CHAPTER 16

Fixing Windows Problems

In this chapter, you will learn:

- What to do when a hardware device, application, or Windows component gives a problem
- What to do when Windows Vista won't boot or boots with errors
- Strategies that you can use to solve problems with Windows 2000/XP startup

In the last chapter, you learned about the several Windows Vista and XP tools that can help you solve Windows problems. Those tools can help when problems arise with a hardware device, application, or Windows components. In addition, some Windows tools are specifically designed to help you solve startup problems with Windows Vista, XP, or 2000. In this chapter, we focus on the techniques and methods to use when all these types of problems occur. You will learn how to put to good use the tools you learned about in Chapter 15. In short, this chapter is the practical application of the tools in Chapter 15.

When a computer gives problems, refuses to boot, or the Windows desktop refuses to load, it takes a cool head to handle the situation gracefully. What helps more than anything else is to have a good plan so you don't feel so helpless. This chapter is designed to give you just that—a plan with all the necessary details so that you can determine just what has gone wrong and what to do about it. Knowledge is power. When you know what to do, the situation doesn't seem nearly as hopeless.

In the chapter, you'll first learn what to do when problems occur after the boot with hardware or software. Then we'll turn to how to solve problems that occur during the boot. Because solving boot problems with Windows Vista is done differently than when solving boot problems with Windows XP/2000, we'll cover Vista boot problems separately from XP/2000 boot problems.

A+ Exam Tip All the content in this chapter applies to the A+ 220-702 Practical Application exam objectives that focus on solving Windows problems.

FIXING PROBLEMS CAUSED BY HARDWARE

A+ 220-702 2.1 2.3 2.4

Now let's look at some general steps to use when solving a problem caused by a hardware device or its drivers. These general steps assume you know how to use the tools discussed in Chapter 15. As you read, you can refer back to Chapter 15 to see the details of how to use a tool mentioned here.

If you don't know which device is causing a problem, follow these steps to find out:

- ***Research an error message.*** If you see an error message that appears during or after the boot, investigate the message. The Internet is a great source. Enter the message in a Google.com search string. Recall that an error message might appear during the boot if a missing program file is referenced in the registry. Also, if you get an error message about a service or driver that has failed to start, search on the filename of the service or driver to find out which component, application, or device uses the service or driver. The System Information utility (msinfo32.exe) can help.
- ***Use the Vista Problem Reports and Solutions window or the XP Error Reporting window.*** These tools can help identify and resolve blue screen errors, errors that cause the system to lock up, and errors caused by device drivers, and services and applications that fail to start. The description of the problem should include clues that can help you identify the device, Windows component, or application causing the problem. For example, Figure 16-1 shows a message that appeared after a Vista system encountered a blue screen error. When you click **Check for solution**, a solution window (see Figure 16-2) appears. For Vista, even if time has passed since the error occurred or the error caused the system to hang resulting in a restart, you can open the Vista Problem Reports and Solutions window to see past problems listed with suggestions for a solution. To open the window, click **Start**, **All Programs**, **Maintenance**, and **Problem Reports and Solutions**.
- ***Check logs in Event Viewer.*** In Event Viewer, the Administrative Events log under Custom Views shows only warnings and error events (see Figure 16-3). Click the label at the top of a column to sort the events to help you search through them as you look

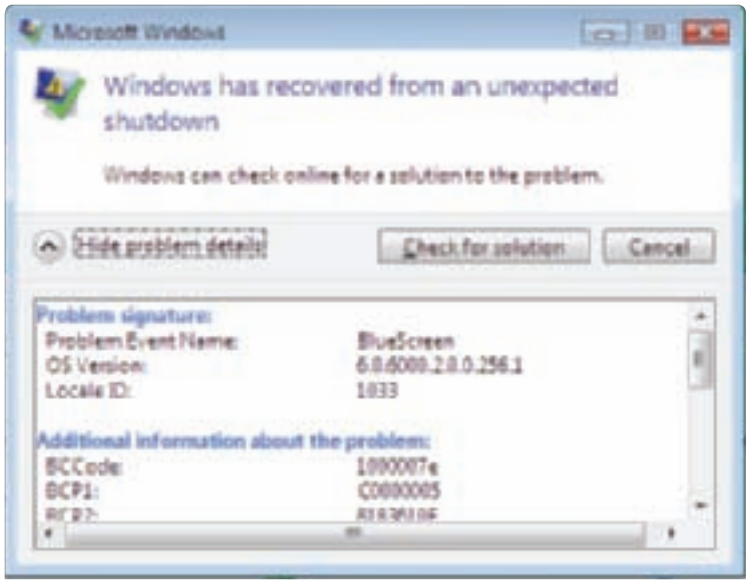

Figure 16-1 Message that appeared after a Vista blue screen error
Courtesy: Course Technology/Cengage Learning

A+ 220-702 2.1 2.3 2.4

Figure 16-2 Windows suggests Windows update might solve a blue screen problem
Courtesy: Course Technology/Cengage Learning

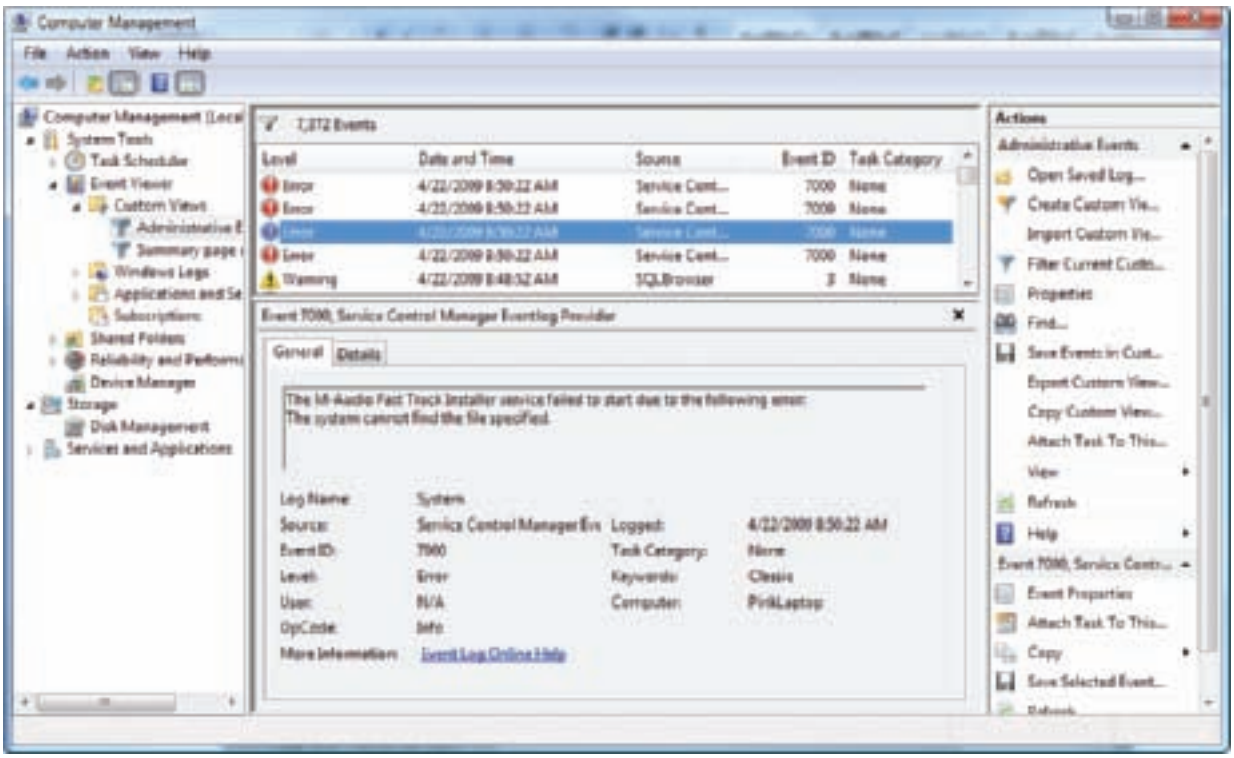

Figure 16-3 Administrative Events log shows error and warning events
Courtesy: Course Technology/Cengage Learning

A+ 220-702 2.1 2.3 2.4

for useful information. Notice in Figure 16-3, a service used by audio failed to start. The problem happened when Windows could not find the specified file. Updating or reinstalling the audio drivers would fix this problem of no audio. Errors that cause the system to lock up might also be recorded here.

- ***Check the Reliability and Performance Monitor.*** In this window, click the Reliability Monitor. Look for error events that occurred about the time the problem started. How to use the Reliability and Performance Monitor is covered in Chapter 14.
- ***Consider recent changes.*** What hardware or software changes have you or someone else recently made? Maybe the change affected something that you have not yet considered. Once I installed a hard drive, turned on the system, and got beep code errors during the power-on self test (POST). I opened the case and checked the drive and connections. It all looked fine, so I tried to boot again with the same results. The second time I opened the case I discovered that I had bumped a memory module while closing the case. Reseating the module solved my problem.

When you know which device is causing a problem, do the following to investigate the device and its drivers to discover the source of the problem:

1. ***Check the simple things first.*** Most computer problems are simple and easy to solve. Check the simple things: Is the external device plugged in and turned on? Are the data cable connections solid at both ends? For sound, is the volume knob turned up? Is there a wall light switch controlling the power, and is it turned on? Is the power strip you're using plugged in and turned on? For expansion cards and memory modules, are they seated solidly in their slots?
2. ***Check that Device Manager recognizes the device with no errors or warnings.*** Check Device Manager to verify that the device is enabled and Windows thinks the device should be working. If you see errors or warnings in Device Manager (displayed as a yellow triangle or question mark, as shown in Figure 16-4), these issues must be resolved before you continue. If you're not sure which device is giving the problem, disable a suspected device to see if the problem goes away. For devices that don't appear in Device Manager—such as a scanner, printer, or some USB or FireWire devices—use the utility program that came bundled with the device to check for errors. You should find the program on the **Start, All Programs** menus. For printers, also use the Printers window to check for problems.

A+ Exam Tip The A+ 220-702 Practical Application exam expects you to know how to use Device Manager to solve a hardware problem.

3. ***Check that BIOS setup recognizes the device with no errors.*** For a device that should be recognized by startup BIOS, go into BIOS setup and make sure the device is correctly detected and is enabled.

To solve a problem with a device driver or service, follow these steps. Be sure to reboot the system after you make a change and before you move on to the next step:

1. ***Update the device drivers.*** For best results, first download the driver files to your hard drive from the device manufacturer's Web site. Then, in Device Manager, update the drivers using these downloaded files. If you don't like the results of the update, you can roll back the driver to undo the update.

A+ 220-702 2.1 2.3 2.4

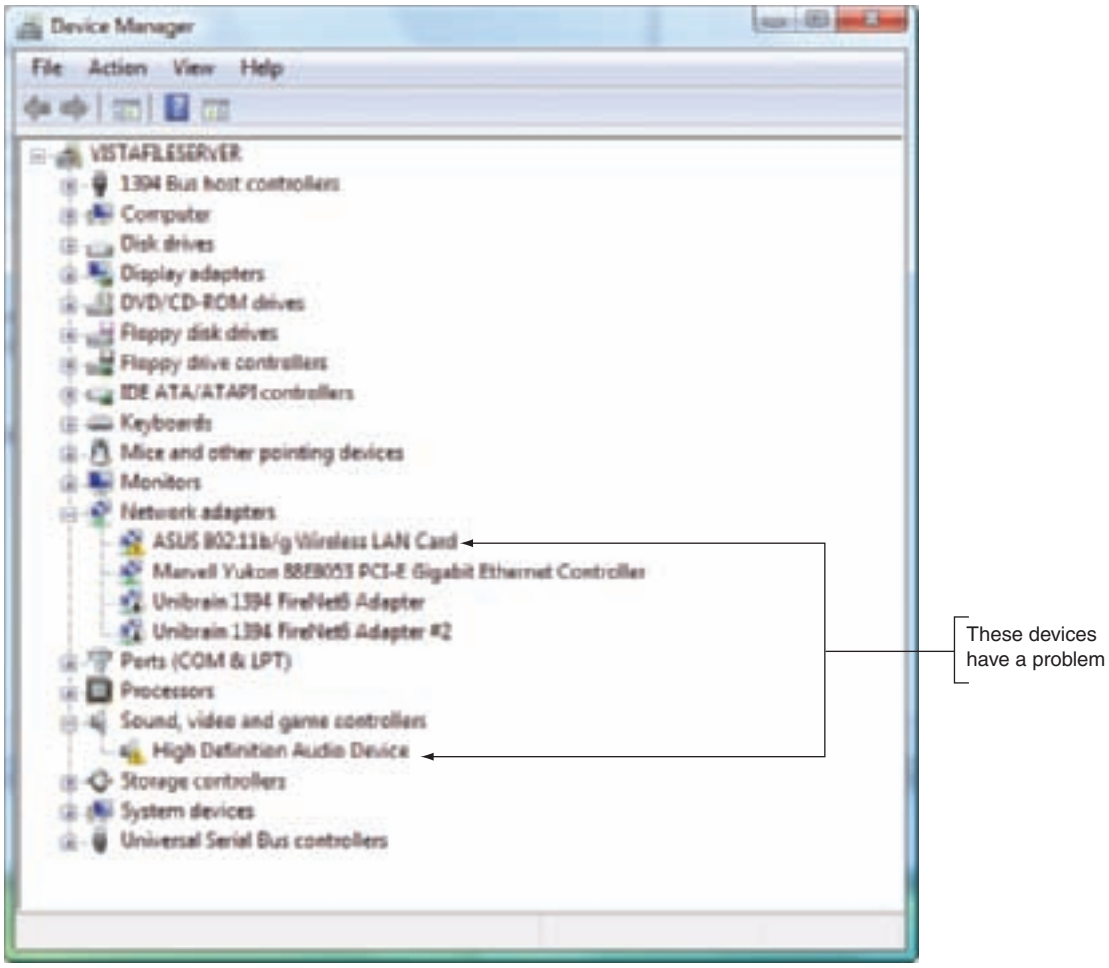

Figure 16-4 Device Manager indicates a problem with a yellow triangle
Courtesy: Course Technology/Cengage Learning

