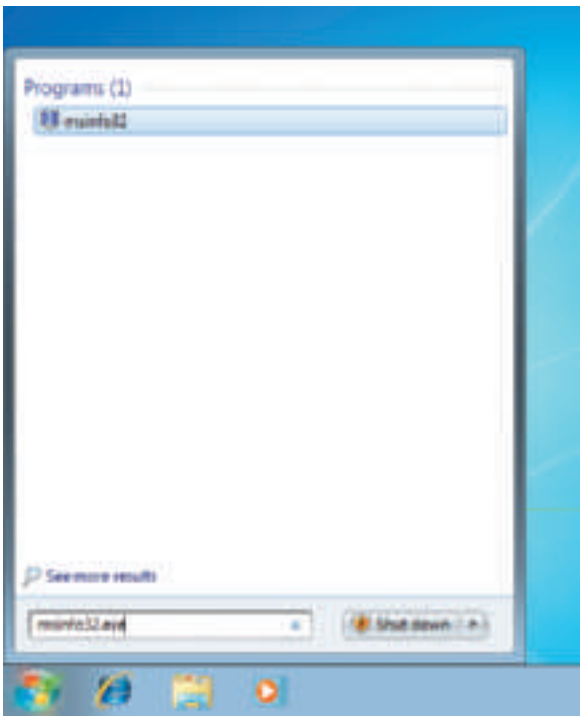
## HOW TO LAUNCH AN APPLICATION

Let's open a few applications and then see how the Windows desktop can be used to manage these open applications. Four options to open an application are:

- ***Use the Start menu***: Click the **Start** button, select **All Programs**, and then select the program from the list of installed software.
- ***Use the Search box***: Click the **Start** button, and then enter the name of the program file or command in the *Search* box (see Figure 3-4). In Windows 7, the empty box is labeled the *Search programs and files* box. In Vista, the box is labeled the *Search* box, and in Windows XP, it is labeled the *Run* box. Program names you might enter in the *Search* or *Run* box include msinfo32 (to open the System Information window), Notepad (to open the Notepad text editor), and Explorer (to open Windows Explorer.) Incidentally, the Windows 7 and Vista search boxes can also find data files and folders and will search text within document files.




Source: Microsoft Windows 7

**Figure 3-4** Use the Windows 7 *Search* box to launch a program

- ***Use Windows Explorer or the Computer window***: Execute a program or launch an application file by double-clicking the icon beside the filename in Windows Explorer or the Computer window. (In Windows XP, the Computer window is called My Computer.) To use the Computer window in Windows 7 or Vista, click **Start, Computer**. The Computer window shown in Figure 3-5 appears. Double-click the drive on which the program file is stored. In our example, we double-clicked **Local Disk (C:)**. Then we drilled down to the program file on the drive. Double-click the program file to launch it.

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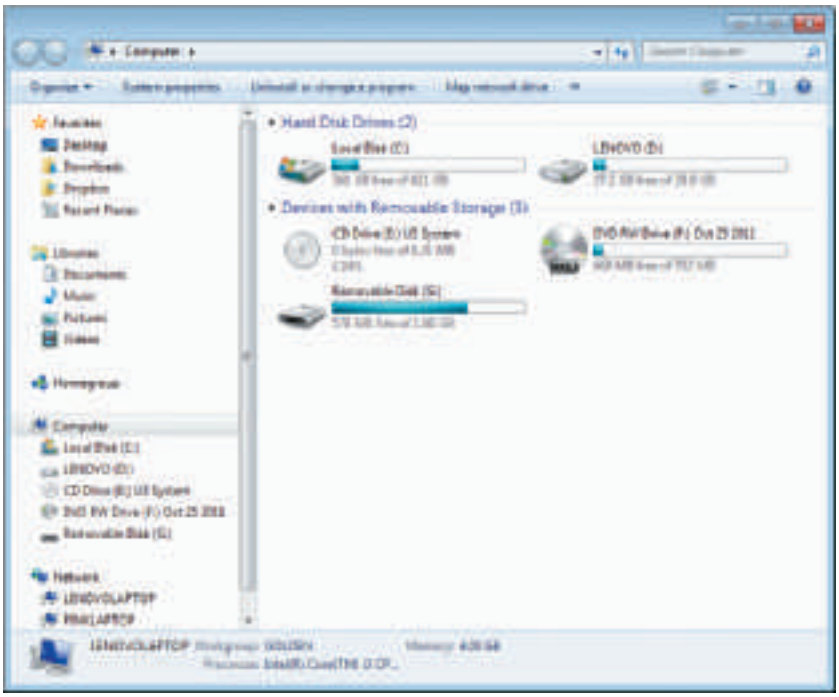

Source: Microsoft Windows 7

**Figure 3-5** If you know the location of a program file, you can drill down to it and launch it from the Computer window

- *Use a shortcut icon*: A quick way to open an application you use often is to place a shortcut icon to the program on the desktop or place a program icon in the taskbar. A shortcut icon is a clickable item on the desktop that points to a program you can execute, or to a file or folder. One way to create a shortcut for a program is to right-click the program file in the Computer or Windows Explorer window and select **Create shortcut** from the menu that appears.

**Notes** The difference between a window and a dialog box is a window can be resized, but a dialog box cannot. A dialog box is sometimes called a box.

When you launch a program, the program window appears on the desktop. You can close, move, or resize the window. Windows 7 Aero Snap and Aero Shake can help:

- Aero Snap automatically maximizes a window when you drag it to the top of the desktop. To restore a maximized window to its original size, drag the window downward on the screen. Drag a window to the right or left of the screen so that it snaps to the side of the screen to fill half the screen.
- Use Aero Shake to minimize all other windows except the one you shake. To shake a window, grab the title bar of the window and shake it. Shake again to restore the size of the other windows. You can also use the Maximize, Minimize, and Close buttons on a window.

**Notes** If you are using the Aero interface, you can get a flip 3D view of applications by pressing **Win+Tab** (the Windows key and the Tab key). Then use the Tab key to move from one open application to another. Windows 7 Starter and Home Basic do not support the Aero interface, and, to conserve system resources, you can turn the feature off using other editions of Windows.

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**A+ Exam Tip** The A+ 220-802 exam expects you to be able to use the Aero interface, including using Aero Snap and Shake.



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## The Taskbar and Notification Area (System Tray)

The **taskbar** is normally located at the bottom of the Windows desktop, displaying information about open programs and providing quick access to others. Items displayed in the taskbar can be programs running or not running. An open application displays a program icon in the taskbar. If you are using the Aero interface, when you mouse over the icon, a thumbnail of the open application appears (see Figure 3-6).

Source: Microsoft Windows 7

**Figure 3-6** Mouse over the Internet Explorer icon in the taskbar to see each open tab in IE

When you right-click an icon in the taskbar, the **Jump List** appears, which provides access to some of the major functions of the program (see Figure 3-7). When you mouse over the rectangle to the far right of the taskbar, all windows disappear so you can see the desktop and any gadgets you might have there. This feature is called **Aero Peek** because it gives you a peek at the desktop. Click the rectangle to minimize all windows. Click the rectangle again to restore all windows.


Source: Microsoft Windows 7

**Figure 3-7** Right-click the Internet Explorer icon in the taskbar to see a Jump List of frequently used web pages and quickly access a page

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**Notes** A **gadget** is a mini-app that appears on the desktop. Windows 7 gadgets shown in Figure 3-7 can appear anywhere on the Windows 7 desktop. Vista gadgets appear in the Vista **sidebar** on the right side of the Vista desktop. To control Windows 7 gadgets, right-click the desktop and select **Gadgets** from the shortcut menu that appears.

The **notification area**, also called the **system tray** or **systray**, is usually on the right side of the taskbar and displays open services. A **service** is a program that runs in the background to support or serve Windows or an application. The services in the notification area include the volume control and network connectivity.

To control the Start menu, taskbar, and notification area, right-click the taskbar and click **Properties** from the shortcut menu. The Taskbar and Start Menu Properties dialog box appears (see Figure 3-8). Use it to move the taskbar on the screen, control the icons that appear in the notification area, and control Start menu items.

**Notes** To pin a program icon to the taskbar so that it's available to quickly launch the program, first locate the program in the Start menu. Then right-click the program and select **Pin to Taskbar** from the shortcut menu.


Source: Microsoft Windows 7

**Figure 3-8** Use the Taskbar and Start Menu Properties box to control what appears in the Start menu and taskbar

**Notes** If you have a sluggish Windows system, one thing you can do is look at all the running services in the notification tray and try to disable the services that are taking up system resources. How to do that is covered in Chapter 11.

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## Hands-on Project 3-1 Using the Taskbar

Using a Windows 7/Vista/XP computer, do the following and answer the following questions about the taskbar:

1. Restart the computer and list the program icons in the taskbar. What is the program name and path to each item? (In Vista, these icons are listed in the Quick Launch area of the taskbar.)
2. List the items in the notification area (system tray) of the taskbar. Don't forget to list the items hidden in this area. Investigate and describe the purpose of each program.
3. Move the taskbar from the bottom of the screen to the left side. List the steps you took to do that.
4. Press **Win+Tab** and describe the results. Are you using the Windows 7/Vista Aero user interface? How do you know?

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## PERSONALIZE THE WINDOWS DESKTOP

You can also personalize the desktop. To use the Personalization window, right-click anywhere on the desktop, and choose **Personalize** from the shortcut menu (see Figure 3-9). Using this window, you can personalize the way Windows appears, including the desktop, sounds, mouse action, color themes, and display settings.


Source: Microsoft Windows 7

**Figure 3-9** Use the Personalization window to change the appearance of Windows

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As a support technician, you are often called on to solve problems with display settings. The most common problem with display is a problem with the screen resolution. The **screen resolution** is the number of dots or pixels on the monitor screen expressed as two numbers such as 1680 × 1050. To change the resolution, right-click anywhere on the desktop and choose **Screen resolution** from the shortcut menu. In the Screen Resolution window, make your changes and click **Apply**. You can also access the Screen Resolution window from the Control Panel or from the Personalization window.

**XP Differences** See Appendix C to learn about the differences in the Windows XP desktop and the Windows 7 desktop.

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## WINDOWS EXPLORER AND THE COMPUTER WINDOW

The two most useful tools to explore files and folders on your computer are Windows Explorer and the Computer window. (Windows XP calls the Computer window the My Computer window.) You learned to open the Computer window earlier in the chapter. For Windows 7, Windows Explorer is opened in these two ways:

- Click the yellow Windows Explorer icon in the taskbar. If a Windows Explorer window is already open, it becomes the active window.
- Right-click **Start** and select **Open Windows Explorer** from the menu. (For Vista and XP, right-click **Start** and select **Explore** from the menu.) If a Windows Explorer instance is already open, a new instance of Explorer is created. Having two instances of Explorer open makes it easy to drag and drop files and folders from one location to another.

Let's now turn our attention to how to use the Computer and Explorer windows to manage files and folders and other system resources.

