OBJECTIVES

This chapter helps you to prepare for the Operating Systems Technologies module of the A+ Certification examination by covering the following objectives within the "Domain 3.0: Diagnosing and Troubleshooting" section.

3.3 Recognize common operational and usability problems and determine how to resolve them.

Content may include the following:

- **Troubleshooting Windows-specific printing problems**
- **Print spool is stalled**
- **Incorrect/incompatible driver for print**
- **Incorrect parameter**
- **Other common problems**
- **General Protection Faults**
- **Bluescreen error (BSOD)**
- **Illegal operation**
- **Invalid working directory**
- **System lockup**
- **Options (sound card, modem, input device) will not function**
- **Application will not start or load**
- **Cannot log on to network (option—NIC not functioning)**
- **Applications don't install**
- **Network connection**
- **Viruses and virus types**
- **What they are**
- **TSR (Terminate-and-Stay-Resident) programs and virus**

CHAPTER 10

Common OS Operational Problems

OBJECTIVES

- **Sources (floppy disks, e-mails, and so on)**
- **How to determine presence**

After the operating system has been started and becomes functional, another set of problems can exist that fall into the category called operational problems. As with startup problems, the technician must be able to identify and correct operational problems associated with the operating system.

The Windows operating systems provide the environment and support for all the applications running under them. In addition, they provide the printing functions for all the applications in a Windows system. The successful technician must be able to recognize and correct application and printing problems related to the Windows environment.

One other problem the technician must be able to effectively deal with is computer viruses. Viruses have become a major cause of problems in the personal computer environment. The technician must be aware of how typical viruses work, how they are contracted, and how to deal with them.

OUTLINE

OUTLINE

STUDY STRATEGIES

To prepare for the Diagnosing and Troubleshooting objective of the Operating Systems Technologies exam:

- ***Use all the traditional study tools we've placed in the chapter***—Pay attention to the Objectives, Challenges, and end-of-chapter questions and use them to learn the material.
- ***Use the pedagogy in this chapter to focus on the exam-specific material***—We've included lots of features geared expressly to the A+ exam. The Exam Tips scattered throughout the chapter are placed there to point to known exam-related materials. The same is true of the embedded Challenge items.
- ***Key in on Exam Tips in the chapter***—While reading through the chapter, make sure to concentrate on the following test-related items:
  - Be aware of reasons that ISP accounts become invalid and what the consequences of this situation are.
  - Be aware of the part that the disk drive plays in Windows 9x memory management and how to optimize its use.
  - Memorize which command-line utility can be used to convert the disk-drive file system from FAT to FAT32.
  - Know how to clear a stalled application in the Windows environment.
  - Memorize the functions associated with the Alt+F4 key combination.
  - Know the function of the Dr. Watson utility and where its information is stored in the system.
  - Be aware that files deleted from remote and removable storage devices do not appear in the Recycle Bin.
  - Remember the different methods of accessing an application's Properties.
  - Know what items to look for when applications do not start.

Study Strategies

- Be aware that Windows 2000 and Windows XP do not show hidden and system files by default. Also, know how to display these file types from the Windows environment.
- Know which Windows utility can be used to monitor the operation of application packages and log errors so that they can be reported to software developers for repairing their programs.
- Be aware of where the Dr. Watson utility is located and what it is used for.
- Remember how to test the operation of the Windows print spooler when the printer will not print.
- Be aware that not having file and print sharing enabled prevents other computers on the network from "seeing" your computer across the network.
- Be able to create a UNC path from a local computer to a remote printer or to a directory located on a remote computer.
- Remember how the different types of viruses attack the system and know how they are spread.

INTRODUCTION

This chapter deals with troubleshooting operating system problems that occur after the system has been successfully booted to a command prompt or desktop environment. Problems in this category are referred to as *operational problems*. As with startup problems, the technician must be able to identify and correct operational problems associated with the various operating system versions.

This chapter covers common operational problems that occur in Windows 9x/Me and Windows NT/2000/XP systems. Typical operational problems include memory usage problems, application problems, printing problems, and networking problems.

The first few sections of the chapter deal with common application-related problems such as applications not installing or not starting.

The second portion of the chapter deals specifically with problems and troubleshooting procedures associated with printing in Windows. The Windows operating environment and operating system provide the printing functions for all the applications in a Windows system. The successful technician must be able to recognize and correct printing problems related to the Windows environment.

Although the A+ Operating System Technologies objective related to operational problems includes references to network connectivity issues, these issues are covered in a better context in Chapter 11, "Networking with Windows." In this chapter, we simply include information about network login problems that can be administered through the operating system.

The final section of the chapter discusses computer viruses. Typical symptoms and precautions for preventing virus infections are presented during the discussion. Viruses have become a major cause of problems in the personal computer environment. The technician must be aware of how typical viruses work, how they are contracted, and how to deal with them.

After completing the chapter, you should be able to relate common Windows operational problems to the symptoms they produce and suggest remedies for these problems. You should also be able to identify Windows-specific printing problems and implement procedures for correcting them. Finally, you should be able to identify

common symptoms produced by viruses and describe preventive measures that can be employed to avoid infections.

COMMON OS OPERATIONAL PROBLEMS

After the operating system is started and becomes functional, operational problems come into play. Many of these problems are documented in A+ Objective 3.3, which states that the technician must be able to identify and correct operational problems associated with the operating system. To this end, this chapter deals specifically with OS operational symptoms and problems, including the following:

- Memory usage
- Applications
- Printing
- Networking

Memory-Usage Problems

Memory-usage problems occur when the operating system, or one of its applications, attempts to access an unallocated memory location. When these memory conflicts occur, the data in the violated memory locations is corrupted and may crash the system. In older Windows versions, these types of problems were labeled *General Protection Faults (GPFs)* and were generally the product of data protection errors induced by poorly written programs.

Although Windows 9x provides a much better multitasking environment than its predecessors, applications can still attempt to access unallocated memory locations or attempt to use another application's space. These actions create a software exception error in the system. When these memory conflicts occur, the system may either return an error message or simply stop processing. Due to the severity of the GPF problems in early Windows versions, Microsoft used the following type of memory-usage error message in Windows 9x: `This application has performed an illegal operation and is about to be shut down`. When this type of error occurs, Windows may take

care of the error and permit you to continue operating by simply pressing a specific key combination.