2. ***Update Windows.*** Sometimes a Windows update solves a problem with a hardware device. On the other hand, Windows might be the problem. If the device was working and now does not, consider whether a Windows update might have caused the problem. Check the Microsoft support site (*support.microsoft.com*) for information and a fix.
3. ***Try moving the device to a different port or connector.*** For external USB devices, try a different USB port. For internal devices, try moving the device to a different expansion slot or connecting it to a different connector on the motherboard. Perhaps the current connector or port is bad, disabled, or not configured correctly.
4. ***Try reinstalling the device.*** To get a clean start with a device, you can uninstall it and start over. In Device Manager, right-click the device and select **Uninstall**. Then reboot the PC. When Windows starts, it should detect a new hardware device and launch the Found New Hardware Wizard. Then you can install the device drivers again. Did the Found New Hardware Wizard launch? If not, the device might be bad or the port it is using might be bad or disabled.
5. ***Try moving the device to a different computer.*** If the device works on another computer, move it back to the original computer. If it still does not work on the original computer, the problem might be with the port or expansion slot the device is using.

A+ 220-702 2.1 2.3 2.4

6. ***Use System Restore.*** If you can identify the approximate date the error started and that date is in the recent past, use System Restore. Select a restore point just before the problem started. Reverting to a restore point can solve problems with hardware, applications, and Windows components, but can cause problems of its own, so use it with caution.
7. ***Check the manufacturer's documentation.*** When installing a device, sometimes the device will not work unless you run the setup CD for the device *before* you physically install the device. (This is sometimes true of internal modem cards, network adapters, and USB devices.) To know the right order, read the manufacturer's documentation. You should also find troubleshooting guidelines there for the device and how to use any diagnostic software the manufacturer offers. Also, the manufacturer's Web site should have a support section, including FAQs about the device. When all else fails, I've often found my solution there.
8. ***Search the Internet for help.*** Look for forums where others have posted the same problem with the same device. Someone else has likely posted a solution. However, be careful and don't take the advice unless you trust the Web site.
9. ***Boot into Safe Mode.*** If the system is caught in an endless loop of restarts, boot into Safe Mode. Then, using the instructions given in Chapter 15, use the Startup and Recovery section of the System Properties box to uncheck **Automatically restart**.
10. ***Use the System File Checker.*** For essential hardware devices, use the System File Checker (SFC) to verify and replace system files. Use the command sfc /scannow or sfc /scanonce. Later in the chapter, you will learn other steps to take if Windows Vista or Windows 2000/XP give startup errors.
11. ***Consider the application using the device.*** The problem might be with the application software that is controlling the device. For example, if you are having problems trying to use a USB scanner, try scanning using a different application.
12. ***Replace the device.*** After you've tried all this and the problem is still not solved, it's time to assume the device is just not working. Replace it with a new one.

Notes There's a lot of detail about troubleshooting in this section. Here's a shortcut that might help: When you are faced with a hardware problem, do two things: Check the cable connections and check the log files. Just remembering these two steps can serve you well.

FIXING PROBLEMS CAUSED BY APPLICATIONS

A+ 220-702 2.3 2.4

Problems with applications might be caused by the application, the hardware, the operating system, the data, other applications in conflict with this one, or the user. Follow these steps to get to the source of the problem. After you have made a change, be sure to restart and check to see if the problem is resolved before you move on to the next step:

Do the following to find the source of the problem and fix it:

1. ***Interview the user and back up data.*** Find out as much information as you can from the user about the problem, when it started, and what happened to the system about the time the problem started. Also ask if valuable data is on the system. If so, back it up.

A+ 220-702 2.3 2.4

2. ***Ask the user to reproduce the problem while you watch.*** Many problems with applications are caused by user error. Watch carefully as the user shows you the problem. If you see him making a mistake, be tactful and don't accuse. Just explain the problem and its solution. It's better to explain and teach rather than fix the problem yourself; that way, the user learns from the experience.
3. ***Use Task Manager to end a process that is not responding.*** If an application is locked up, use Task Manager to end it.
4. ***Try a reboot.*** Reboot the system and see if that solves the problem.
5. ***Suspect a virus is causing a problem.*** Scan for viruses and check Task Manager to make sure some strange process is not interfering with your applications.
6. ***Allow Windows to provide a solution.*** For Vista, use the Problem Reports and Solutions tool to search for the problem and suggested solutions. For XP, if Error Reporting displays a window (see Figure 16-5), click **Send Error Report** in the window and follow through by applying any recommended solutions.

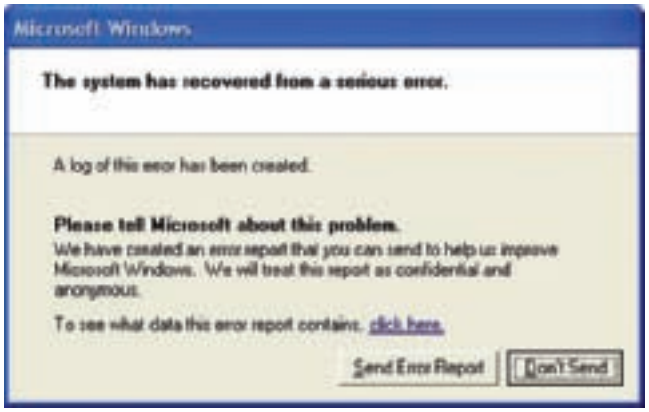

Figure 16-5 A serious Windows error sometimes generates this Microsoft Windows error-reporting box
Courtesy: Course Technology/Cengage Learning

7. ***Windows update might solve the problem.*** When Microsoft is aware of application problems caused by Windows, it sometimes releases a patch to solve the problem. Make sure Windows updates are current. Know that these updates include updates for other Microsoft products such as Microsoft Office.
8. ***Download updates or patches for the application.*** Software manufacturers often publish updates or patches for their software to address known problems. You can go to the software manufacturer's Web site to download these updates and get information about known problems.
9. ***Use the application setup to repair the installation.*** The application setup might have this option to repair the installation. Look for it in the Vista Programs and Features window, the XP Add or Remove Programs window, or on the setup CD for the application.
10. ***Consider data corruption.*** It might appear that the application has a problem when the problem is really a corrupted data file. Try creating an entirely new data file. If

A+ 220-702 2.3 2.4

that works, then suspect that previous errors might be caused by corrupted data. You might be able to recover part of a corrupted file by changing its file extension to .txt and importing it into the application as a text file.

11. ***Try restoring default settings.*** Maybe a user has made one too many changes to the application settings, which can cause a problem with missing toolbars and other functions. Write down each setting the user has changed and then restore all settings back to their default values. If the problem is solved, restore each setting to the way the user had it until you find the one causing the problem. The process will take some time, but users can get upset if you change their application settings without justification.
12. ***Uninstall and reinstall the application.*** Sometimes an application gives problems because the installation gets corrupted. You can try uninstalling and reinstalling the application. However, in doing so you might lose any customized settings, macros, or scripts. Also know this still might not solve a problem with a corrupted application because registry entries might not be properly reset during the uninstall process.
13. ***Use System Restore.*** If you can identify the approximate date the error started and that date is in the recent past, use System Restore. Select a restore point just before the problem started. Reverting to a restore point can solve problems with registry entries the application uses that have become corrupted.

A+ Exam Tip A+ 220-702 Practical Application exam expects you to know when and how to use System Restore to solve a Windows, hardware, or application problem.

If the application has never worked, follow these steps:

1. ***Run the application as an administrator.*** The application might require that the user have privileges not assigned to the current account. Try running the application with administrator privileges, which Windows calls a **secondary logon**. To do that, right-click the application icon on the desktop or the application name in the **All Programs** menu, and select **Run as administrator** from the shortcut menu (see Figure 16-6). If this fixes the problem, you can make this setting permanent. To do that, use Windows Explorer: Locate the program filename (most likely in a subfolder of the Program Files folder), right-click it, and select **Properties** from the shortcut menu. Then click the **Compatibility** tab and check **Run this program as an administrator** (see Figure 16-7). Click **Apply** and then close the Properties box.
2. ***Install the application as an administrator.*** By default, Windows does not allow standard or limited accounts to install applications. To install software, first log onto the system as an administrator.
3. ***Consider whether an older application is having compatibility problems with Vista.*** Some older applications cannot run under Vista or run with errors. Here are some steps you can take to fix the problem:
   a. Go to the Windows Vista Compatibility Center site at *www.microsoft.com/windows/compatibility* and search for the application. The site reports problems and solutions for known legacy software. For example, when you search on the

A+ 220-702 2.3 2.4

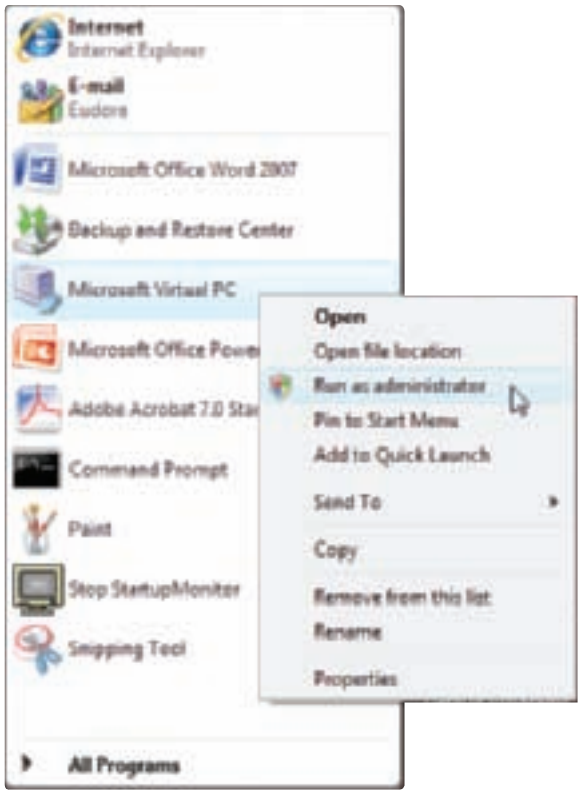

Figure 16-6 To elevate an application's privileges, run the application as an administrator
Courtesy: Course Technology/Cengage Learning

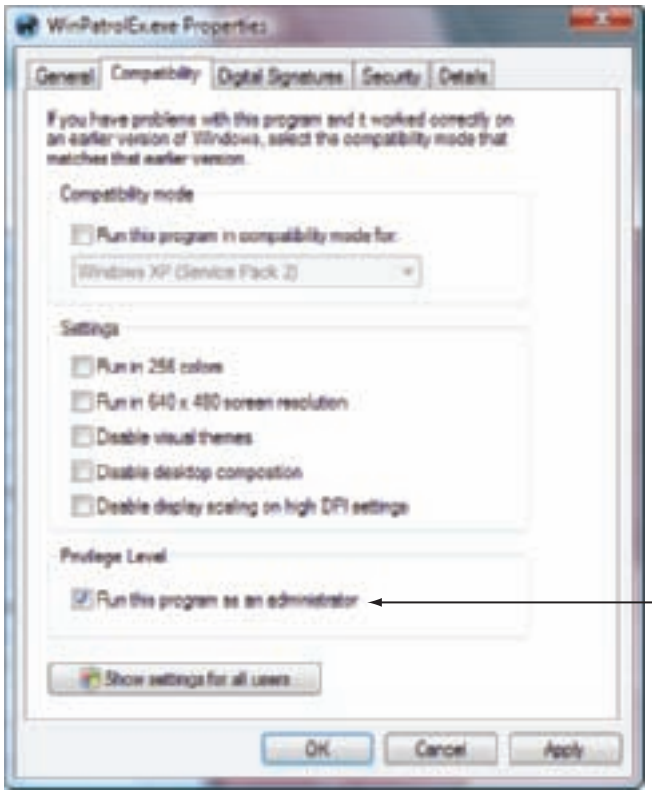

Figure 16-7 Permanently change the privilege level of an application
Courtesy: Course Technology/Cengage Learning

A+ 220-702 2.3 2.4

application WinPatrol, you find that Version 11 is not compatible with Vista, but Version 14 is compatible (see Figure 16-8). If the application is known to not be compatible with the OS you are using, try to replace or upgrade the software.