### FILES AND DIRECTORIES

Every OS manages a hard drive, optical drive, USB drive, or other type of drive by using directories (also called folders), subdirectories, and files. The drive is organized with a single **root directory** at the top of the top-down hierarchical structure of subdirectories, as shown in Figure 3-10. The exception to this rule is a hard drive because it can be divided into partitions that can have more than one **volume** such as drive C: and drive D: on the same physical hard drive (see Figure 3-11). For a volume, such as drive C:, the root directory is written as C:. Each volume has its own root directory and hierarchical structure of subdirectories. You can think of volumes as logical drives within the one physical drive.

As shown in Figure 3-10, the root directory can hold files or other directories, which can have names such as C:\Data. These directories, called **subdirectories**, **child directories**, or **folders**, can, in turn, have other directories listed in them. Any directory can have files and other subdirectories listed in it; for example, Figure 3-10 shows one file on drive C: is C:\Data\Business\Letter.docx. In this path to the file, the C: identifies the volume and is called the drive letter. Drive letters used for a hard drive, CD, USB drive, or DVD are C:, D:, E:, and so forth. Drive letters used for a floppy drive are A: or B:.

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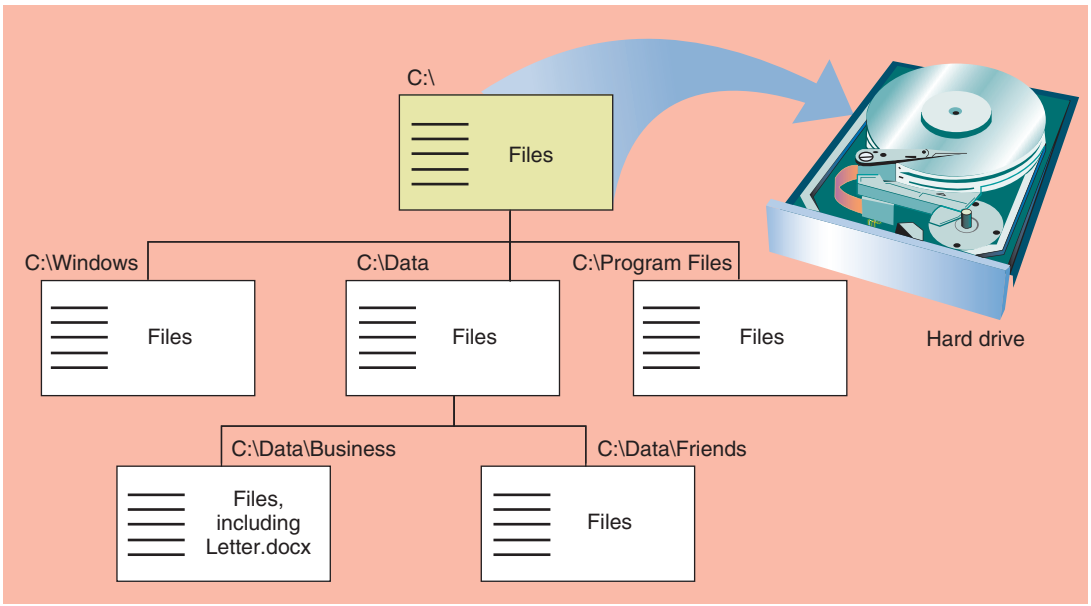




**Figure 3-10** Storage devices such as a USB drive, CD, or hard drive are organized into directories and subdirectories that contain files

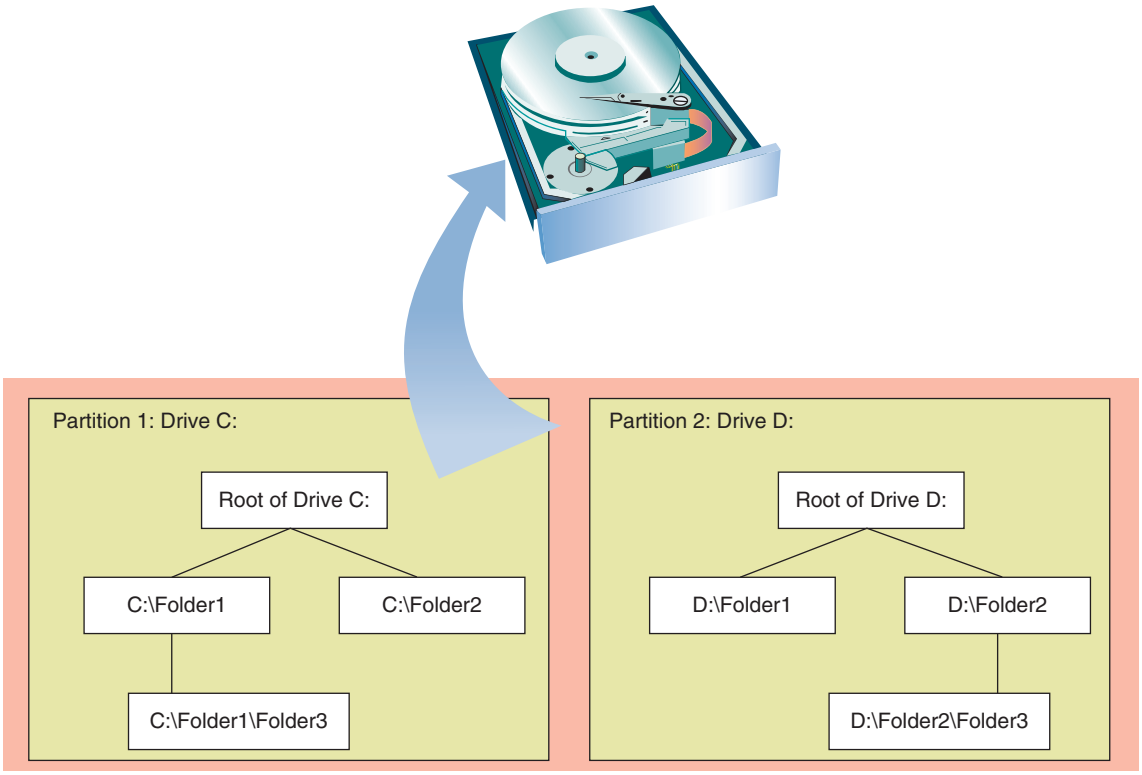




**Figure 3-11** A hard drive can be divided into one or more partitions that can each contain a volume such as drive C: or drive D:

**Notes** Technicians tend to call a directory a folder when working in Windows Explorer, but when working with a command-line interface, they call a directory a directory.

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When you refer to a drive and directories that are pointing to the location of a file, as in C:\Data\Business\Letter.docx, the drive and directories are called the **path** to the file (see Figure 3-12). The first part of the name before the period is called the **filename** (Letter), and the part after the period is called the file extension (.docx). A **file extension** indicates how the file is organized or formatted, the type content in the file, and what program uses the file. For example, the .docx file extension identifies the file type as a Microsoft Word 2010 document file. By default, Windows does not display file extensions in Windows Explorer. How to display these extensions is coming up.

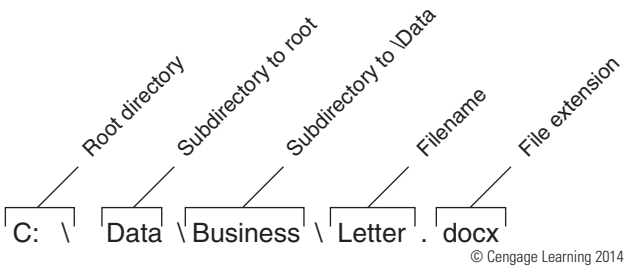
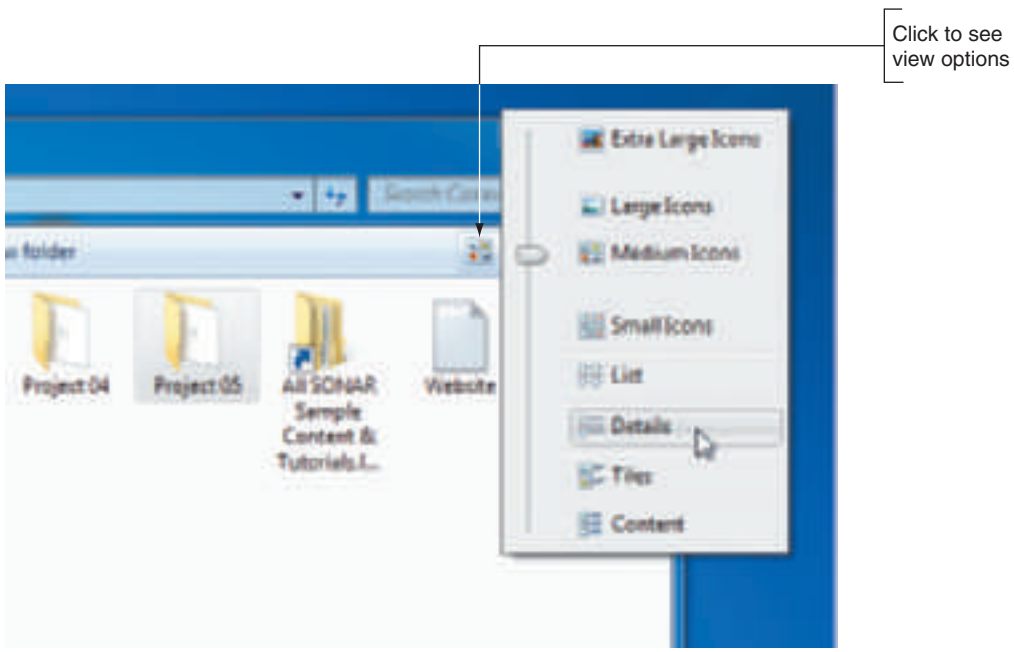



**Figure 3-12** The complete path to a file includes the volume letter, directories, filename, and file extension; the colon, backslashes, and period are required to separate items in the path

## NAVIGATE THE FOLDER STRUCTURE

When working with the Windows Explorer or Computer window, these tips can make your work easier:

- ***Tip 1***: Click or double-click items in the left pane, called the **navigation pane**, to drill down into these items. The folders or subfolders appear in the right pane. You can also double-click folders in the right pane to drill down. When you click the white arrow to the left of a folder in the navigation pane, its subfolders are listed underneath it in the pane. (For XP, click the plus sign to the left of a folder.)
- ***Tip 2***: To control how files and subfolders appear in the right pane, click the View icon in the menu bar and select your view (see Figure 3-13).




Source: Microsoft Windows 7

**Figure 3-13** Click the View icon to change how files and folders display in the right pane of Windows Explorer

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- *Tip 3*: To control the column headings that appear in the Details view, right-click a column heading and select the headings that you want to appear (see Figure 3-14). To control which column is used to sort items in the Details view, click a column heading.