Some memory-usage errors are nonfatal and provide an option to ignore the fault and continue working, or to just close the application. These errors are generally caused by Windows applications and can sometimes be tracked to *dynamic link library (DLL)* files associated with a particular application. Although the application may continue to operate, it is generally not stable enough to continue working on an extended basis. It is recommended that the application be used only long enough to save any existing work.

Windows NT, Windows 2000, and Windows XP employ a flat memory-management scheme that does not use the segmented memory-mapping features associated with the Intel microprocessors. Therefore, these operating systems have very few memory-usage problems.

Optional Devices Do Not Operate

The system's basic devices are configured as part of the system's PnP startup process in both Windows 9x/Me and Windows NT/2000/XP systems; however, this doesn't mean that all the system's devices are in working order or that they will remain in working order while the system is on. Optional devices such as modems, sound cards, and advanced I/O devices may configure properly as part of the PnP process and then fail to operate after the system starts.

As an example, many video cards are capable of displaying very high-resolution screens at high refresh rates. However, some monitors do not have the same capabilities. When you configure a video card with settings that the monitor cannot display, symptoms may range from a simple blank screen to several ghost images being displayed onscreen. After the initial installation, the video drivers are always changed while Windows is operating.

To correct this problem under Windows 9x or Me, start the system in Safe Mode. This action causes Windows to load a basic VGA video driver, enabling you to then change the display properties of the video card. In a Windows NT/2000/XP system, you should select the VGA Mode option to gain access to the video configuration by loading a standard VGA driver.

Similarly, adding input devices such as a new mouse or joystick can create problems in which the new device does not work under the Windows environment. In the Windows operating system, you can find several tools to help identify and isolate hardware-related problems. These tools include the Device Manager located under the Control Panel's System icon, the Hardware Troubleshooter procedures located under the Help entry of the Start menu, and the various hardware-related icons in the Control Panel.

CHALLENGE #1

You believe your video display can produce a much higher resolution display than it is currently providing, so you change the video driver in your Windows 2000 Professional system. When you apply the new setting, you cannot see anything on the display. What should you do to regain control of your display?

Refer to the "Challenge Solutions" section at the end of this chapter for the resolution to the challenge.

Applications Do Not Install

In both Windows 9x/Me and Windows NT/2000/XP lines, most applications autorun when their distribution CD is placed in the drive. The Autorun feature presents a user interface on the display that guides the user through the installation process. If the Autorun feature in Windows 2000/XP is disabled in the drive's Properties page, the automatic interface will not start, and the installation will not be performed. In Windows 9x/Me, the Autorun feature is a function of the Registry and is not generally available to the user.

You should check the distribution CD for the presence of the `Autorun.inf` file. If it is present and no Autorun action occurs, you should examine the CD-ROM drive's Properties page to ensure that the Autorun function is enabled.

Some applications do not include the Autorun function as part of their installation scheme and are typically installed through the Control Panel's Add/Remove Programs applet. If an application is not on the Windows 2000 *Application Compatibility Toolkit* (*ACT*, the software equivalent of the HCL listing), the application may not

install on the system or operate properly. This toolkit can be downloaded from the Microsoft Upgrade Web page at `http://MSDN.Microsoft.com/compatibility`. The ACT utility will run on Windows Server 2003, Windows XP, and 2000 Professional, as well as on Windows 2000 Server with Service Pack 3 (SP3) installed.

Blue Screen Errors

In the normal course of operation, Windows NT, Windows 2000, or Windows XP can encounter situations that cause it to stop and display a blue screen. Collectively, these errors are referred to as Stop errors; they basically occur whenever Windows NT/2000/XP operating systems detect a condition from which they cannot recover. The system stops responding, and a screen of information with a blue or black background appears, as illustrated in Figure 10.1. Stop errors are also known as *Blue Screen errors* or simply as the *Blue Screen of Death (BSOD)*.

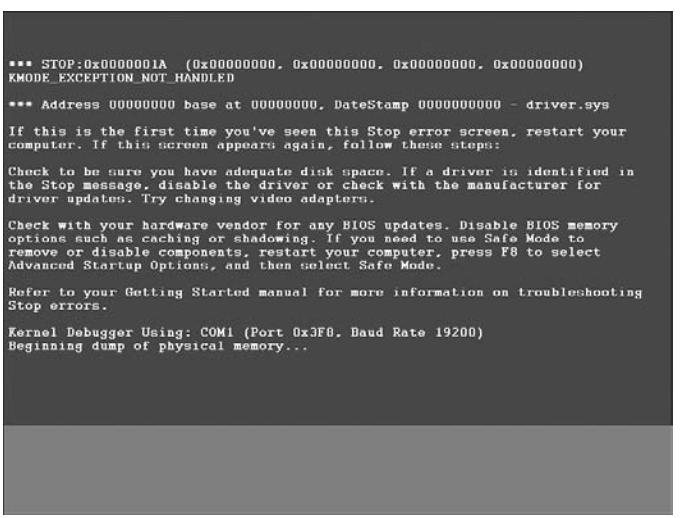

FIGURE 10.1
Stop error or Blue Screen error.

Although Stop errors occur most frequently after new hardware devices (or their device drivers) have been installed, they can also occur when the system is running low on disk space. In addition,

Stop errors can occur without apparent reasons on systems that have been running without a problem for an extended period of time.

You can perform the following activities to gain additional information about what caused a Stop error so that you can troubleshoot and repair it:

- Restart the system to determine whether the error will repeat itself. In many cases, a temporary condition in the system can cause the error to occur. In these cases, simply restarting the system corrects the condition.
- If new hardware devices or updated drivers have been installed in the system, verify that they have been installed correctly and that they are the most current versions of the device drivers. Check the Windows HCL to verify that any newly installed hardware and device drivers are compatible with the operating system version.
- Remove any newly installed hardware and restart the system. If the operating system starts up, use the Event Viewer utility to view any error messages generated before the Stop error occurred.
- Restart the system in *Safe Mode*. If the system starts up, remove any newly installed drivers or applications that could possibly be causing the Stop error.
- Attempt to restart the system using the *Last Known Good Configuration* boot option. Doing so resets the system and provides an opportunity to install the new hardware device again.
- Access the Windows Components window of the Add/Remove Software applet and make certain that the latest available service pack for the operating system has been installed.
- Access the *Microsoft Support Center* or *Technet* Web site and search for information about the particular Stop error number you are encountering.
- Access the CMOS Setup utility and disable any memory caching or shadowing options that have been established.
- Restart the system using a software diagnostic utility and check the system for memory errors.
- Check the system for viruses.