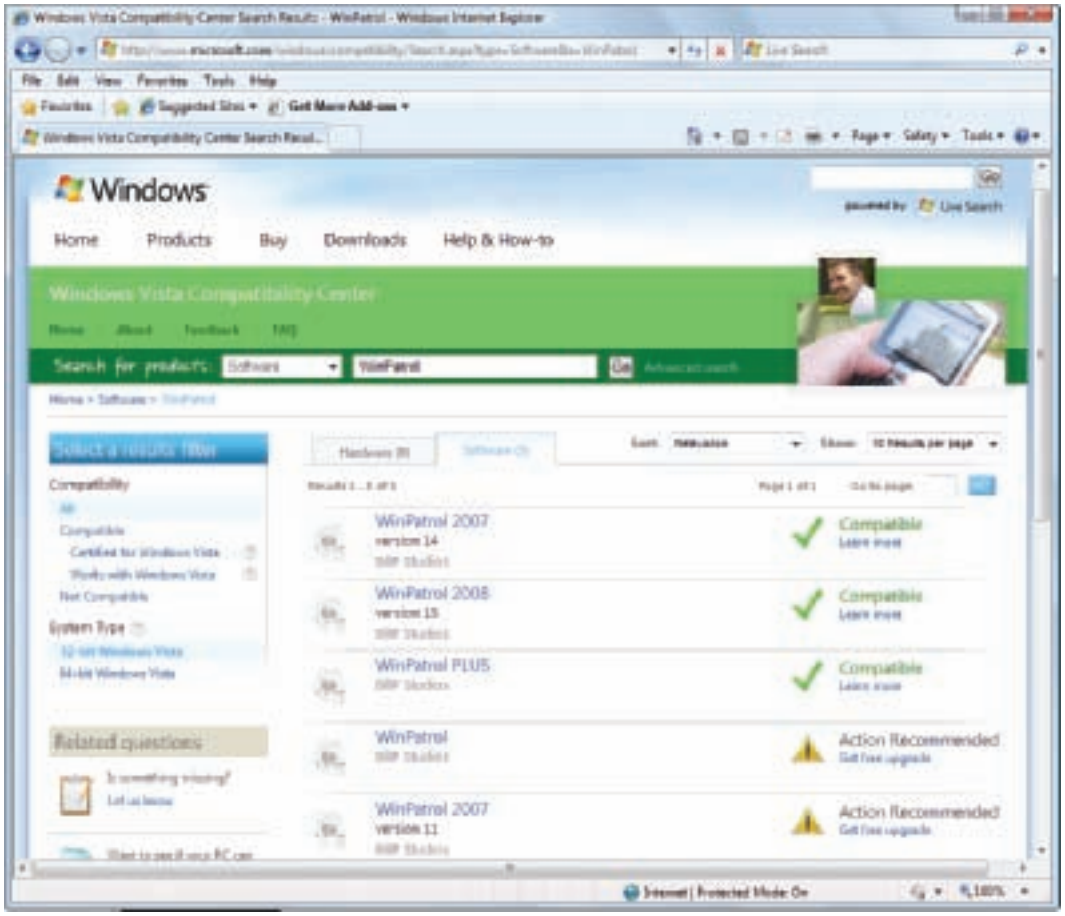

Figure 16-8 Microsoft tracks software and hardware compatible with Vista
Courtesy: Course Technology/Cengage Learning

b. Try running the application in compatibility mode. To do that, on the Compatibility tab of the program file Properties box shown earlier in Figure 16-7, check **Run this program in compatibility mode for:**. Then, in the drop-down menu, select the operating system that the application was written to run under. Click **Apply** and close the **Properties** box.

4. ***Verify that the application is digitally signed.*** Although applications that are not digitally signed can still run on Windows, a digital signature does verify that the application is not a rogue application and that it is certified as Windows-compatible by Microsoft. To view the digital signature, in Windows Explorer, find the program filename (most likely in a subfolder of the Program Files folder), right-click the filename, and select **Properties** from the shortcut menu. Select the **Digital Signatures** tab and click **Advanced** (see Figure 16-9). If the Digital Signatures tab is missing, the program is not digitally signed.

A+ 220-702 2.3 2.4

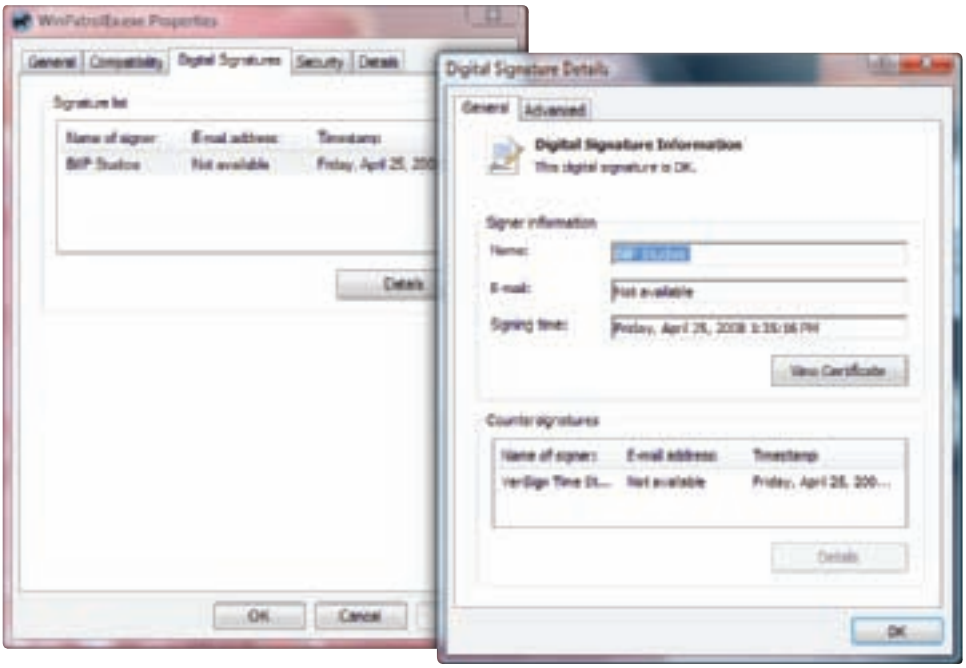

Figure 16-9 This program is digitally signed
Courtesy: Course Technology/Cengage Learning

The problem might be caused by other applications, services the application uses, Windows, or hardware. Do the following to check these possibilities:

1. ***Another application might be interfering.*** Close all other applications. Another application might be corrupted or have a data file open that this application needs.
2. ***Use the Services console.*** Check this console to make sure a service the application uses has started. If the service has failed to start, make sure it has an Automatic or Manual setting.
3. ***You might be low on system resources.*** Close all other applications. Check Task Manager to make sure that unnecessary processes are closed. If you must run more than one application at a time, you can increase the priority level for an application that is not getting its fair share of resources. To do that, on the **Processes** tab of Task Manager, right-click the application and select **Set Priority**. Then increase the priority level. This setting applies to the current session only. Also, consider that your system might be running low on memory. For good performance, Windows Vista needs at least 2 GB of RAM, and XP needs at least 1 GB of RAM. For great performance, use more than that. See Chapter 14 for more suggestions to optimize Windows.
4. ***Verify Windows system files.*** Corrupted Windows system files can cause application errors. To have Windows verify system files and replace a bad one with a good one, use the System File Checker (sfc.exe) utility. You learned how to use the utility in Chapter 15.
5. ***The problem might be bad memory.*** Following the directions given in Chapter 15, use the Memory Diagnostics tool (mdsched.exe) to test memory. If it finds errors, replace the memory modules.
6. ***Use Event Viewer to look for clues.*** The Event Viewer logs might give clues about applications and the system.

A+ 220-702 2.3 2.4

7. ***Use the Reliability Monitor to look for clues.*** The Reliability Monitor might help you discover the source of the problem. Look for errors with other applications or with key hardware components such as the hard drive. Hard drive errors often appear as an application error.
8. ***Use the Chkdsk command to check the hard drive.*** To eliminate the hard drive as the source of an application error, use the Chkdsk command to check the drive. Recall the command is **chkdsk C: /r** and, for Vista, must be executed from an elevated command prompt.
9. ***Run the application in Safe Mode with Networking***. Press **F8** at startup to display the Advanced Boot Options menu and select **Safe Mode with Networking** from the menu. If the application works in Safe Mode, then you can assume the problem is not with the application, but with the operating system, device drivers, or other applications that load at startup which are conflicting with the application. In this situation, approach the problem as a Windows problem rather than an application problem. There are several methods and tools to troubleshoot Windows Vista, all discussed in the next part of the chapter. As you read, look for ways to repair Windows Vista that require the least amount of work and make the fewest drastic changes to your system. How to fix Windows XP/2000 problems is covered later in the chapter.

TROUBLESHOOTING VISTA STARTUP

A+ 220-702 2.4

This section is written as step-by-step instructions for problem-solving, so that you can use it to solve a boot problem with Windows Vista by following the steps. Each step takes you sequentially through the boot process and shows you what to do when the boot fails at that point in the process. Therefore, your first decision in troubleshooting a failed boot is to decide at what point in the boot the failure occurred. Next, you have to decide which tool will be the least invasive to use, yet still will fix the problem. The idea is to make as few changes to your system as possible in order to solve the problem without having to do a lot of work to return the system to normal (such as having to reinstall all your applications). And, as with every computer problem, if user data is at risk, you need to take steps to back up the data as soon as possible in the troubleshooting process.

To determine where in the boot process the failure occurred, we'll focus on these three startup stages of the boot:

- ***Stage 1: Before the progress bar.*** When you see the Microsoft progress bar appear, you know the Windows kernel, including all critical services and drivers, has loaded. Any problems that occur before the progress bar appears are most likely related to corrupt or missing system files or hardware. Your best Vista tools to use for these problems are Startup Repair and System Restore.
- ***Stage 2: After the progress bar and before logon.*** After the progress bar appears, user mode services and drivers are loaded and then the logon screen appears. Problems with these components can best be solved using Startup Repair, the Last Known Good Configuration, System Restore, Safe Mode, Device Manager, and MSconfig.
- ***Stage 3: After logon.*** After the logon screen appears, problems can be caused by startup scripts, applications set to launch at startup, and desktop settings. Use MSconfig to temporarily disable startup programs. Other useful tools to solve the problem are Software Explorer and Safe Mode.

A+ 220-702 2.4

Recall that all three stages of the Vista boot are described in detail in Chapter 15. Also in Chapter 15, you'll find detailed descriptions of the Windows troubleshooting tools used here. Now let's take a closer look at how to address problems at each of the three stages of Vista startup.

PROBLEMS AT STAGE 1: BEFORE THE PROGRESS BAR APPEARS

As always, first check with the user to find out if important data is on the hard drive and not backed up. Make every effort to copy the data to a safe location before you start troubleshooting the original problem. How to recover data from a system that refuses to boot is covered later in the chapter in the section "How to Recover Lost Data."

Remember, if the progress bar has not yet appeared, some portions of the Vista kernel and critical drivers and services to be started by the kernel have not yet started. Therefore, the problem is with hardware or these startup files. Hardware that might be failing includes the power supply, motherboard, CPU, memory, hard drive, video, or keyboard. If any one of these devices is not working, the error is communicated using beep codes, or using on-screen or voice error messages—and then the computer halts.

As you perform each troubleshooting step, be sure to restart the system to see if the problem is solved before you apply the next step.

IS THE SCREEN BLANK?

If you see absolutely nothing on the screen, check that the system is getting power and the monitor is plugged in and turned on. Can you hear the spinning fan or hard drive inside the computer case? Are lights on the front of the case lit? If not, suspect that power is not getting to the system. Check that the system is not in standby mode or hibernation: Try waking up the system by pressing any key or a special standby key on laptops, or by pressing the power-on button. Is the monitor totally without lights, or is the screen blank but the LED light on front of the monitor is lit? If the LED light is lit, try rebooting the system. If the LED light is not lit, check that power is getting to the monitor. Is it turned on?