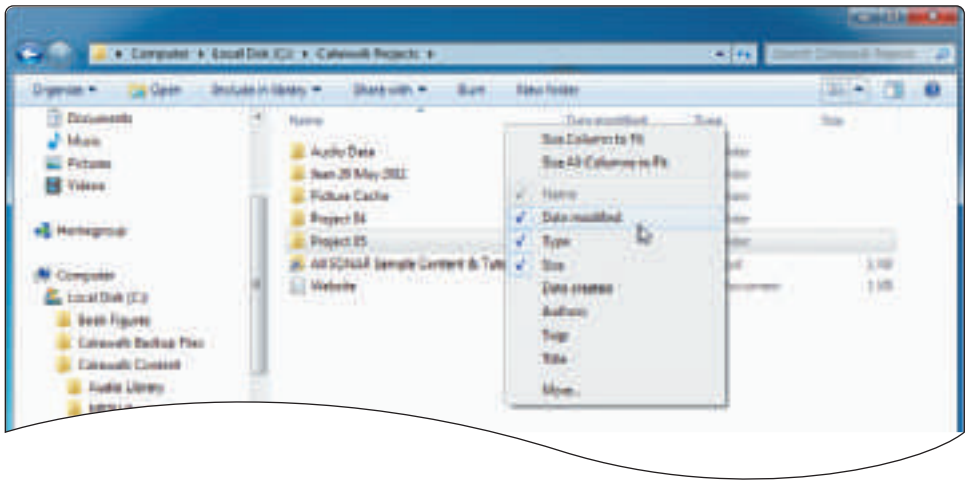

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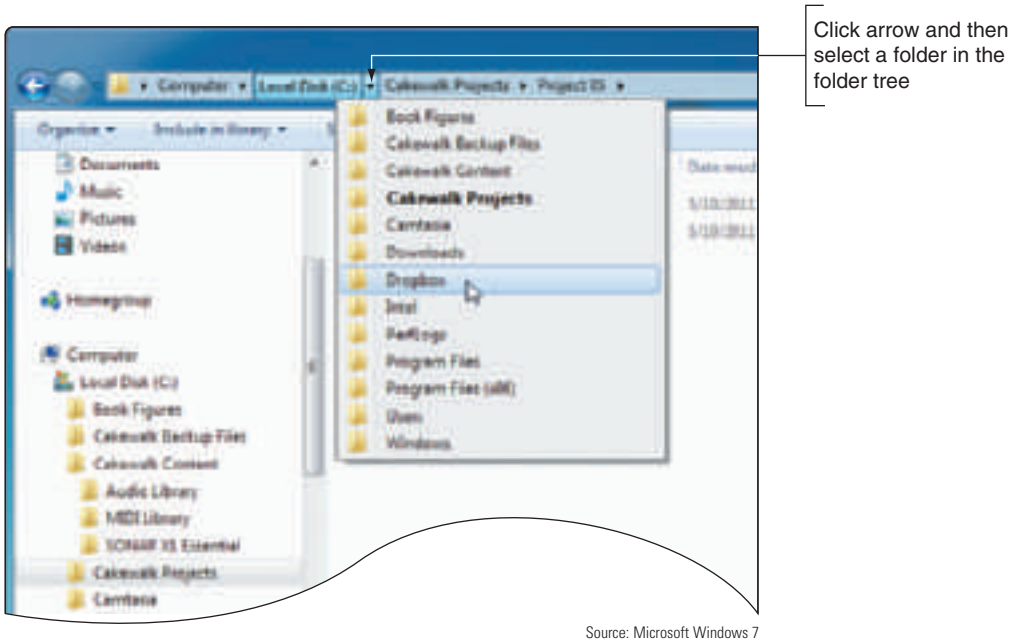
**Figure 3-14** Right-click a column heading to select columns to display in the Details view

- *Tip 4*: To search for a folder or file, use the Search box in the upper-right corner of the window. (This search box is not available in Windows XP.)
- *Tip 5*: Use the forward and back arrows in the upper-left corner to move forward and backward to previous views. (These buttons are not available in Windows XP.)
- *Tip 6*: Click a right arrow in the path displayed in the address bar at the top of the Explorer window to see a drop-down list of subfolders (see Figure 3-15). Click one to move to this subfolder.




Source: Microsoft Windows 7

**Figure 3-15** Click a right arrow in the address bar to move up the folder tree and down to a new folder

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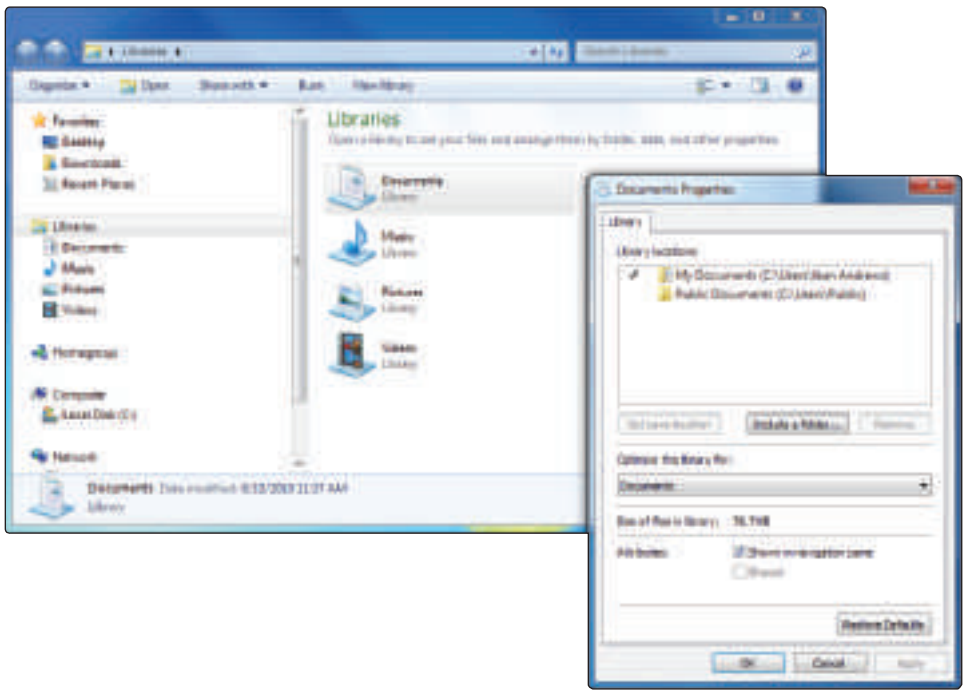
## WINDOWS 7 LIBRARIES

A Windows 7 **library** is a collection of one or more folders, and these folders can be stored on different local drives or on the network. (Vista and XP do not support libraries.) A library is a convenient way to access several folders in different locations from one central location. When Windows is installed, it creates four default libraries: Documents, Music, Pictures, and Videos. By default, the first three libraries can be accessed from the Start menu. In addition, you can use the Computer window or Windows Explorer to access all libraries, including the four default ones and any libraries you create.

When you first open Windows Explorer, the list of libraries appears (see Figure 3-16). Use a library's Properties box to find out the folders that are contained in the library and the location of each folder. For example, right-click the Documents library and then select **Properties** from the shortcut menu. The Properties box shown on the right side of Figure 3-16 appears. The box shows that the Documents library contains two folders, the user's My Documents folder and the Public Documents folder.




Source: Microsoft Windows 7

**Figure 3-16** Windows 7 includes four default libraries

When you add a new folder to a library, the files in that folder appear as though they are in the library even though they continue to be stored in the original location. When you add a file to the library, it is stored in the library's default save location folder. Which folder is that? It's the one checked as the save location in the library's Properties box. For example, in the Properties box shown in Figure 3-16, you can see the check beside the My Documents folder, indicating it is the save location folder. To create a new library, click in the white space in the right pane of Explorer and then click the **New library** command in the menu bar.

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## CHANGE WINDOWS EXPLORER SETTINGS AND FOLDER OPTIONS

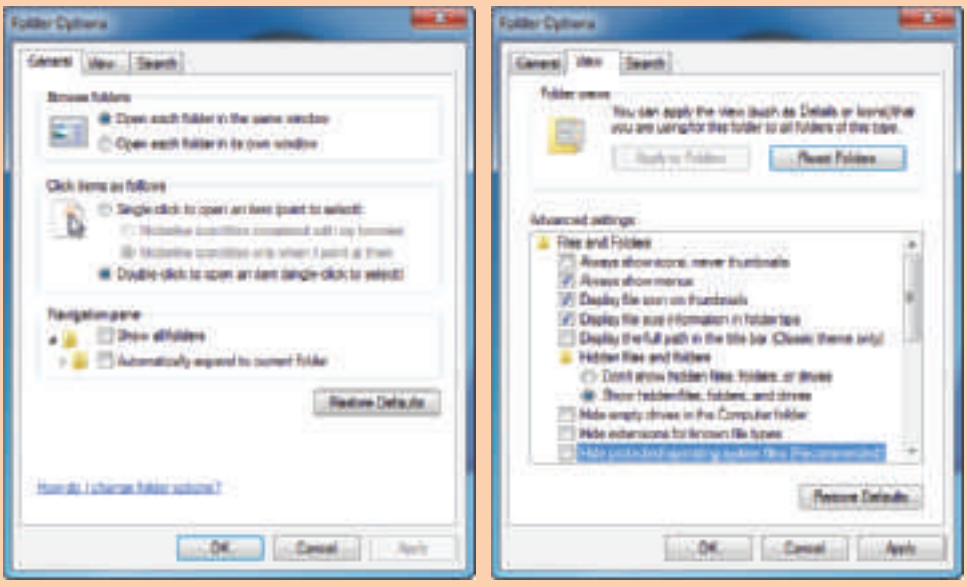
You can view and change options assigned to folders. These options control how users view the files in the folder and what they can do with these files. In Windows Explorer and the Computer window, Windows has an annoying habit of hiding file extensions if it knows which application is associated with a file extension. For example, just after installation, it hides .exe, .com, .sys, and .txt file extensions, but does not hide .docx, .pptx, or .xlsx file extensions until the software to open these files has been installed. Also, Windows really doesn't want you to see its own system files, and it hides these files from view until you force it to show them.



### APPLYING CONCEPTS

A technician is responsible for solving problems with system files (files that belong to the Windows operating system) and file extensions. To fix problems with these files and extensions, you need to see them. To change folder options so you can view system files and file extensions, do the following:

1. To open the Control Panel, click **Start**, **Control Panel**. In the Control Panel, click **Appearance and Personalization**. Then click **Folder Options**. The Folder Options dialog box appears.
2. Use items on the General tab to change the way Windows Explorer works and how items appear in the navigation pane of Explorer. For Windows 7, the General tab is shown on the left in Figure 3-17. The View tab is shown on the right in Figure 3-17. (The Vista and XP Folder Options box looks and works about the same as that of Windows 7.)



Source: Microsoft Windows 7

**Figure 3-17** Use the Folder Options box to control how Windows Explorer works and displays files and folders

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3. On the View tab of the Folder Options box, scroll down in the Advanced settings group and make these selections to show hidden information about files, folders, and drives, as shown on the right in Figure 3-17:
   - Select **Show hidden files, folders, and drives**.
   - Uncheck **Hide extensions for known file types**.
   - Uncheck **Hide protected operating system files (Recommended)** and respond to the Warning box.
4. To display the menu bar in Windows Explorer, check **Always show menus**. (By default, this bar is hidden in Windows 7 and Vista.)
5. To save your changes and close the Folder Options box, click **OK**.