Logon Problems

Logon problems commonly occur during startup (even though they are not actually startup problems) or when the user is trying to access different applications and utilities. Basically, in network and internetworked computer environments, users cannot log on to systems and applications unless they have the proper authorization to do so. These problems tend to be very common in secure environments such as local and wide area networks.

The most common logon problem is a forgotten or invalid username and password. Invalid usernames and passwords typically result from poor typing or from having the Caps Lock function turned on. Users can also be prevented from logging on due to network station or time restrictions imposed by administrators. You should check with the network administrator to see whether the users' rights to the system have been restricted.

Another common username/password problem occurs when the user is locked out of the system after too many failed attempts have been made. In some organizations, network administrators may establish policies to lock out users after one or two attempts. As mentioned earlier, entering usernames and passwords with the Caps Lock function turned on can cause users to be locked out of their accounts.

In the Internet environment, the ISP is responsible for establishing Internet access accounts for each user. These accounts are based on the user's account name and password, which the ISP asks for each time the user logs on to the account. Forgetting or misspelling either item results in the ISP rejecting access to the Internet. Most accounts are paid monthly. If the account isn't paid up, the ISP may cancel the account and deny access to the user. In either of these situations, if the user attempts to log on to the account, he or she will repeatedly be asked to enter his or her account name and password until a predetermined number of failed attempts is reached. Users can save their Internet usernames and passwords in the Internet Connection dialog box to prevent these problems from occurring.

EXAM TIP

Be aware of reasons that ISP accounts become invalid and what the consequences of this situation are.

Windows 9x/Me Operating Problems

Aside from the application, printing, and networking problem categories listed earlier, if the Windows 9x/Me operating system starts up properly, only a limited number of things can go wrong

afterward. The disk drive can run out of space, files can become corrupt, or the system can lock up due to software exception errors. When these problems occur, the system can either return an error message or simply stop processing.

Drive Space and Memory Problems

You can use the System Information utility, which you access by selecting Programs, Accessories, System Tools, to view the disk drive's space parameters. You also can check the drive's used/available space information by performing a CheckDisk operation on it.

If the system produces an `Out of Memory` error in Windows 9x, it is very unlikely that the system is running out of RAM, unless you are running MS-DOS–based applications. In Windows 9x, this error indicates that the system is running out of memory space altogether—RAM and virtual.

Run the Windows *System Monitor* utility described in Chapter 5, "Operating System Utilities," to observe system memory usage and determine the nature of the error. If you are running MS-DOS– based applications, you can optimize the system's use of conventional memory by running the old DOS MEMMAKER utility from the `\Tools\Oldmsdos` directory on the Windows distribution CD.

EXAM TIP

Be aware of the part that the disk drive plays in Windows 9x memory management and how to optimize its use.

Memorize which command-line utility can be used to convert the disk-drive file system from FAT to FAT32.

You can view the system's swap file settings through the Control Panel's System, Performance, Virtual Memory option or through the System Tool's System Information utility. Any lost clusters taking up space on the drive can be identified and eliminated using the ScanDisk utility. A heavily used, heavily fragmented hard drive can affect the system's virtual memory and produce memory shortages as well. Run the Defrag utility to optimize the storage patterns on the drive and thus improve drive read/write access times and virtual memory performance.

If the system is running a FAT16 drive, you can free additional space by converting it to a FAT32 drive using the `CVT1.EXE` command of the *Drive Converter (FAT32)* utility. The smaller sector clustering arrangement available through FAT32 frees wasted space on the drive. The drawbacks of performing this upgrade are that you have some risk of losing data if a failure occurs in the conversion process and that larger files will have slightly slower read/write times than they did under FAT16.

If these corrective actions do not clear the memory error, you need to remove unnecessary files from the drive or install a larger drive. If the system still runs out of hard-disk space, remember that up to five backup copies of the Registry may exist on the drive. These copies are a product of using the SCANREGW utility to check out the Registry structure for corruption. Each backup is up to 2MB in size and can be removed to free additional disk-drive space.

Stalled Applications

If the system locks up, or an application stalls, often you can regain access to the *Close Program dialog box* by pressing the Ctrl+Alt+Del key combination. When the Close Program dialog box appears, you can close the offending application and continue operating the system without rebooting.

As an example, in Windows 9x the *Windows Explorer* shell (`EXPLORER.EXE`) may crash and leave the system without a Start button or *taskbar*. To recover from this condition, use the Ctrl+Alt+Del combination to access the Close Programs dialog box and shut down the system in a proper manner. Pressing the Ctrl+Alt+Del combination again immediately shuts down the operating system and any unsaved data in other open applications.

The Alt+F4 key combination can also be used to close active windows. Pressing this key combination in an application stops the application and moves to the next active application in the task list. If the Alt+F4 combination is pressed when no applications are active, the Shut Down Windows menu appears on the display. Using it, you can shut down or restart the system in an orderly fashion.

If the application repeatedly locks up the system, you must reinstall the application and check its configuration settings. The Dr. Watson utility also proves useful in detecting application faults. When activated, Dr. Watson intercepts the software actions, detects the failure, identifies the application, and provides a detailed description of the failure. The information is automatically transferred to the disk drive and stored in the `\Windows\Drwatson\*.WLG` file. You can view and print the information stored in the file from a word processor.

EXAM TIP

Know how to clear a stalled application in the Windows environment.

Memorize the functions associated with the Alt+F4 key combination.

Know the function of the Dr. Watson utility and where its information is stored in the system.

CHALLENGE #2

You are using a number of different applications on a Windows 9x system, but when you open a spreadsheet program, it hangs up and the system will not do anything. What is the best method to safely restart the system and retain the information you have in the other open applications?

Refer to the "Challenge Solutions" section at the end of this chapter for the resolution to the challenge.

If an MS-DOS–based program is running and the system locks up, you must restore Windows 9x. To accomplish this task, attempt to restart the system from a cold boot. If the system starts in Windows 9x, check the Properties of the DOS application. You can obtain this information by locating the program through the My Computer or Windows Explorer interfaces, right-clicking on its filename, and selecting the Properties option from the pop-up menu.

From the Properties page, select the Programs tab and then click on the Advanced button to view the file's settings, as shown in Figure 10.2. If the application is not already set for MS-DOS mode operation, click the box to select it. Also, select the Prevent MS-DOS–Based Programs from Detecting Windows option. Return to the failing application to see whether it will run correctly in this environment.