Try trading the monitor for one you know is good. If you can hear a spinning drive and see lights on the front of the computer case and know the monitor works, the video card might be bad or not seated properly in its slot, the memory might be bad, the video cable might be bad, or a component on the motherboard might have failed.

DOES THE COMPUTER APPEAR TO HAVE POWER?

If you can't hear the spinning drive or see lights on the front of the case, suspect the electrical system. Check power connections and switches. The power supply might be bad or connections inside the case might be loose.

DOES AN ERROR MESSAGE APPEAR BEFORE VISTA STARTS?

Recall that when you first turn on a system, startup BIOS takes control, checks essential hardware devices, and searches for an OS to load. If it has a problem while doing all that and the video system is working, it displays an error message on-screen. If video is not working, it might attempt to communicate an error with a series of beeps (called beep codes) or speech (for speech-enabled BIOS).

For messages displayed on-screen that apply to nonessential hardware devices such as DVD drives or floppy drives, you might be able to bypass the error by pressing a key and moving forward in the boot. However, for errors with essential hardware devices such as the one shown in Figure 16-10, focus your attention on the error message, beep code, or voice message describing the problem. For example, notice in Figure 16-10 that the system is

A+ 220-702 2.4

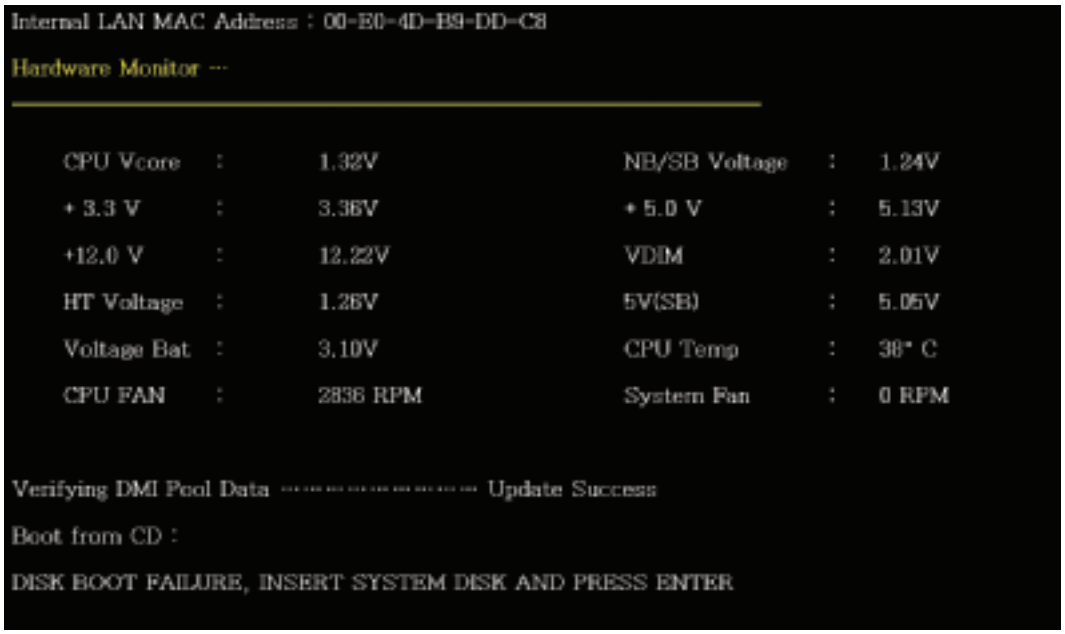

Figure 16-10 This error message at POST indicates a hardware problem
Courtesy: Course Technology/Cengage Learning

attempting to boot from the CD. It should be booting from the hard drive, but moved on to the CD when it did not find a hard drive present. If you don't know what the error message or beep codes mean, you can search the Web site of the motherboard manufacturer or do a general search of the Web using a search engine such as Google.

CAN STARTUP BIOS ACCESS THE HARD DRIVE?

Error messages generated by startup BIOS that pertain to the hard drive can be caused by a variety of things. Here is a list of text error messages that indicate that BIOS could not find a hard drive:

- Hard drive not found
- Fixed disk error
- Disk boot failure, insert system disk and press enter
- No boot device available

The problem might be a physical problem with the drive, the data cable, power, or the motherboard. Start with checking BIOS setup to verify that BIOS detected the drive correctly. If the drive was not detected, check the autodetection setting. (Chapter 8 shows sample BIOS setup screens for these hard drive settings.) If autodetection is turned off, turn it on and reboot. Your problem might be solved. If startup BIOS still doesn't find the drive, power down the system, unplug it, and open the case. Physically check the hard drive power and data cable connections at both ends. Sometimes cables work their way loose. Be careful not to touch circuit boards or the processor as you work, and to protect the system against static electricity, wear an antistatic bracelet that is clipped to the computer case.

Here is a list of error messages that indicate the BIOS was able to find the hard drive but couldn't read what was written on the drive or could not find what it was looking for:

- Invalid boot disk
- Inaccessible boot device

A+ 220-702 2.4

- Invalid drive specification
- Invalid partition table
- No operating system found, Missing operating system, Error loading operating system
- Couldn't find bootmgr or bootmgr is missing

A+ Exam Tip The A+ 220-702 Practical Application exam expects you to be able to resolve a problem that gives the error messages "Invalid boot disk" or "Inaccessible boot drive."

For these error messages, you need to boot from the Windows Vista setup DVD, but first check BIOS setup to make sure the boot sequence lists the DVD drive before the hard drive.

USE BIOS SETUP TO SET THE BOOT SEQUENCE

To access BIOS setup, reboot the PC and look on-screen for a message such as "Press DEL for setup" or "Press F2 for BIOS settings" or something similar. Press that key and the BIOS setup utility loads. Find the screen, such as the one in Figure 16-11, that lets you set the boot sequence. The boot sequence is the order of devices to which BIOS looks to find an OS to load. Make sure that the DVD drive is listed before the hard drive so that you can force the system to boot from the Windows Vista setup DVD. Save your settings and exit BIOS setup.

The next step is to try to boot from the Windows Vista setup DVD.

CAN YOU BOOT FROM THE VISTA SETUP DVD?

Now that you have made sure that BIOS setup is configured to boot first from the DVD drive before it turns to the hard drive, you can try to boot from the Windows Vista setup DVD. If you cannot boot from this disc, the problem is not just the hard drive. Study the

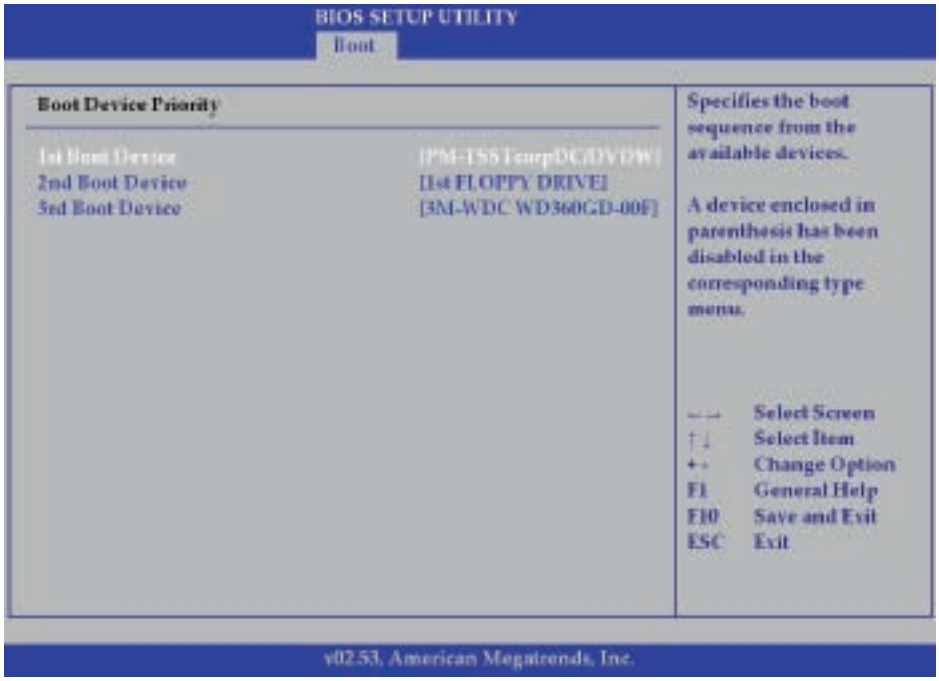

Figure 16-11 Verify that the boot sequence looks to the DVD drive before it checks the hard drive for an operating system
Courtesy: Course Technology/Cengage Learning

A+ 220-702 2.4

error message and solve the immediate hardware problem. It's possible the hard drive and the optical drive have failed, but the floppy drive might still work. If you have a DOS or Windows 9x startup floppy disk, you can try booting from the floppy. If you can boot from the floppy, then you have proven the problem is with both the hard drive and the DVD drive.

If you are able to boot from the Vista DVD, the window shown in Figure 16-12 appears. If you see this window, you have proven that the problem is isolated to the hard drive. Now the trick is to find out exactly what is wrong with the drive and fix it.

Figure 16-12 Select your language preference
Courtesy: Course Technology/Cengage Learning

CAN WINDOWS RE FIND THE VISTA INSTALLATION?

At this point, click **Next** in Figure 16-12 and then click **Repair your computer** to attempt to launch Windows RE. The first thing Windows RE does is attempt to locate a Vista installation on the hard drive (see Figure 16-13). If it cannot locate the installation, but BIOS setup

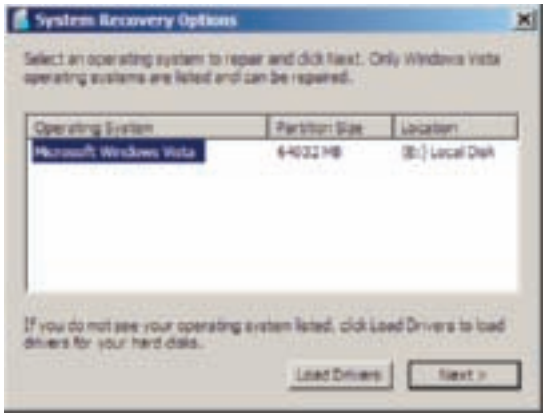

Figure 16-13 Select a Vista installation to repair
Courtesy: Course Technology/Cengage Learning

A+ 220-702 2.4

recognizes the drive, then the drive partitions and file systems might be corrupted. If Windows RE does locate the installation, the problem is more likely to be limited to corrupted or missing system files or drivers.

As you attempt each fix in the following list, be sure to restart the system after each step to find out if the problem still exists or has changed:

1. Run Startup Repair. This process can sometimes fix drastic problems with system files and boot records.
2. Run System Restore. The process won't help if the file system is corrupted.
3. Restart the system and press **F8** during the boot to launch the Advanced Boot Options menu, as shown in Figure 16-14. If the boot menu does not appear, chances are the problem is a corrupted boot sector. If the boot menu appears, chances are the BCD file or other startup files are the problem. If you do see the menu, enable boot logging and reboot. Then check the boot log (\Windows\ntbtlog.txt) for the last entry, which might indicate which system file is missing or corrupt. (If the hard drive is at all accessible, your best chance of viewing the boot log file is to use the command prompt window and the Type command.)

Figure 16-14 Press F8 to see the Advanced Boot Options menu
Courtesy: Course Technology/Cengage Learning

4. If the boot menu does not appear, return to Windows RE, launch the command prompt window, and attempt to repair the boot sector. Try these commands: **bootrec /fixmbr** and **bootrec /fixboot**. Also try the **Diskpart** command followed by the command **list volume**. Does the OS find the system volume? If not, the entire partition might be lost.
5. If the boot menu does appear, return to Windows RE, launch the command prompt window, and attempt to repair the BCD file. Try this command: **bootrec /rebuildbcd**.
6. Try to repair a corrupted file system by using the command prompt window and the **chkdsk c: /r** command.

A+ 220-702 2.4

7. When startup files are missing or corrupt, sometimes Vista displays an error message similar to the one shown in Figure 16-15, which names the file giving the problem. You can replace the file by going to a healthy Vista computer and copying the file to a removable media. Then, on the problem computer, boot to Windows RE, open the command prompt window, and rename the original file so you will not overwrite it with the replacement and you can backtrack if necessary. Then copy the replacement file to the hard drive.