**A+ Exam Tip** The A+ 220-802 exam expects you to know how to view hidden files and file extensions and to be able to change the layout or view of folders in Windows Explorer.

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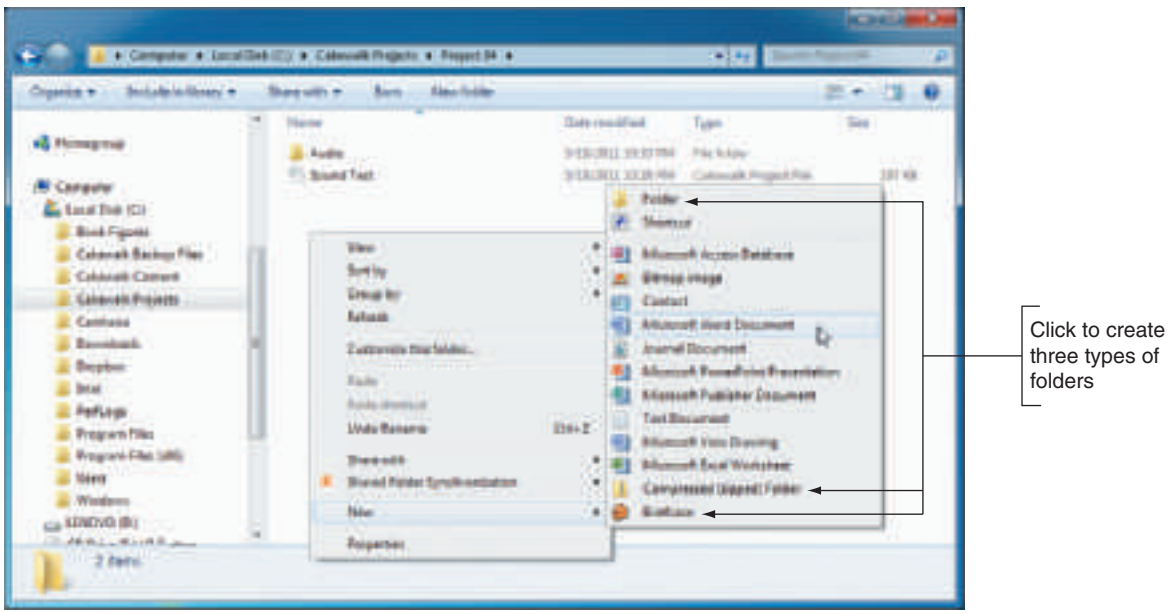
## CREATE A FILE

You can create a file using a particular application, or you can create a file using Windows Explorer or the Computer window. In Explorer and the Computer window, to create a file, right-click in the unused white area in the right pane of the window and point to **New** in the shortcut menu. The menu lists applications you can use to create a file in the current folder (see Figure 3-18). Click the application and the file is created. You can then rename the filename. However, to keep the proper file association, don't change the file extension.




Source: Microsoft Windows 7

**Figure 3-18** Create a new file or folder using Windows Explorer

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## CREATE A FOLDER

To create a folder, first select the folder you want to be the parent folder. (Remember that a parent folder is the folder that contains the child folder.) Right-click in the white area of the right pane and point to **New** in the shortcut menu. The menu in Figure 3-18 appears. Notice in the menu that for Windows 7 and Vista, you have three choices for folder types. These choices are explained here:

- *Folder* creates a regular folder.
- **Compressed (zipped) Folder** creates a compressed folder with a .zip extension. Any file or folder that you put in this folder will be compressed to a smaller size than normal. A compressed folder is often used to compress files to a smaller size so they can more easily be sent by email. When you remove a file or folder from a compressed folder, the file or folder is uncompressed back to its original size.
- **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. (Windows offers two ways to sync files on different computers: Briefcase and Offline Files.)

Make your selection and the folder is created and highlighted so that you can rename it (see Figure 3-19).

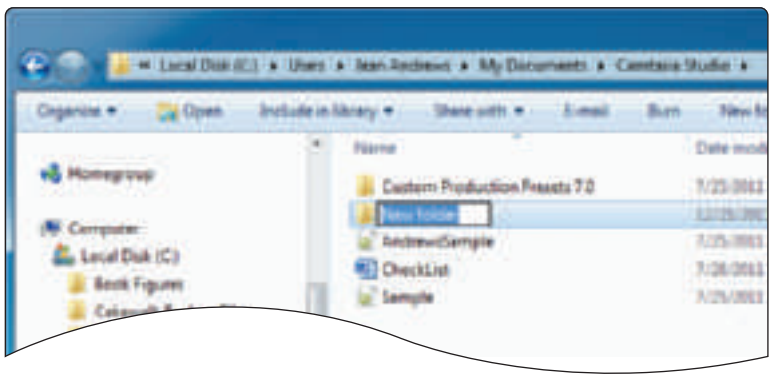

**Figure 3-19** Edit the new folder's name

Source: Microsoft Windows 7

You can create folders within folders within folders, but there is a limitation as to the maximum depth of folders under folders; how deep you can nest folders depends on the length of the folder names themselves. The maximum length of a path and filename cannot exceed 260 characters.

**Notes** The Windows desktop is itself a folder and, for Windows 7 and Vista, is located at C:\Users*username*\Desktop. For example, if the user, Anne, creates a folder on her desktop named Downloads, this folder is located at C:\Users\Anne\Desktop\Downloads.

## COPY, MOVE, RENAME, OR DELETE FILES OR FOLDERS

Use these handy tips to copy, move, and delete files or folders using Windows Explorer:

- To copy a file or folder, right-click it and select **Copy** from the shortcut menu. Then click in the white area of the folder where the copied item is to go and select **Paste** from the shortcut menu. You can also use the Cut and Paste commands to move an item to a new location.

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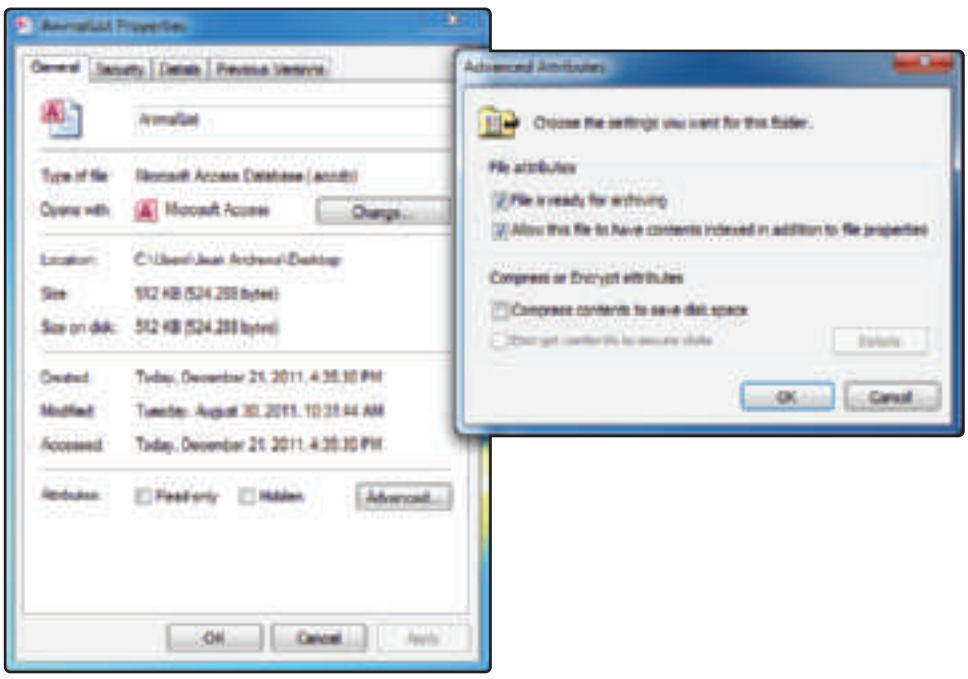
- Drag and drop an item to move or copy it to a new location. If the location is on the same drive as the original location, the file or folder will be automatically deleted from its original location. If you don't want it deleted, hold down the **Ctrl** key while you drag and drop the item.
- To rename a file or folder, right-click it and select **Rename** from the shortcut menu. Change the name and click off the file or folder to deselect it.
- To delete a file or folder, select the item and press the **Delete** key. Or you can right-click the item and select **Delete** from the shortcut menu. Either way, a confirmation dialog box asks if you are sure you want to delete the item. If you click **Yes**, you send the file or folder and all its contents, including subfolders, to the Recycle Bin.
- To select multiple items to delete, copy, or move at the same time, hold down the **Shift** or **Ctrl** key as you click. To select several adjacent items in a list, click the first item and Shift-click the last item. To select nonadjacent items in a list, hold down the Ctrl key as you click each item.

**Notes** Appendix E lists handy keystrokes to save you time when working with Windows.

Emptying the Recycle Bin will free up your disk space. Files and folders sent to the Recycle Bin are not *really* deleted until you empty the bin. To do that, right-click the bin and select **Empty Recycle Bin** from the shortcut menu.

## CHANGE FILE OR FOLDER ATTRIBUTES

Using Explorer or the Computer window, you can view and change the properties assigned to a file or folder; these properties are called the **file attributes** or **folder attributes**. Using these attributes, you can do such things as hide a file, make it a read-only file, or flag a file to be backed up. From Explorer or the Computer window, right-click a file or folder and select **Properties** from the shortcut menu. The Properties window shown on the left side of Figure 3-20 opens for the AnimalList.accdb database file.



Source: Microsoft Windows 7

**Figure 3-20** Use a file's Properties box to view file properties and edit file attributes

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From the Properties window, you can change the read-only, hidden, archive, and indexing attributes of the file or folder. (Indexing is not used in Windows XP.) To make the file a read-only file or to hide the file so that it does not appear in the directory list, check the appropriate box and click **Apply**. The archive attribute is used to determine if a file or folder has changed since the last backup. To change its value, click **Advanced** in the Properties window (see the right side of Figure 3-20). Make your change and click **OK**.



**Notes** In this chapter, you learn how to use Windows Explorer to create, copy, move, delete, rename, and change the attributes of files and folders. In Chapter 10, you will learn that you can do these same tasks using commands from a command prompt.

## Hands-on Project 3-2 Using Windows Explorer

Do the following to practice using Windows Explorer:

1. Open Windows Explorer and create a folder under the root directory of the hard drive called \Temp. List the steps you took.
2. Add a subfolder to \Temp called **MyFiles**. List the steps you took.
3. Create a text file in the MyFiles folder named **Text1.txt**. List the steps you took.
4. Create a shortcut to the MyFiles folder on the Windows desktop. List the steps you took.
5. Rename the file **Text2.txt**.
6. Double-click the shortcut on the desktop. What error did you get?
7. The program file for Microsoft Paint is mspaint.exe. Use Windows Explorer to locate the program file and launch the Microsoft Paint program.
8. Create a shortcut to Microsoft Paint on the Windows desktop. Launch Microsoft Paint using the shortcut.
9. To clean up after yourself, delete the \Temp folder and the shortcuts. Close the two Paint windows.