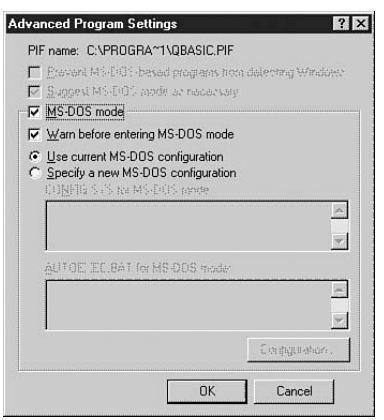

FIGURE 10.2
MS-DOS Program Properties.

Windows 98 occasionally produces the `Running out of resources` error message, which indicates that the operating system believes that it has exhausted all the system's real and virtual memory. Although the message tells you to correct the problem by shutting down applications, and it provides an endless series of application shutdown dialog boxes, this process almost never works. Even shutting down the applications through the Close Program dialog box does not restore the system. Therefore, you should shut down the system and restart it. This action normally clears the problem.

Windows 2000/XP Operating Problems

You should be aware of some typical symptoms that can pop up during the normal operation of the Windows 2000 or Windows XP operating system, including the following:

- A user cannot log on.
- You cannot recover an item that was deleted by another user.
- You cannot recover any deleted items.
- The video adapter supports higher resolution than the monitor does.
- You cannot find key files using Windows utilities.

When Windows 2000 or Windows XP is first installed, the only usable account is the *Administrator account*. The *Guest account* is disabled by default. Someone who has Administrator privileges must create any additional *user accounts*. Each user account is given a password and username. If a user cannot log on, check his or her password. The password is case sensitive, so verify that the Caps Lock key is not an issue. If you forget the Administrator password and have not created any other accounts with Administrator privileges, you must reinstall Windows 2000/XP.

You cannot recover an item that has been deleted by another user because the Recycle Bin is maintained on a user-by-user basis. If one user deletes something, only that user can recover it. You must log on as the user who deleted the items. Files and folders deleted from a floppy disk or network drive are permanently deleted and cannot be

EXAM TIP

Be aware that files deleted from remote and removable storage devices do not appear in the Recycle Bin.

recovered. After the Recycle Bin fills to capacity, any newly deleted file or folder causes older deleted items to be automatically removed from the Recycle Bin.

Troubleshooting Application Problems

One other major operational problem that affects operating systems involves the application programs running in the system. Recall that in the Microsoft world, if the application is a `.BAT`, `.EXE`, or `.COM` file, it should start when its name is properly entered on the command line. If such an application does not start in a command-line environment, you have a few basic possibilities to consider: The application has been improperly identified, it is not located where it is supposed to be, or the application program is corrupted.

Check the spelling of the filename and re-enter it at the command prompt. Also, verify that the path to the program has been presented correctly and thoroughly. If the path and filename are correct, the application may be corrupted. Reinstall the application and try to start it again.

Windows 9x/Me Application Problems

EXAM TIP

Be aware of the different methods of accessing an application's Properties.

As with other GUI-based environments, Windows 9x/Me applications hide behind icons. The Properties of each application's icon must correctly identify the filename and path of the application's executable file; otherwise, Windows cannot start it. Likewise, when a folder or file accessed by the icon or by the shortcut from the Windows 9x Start menu is moved, renamed, or removed, Windows cannot find it when asked to start the application. Check the application's Properties to verify that the filename, path, and syntax are correct. You can access an application's Properties by right-clicking on the application's desktop icon, as well as right-clicking its entry in the Start menu, My Computer page, or Windows Explorer screen.

Most applications require Registry entries to run. If these entries are missing or corrupt, the application will not start. In addition, Windows 9x/Me retains the DLL structure of its Windows 3.x predecessor under the `\Windows\System` directory. Corrupted or conflicting DLL files prevent applications from starting. To recover from these types of errors, you must reinstall the application.

Windows NT/2000/XP Application Problems

Windows 2000 and Windows XP may suffer the same types of application problems described for the Windows 9x/Me versions:

- Incorrect application properties (filename, path, and syntax)
- Missing or corrupt Registry entries
- Conflicting DLL files

EXAM TIP

Know what items to look for when applications do not start.

Because Windows NT, Windows 2000, and Windows XP are typically used in client/server networks, some typical administrative problems associated with files, folders, and printers can pop up during normal operations. These problems include the following:

- Users cannot gain access to folders.
- Users send a print job to the printer but cannot locate the document.
- Users complain that they can see files in a folder but cannot access any of the files.

A user's inability to gain access to folders can occur for many reasons. In the Windows NT/2000/XP environment, a user may not have permissions that enable him or her to access different files and folders. This is an administrative decision and can be overcome only by an administrator establishing permission levels that permit access.

If the print job is visible in the spooler but does not print, there is a good chance that a print job ahead of the current job has locked up and is blocking access to the printer because Windows executes print jobs in the order they are received. This symptom could also be caused by the printer availability hours being set for times other than when the user submitted the print job.

When users complain that they can see files in a folder but cannot access any of the files, they may have been assigned the List permission at the folder level. The List permission enables users to view only the contents of the folder, denying them all other permissions, including Read and Execute.

CHALLENGE #3

You have just installed a new Windows 2000 Professional operating system upgrade on a coworker's machine. In the process of testing it, you discover that her word processor application will not start from the desktop icon. How should you go about troubleshooting this problem?

Refer to the "Challenge Solutions" section at the end of this chapter for the resolution to the challenge.

Locating Hidden Files

By default, Windows 2000 and Windows XP hide known filename extensions. If you cannot see filename extensions, open the Windows Explorer, click on Tools, click on Folder Options, click on the View tab, and deselect the Hide File Extensions for Known Files option.

Likewise, Windows 2000/XP, by default, does not display hidden or system files in Explorer. To see hidden or system files, open the Windows Explorer, click on Tools, click on Folder Options, click on the View tab, and select the Show Hidden Files and Folders option, as illustrated in Figure 10.3.

EXAM TIP

Be aware that Windows 2000 and Windows XP do not show hidden and system files by default. Also, know how to display these file types from the Windows environment.