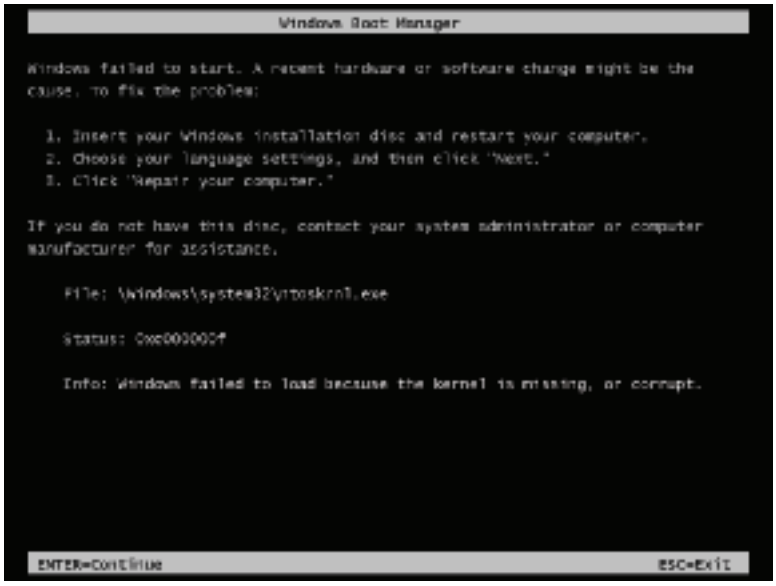

Figure 16-15 Windows Vista might display a screen similar to this one when a critical startup file is missing or corrupt
Courtesy: Course Technology/Cengage Learning

8. Try using the command prompt window to access drive C. If you can get to a C prompt, use the **DIR** command to list folders and files. If you see a good list, check the log file, C:\Windows\System32\LogFiles\SRT\SRTTrail.txt, for clues. (Recall this log file is kept by the Startup Repair process of Windows RE.) If you cannot get a good list of contents of drive C, most likely the Vista installation is destroyed beyond repair. Before you address the problem of a corrupted Vista installation, make every effort to copy data to another media. You can use copy commands in the Windows RE command prompt window or move the drive to a working computer to copy files.

OPTIONS TO RECOVER FROM A CORRUPTED VISTA INSTALLATION

If you are not able to repair the corrupted installation using the techniques in the previous list, your next step is to consider what options are available to restore the system. Your options depend on backups available. Here are your choices to restore a corrupted installation:

- *Option 1:* If you have a Complete PC backup, use it to restore the system to the last backup. If data is on the hard drive that has not been backed up, make every effort to copy this data to a safe place before you restore the system.

A+ 220-702 2.4

- *Option 2:* If you don't have a Complete PC backup but you do have backups of the data on the hard drive, install Windows Vista on the partition, formatting the hard drive during the installation. You'll need to install all applications again and then restore the data.
- *Option 3:* If you don't have a Complete PC backup and you also don't have backups of the data on the drive (worst case scenario), try to copy the data and then perform a reinstallation of Windows Vista. Even if you cannot copy the data, you might be able to recover it after the reinstallation. If you have data on the same partition as Vista, don't format during the Vista installation.

STEPS TO REINSTALL WINDOWS VISTA

Follow these steps to reinstall Vista when the OS refuses to boot and there is important data on the drive:

1. Boot from the Vista DVD, select the language, and then select **Install now** from the opening menu. Follow the directions on-screen to install the OS.
2. When given the opportunities, enter the product key and accept the license agreement. For the type of installation, select **Custom (advanced)**.
3. When asked where you want to install the OS, select the partition on which Vista is installed.

Vista setup will move all folders of the old installation into the \Windows.Old folder, including the \Windows, \Users, and \Program Files folders. A fresh, clean installation of Vista will then be installed in the \Windows folder. If you suspect the hard drive might be failing or need reformatting, immediately save all important data to a removable media and reinstall Windows Vista a second time, this time reformatting the hard drive. If you believe the hard drive is healthy, then follow these steps to get things back to their original order:

1. Run Chkdsk to fix errors on the drive.
2. Install all applications and device drivers.
3. Create all user accounts and customize Vista settings. Then copy all user data and other folders from the \Windows.Old folder to the new installation. How to create user accounts is covered in Chapter 17.
4. To free up disk space, delete the \Windows.Old folder. To do that, using the Disk Cleanup utility in the Properties box for drive C, select **Previous Windows installation(s)** (see Figure 16-16). Note that this option will not be available if the \Windows.Old folder does not exist.

REINSTALL VISTA ON A LAPTOP OR BRAND-NAME COMPUTER

If you have a laptop or a brand-name computer such as a Gateway, Dell, or IBM, most likely the manufacturer has set up a hidden partition on the hard drive that can be used to recover the Windows installation. During startup, you'll see a message on-screen such as "Press F2 to recover the system" or "Press F11 to start recovery." When you press the appropriate key, a menu should appear that gives you two options: one repairs the Windows installation, saving user data, while the other reformats drive C and restores your system to the way it was when purchased. First, try to save user data before you attempt the destructive recovery. If neither method works, the hidden partition might be corrupted or the hard drive might be physically damaged.

A+ 220-702 2.4

If the recovery process stored on the hard drive doesn't work, try to use the recovery CD or DVD that came bundled with your computer to repair the installation. If you don't have the recovery disc, you might be able to buy one from the computer manufacturer. For notebook computers, you absolutely must have this recovery disc to reinstall Windows because the device drivers on the disc are specific to your notebook. If you cannot buy a recovery disc, you might be able to download the drivers from the notebook manufacturer's Web site. Download them to another computer and burn them to a DVD or CD that you can use on the notebook to install drivers.

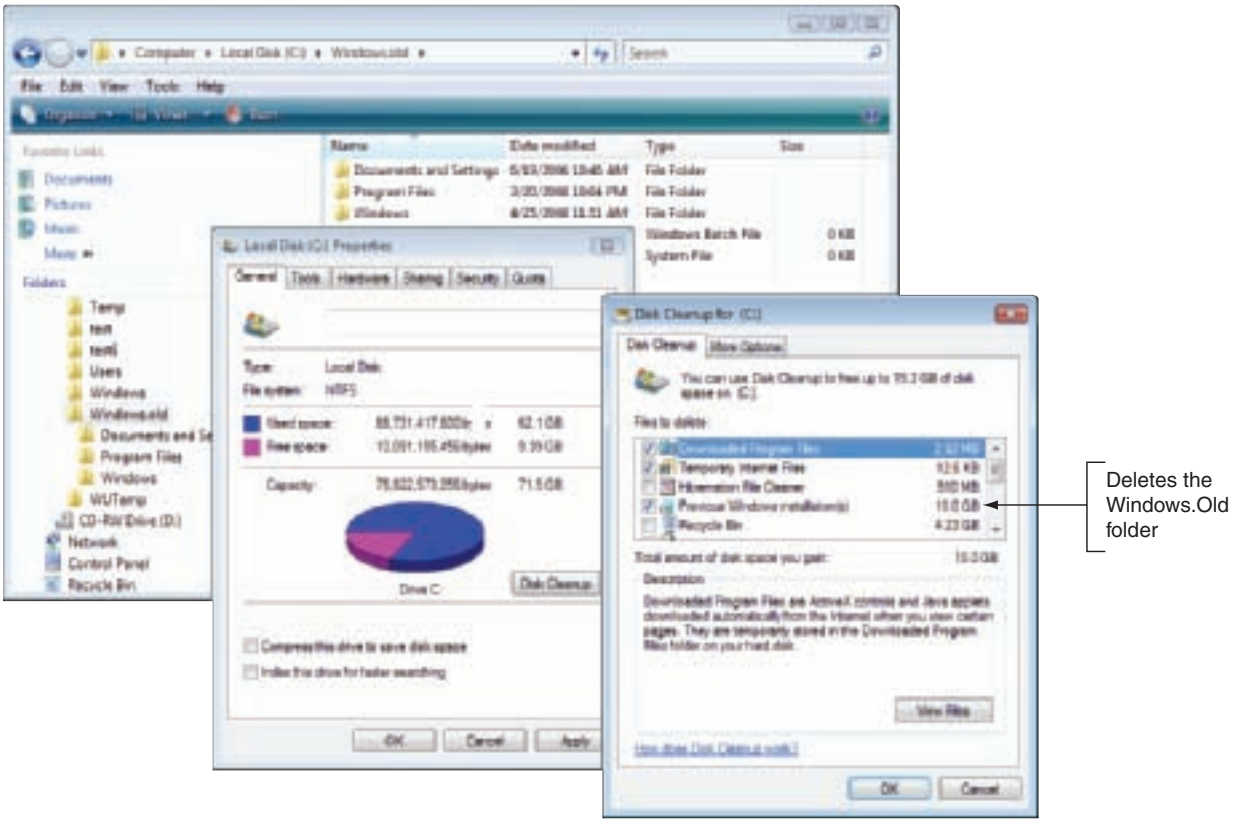

Figure 16-16 Free up disk space by deleting the Windows.Old folder
Courtesy: Course Technology/Cengage Learning

Caution When you first become responsible for a laptop computer, it's extremely important that you create or obtain the recovery DVD or CDs that you will need in case the hard drive crashes. Without this recovery media, it's almost impossible to recover the system using a new hard drive. And, laptop manufacturers don't make these media available to customers after the laptop is a few years old. Get the recovery media in hand while it is still available! You might be able to create the media from the hard drive while the system is still healthy. See the laptop documentation for instructions.

PROBLEMS AT STAGE 2: AFTER THE PROGRESS BAR APPEARS AND BEFORE LOGON

When you see the Microsoft progress bar appear during the boot, you know the Windows kernel has loaded successfully and critical drivers and services configured to be started by the kernel are running. You also know the Session Manager (Smss.exe)

A+ 220-702 2.4

running in user mode has started the Win32 subsystem necessary to provide the graphics of the progress bar. If the progress bar has appeared and the logon screen has not yet been displayed, most likely the problem is caused by a corrupted driver or service that is started after the kernel has finished its part of the boot. Your general attack plan to fix the problem is to isolate and disable the Windows component, service, or application causing trouble. However, if user data on the hard drive is not backed up, do what you can to copy that data to another media before you focus on the problem at hand.

Follow these steps:

1. Launch Windows RE from the Vista setup DVD and run **Startup Repair** from the Recovery Environment menu (see Figure 16-17). It can't do any harm, it's easy to use, and it might fix the problem.

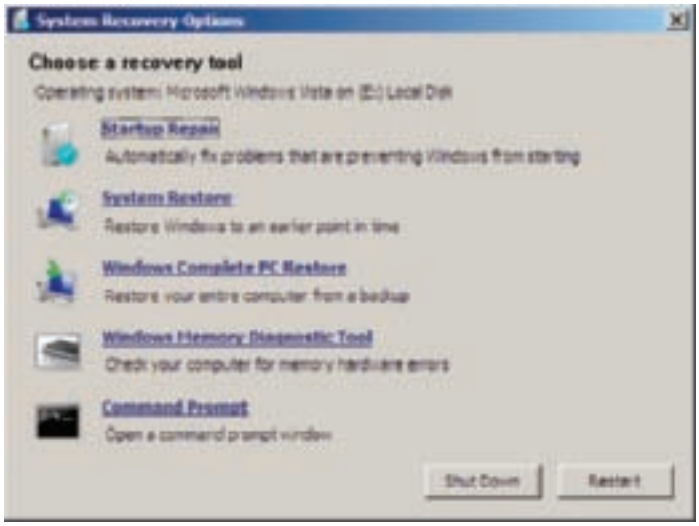

Figure 16-17 Recovery tools in Windows RE
Courtesy: Course Technology/Cengage Learning

2. Reboot and press **F8** to launch the Advanced Boot Options menu. Then select the **Last Known Good Configuration**. It's important to try this option early in the troubleshooting process, because you might accidentally overwrite a good Last Known Good with a bad one as you attempt to log on with the problem still there.
3. In Windows RE, run **System Restore**. Select the latest restore point. If that doesn't fix the problem, try an earlier one.
4. Try booting into **Safe Mode**. If you don't know the source of the problem, here are some things you can try to discover the source and hopefully solve the problem:
   a. Immediately run antivirus software to eliminate a virus as the problem.
   b. Run Chkdsk c: /r to check and repair the hard drive.
   c. Examine all the logs in Event Viewer for errors that might point to the problem.

Notes The Last Known Good Configuration is updated after you log on normally to Vista. However, logging onto a computer when booting into Safe Mode does not update the Last Known Good.

A+ 220-702 2.4

d. Use Software Explorer and MSconfig to stop any applications just installed. Then uninstall and reinstall the application.

e. Use Device Manager to check for hardware errors and disable any devices just installed. If you have just updated a driver, roll back the driver.

f. Open an elevated command prompt window and use the System File Checker (SFC) tool to search for and replace corrupted system files. The command **sfc /scannow** searches for and replaces corrupted system files. Be sure to restart the system after this command is finished.

g. Rename the \Windows\Ntbtlog.txt file to keep it from being overwritten so you can view it later.