## Hands-on Project 3-3 Practicing Keystrokes

You might be called on to troubleshoot a system when the mouse does not work. In this situation, Appendix E, *Keystroke Shortcuts in Windows*, can help. To prepare yourself to work without a mouse, disconnect your mouse and do the following:

1. Files in the root directory of a computer you are troubleshooting might be corrupted. Open Explorer and display the files in the root directory of drive C. List the steps and keystrokes you used to do this.
2. Seeing hidden files and file extensions might help you to better understand a problem you are facing. Unhide all the files and folders. Using Control Panel, open the **Folder Options** dialog box. Select the **View** tab, and then select **Show hidden files, folders, and drives**. Also uncheck **Hide extensions for known file types** and uncheck **Hide protected operating system files (Recommended)**. List the steps and keystrokes you used.
3. The Pagefile.sys might be corrupted. What is the exact size of the file Pagefile.sys in bytes, and the date and time the file was last modified?

## QUICK AND EASY WINDOWS SUPPORT TOOLS

As a PC support technician, you need to be able to sit down at a working computer and within five or ten minutes find the details about what software and hardware is installed on the system and the general health of the system. Within 20 minutes, you should be able to solve any minor problems the computer might have such as a broken network connection.

In this part of the chapter, you learn about the tools you need to quickly find these answers and solve some common problems. You'll learn to use the System window, System Information window, Control Panel, Action Center, User Account Control dialog box, and Windows Help and Support. In other chapters, you'll learn to use more Windows tools.

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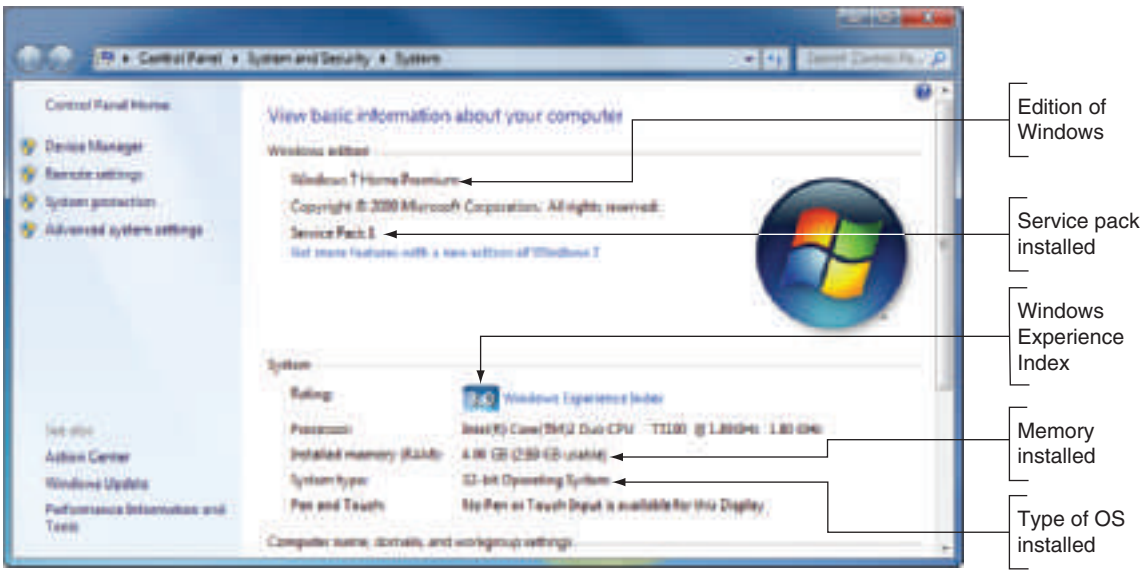
### SYSTEM WINDOW

The **System window** is your friend. It can give you a quick look at what hardware and software are installed and can get you to other useful Windows tools. To open the System window, click **Start**, right-click **Computer**, and select **Properties** from the shortcut menu. (Alternately, you can open Control Panel, click System and Security, and then click System.) Figure 3-21 shows the resulting System window for one laptop.




Source: Microsoft Windows 7

**Figure 3-21** A 32-bit version of Windows 7 Home Premium is installed

So what technical information are you looking at? Here is the rundown:

- Windows 7 comes in several editions and you can see this system has the Windows 7 Home Premium edition installed.
- You can see that Service Pack 1 is installed. (A **service pack** is a major update or fix to an OS occasionally released by Microsoft. Minor updates or fixes that are released more frequently are called **patches**.)
- The type of OS installed is a 32-bit OS. A **32-bit operating system** processes 32 bits at a time, and a **64-bit operating system** processes 64 bits at a time. The Starter edition of Windows 7 comes in the 32-bit version and other editions come in either 32-bit or 64-bit versions. A 64-bit OS performs better than a 32-bit OS, but requires more memory. A 32-bit OS can support up to 4 GB of memory, and a 64-bit OS can support much more. The details of how much memory each edition of Windows 7 can support are covered in Chapter 7.

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- The amount of installed memory is 4 GB. For a 32-bit OS, this is all the memory the system can use. If the user of this computer is thinking about upgrading RAM, you can tell him to not waste his money so long as he has a 32-bit OS installed.
- The **Windows Experience Index** is 3.0. That index is a rating of the system's overall performance on a scale from 1.0 to 7.9. Immediately, you know this system is not a snail or a blazing torch, but somewhere in the middle and probably toward the low range of performance.

That's a lot of useful information for a first look at a computer.

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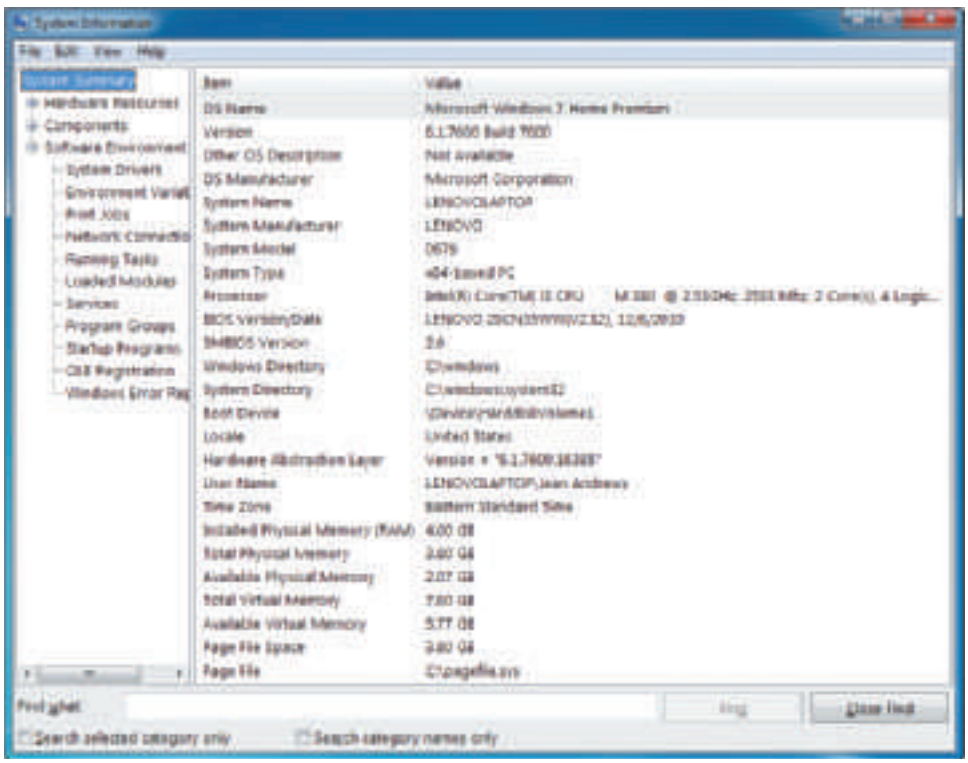
## SYSTEM INFORMATION WINDOW

Turn to the **System Information** (msinfo32.exe) window for more details about a system, including installed hardware and software, the current system configuration, and currently running programs. For example, you can use it to find out what BIOS version is installed on the motherboard, how much RAM is installed, the directory where the OS is installed, the size of the hard drive, the names of currently running drivers, a list of startup programs, print jobs in progress, currently running tasks, and much more. Because the System Information window gives so much useful information, help desk technicians often ask a user on the phone to open it and read to the technician information about the computer.

When strange error messages appear during startup, use the System Information window to get a list of drivers that loaded successfully. Device drivers are small programs stored on the hard drive that tell the computer how to communicate with a specific hardware device such as a printer, network card, or scanner. If you have saved the System Information report when the system was starting successfully, comparing the two reports can help identify the problem device.

To run System Information, click **Start**, and enter **Msinfo32.exe** in the *Search* box and press **Enter**. The System Information window for one computer is shown in Figure 3-22. To drill down to more information in the window, click items in the left pane.



Source: Microsoft Windows 7

**Figure 3-22** Use the System Information utility to examine details about a system

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**A+ Exam Tip** The A+ 220-802 exam expects you to be familiar with and know how to use the Windows 7/Vista/XP desktop, Computer, My Computer, Windows Explorer, System, System Information, Control Panel, Action Center, and Network and Sharing Center windows. All these tools are discussed in this section. If the utility can be accessed by more than one method, you are expected to know all of the methods.

## Hands-on Project 3-4 Using the System Information Utility

Do the following to run the System Information utility and gather information about your system:

1. Use the **Msinfo32.exe** command to launch the System Information window.
2. Browse through the different levels of information in this window and answer the following questions:
   a. What OS and OS version are you using?
   b. What is your CPU speed?
   c. What is your BIOS manufacturer and version?
   d. How much video RAM is available to your video adapter card? Explain how you got this information.
   e. What is the name of the driver file that manages your network adapter? Your optical drive?

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## THE CONTROL PANEL

The Control Panel is a window containing several small utility programs called applets that are used to manage hardware, software, users, and the system. (In general, a utility program is a program used to maintain a system or fix a computer problem.) To access the Control Panel, click **Start** and then click **Control Panel**.

Figure 3-23 shows the Windows 7 Control Panel in Category view. To switch to the Large icons or Small icons view, click **Category** and make your selection. (In Vista and XP, you can switch Control Panel between Category view and Classic View. Classic View looks similar to the icon views in Windows 7.) Use the search box in the title bar to help find information and utilities in Control Panel.

You can also access the utilities using one of these methods:

- If you know the name of the utility program file, click **Start** and type the program name in the *Search* box. For example, to open the Mouse Properties applet, type **Main.cpl** in the box, and then press **Enter**. (An applet in Control Panel sometimes has a .cpl file extension.)
- Type a description or title of the utility in the *Search* box. For example, type **Network and Sharing Center** to open that window.
- Find another path to the utility. For example, to open the System window in the System and Security group of Control Panel, click **Start**, right-click **Computer** and select **Properties**.