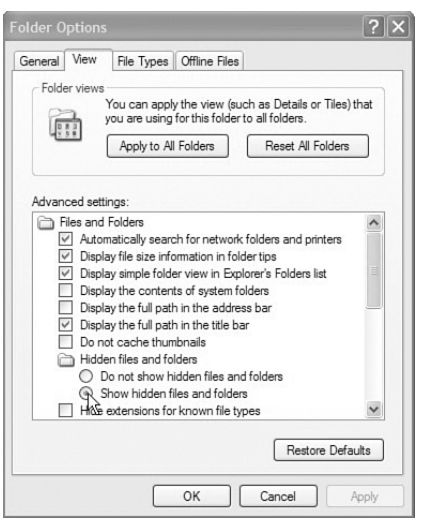

FIGURE 10.3
Selecting the Show Hidden Files and Folders option.

Applying Task Manager to Application Problems

In Windows 2000 and XP, the *Task Manager* can be used to monitor the condition and operation of application programs and key Windows operating system services and components. In these operating systems, the Task Manager is available at any time and can be accessed by pressing the Ctrl+Alt+Del key combination.

When the Task Manager appears, move to the Applications tab if it is not shown (in Windows 2000 and Windows XP, the Task Manager opens to the tab that was open when Task Manager was last closed—even after a reboot). This tab displays the applications that are currently running in the system along with a description of their status (that is, Running or Not Responding). When an application is present in this window and shows a Not Responding status, it has stalled and you should remove it. You can use this tab to remove these applications from the active system by highlighting the task and clicking the End Task Button.

You should consult the Task Manager's Processes tab if the system is running slow to determine whether an application is using more of the system's resources than it should. If the memory-usage number for a given application consistently grows, the application may have a programming problem known as a *memory leak*. Over time, memory leaks can absorb all the system's free memory and crash the system.

Applying Event Viewer to Application Problems

Although Blue Screen Stop errors are primarily associated with setup and configuration problems involving new hardware or software products, they can happen at any time. When they occur during the normal operation of a Windows NT/2000/XP system, you should restart the system and see whether the problems reoccur. When the system restarts, use the *Event Viewer* utility to look for the source of the problems.

The Windows 2000 and Windows XP application logs can be used to examine the operation of the higher-end applications and some operating system services. You can examine the contents of this log through the *Event Viewer* utility to determine what conditions the

system logged leading up to a failure, such as an application failing to start or stalling. As indicated in Chapter 5, the Event Viewer shows whether the application or service ran correctly or not. It may also indicate conditions you should take note of before they become failures.

Another indicator of application-related problems is the appearance of an `Event Log is full` error message. The event logs have a specified maximum file size that they can reach before they are considered full. By default, the event logs are set to overwrite any log data that is more than seven days old if they become full. Therefore, if events are occurring so quickly that the logs fill up before the default time, this indicates that an excessive number of system errors (events) is occurring. In addition, the Event Viewer stops logging events until the seven days have passed. You should examine the full event log to determine what activity is accounting for so many loggable events.

In the case of failure events, the system normally generates a user alert through a pop-up dialog box on the screen. The information in the box indicates the nature of the problem and refers you to the Event Viewer for details. You can access the Event Viewer by selecting Start, Programs, Administrative Tools, Event Viewer.

Using Dr. Watson

The main tool for isolating and correcting *General Protection Faults (GPFs)* is the *Dr. Watson* utility provided in all Windows versions. It is used to trace problems that appear under certain conditions, such as starting or using a certain application. When Dr. Watson is started, it runs in the background with only an icon appearing on the taskbar to signify that it is present. For a GPF that cannot be directly attributed to the Windows operating system, an application program may be the source of the problem, and the Dr. Watson utility should be set up to run in the background as the system operates.

As the system operates, the Dr. Watson utility monitors the code moving through the system and logs its key events in the `DRWATSON.LOG` file. When a system error occurs, the Dr. Watson log contains a listing of the events that were going on up to the time of the failure. This log provides programmers with a detailed listing of the events that led up to the failure. The information is automatically stored in the log file so that it can be provided to software

developers, or to Microsoft, so that they can debug their software and produce patches for it. In many cases, the program describes the nature of the error and possibly suggests a fix.

The Dr. Watson utility is not located in any of the Windows 98/Me or Windows 2000/XP menus. To use it, you must execute the program from the Start menu's Run option by typing the name `drwatson` in the Run dialog box and clicking on OK to start the log file. This causes the Dr. Watson icon to appear on the taskbar. You also can start Dr. Watson through the Tools menu in the System Information screen. You can access this option by selecting Programs, Accessories, System Tools.

EXAM TIP

Know which Windows utility can be used to monitor the operation of application packages and log errors so that they can be reported to software developers for repairing their programs.

Be aware of where the Dr. Watson utility is located and what it is used for.

WINDOWS-RELATED PRINTING PROBLEMS

In a Windows-based system, the Windows environment controls the printing function through its drivers. Check the printer driver using the Control Panel's Print applet to make certain that the correct driver is installed. Substitute the standard VGA driver and try to print a document.

Determine whether the Print option from the application's File menu is unavailable (gray). If so, check the Windows Control Panel, Printers window for correct parallel port settings. Make certain that the correct printer driver is selected for the printer being used. If no printer type or the wrong printer type is selected, simply set the desired printer as the default printer.

Check to see whether a printer switch box exists between the computer and the printer. If so, remove the print sharing equipment and connect the computer directly to the printer.

Troubleshooting Windows Printing Problems

If a printer is not producing anything in a Windows 9x/NT/2000/XP environment, even though print jobs have been sent to it, check the *print spooler* to see whether any particular type of error has occurred. To view documents waiting to be printed, double-click the desired

printer's icon. While viewing the print spooler queue, check to make certain that the printer has not been set to the Pause printing setting.

Return to the Printer folder, right-click the printer icon, click on Properties, and then select Details. From this point, select Spool Settings and select the Print Directly to the Printer option. If the print job goes through, there is a spooler problem. If not, the hardware and printer driver are suspect.

To check spooler problems, examine the system for adequate hard-disk space and memory. If the *Enhanced Metafile (EMF) Spooling* option is selected, disable it, clear the spooler, and try to print. To check the printer driver, right-click the printer icon, select the Properties option, and click on the Details option. Reload or upgrade the driver if necessary.

EXAM TIP

Remember how to test the operation of the Windows print spooler when the printer will not print.

If the printer operation stalls during the printing operation, some critical condition must have been reached to stop the printing process (that is, the system was running but stopped). Restart the system and try to print again. If the system still does not print, delete backed-up spool files (`.SPL` and `.TMP`) in the System\Spool\ Printers directory.