5. Boot to the Advanced Boot Options menu and select **Enable Boot Logging**. Windows starts logging information to the log file \Windows\Ntbtlog.txt. Every driver that is loaded or not loaded is written to the file (see Figure 16-18).

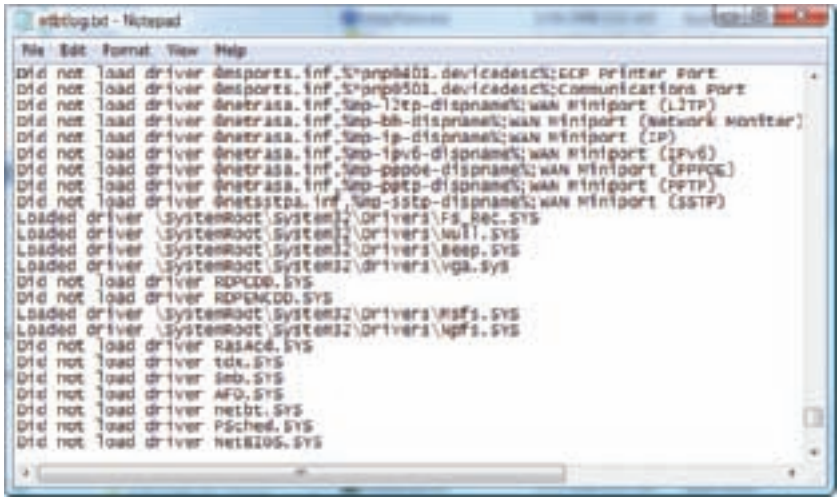

Figure 16-18 Sample Ntbtlog.txt file
Courtesy: Course Technology/Cengage Learning

6. Compare the Ntbtlog.txt file to the one that was created in Safe Mode. If the boot failed, look at the last entry in the Ntbtlog.txt file that was generated. Find that entry in the one created while booting into Safe Mode. The next driver listed in the Safe Mode Ntbtlog.txt file is likely the one giving problems.

7. The easiest way to view the logs is to boot into Safe Mode and view the files with Notepad. If you can't boot into Safe Mode, you can still view the file using the Windows RE command prompt window. Try replacing the program file listed last in the log or disabling the device or service. If that doesn't work, then you'll need to dig a little deeper to identify the culprit. Here are some tips for identifying a device or service causing the problem:
   - *Tip 1:* Try to boot into Safe Mode. Then use MSconfig to disable all nonessential services and programs. Reboot normally. If the problem goes away, you can enable services and programs until you find the one causing the problem.
   - *Tip 2:* In Safe Mode, examine Event Viewer logs for errors.
   - *Tip 3:* In Safe Mode, use System Information (msinfo32.exe) to find the program filenames of drivers and services. Useful information can be found

A+ 220-702 2.4

at these locations: Services in the Software Environment group and Problem Devices in the Components group.

- *Tip 4:* Compare the entries in the Ntbtlog.txt file when booting in Safe Mode to the entries when booting normally. Consider that the culprit might be any item that is loaded for a normal boot but not loaded for Safe Mode. Disable each driver one at a time until the problem goes away.
- *Tip 5:* If the computer will not boot into Safe Mode, compare the Ntbtlog.txt file to one created on a similar computer booted into Safe Mode. Look for a service or driver listed as loaded on the good computer that is not loaded or is missing on the bad computer.

A+ Exam Tip The A+ 220-702 Practical Application exam expects you to know how to use System Information to help you resolve a Windows startup problem.

8. After you believe you've identified the problem service or device, if you can boot into Safe Mode, first use Device Manager to disable the device or use the Services console to disable the service. Then reboot, and, if the problem goes away, restore the program file and enable the driver or service.
9. If you cannot boot into Safe Mode, open the command prompt window of the Recovery Environment. Then back up the registry and open the Registry Editor using the regedit command. Drill down to the service or device key. The key that loads services and drivers can be found in this location:

   HKEY__LOCAL__MACHINE\System\CurrentControlSet\Services
10. Disable the service or driver by changing the Start value to 0x4. Close the Registry Editor and reboot. If the problem goes away, use the Copy command to replace the program file, and restart the service or driver.

PROBLEMS AT STAGE 3: AFTER WINDOWS LOGON

Problems that occur after the user logs onto Windows are caused by applications or services configured to launch at startup. Programs can be set to launch at startup by placing their shortcuts in startup folders, by Scheduled Tasks, or by software installation processes that affect registry entries. If you see an error message at startup that gives you a clue as to which service or program is at fault, test your theory by using MSconfig to disable that program. Recall from Chapter 14 that you can also use MSconfig to temporarily disable groups of startup services and startup programs and then enable a few services and programs until you find the one causing the problem.

Table 16-1 summarizes some error messages including blue screen or STOP errors you might encounter during the boot and what to do about them. STOP errors occur when the Windows kernel encounters an error in a kernel mode process, which most likely points to a hardware or driver problem.

HOW TO RECOVER LOST DATA

When data is lost or corrupted, you might be able to recover it using Windows tools, third-party software, or commercial data recovery services. This section discusses your options to recover lost data.

A+ 220-702 2.4

Error or Error Message	Description and What to Do
Non-system disk or disk error Replace and press any key when ready	Startup BIOS could not find a boot device. Check BIOS setup for the boot sequence and try to boot from another device.
Invalid partition table Error loading operating system Missing operating system	MBR record is damaged or the active partition is corrupt or missing. Use the repair commands from the Windows RE command prompt window.
An application launched at startup that gives errors or takes up resources	Use Software Explorer to remove it from the list of startup programs.
Stop 0xc0000034 or The Windows Boot Configuration Data file is missing required information	The C:\Boot\BCD file is corrupted or missing. Use the Startup Repair tool in Windows RE or the Bootrec command.
Stop 0x0A or IRQL_NOT_LESS_OR_EQUAL	Caused by a driver or service making an illegal access to memory. Try the Last Known Good Configuration. Then look for an incompatible driver or service.
Stop 0x1E or KMODE_EXCEPTION_NOT-HANDLED	A bad driver or service has performed an illegal action. Look for corrupted or bad drivers or services. Try updating firmware.
Stop 0x24 or NTFS_FILE_SYSTEM	Suspect a failing hard drive or bad third-party disk utility tools.
Stop 0x2E or DATA_BUS_ERROR	A hardware problem most likely caused by failing memory or a corrupted hard drive.
Stop 0x50 or PAGE_FAULT_IN_NONPAGED_AREA	Caused by failing memory or bad software. Test memory using the Memory Diagnostic tool.
Stop 0x7B or INACCESSIBLE_BOOT_DEVICE	Windows cannot access the hard drive. This is probably caused by installing bad or incorrect hard drive drivers.
Stop 0xFE or BUGCODE_USB_DRIVER	Caused by corrupted USB drivers. Update the motherboard drivers for the USB ports.
Any other Stop error that occurs during startup	Other Stop errors are most likely caused by a corrupted registry, a system file that is missing or damaged, or a device driver that is missing or damaged. Use the Startup Repair tool and then examine the log file it creates at C:\Windows\System32\LogFiles\Srt\Srttail.txt.
Any Stop error that occurs during a Vista installation	See the Microsoft Knowledge Base article 935806 for a list of Stop errors during installation and what to do about them.

Table 16-1 Error messages during the Vista startup and what to do about them

RECOVER A DELETED OR CORRUPTED DATA FILE

Here are some things to try to recover a deleted or corrupted data file:

- If you have accidentally deleted a data file, to get it back, look in the Recycle Bin. Drag and drop the file back to where it belongs, or right-click the file and click **Restore** on the shortcut menu.

A+ 220-702 2.4

- If a data file is corrupted, you can try to use the Recover command. To use the command, the volume on which the file is located cannot be in use. The easiest way to do that is to boot into Windows RE and open a command prompt window. For example, Figure 16-19 shows the command **recover C:\Data\Mydata.txt**. Notice in the figure that the C drive is not the current drive. The drive is not used when you load Windows RE and drive C is not the current or default drive.

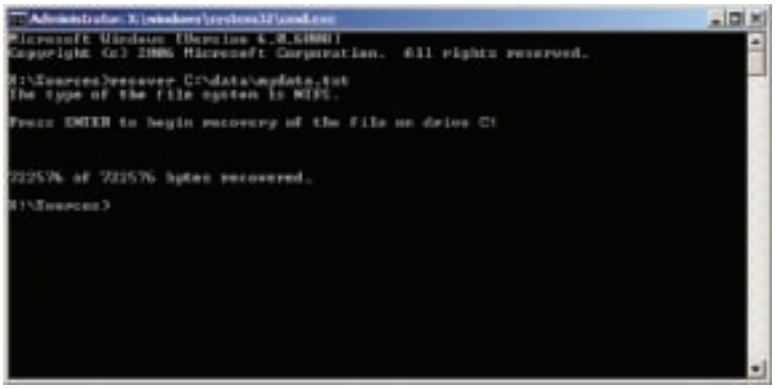

Figure 16-19 Use the Recover command to recover a corrupted file while the volume on which it is stored is not in use
Courtesy: Course Technology/Cengage Learning

- If an application's data file gets corrupted, go to the Web site of the application manufacturer and search the support section for what to do to recover the file. For example, if an Excel spreadsheet gets corrupted, search the Knowledge Base at *support.microsoft.com* for solutions.
- Third-party software can help recover deleted and corrupted files. On the Internet, do a search on "data recovery" for lots of examples. One good product is GetDataBack by Runtime Software (*www.runtime.org*), which can recover data and program files even when Windows cannot recognize the drive. It can read FAT and NTFS file systems and can solve problems with a corrupted partition table, boot record, or root directory.

RECOVER DATA FROM A COMPUTER THAT WILL NOT BOOT

If Windows is corrupted and the system will not boot, recovering your data might be your first priority. One way to get to the data is to remove your hard drive from your computer and install it as a second nonbooting hard drive in another system. After you boot up the system, you should be able to use Windows Explorer to copy the data to another medium. If the data is corrupted, try to use data recovery software.

Recall from Chapter 8 that for less than $30 you can purchase an IDE to USB converter kit or a SATA to USB converter kit that includes a data cable and power adapter. (For notebook hard drives, the IDE to USB kit needs to include an adapter for these smaller drives. This extra adapter is not needed for SATA notebook hard drives because these SATA connectors are the same size as those used for desktop drives.) You can use one of these kits to temporarily connect a desktop or notebook hard drive to a USB port on a working computer. Set the drive beside your computer

A+ 220-702 2.4

and plug one end of the data cable into the drive and the other into the USB port. (For an IDE drive, a jumper on the drive must be set to the master setting.) The AC adapter supplies power to the drive. While power is getting to the drive, be careful to not touch the circuit board on the drive.

Using Windows Explorer, you can browse the drive and copy data to other media. After you have saved the data, use Disk Management to try to repartition and reformat the drive. You can also use diagnostic software from the hard drive manufacturer to examine the drive and possibly repair it.

USE A DATA RECOVERY SERVICE

If your data is extremely valuable and other methods have failed, you might want to consider a professional data recovery service. They're expensive, but getting the data back might be worth it. To find a service, use Google.com and search on "data recovery." Before selecting a service, be sure to read up on reviews, understand the warranty and guarantees, and perhaps get a recommendation from a satisfied customer.

TROUBLESHOOTING WINDOWS 2000/XP STARTUP

In Chapter 15, you learned how the Windows 2000/XP boot process works and about the different tools you can use to solve boot problems. These tools include the Advanced Options menu, the boot disk, the Recovery Console, the Windows XP Automated System Recovery process, and the Windows 2000 Emergency Repair process. Before you read this part of the chapter, you might want to take a few moments to review the steps to loading Windows 2000/XP outlined in Chapter 15 and also the tools to solve Windows 2000/XP startup problems. With this knowledge in hand, you're ready to face Windows 2000/XP startup problems. Follow these steps:

1. As with every PC problem, begin by interviewing the user to find out what has recently changed, what happened just before the problem started, and how to reproduce the problem. Ask what has recently happened. Has new hardware or software been installed? Don't forget to ask about any important data that is not backed up.
2. If important data is not backed up, make every effort to copy the data to another media before you try to solve the Windows problem. Don't risk the data without the user's permission. If the system is giving so many errors that you cannot copy data, try booting into Safe Mode (see Figure 16-20). If Safe Mode doesn't load, you can use the Recovery Console to access the data. If Recovery Console cannot access the hard drive, you can move the hard drive to another computer and access it as a second drive in that computer. An IDE to USB or SATA to USB converter kit works well to make the connection so that you don't have to install the drive in the other computer case.
3. Next, determine at what point in the boot the system fails. Decide if you think the problem is hardware or software related.
4. If you think the problem is related to hardware, check the simple things first. Turn off the power and restart the system. Check for loose cables, switches that are not on, stuck keys on the keyboard, a wall outlet switch that has been turned off, and similar easy-to-solve problems.