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Source: Microsoft Windows 7

**Figure 3-23** The Control Panel is organized by category, although you can easily switch to a list of selections

**A+ Exam Tip** The A+ 220-802 exam expects you to be familiar with the Control Panel and its utilities. You should also know how to use the Large icons view in Windows 7 and the Classic View in Vista and XP. You are also expected to know more than one method of opening a Windows utility program.

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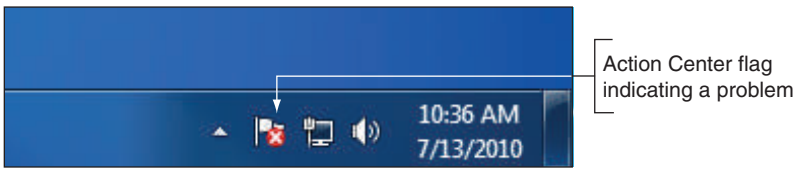
## ACTION CENTER

The Action Center is the tool to use when you want to make a quick jab at solving a computer problem. If a hardware or application problem is easy to solve, the Action Center can probably do it in a matter of minutes. The **Action Center** is new to Windows 7 and lists errors and issues that need attention. The Action Center flag appears in the notification area of the taskbar. If the flag has a red X beside it, as shown in Figure 3-24, Windows considers the system has an important issue that needs resolving immediately.




Source: Microsoft Windows 7

**Figure 3-24** A red X on the Action Center flag in the taskbar indicates a critical issue needs resolving

To open the Action Center, use one of these methods:

- Click the **flag icon** in the taskbar. A list of issues appears (see Figure 3-25). Click **Open Action Center**.
- Click **Start** and type **Action Center** in the search box and press **Enter**.
- Click **Start** and click **Control Panel**. The Control Panel opens. Under the System and Security group, click **Review your computer's status**.

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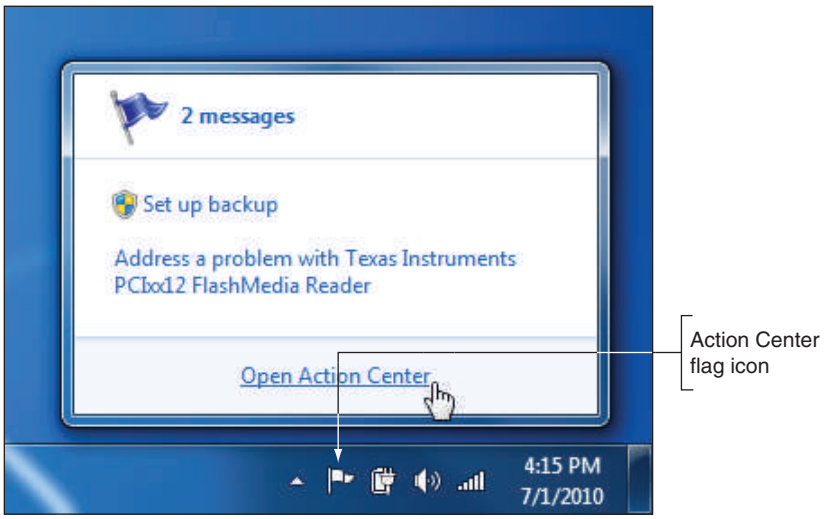
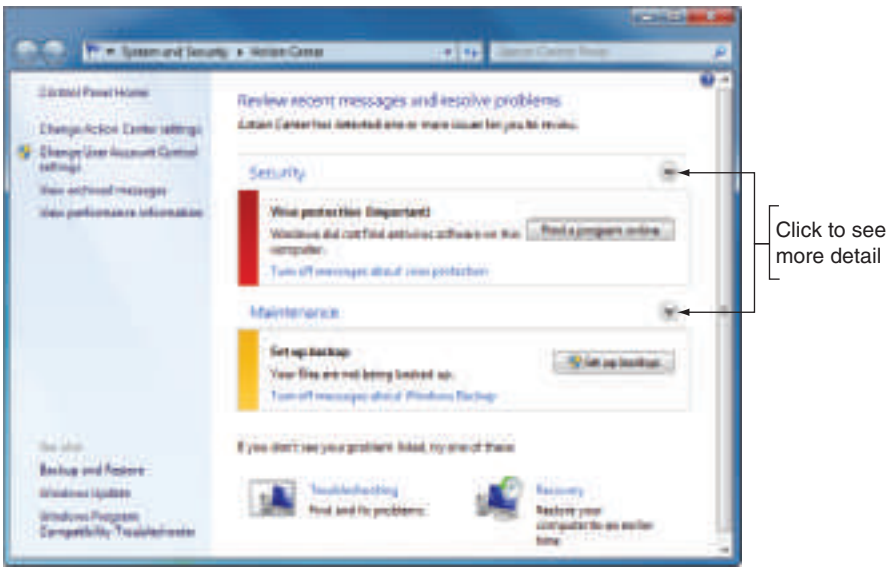



Source: Microsoft Windows 7

**Figure 3-25** Click the Action Center flag to see a list of current issues and to open the Action Center

Using either method, the Action Center for one computer shown in Figure 3-26 appears. Notice the colored bar to the left of a problem. The red color indicates a critical problem that needs immediate attention. In this example, antivirus software is not installed on the system. The orange color indicates a less critical problem, such as no backups are scheduled. Click the button to the right of a problem to find a recommended solution.




Source: Microsoft Windows 7

**Figure 3-26** The Action Center shows a critical problem that needs a resolution

When you first open the Action Center, any problem that needs addressing is displayed. Looking back at Figure 3-25, you can see the Action Center reports a problem with a Texas Instruments FlashMedia Reader. When you click **View message details** in the Action Center, the screen shown in Figure 3-27 appears. Looking at Figure 3-27, you can see that the device does not have a Windows 7 driver and Windows is suggesting the problem might

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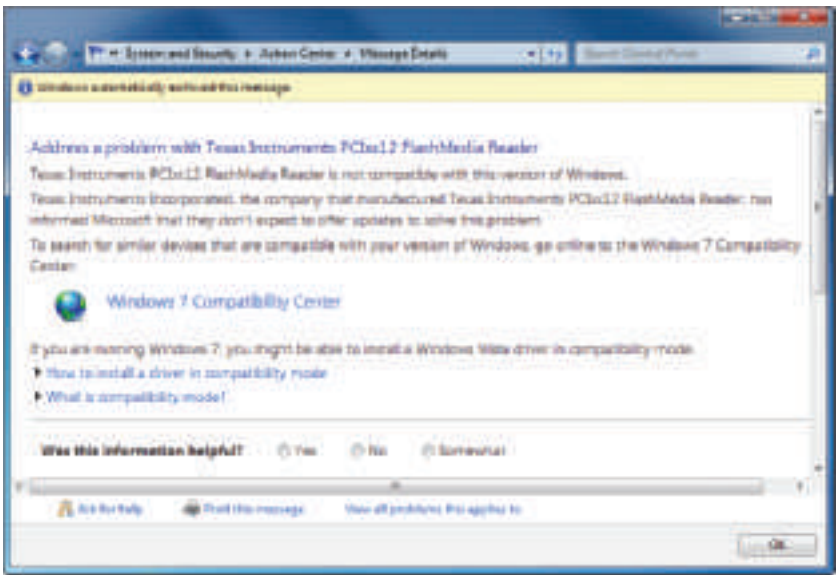
be solved by installing a Vista driver using compatibility mode. By clicking the links on the window, you can attempt the solution. Chapter 7 covers more about the possibility of using a Vista driver in a Windows 7 system.






Source: Microsoft Windows 7

**Figure 3-27** A problem reported in the Action Center with a possible solution

To see other information available under the Security and Maintenance groups, click the down arrow to the right of a group. For example, after the arrow to the right of Security is clicked, detailed information about Windows Firewall, Windows Update, and other security settings appears.

To see a complete list of past and current problems on this computer, click **View archived messages** in the left pane of the Action Center. This report helps understand the history of problems on a computer that you are troubleshooting. The problems in this list might or might not have a solution.

## Hands-on Project 3-5 Using the Action Center

Using Windows 7, follow these steps to explore and use the Action Center:

1. Open the Action Center and list any problems it reports.
2. If a problem is listed, click **View message details**. Investigate possible solutions to the problem. If appropriate for your system, apply any solutions not yet applied. Make notes regarding the solutions you applied and the results of applying these solutions.
3. In the left pane of the Action Center, click **View archived messages**. Do you find a previous problem with this computer that already has a solution applied? If so, double-click the problem to read about the solution. Describe the problem and the solution that was applied.

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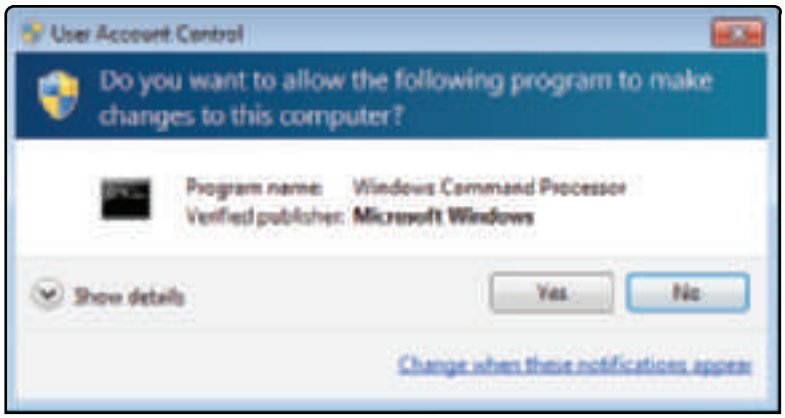
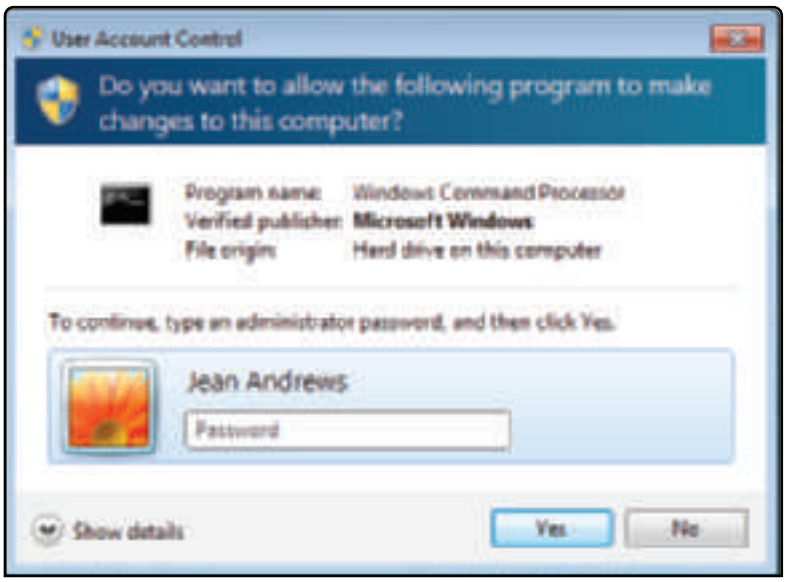
## USER ACCOUNT CONTROL BOX

At some point while working with a computer to maintain or troubleshoot it, the **User Account Control (UAC) dialog box**, shown in Figure 3-28, will pop up. In Vista, this box was disruptive for power users and administrators because it appears each time a user attempts to perform an action that can be done only with administrative privileges. Windows 7 made the box less annoying and gives more options for configuring it.