CHALLENGE #4

Your customer tells you that he has been sending files to the local printer, but nothing comes out. When you check the local print queue, you see the files sitting there and determine that they are not moving. What steps should you take to get the printer back into operation?

Refer to the "Challenge Solutions" section at the end of this chapter for the resolution to the challenge.

Troubleshooting Windows-Related Network Printing Problems

When printing cannot be carried out across the network, verify that the local computer and network printer are set up for remote

printing. In Windows, this task involves sharing the printer with the network users. The local computer that the printer is connected to, referred to as the *print server*, should appear in the Windows 9x Network Neighborhood window of the remote computer. If the local computer cannot see files and printers at the print server station, file and print sharing may not be enabled there.

EXAM TIP

Be aware that not having file and print sharing enabled prevents other computers on the network from "seeing" your computer across the network.

In Windows 9x/Me, you can enable file and printer sharing at the print server in a number of ways. First, double-click the printer's icon in the My Computer window or the Windows Explorer screen. Select the Printer, Properties, Sharing option and then choose the desired configuration. For the second method, right-click on the printer's icon, select Share from the context menu, and then choose the desired configuration. The final method is similar except that you right-click the printer's icon, click on Properties and Sharing, and then choose the configuration.

The print server may not have enough memory or hard-drive space available. In Windows 9x/Me systems, check the *spool settings*, shown in Figure 10.4, by opening the Control Panel; selecting Printers, Properties; and then selecting Details. If the spooler is set to EMF, set it to RAW spooling. If the print spool is set to RAW, turn off the spool by clicking the Print Directly to the Printer radio button. Then click the OK button and try to print a test page. If the unit prints the test page from the local print server, use the ScanDisk utility to check the disk space. Clear the contents of the `\Temp` directory.

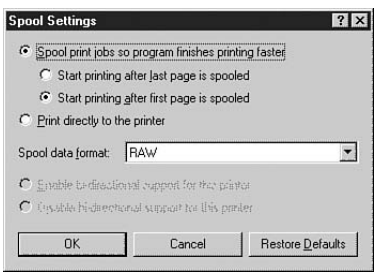

FIGURE 10.4
Windows 9x Spool Settings.

If the local print server operation is working correctly, verify the operation of the network by attempting to perform other network functions, such as transferring a file from the remote unit to the print server. In a client/server network, users at a remote client computer may not be able to print to a print server across the network due to insufficient permission settings. Check with the network administrator to verify that permissions are present to enable remote printing using the network.

In Windows 9x/Me, open the Control Panel's Printer folder on the remote computer, right-click on the desired printer, and select the Properties entry from the drop-down File menu. Check the printer's information under the Details and Sharing tabs. If this information appears to be correct, click the Print a Test Page button on the General tab of the printer's Properties page.

EXAM TIP

Know how to create a UNC path from a local computer to a remote printer or to a directory located on a remote computer.

If other network functions are operational, verify the printer operation of the remote computer. If possible, connect a printer directly to the local unit and set up its print driver to print to the local printer port. If the file prints to the local printer, a network/printer driver problem still exists. Reload the printer driver and check the network print path. The correct format for the *Universal Naming Convention (UNC)* network pathname is `\\computer_name\shared_ device_name`, as illustrated in Figure 10.5.

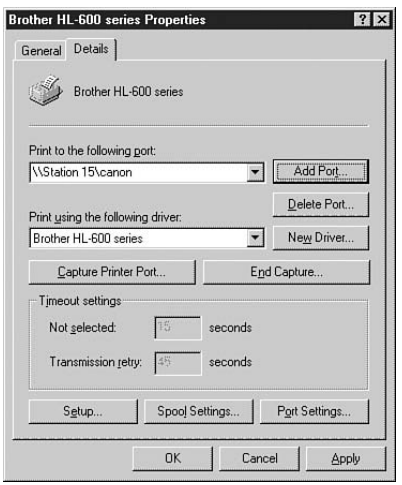

FIGURE 10.5
Checking the network printer path.

VIRUSES

Computer viruses are destructive programs designed to replicate and spread on their own. Viruses are created to sneak into personal computers. Sometimes these programs take control of a machine to leave a humorous message, and sometimes they destroy data. After they infiltrate one machine, they can spread into other computers through infected disks that friends and coworkers pass around, or through local and wide area network connections.

Common Viruses

There are basically three types of viruses, based on how they infect a computer system:

- *A boot-sector virus*—This type of virus copies itself onto the boot sector of floppy and hard disks. The virus replaces the disk's original boot-sector code with its own code. This allows it to be loaded into memory before anything else is loaded. Once in memory, the virus can spread to other disks.
- *A file infector*—This type of virus adds its virus code to executable files. After the file with the virus is executed, it spreads to other executable files. A similar type of virus, called a macro virus, hides in the macro programs of word processing document files. These files can be designed to load when the document is opened or when a certain key combination is entered. In addition, these types of viruses can be designed to stay resident in memory after the host program has been exited (similar to a TSR program) or may just stop working when the infected file is terminated.
- *A Trojan horse*—This type of virus pretends to be a legitimate program that could be found on any system. Trojan horse viruses are more likely to do damage by destroying files and can cause physical damage to disks.

A number of different viruses have been created from these three virus types. They have several different names, but they all inflict basically the same damage. After the virus file becomes active in the computer, it resides in memory when the system is running. From this point, it may perform a number of different types of operations that can be as complex and damaging as the author designs them to be.

As an example, a strain of boot-sector virus known as a *CMOS virus* infects the hard drive's master boot record and becomes memory resident. When activated, the virus writes over the system's configuration information in the CMOS area. Part of what is overwritten is the HDD and FDD information. Therefore, the system cannot boot up properly. The initial infection comes from booting from an infected floppy disk. The virus overwrites the CMOS once in every 60 bootups.

A similar boot-sector virus, referred to as a *FAT virus*, becomes memory resident in the area of system memory where the `IO.SYS` and `MSDOS.SYS` files are located. This way, it can spread to any non–write-protected disks inserted into the computer. In addition, the virus

moves the system pointers for the disk's executable files to an unused cluster and rewrites the pointers in the FAT to point to the sector where the virus is located. The result is improper disk copies, inability to back up files, large numbers of lost clusters, and all executable files being cross-linked with each other. Removing boot sector viruses can be difficult because one or more copies resident in RAM can re-infect files after the disk has been repartitioned and reformatted.