A+ 220-702 2.4

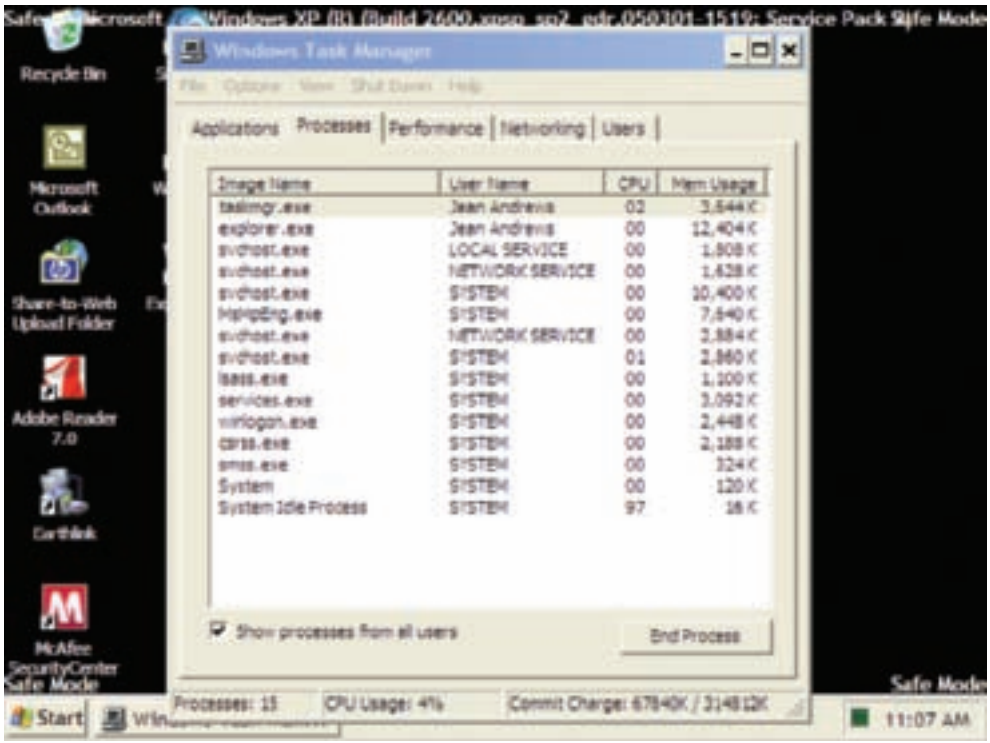

Figure 16-20 Windows XP Safe Mode with Task Manager
Courtesy: Course Technology/Cengage Learning

5. If an error message is displayed on-screen, start by addressing it. Table 16-2 lists several startup errors and what to do about them. As you work to correct the problem and restore the system, always keep in mind to use the least drastic solution that will change as little of the system as possible.
6. If you think the problem is software related and you cannot boot to the Windows desktop, try booting to the Advanced Options menu (hold down **F8** while Windows loads) and select the **Last Known Good Configuration**. If you want to use this option, it's important to use it early in the troubleshooting process before you accidentally overwrite the Last Known Good Configuration.

A+ Exam Tip The A+ 220-702 Practical Application exam expects you to be able to select the appropriate next step in troubleshooting a failed boot when given a specific scenario. As you study the tools and methods in this part of the chapter, pay attention to how a technique affects the installed OS, applications, and data. The idea is to fix the problem by using the tool that least affects the OS, applications, and data.

7. If you can load the Windows desktop, but the system is giving many errors or is extremely slow, suspect a virus is present. Run antivirus software to scan the entire hard drive for malicious software. If the antivirus software won't work or is not installed, boot into Safe Mode and install and run the software there. You will learn more about using antivirus software in Chapter 20.
8. If the system has recently been changed, such as installing software or hardware, assume the installation is the guilty party until it's proven innocent. Use Device Manager to disable or uninstall the device. If this solves the problem, then try to find updated device drivers for the device. Search the Microsoft Web site for known problems with the device or search the device manufacturer Web site. Try updating or rolling back the device drivers.

A+ 220-702 2.4

Error Message	What It Means and What to Do About It
Errors that occur before the Windows load begins:	
Hard drive not found Fixed disk error Disk boot failure, insert system disk and press enter No boot device available	Startup BIOS cannot find the hard drive. Problems with the hard drive and its subsystem are covered in Chapter 8.
Invalid boot disk Inaccessible boot device Invalid partition table Error loading operating system Missing operating system No operating system found Error loading operating system	The program in the MBR displays these messages when it cannot find the active partition on the hard drive or the boot sector on that partition. Use the Diskpart command from the Recovery Console to check the hard drive partition table for errors. Sometimes Fixmbr solves the problem. Third-party recovery software such as PartitionMagic might help. If a setup program came bundled with the hard drive (such as Data Lifeguard from Western Digital or MaxBlast from Maxtor), use it to examine the drive. Check the hard drive manufacturer's Web site for other diagnostic software.
Black screen with no error messages	This is likely to be a corrupted MBR, partition table, boot sector, or Ntldr file. Boot the PC using a Windows 2000/XP boot disk and then try the fixmbr and fixboot commands from the Recovery Console. You might have to reinstall Windows.
When you first turn on the computer, it continually reboots.	This is most likely a hardware problem. Could be the CPU, motherboard, or RAM. First disconnect or remove all nonessential devices such as USB or FireWire devices. Inside the case, check all connections using safety precautions to protect the system against static electricity as you work. Try reseating RAM. Check for fans that are not working, causing the CPU to quickly overheat.
Windows gives an error and then automatically restarts in an endless loop.	To stop the automatic restarts, press F8 to load the Advanced Options Menu. Then select Disable Automatic Restart on System Failure. You will then be able to read the error message and can turn your attention to addressing this error.
A disk read error occurred Missing NTLDR NTLDR is missing NTLDR is compressed	A disk is probably in the floppy disk drive. Remove the disk and reboot. When booting from the hard drive, these errors occur if Ntldr has been moved, renamed, or deleted, or is corrupted, if the boot sector on the active partition is corrupted, or you have just tried to install an older version of Windows, such as Windows 98, on the hard drive. First try replacing Ntldr. Then check Boot.ini settings.
When you first turn on a system, it begins the boot process, but then powers down.	The CPU might be quickly overheating. Check for fans not running. Is this a new CPU installation? If so, make sure the cooler assembly on top of the CPU is correctly installed.
STOP errors that cause Windows to lock up:	
A text error message appears on a blue screen and then the system halts.	Stop errors are usually caused by viruses, errors in the file system, a corrupted hard drive, or a hardware problem. Search the Microsoft Web site for information about an unidentified stop error. Several stop errors and their solutions can be found in Table 16-1 earlier in the chapter.

Table 16-2 Error messages during Windows 2000/XP startup and what to do about them

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Error Message	What It Means and What to Do About It
Startup errors that occur because a program is corrupted or not found:	
A device has failed to start Service failed to start Program not found	**A registry entry or startup folder is referencing a startup program it cannot find. Use MSconfig or the Services Console to find the entry and then replace the missing program. These errors are sometimes caused by uninstall routines that left behind these orphan entries. Depending on the error, the system might or might not halt.**

Table 16-2 Error messages during Windows 2000/XP startup and what to do about them (continued)

9. If a new application or utility program has just been installed, go to the Add or Remove Programs applet in Control Panel and uninstall the software. Reboot the system. If the problem goes away, then try reinstalling the software. If the problem comes back, go to the software manufacturer's Web site and download and install any updates or fixes.
10. If the system will not start normally, try to boot into Safe Mode. If you boot into Safe Mode and Windows XP recognizes System Restore has previously been used to create restore points, Windows XP gives you the opportunity to launch the System Restore Wizard (see Figure 16-21). The wizard gives you the opportunity to choose a restore point from those previously saved. Recall that when Windows is restored to a restore point, all Windows settings are returned to the way they were when the restore point was created.
11. After you boot into Safe Mode, you can use the SFC, Chkdsk, and Defrag commands to verify system files and clean the hard drive. How to do these tasks is covered in Chapter 13. Use antivirus software to scan for viruses. Restart the system. If the problem is not solved, then use System Restore to restore previous settings. The idea is to fix the problem while making as few changes to the system as necessary.

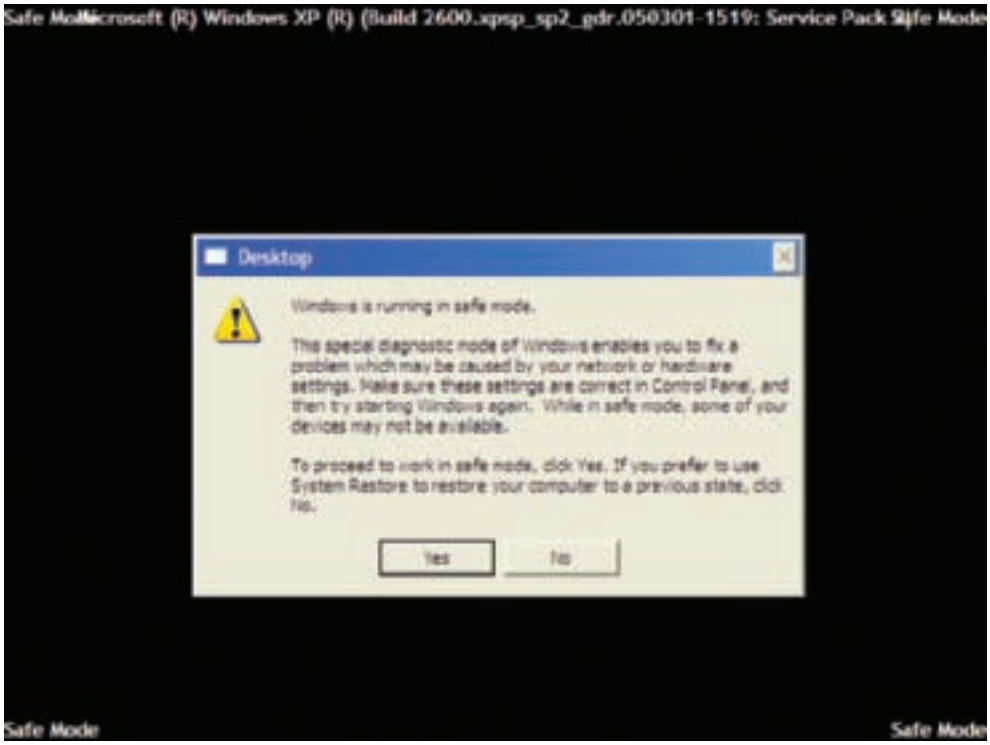

Figure 16-21 Windows XP gives you the opportunity to launch System Restore before it loads Safe Mode
Courtesy: Course Technology/Cengage Learning

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12. If you cannot boot into Safe Mode, try Safe Mode with Command Prompt. Then try these commands, rebooting between commands: **Sfc.exe**, **Chkdsk C: /r**, and **C:\Windows\system32\restore\rstrui.exe**.
13. If you cannot boot from the hard drive, try creating and using a Windows 2000/XP boot disk. If you can boot to the Windows desktop when using this boot disk, you can assume that the boot files in the root directory of drive C are missing or corrupted. If necessary, you can restore these files using the Recovery Console. Also use Fixmbr and Fixboot to repair the MBR and boot sector.
14. If you cannot boot from the Windows 2000/XP boot disk, load the Recovery Console and do the following to restore system files. After you have made a change, restart the system to find out if the problem is fixed or has changed before you attempt the next fix:
    a. Get a directory listing of files in the root directory. If you see garbage on the screen instead of a clean directory list, most likely the hard drive file system is corrupted or the hard drive is physically damaged.
    b. Use the Chkdsk command to scan the hard drive for errors.
    c. Try copying the backup copies of the registry files from the \Windows\repair folder to the \Windows\system32\config folder. Directions are given in Chapter 15. Reboot to see if the problem is solved.
    d. If you have previously identified a key Windows service that is causing the problem, you can locate the file in the \Windows folder and replace it with a fresh copy from the Windows 2000/XP setup CD.
    e. To see a list of all services you can disable, use the Listsvc command. Use the Disable and Enable commands to try disabling each service one by one until you find the one causing the problem.
    f. For Windows XP, try using System Restore to return the system to a previously saved restore point.
    g. If you have a backup of the system state, use Ntbackup to restore the system state using this backup.
15. If the problem is still not solved, it's time to assume that the Windows installation is corrupted and you need to restore the Windows installation. However, if there is data on the hard drive that is not backed up, first look over the section "How to Recover Lost Data" earlier in the chapter. There might be a way to recover the data before you use one of the following methods to restore the Windows installation. Here are the tools used to restore a Windows installation:
    a. For Windows XP, use Automated System Recovery to restore the system to the last ASR backup. You will then need to restore data from backups.
    b. For Windows 2000, use the Emergency Repair Process to restore Windows 2000 to its state immediately after it was installed. You can then install applications and drivers and restore data from backups.
    c. Use the Windows 2000/XP setup CD to perform an in-place upgrade of Windows 2000/XP. Recall from Chapter 12 that an in-place upgrade installs Windows on top of the existing installation so that applications and drivers don't have to be reinstalled. The data might not be disturbed.
    d. If the in-place upgrade does not work, use the Windows 2000/XP setup CD to perform a clean install of Windows 2000/XP. You will then need to reinstall applications and drivers and restore the data from backups.