(A)




(B)




Source: Microsoft Windows 7

**Figure 3-28 (a) and (b)** (a) The User Account Control box of an administrator does not require an administrative password; (b) the UAC box of a standard user requires an administrative password

In Windows, there are two types of user accounts: An **administrator account** and a **standard account**. An administrator account has more privileges than a standard account and is used by those responsible for maintaining and securing the system. When the UAC box appears, if you are logged on as an administrator, all you have to do is click Yes to close the box and move on, as shown in Figure 3-28(a). If the user account does not have administrative privileges, you'll have the opportunity to enter a password of an administrative account to continue, as shown in Figure 3-28(b).

The purposes of the UAC box are: (1) to prevent malicious background tasks from gaining administrative privileges when the administrator is logged on, and (2) to make it easier

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for an administrator to log in using a less powerful user account for normal desktop activities, but still be able to perform administrative tasks while logged in as a regular user.

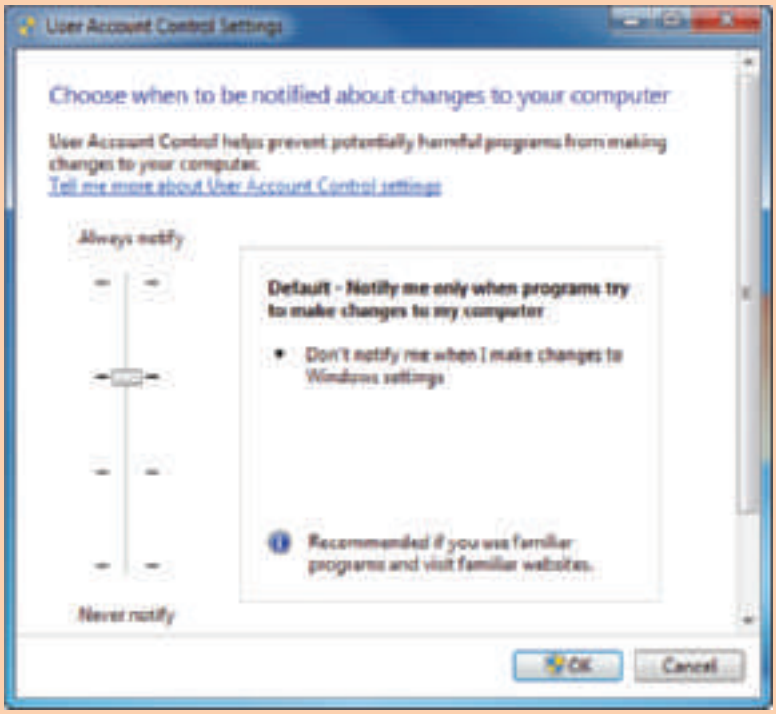
For example, suppose you're logged on as an administrator with the UAC box turned off and click a malicious link on a web site. Malware can download and install itself without your knowledge and might get admin privileges on the computer. If you're logged on as a standard user and the UAC box is turned off, the malware might still install without your knowledge but with lesser privileges. The UAC box stands as a gatekeeper to malware installing behind your back because someone has to click the UAC box before the installation can proceed.



## APPLYING CONCEPTS

Using Windows 7, you can control how the UAC box works. Do the following:

1. Open the Control Panel and click **User Accounts** in the User Accounts and Family Safety group.
2. In the User Accounts window, click **Change User Account Control settings**. The User Account Control Settings window appears (see Figure 3-29).




Source: Microsoft Windows 7

**Figure 3-29** Windows 7 provides options to control the UAC box

3. Change when the UAC box appears. Here is a description of the four options shown in Figure 3-29:
   - Always notify me when programs are trying to install software or make other changes to the computer and when I am making changes to Windows settings. (This is the Vista default option.)

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- Notify me when programs are trying to make changes, but don't notify me when I am changing Windows settings. (This option is new to Windows 7 and causes the UAC box to be less annoying.)
- Same as the second option above but, in addition, do not dim the Windows desktop. Dimming the Windows desktop can alarm a user and take up resources. (In the Vista Business and Ultimate editions, a setting can be used to disable dimming the desktop.)
- Never notify me when a program is trying to change the computer or I am changing it. (This option is also available in Vista.)

4. Click **OK** and respond to the UAC box. Close the Action Center window.

**Vista Differences** To find out how to control the Vista User Account Control box, see Appendix B.

**A+ Exam Tip** The A+ 220-802 exam expects you to know how to change the settings that control when the UAC box appears.

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## NETWORK AND SHARING CENTER

A failed network connection can sometimes quickly be resolved using the **Network and Sharing Center** available in Windows 7 and Vista. Use Control Panel or the taskbar to access the center. To use the taskbar, do the following:

1. Look for the networking icon in the taskbar. Wired networks show the icon on the left side of Figure 3-30 and wireless networks show the icon on the right side of Figure 3-30. Click the icon to see more information. An icon that indicates a problem has a red X and is shown on the left side of Figure 3-31. If wireless networks are available, the icon has a yellow star, as shown on the right side of Figure 3-31. In the pop-up bubble, click a wireless network to connect to it. If the network is secured, you must enter the wireless security key.

**Notes** If you don't see the networking icon in the taskbar, you can add it using the Taskbar and Start Menu Properties box you learned about earlier in the chapter. You can also access the Network and Sharing Center from the Control Panel.


Source: Microsoft Windows 7

**Figure 3-30** Wired and wireless networking icons in the taskbar

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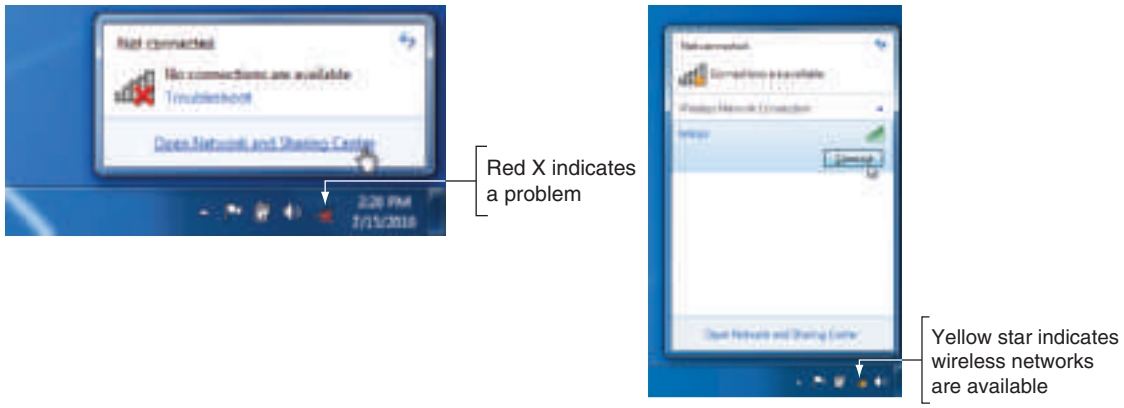
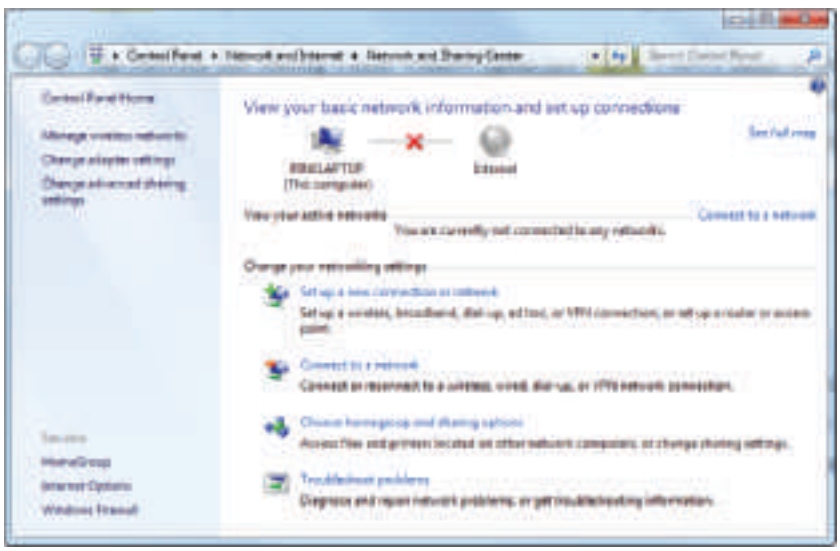



Source: Microsoft Windows 7

**Figure 3-31** The network icon in the taskbar indicates a problem or a possible new connection to a wireless network

2. To get more information about a problem, click **Open Network and Sharing Center**.
3. The Network and Sharing Center window opens (see Figure 3-32). A red X indicates a problem. Click the X to get help and resolve the problem. Windows Network Diagnostics starts looking for problems, applying solutions, and making suggestions. You can also check these things:
   - For wired networks, is the network cable connected at both ends?
   - Are status light indicators next to the network port on your computer lit or blinking appropriately to indicate connectivity and activity?
   - Is the wireless switch on a laptop turned on?




Source: Microsoft Windows 7

**Figure 3-32** The Network and Sharing Center reports a problem connecting to the network

4. After Windows has resolved the problem, you should see a clear path from the computer to the Internet, as shown in Figure 3-33. To verify the problem is resolved, use Windows Explorer to try to access resources on the local network, and use Internet Explorer to try to access the Internet.