EXAM TIP

Know how the different types of viruses attack the system.

In another example, a file infector virus strain, called the *FAT table virus*, infects `.EXE` files but does not become memory resident. When the infected file is executed, the virus rewrites another `.EXE` file.

Likewise, *Terminate-and-Stay-Resident (TSR) viruses* create copies of themselves in system memory. Then they intercept system events such as a disk access and use this operation to infect files and sectors on the disk. In this manner, TSR viruses are active both when an infected program runs and after it terminates. Because the resident copy of these viruses remains viable in memory, even if all the infected files are deleted from disk, fully removing these viruses from the system is very difficult. Removing TSR viruses by restoring all the files from distribution disks or backup copies does not work well because a resident copy of the virus remains active in RAM and infects the newly created files.

Virus Symptoms

Because viruses tend to operate in the background, it is sometimes difficult to realize that the computer has been infected. Typical virus symptoms include the following:

- The hard-disk controller fails.
- Disks continue to be full even when you have deleted files.
- The system cannot read write-protected disks.
- The hard disk stops booting, and files are corrupted.
- The system boots to floppy disk but does not access the HDD.
- An `Invalid Drive Specification` message usually appears when you attempt to access the C: drive.

- CMOS settings continually revert to default even though the system board battery is good.
- Files change size for no apparent reason.
- System operation slows down noticeably.
- The screen remains blank (with a flashing cursor) when booting.
- Windows crashes.
- The hard drive is set to MS-DOS compatibility, and 32-bit file access suddenly stops working.
- Network data transfers and print jobs slow down dramatically.

Common practices that increase the odds of a machine being infected by a virus include use of shareware software, software of unknown origin, or bulletin board software. One of the most effective ways to reduce these avenues of infection is to buy shrink-wrapped products from a reputable source.

EXAM TIP

Know how viruses are spread.

Another means of virus protection involves installing a virus-scanning program that checks disks and files before you use them in the computer. If the computer is a standalone unit, it may be nonproductive to have the antivirus software run each time the system is booted up. It would be much more practical to have the program check floppy disks only because this is the only possible entry into the computer.

A networked or online computer has more opportunity to contract a virus than a standalone unit because viruses may enter the unit over the network or through the modem.

In all these cases, setting the antivirus software to run at each bootup is more desirable. Most modern antivirus software includes utilities to check files downloaded to the computer through dial-up connections, such as from the Internet. In particular, viruses are often contracted through infected email attachments that are opened when received. One step you can use to minimize this occurrence is to turn off the preview pane of the email reader to prevent inadvertent execution of an email-borne virus. Another practice to help prevent this situation from occurring is not to open email that you are not expecting or that you do not have a reasonable expectation of knowing what is in it.

With Windows 95, Microsoft abandoned integrated antivirus protection. Therefore, you must use third-party antivirus programs with Windows 9x/Me and Windows NT/2000/XP operating systems.

CHALLENGE #5

A customer calls you to her site complaining that the wide-carriage dot-matrix printer in the accounting department is running very slowly and that she cannot print all her invoices for today's shipping purposes. When you check the customer's print queue, you see that the print jobs for the invoices are stacked up in the queue but that they are being processed. The accounting manager tells you that she typically doesn't have any problems printing her invoices and that nothing out of the ordinary has been done to the computer to make it slow down. What items should you check to determine the cause of the slowdown?

Refer to the "Challenge Solutions" section at the end of this chapter for the resolution to the challenge.

CHAPTER SUMMARY

This chapter contained material concerning typical operational problems associated with Microsoft operating systems. Once again, Windows 9x/Me and Windows NT/2000/XP systems were discussed, and typical error messages and symptoms were related to probable causes for both types of systems. An extended discussion of Windows utilities was presented in this section as well.

The second section of the chapter was dedicated to printing problems associated with the different Windows operating systems. Specific types of printing problems were presented, along with procedures for correcting them.

The final topic the chapter dealt with was computer viruses. Different types of viruses were described, along with ways to protect computer systems against them.

At this point, review the objectives listed at the beginning of the chapter to be certain that you understand each point and can perform each task listed there. Afterward, answer the review questions that follow to verify your knowledge of the information.

KEY TERMS

- Application Compatibility Toolkit (ACT)
- Blue Screen of Death (BSOD)
- Boot-sector virus
- CANREGW
- CHKDSK
- Close Program dialog box
- CMOS virus
- Computer viruses
- CVT1.EXE
- Dr. Watson

CHAPTER SUMMARY

- Drive Converter (FAT32)
- Dynamic link library (DLL)
- Enhanced Metafile (EMF) Spooling
- Event Viewer
- FAT table
- FAT virus
- File infector
- General Protection Faults (GPFs)
- Login problems
- MEMMAKER
- Spool settings
- Task Manager
- Taskbar
- Terminate-and-Stay-Resident (TSR) viruses
- Trojan horse
- Universal Naming Convention (UNC)
- Windows Explorer

APPLY YOUR KNOWLEDGE

Review Questions

1. What are the possible reasons that a user could log in to his or her Internet account yesterday, but it won't work today? (Select all that apply.)