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Notes For a laptop or other brand-name computer, don't forget to reinstall Windows using recovery CDs provided by the computer manufacturer. Alternately, it might be possible to reinstall Windows from a recovery partition on the hard drive.

As you work to solve a Windows problem, keep in mind that many tools are at your disposal. As you decide which tool to use to correct a problem, always use the least drastic solution to make the fewest possible changes to the system. For example, if you know a driver is giving a problem, even though you can use System Restore to restore the system before the driver was installed, doing so is more drastic than simply rolling back the driver. Always choose the method that makes as few changes to the system as possible and still solves the problem.

Notes When using System Restore and system state backups, you run the risk of undoing *desired* changes to the Windows environment and software installations. Before using one of these fixes, consider what desired changes will be lost when you apply the fix.

When you think the problem is solved, be sure to restart the system one last time to make sure all is well. Verify that everything is working and then ask the user to also verify that the problem is solved and all is working. And don't forget the paperwork. As you work, keep notes about the original symptoms, what you're doing, and the outcome. This paperwork will be a great help the next time you're faced with a similar problem.

>> CHAPTER SUMMARY

- When solving a problem caused by hardware, first identify the device causing the problem. Tools that can help are error messages that are displayed on the screen, the Vista Problem Reports and Solutions tool, the XP Error Reporting tool, Event Viewer, and Reliability and Performance Monitor.
- To fix a problem with a device or its drivers, use Device Manager, Windows update, System Restore, Safe Mode, System File Checker, and possibly use BIOS setup.
- To fix a problem with an application, use Task Manager, antivirus software, Vista Problem Reports and Solutions, XP Error Reporting, Windows updates, System Restore, and the Web site of the application developer.
- Windows Vista tools and techniques used to troubleshoot a failed boot include Last Known Good Configuration, Startup Repair, System Restore, Safe Mode, Command Prompt, in-place upgrade of Windows Vista, Complete PC Restore, and reformatting the hard drive and reinstalling Windows.
- Startup Repair in the Windows Recovery Environment can automatically fix many Windows problems, including those caused by a corrupted BCD file and missing system files. You can't cause any additional problems by using it and it's easy to use. Therefore, it should be your first recovery option when Vista refuses to load.
- Last Known Good Configuration can solve problems caused by a bad hardware or software installation by undoing the install.
- Use the command prompt window in Windows RE when the other RE tools fail to solve the problem.

- Your first decision in troubleshooting a failed Vista boot is to decide at what point in the boot the failure occurred. Determine if the failure occurred before the progress bar, after the progress bar and before logon, or after logon.
- If a hard drive contains valuable data but will not boot, you might be able to recover the data by installing the drive in another system as the second, nonbooting hard drive in the system.
- If you can boot from the Windows 2000/XP boot disk and load the Windows desktop, you have proven the problem is with the boot files in the root directory of the hard drive.
- Access the Recovery Console by first booting from the Windows 2000/XP CD, or the four Windows 2000 setup disks, or install the console under the boot loader menu and access it from there.
- The Windows 2000 Emergency Repair Process lets you restore the system to its state at the end of the Windows 2000 installation. Don't use it unless all other methods fail, because you will lose all changes made to the system since the installation. The Emergency Repair Process requires the emergency repair disk.
- You can use the Windows 2000/XP setup CD to perform an in-place upgrade or clean installation of Windows.

>> KEY TERMS

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

secondary logon

>> REVIEWING THE BASICS

1. When you have a problem with a USB device, what is the simplest way to determine that the USB port is good?
2. When you have a problem with a USB device, what is the simplest way to determine that the USB device is not causing the problem?
3. How can you determine that device drivers loaded at startup are not interfering with an application that is having problems?
4. What is the command used for testing memory?
5. If you are not sure which device is causing a video problem—the monitor or the video card—which one should you exchange first? Why?
6. What type of device, when installed, is not listed in BIOS setup, Device Manager, or the Printers window?
7. What is the term used to describe undoing a driver update?
8. What Windows Vista tool can you use to uninstall a USB device?
9. What Windows XP tool can you use to uninstall a FireWire device?
10. What Windows tool can you use to uninstall a network card?
11. What Windows tool can you use to restore the Windows system to a previous point in time before a device was installed?

12. What Windows tool can you use to update your video drivers?
13. What symbols might Device Manager use to indicate a device is not working?
14. What level of permission must a user account have to install software?
15. If a computer won't boot, to figure out if the problem is related to the hard drive or other vital hardware component, what would be the first step?
16. What is another name for a Windows Stop error?
17. What is the name of the folder that is created when files from an old installation are moved during a reinstall of Vista?
18. What is the purpose of the hidden partition used by many of the brand-name computer companies?
19. What information is contained in the C:\Windows\System32\LogFiles\SRT\SRTTrail.txt file?
20. What is the name of the log file that Windows uses when booting in Safe Mode?

>> THINKING CRITICALLY

1. Windows Vista refused to start and the error message says something about the WinLoad program file being missing. Which action is the best way to fix the problem? Why?
   a. Boot from the Vista DVD and use the command prompt window to copy the WinLoad file from a working PC to this PC.
   b. Boot from the Vista DVD and use the Startup Repair tool.
   c. Use the latest Complete PC backup to restore the system.
   d. Boot into Safe Mode and restore the program from backup.
2. An error message is displayed during Vista startup before the progress bar appeared about missing services program files. You try to boot into Safe Mode, but get the same error message. Next, you use the Vista DVD to boot into the Recovery Environment. Select the best two tasks to fix the problem and order them correctly.
   a. Use System Restore to restore the system to a previous restore point.
   b. Use the command prompt to disable and then replace the service.
   c. Use Startup Repair.
   d. Use Complete PC Restore.
3. You tried to use the Automated System Recovery to restore a failed Windows XP system. The process failed with errors, but there is an extremely important data file on the hard drive that you need to recover. The hard drive is using the NTFS file system. What do you do?
   a. Most likely the file is toast. The ASR process probably destroyed the file if it were not already destroyed.
   b. Boot to the Recovery Console using the Windows XP setup CD and attempt to recover the file.
   c. Reinstall Windows XP and then recover the file.
   d. Boot to the Advanced Options menu and use Safe Mode to recover the file.

4. When you start Windows XP, you see an error message about a service that has failed to start and then the system locks up. You think this service is related to a critical Windows process. What do you try first? Second?
   a. Boot into Safe Mode and run System Restore.
   b. Select the Last Known Good Configuration on the Advanced Options menu.
   c. Perform an in-place upgrade of Windows XP.
   d. Use the Recovery Console to restore the system file.
5. Which statement(s) are true about the Windows 2000/XP boot disk?
   a. The boot disk can be used to boot the system to the Windows 2000/XP desktop when Ntldr is missing from the hard drive.
   b. The boot disk can be used to boot to the desktop even when the C:\Windows folder is corrupted.
   c. The boot disk can be used in place of the boot files in the root directory of the active partition.
   d. The boot disk can be used to boot to the desktop even when the partition table is corrupted.

>> HANDS-ON PROJECTS

PROJECT 16-1: Digging Deeper into System File Checker

The System File Checker tool can be used to find and replace corrupted Vista system files. The tool keeps a log of its actions, and, if it cannot replace a corrupted file, you can find that information in the log file. Then you can manually replace the file. Locate the Microsoft Knowledge Base Article 929833 at the *support.microsoft.com* site. Do whatever research is necessary to understand the steps in the article to manually replace a corrupted file and answer these questions:

1. What are other parameters for the sfc command besides /scannow?
2. Explain the purpose of the findstr command when finding the log file.
3. Can a filename other than sfcdetails.txt be used in the findstr command line? Explain your answer.
4. What is the purpose of the edit command?
5. Explain the purpose of the takeown command when replacing a system file.
6. Explain why the icacls command is needed in the process.
7. List some ways that you can locate a known good copy of the corrupted system file.

PROJECT 16-2: Practice Using the Recovery Console

To get some practice using the Recovery Console, first boot from your Windows 2000/XP setup CD and load the Recovery Console. Then do the following:

1. Get a directory listing of C:\. Are files normally hidden in Windows Explorer displayed in the list?
2. Create a folder on your hard drive named C:\Temp.

3. List the files contained in the Drivers.cab cabinet file.
4. Expand one of these files and put it in the C:\Temp folder.
5. Exit the Recovery Console and reboot.

PROJECT 16-3: More Practice with Recovery Console

Using Windows Explorer, rename the Ntldr file in the root directory of drive C. Reboot the system. What error message do you see? Now use Recovery Console to restore Ntldr without using the renamed Ntldr file on drive C. Copy the file from the Windows setup CD to drive C. List the commands you used to do the job.

PROJECT 16-4: Sabotage a Windows XP System

In a lab environment, follow these steps to find out if you can corrupt a Windows XP system so that it will not boot, and then repair the system.

1. Looking at Figure 16-22, make a list of the user-mode processes critical to Windows XP.

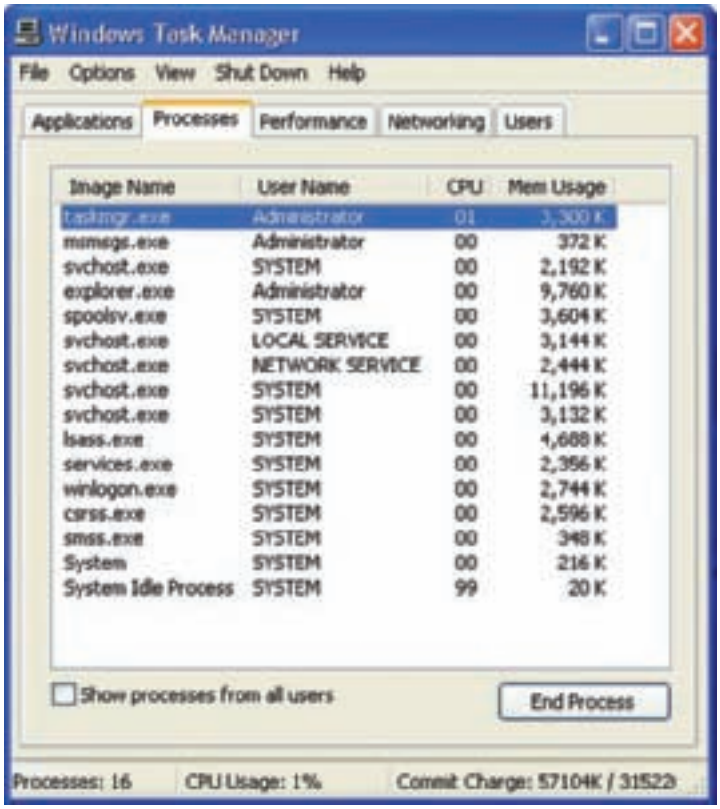

Figure 16-22 Processes that launch when Windows XP is newly installed
Courtesy: Course Technology/Cengage Learning

2. Rename or move one of the program files shown in Figure 16-22. Which program file did you select? In what Windows folder did you find it?
3. Restart your system. Did an error occur? Check in Explorer. Is the file restored? What Windows feature repaired the problem?

4. Try other methods of sabotaging the Windows XP system, but carefully record exactly what you did to sabotage the boot. Can you make the boot fail?
5. Now recover the Windows XP system. List the steps you took to get the system back to good working order.

PROJECT 16-5: Using a Windows 2000/XP Boot Disk

Create a Windows 2000/XP boot disk and use it to boot your computer. Describe how the boot worked differently from booting entirely from the hard drive.

>> REAL PROBLEMS, REAL SOLUTIONS

REAL PROBLEM 16-1: Fixing a PC Problem

This project should be fun, extremely useful, and give you an opportunity to find out just how much you have learned so far from this book. Make yourself available to family and friends who have problems with their computers. For each problem, don't forget to follow the procedures for troubleshooting you have learned in this book, especially the one about backing up user data before you make any changes to a system. For the first three problems you face, keep a record that includes this information:

1. Describe the problem as the user described it to you.
2. Briefly list the things you did to discover the cause of the problem.
3. What was the final solution?
4. How long did it take you to fix the problem?
5. What would you do differently the next time you encounter this same problem?