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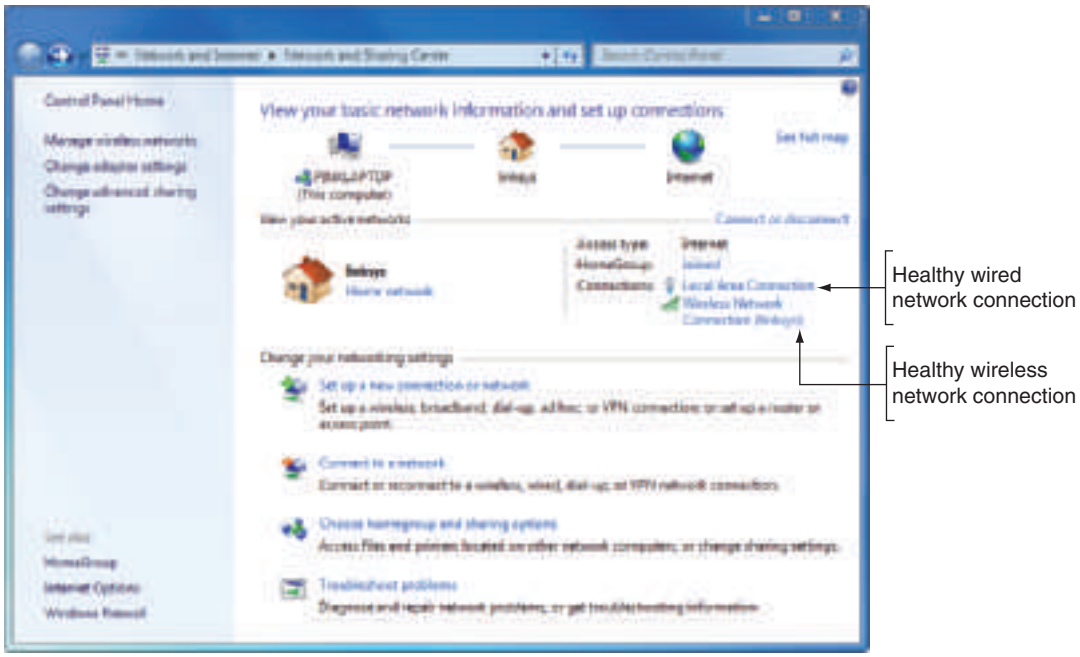


Source: Microsoft Windows 7

**Figure 3-33** The Network and Sharing Center reports two healthy network connections

In Chapter 15, you learn more about the Networking and Sharing Center.

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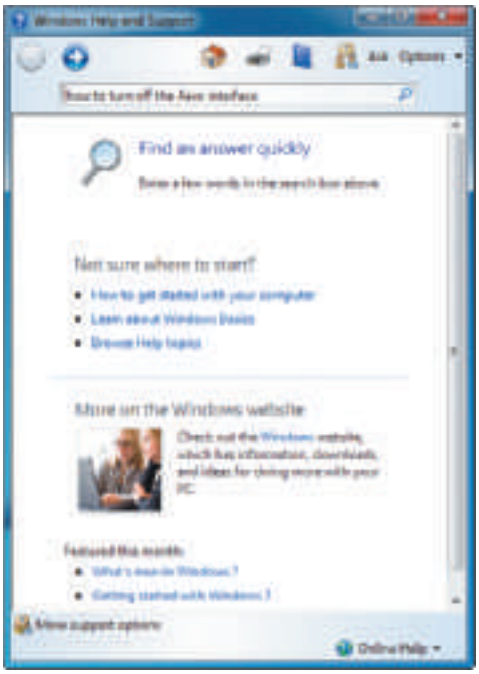
## WINDOWS HELP AND SUPPORT AND THE WEB

The best PC support technicians are the ones continually teaching themselves new skills. You can teach yourself to use and support Windows by using the web and the Windows Help and Support utility (see Figure 3-34). To start the utility, click **Start** and click **Help and Support**. Click links or enter a question or topic in the search box. If you are connected to the Internet, links can take you to the Microsoft web site where you can find information and watch videos about Windows.




Source: Microsoft Windows 7

**Figure 3-34** Use the Help and Support tool to teach yourself about Windows

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Here are some tips for using the web and Help and Support:

- The Microsoft web site (*support.microsoft.com*, *windows.microsoft.com*, and *technet.microsoft.com*) has tons of useful information. Search for a device, an error message, a Windows utility, a symptom, a software application, an update version number, or keywords that lead you to articles about problems and solutions.
- Using a search engine such as Google (*www.google.com*), enter the error message, software application, symptom, or Windows utility in the search box to search the web for answers, suggestions, and comments. Beware, however, that you don't bump into a site that does more harm than good. Some sites are simply guessing, offering incomplete and possibly wrong solutions, and even offering a utility the site claims will solve your problem but really contains only pop-up ads or a virus. Use only reputable sites you can trust. You'll learn about several of these excellent sites in this book.
- To limit a Google search to the Microsoft web site, use the **site:microsoft.com** text in the search string. A Google search of the Microsoft site often gives better results than the search box on the Microsoft web site.

Other sources of help are user and installation manuals for applications and hardware devices, training materials, and the web sites of application and device manufacturers.

**Notes** If you are serious about learning to provide professional support for Windows, each OS has a resource kit, including support software and a huge reference book containing inside information about the OS. Check out *Microsoft Windows 7 Resource Kit, Microsoft Windows Vista Resource Kit,* or *Microsoft Windows XP Professional Resource Kit.* All three are put out by Microsoft Press.

As you work your way through this book, try to learn to teach yourself about Windows by searching for information on the web, in Windows Help and Support, and in Microsoft documentation. The more independent a learner you are, the better support technician you will be.

## Hands-on Project 3-6 Using Windows Help and Support and the Web to Research a Topic

Do the following to learn to research a topic so you can become an independent learner about Windows 7:

1. Use Windows Help and Support to find out how to add a folder to an existing library. Using your own user account on a Windows 7 computer, add your Desktop folder to your Documents library. List the steps you took to do that. Verify that items on your desktop are now included in your Documents library.
2. Windows 7 Home Premium, Professional, Enterprise, and Ultimate editions all support the Aero interface. If you are using one of these editions, find out how to turn the Aero interface off and on. Describe the difference in the appearance of Windows when using Aero and not using it.

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3. The Windows 7 Snipping Tool can help you take screen shots of the Windows desktop. These screen shots are useful when documenting computer problems and solutions. Use Windows Help and Support to find out how to use the Snipping Tool. Use it to take a screen shot of your Windows desktop. Save the screen shot into a file on a USB flash drive or on the hard drive. Print the file contents.
4. Access the *support.microsoft.com* web site for Windows 7 support. Print one article from the Knowledge Base that addresses a problem when installing Windows 7.
5. Search the web for the purpose of the Pagefile.sys file that you found in the root directory of drive C: while doing Hands-on Project 3-3. What web site did you use to find your answer? Why is the Microsoft.com web site considered the best source for information about the Pagefile.sys file?

## >> CHAPTER SUMMARY

### Using Windows

- An operating system manages hardware, runs applications, provides an interface for users, and stores, retrieves, and manipulates files.
- The Windows 7 and Vista desktop offers the Aero user interface. Vista includes the sidebar with gadgets. Gadgets are placed directly on the Windows 7 desktop.
- Four ways to launch an application are to use the Start menu, the search box, Windows Explorer, or a shortcut icon on the desktop or taskbar.
- Use Windows 7 Aero Snap and Aero Shake to manage open windows on the desktop.
- The right side of the taskbar is called the notification area, which some call the system tray.
- Windows Explorer and the Computer window are used to manage files, folders (also called directories), and libraries. Windows Vista and XP do not support libraries, and Windows XP calls the Computer window the My Computer window.
- The file extension indicates how the file contents are organized and formatted and what program uses the file.
- Use the Control Panel Folder Options box to change the way Windows Explorer works and displays files and folders.

### Quick and Easy Windows Support Tools

- The System window gives a quick overview of the system, including which edition and version of Windows is installed and the amount of installed memory.
- The System Information window gives much information about the computer, including hardware, device drivers, the OS, and applications.
- Control Panel gives access to a group of utility programs used to manage the system.
- The Windows 7 Action Center is a centralized location used to solve problems with security and computer maintenance issues.

- The User Account Control (UAC) box is used to protect the system against malware or accidental changes to a system done by inexperienced users.
- Use the Network and Sharing Center to manage, secure, and troubleshoot network connections.
- Use the web and the Windows Help and Support utility to teach yourself about Windows and how to support it.

## >> KEY TERMS

For explanations of key terms, see the Glossary near the end of the book.

32-bit operating system
64-bit operating system
Action Center
administrator account
Aero Peek
Aero Shake
Aero Snap
Aero user interface
child directories
Compressed (zipped) Folder
Control Panel
desktop
device driver
file attributes
file extension
filename
folder attributes
folder
gadget
graphical user interface (GUI)
Jump List
library
navigation pane
Network and Sharing Center
notification area
operating system (OS)
patches
path
root directory
service
screen resolution
service pack
sidebar
standard account
subdirectory
System Information
system tray
System window
systray
taskbar
User Account Control (UAC) dialog box
volume
Windows Experience Index

## >> REVIEWING THE BASICS

1. List four major functions of an OS.
2. Using Aero Snap, what happens when you drag a window to the top of the Windows 7 desktop?
3. How can you add a program icon to the Windows 7 taskbar so the program can quickly be launched at any time?
4. What might happen to the Windows system if too many services are running, as indicated by multiple icons in the notification area of the taskbar?
5. What is the keyboard shortcut to the flip 3D view?
6. What are the four libraries that Windows 7 creates by default?
7. What part of a filename does Windows use to know which application to open to manage the file?
8. What file extension is used to name a compressed folder?
9. Which folder does Windows use to store files a user puts in the Documents library?
10. Which Windows 7 edition(s) come only in a 32-bit version?
11. What is the memory limitation for a 32-bit operating system?
12. How do you access the Properties box for a file to change a file attribute?

13. What is the program name for the System Information utility?
14. Which Windows 7 window can be used to get a report of the history of problems on a computer?
15. When does a user need to enter a password into the UAC box in order to continue?

## >> THINKING CRITICALLY

1. What Windows tool can you use to know how much RAM is installed on your system?
2. Mary wants her 32-bit installation of Windows 7 Professional 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 Control Panel to install the memory in Windows 7. After it is installed, performance should improve. Tell Mary how to open the Control Panel.
   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 Windows 7 Professional.
   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.
3. 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.
4. For each of the following programs, identify if the program is an operating system, application, device driver, or utility program: Internet Explorer, Norton Antivirus, Windows 98, and Adobe Photoshop.

## >> REAL PROBLEMS, REAL SOLUTIONS

### REAL PROBLEM 3-1: Becoming a PC Support Technician

You've just been hired as a PC support technician in the IT department of your university. At the job interview, you were promised a two-week training period, but by noon on your first day on the job it dawns on you that "training period" means you gotta train yourself *really quick*! Listed below are some problems you encounter that day. How do you solve these problems and what Windows tools do you use?

1. A history professor calls you into his office and tells you he thinks the memory on his Windows 7 computer needs upgrading. He wants you to tell him how much RAM is currently installed. What do you do?

2. A PE instructor discovers the history professor has Windows 7 on his desktop. She thinks she has Windows XP on her computer and wants you to tell her exactly which OS she has installed. What do you do?

3. Your boss asks you to go down the hall to the Windows 7 computer in the break room and find out the path and name of the device driver for the optical drive (CD drive or DVD drive) that is installed. What steps do you use? What is the path and name of the optical drive device driver on your Windows XP/Vista/7 system?

4. The Office Administrator for Career Education often uses MS Word and wants you to place a shortcut on her desktop to launch this application. List the steps to do that.

5. A student in a computer lab is trying to answer a question in the lab about the Windows 7 desktop. She needs to add a gadget to the desktop to show the current temperature in Seattle. What steps do you give her to find the answer? Print the screen showing the gadget. List the steps you took to print the screen.

6. The Biology professor's Windows 7 system is slow and you decide to turn off the Aero user interface to save on resources. List the steps to do that and the source of information you used.