   A. The password has expired.

   B. incorrect username or password

   C. failure to pay fee

   D. thunderstorm

2. The _____ process provides more efficient and faster operation of your system.

   A. ScanDisk

   B. defragmentation

   C. CHKDSK

   D. backup

3. What part does the hard-disk drive play in Windows 9x memory management?

   A. The page file is located on the hard-disk drive.

   B. Real memory storage is located on the hard-disk drive.

   C. The memory registers are located on the hard-disk drive.

   D. The swap file is located on the hard-disk drive.

4. Which command-line utility can be used to convert the disk-drive file system from FAT to FAT32?

   A. `CNVRT1.EXE`

   B. `CONVERT.EXT`

   C. `CVT1.EXE`

   D. `CONVTER.EXE`

5. How is a stalled application cleared in the Windows 9x environment?

   A. Press Ctrl+Alt+Del and select Task Manager, highlight all nonresponding applications, and click on End Task.

   B. Press Ctrl+Alt+Del and close all nonresponding applications.

   C. Select Start, Settings, Control Panel, Add-Remove Programs; select the offending program; and then click on Remove.

   D. Select Start, Programs, Accessories, System Tools, System Manager and close all nonresponding applications.

6. What are the two possible functions associated with the Alt+F4 key combination?

   A. Stop an application or open the Shut Down Windows menu.

   B. Stop an application or restart the computer.

   C. Open the Close Program window or open the Shut Down Windows menu.

   D. Switch the active window or open the Shut Down Windows menu.

7. What is the function of the Dr. Watson utility?

   A. It analyzes system failures.

   B. It analyzes virus activity.

   C. It detects and logs an application failure.

   D. It detects and logs unauthorized user access.

APPLY YOUR KNOWLEDGE

8. Where is the Dr. Watson utility information stored in the system?

   A. `\Windows\Drwatson\*.WLG`

   B. `\Drwatson\*.WLG`

   C. `\Program Files\Drwatson\*.WLG`

   D. `\Windows\System\Drwatson\*.WLG`

9. What happens to information that was deleted from removable media?

   A. It is deleted from the file system.

   B. It is moved into the Recycle Bin.

   C. It is relocated to the System Backup directory.

   D. The file is archived and held for later deletion.

10. What are the various methods of launching an application in the Windows environment? (Select all that apply.)

    A. Select Start, Programs; select the application's entry; and then select the shortcut to the executable file.

    B. Select Start, Run; enter the full path and filename to the executable file; and then click on the OK button.

    C. Browse to the application's folder in Windows Explorer and then double-click the application's executable file.

    D. Browse to the application's folder in Windows Explorer, click on the executable file to highlight it, and then click on the Edit menu and select the Open option.

11. The _____ in Windows 2000 and Windows XP can be used to remove nonfunctioning applications from the system.

    A. Close Program tool

    B. Task Manager tool

    C. Close Application tool

    D. Computer Management tool

12. How are hidden and system files displayed in the Windows 2000 environment?

    A. Select Start, Settings, Control Panel, System, Folder Options, View and then select the Show Hidden Files and Folders option.

    B. Open Windows Explorer; select Tools, Folder Options; and then select the Show Hidden Files and Folders option.

    C. Select Start, Programs, Accessories, System Tools, Folder Options, View and then select the Show Hidden Files and Folders option.

    D. Open Windows Explorer; select Tools, Folder Options, View; and then select the Show Hidden Files and Folders option.

13. Which Windows 9x utility can be used to monitor the operation of application packages and log any errors?

    A. ScanDisk

    B. Report Tool

    C. Conflict Manager

    D. Dr. Watson

14. Where is the Dr. Watson utility?

    A. Select Start, Programs, Accessories, System Tools and then select Dr. Watson.

    B. Select Start, Settings, Control Panel, Administrative Tools and then double-click Dr. Watson.

APPLY YOUR KNOWLEDGE

C. Select Start, Programs, Accessories, System Tools; select System Information; click on the Tools menu; and then select Dr. Watson.

D. Select Start, Programs, Accessories and then select Dr. Watson.

15. How do you test the operation of the Windows 9x print spooler when the printer will not print?

A. Select Start, Settings, Printers; right-click on the printer icon and select Properties; then click on the Print Test Page button.

B. Select Start, Settings, Printers; click on the printer icon to highlight it; click on the File menu and select Properties; then click on the Print Test Page button.

C. Select Start, Settings, Printers; right-click on the printer icon and select Properties; click on the Details button; select Spool Settings; and then select the Print Directly to Printer option.

D. Select Start, Settings, Printers; right-click on the printer icon and select Properties; click on the Advanced tab; and then select the Print Directly to Printer option.

16. What is a common reason for not seeing a remote printer in the Windows 9x Network Neighborhood?

A. inadequate access rights

B. file and printer sharing not enabled on the remote computer

C. improper printer name

D. no driver loaded

17. How is a UNC path created from a local computer to a remote printer or to a directory located on a remote computer?

A. `//shared_resource_name`

B. `//computer_name/shared_resource_name`

C. `\\shared_resource_name`

D. `\\computer_name\shared_resource_name`

18. How does a Trojan horse virus attack a system?

A. It replaces a disk's original boot-sector code.

B. Code is added to a legitimate program.

C. It appears to be a normal program.

D. The attack occurs when a document is opened.

19. Which of the following represents the least likely method to spread computer viruses?

A. by installing downloaded software

B. by sending Microsoft Word documents through email

C. by installing shrink-wrapped commercial software

D. by transferring a file via a floppy disk

20. How can you optimize a Windows system to improve drive access times and virtual memory performance?

A. Run the ScanDisk utility.

B. Run the Cleanup utility to improve free disk space.

C. Defrag the drive.

D. Convert the file system to FAT16.

APPLY YOUR KNOWLEDGE

21. What types of deleted files do not appear in the Recycle Bin? (Select two answers.)

    A. System files

    B. Files from remote devices

    C. Files from removable storage devices

    D. Hidden files

22. When applications do not start in Windows, what items should you look for? (Select all that apply.)

    A. Conflicting DLL files

    B. Incorrect application properties

    C. Missing or corrupt Registry entries

    D. Incompatibility with the installed operating system

23. What happens when the Ctrl+Alt+Del keys are pressed twice in a Windows 9x system?

    A The computer shuts down immediately.

    B. The computer restarts automatically.

    C. The Close Program window opens.

    D. The current application shuts down immediately.

24. How does a macro virus attack a system?

    A. It replaces a disk's original boot-sector code.

    B. It adds code to a legitimate program.

    C. It appears to be a normal program.

    D. An attack occurs when an infected document is opened.

Answers and Explanations

1. **B**, **C**. Internet accounts are based on the user's account name and password, which the ISP asks for each time the user logs on to the account. Forgetting or misspelling either item results in the ISP rejecting access to the Internet. Most accounts are paid monthly. If the account isn't paid up, the ISP may cancel the account and deny access to the user. In either of these situations, if the user attempts to log on to the account, he or she is repeatedly asked to enter his or her account name and password until a predetermined number of failed attempts has been reached.

2. **B**. Because fragmented files do not provide for efficient reading by the drive, completing multisector read operations takes longer. The defragmentation program realigns the positioning of related file clusters to speed up the operation of drive access operations.

3. **D**. A heavily used, heavily fragmented hard drive can affect the system's virtual memory (in particular, the swap file) and produce memory shortages as well.

4. **C**. You can free additional space by converting a FAT16 drive to a FAT32 drive using the `CVT1.EXE` command-line utility. The smaller sector clustering arrangement available through FAT32 frees wasted space on the drive.

5. **B**. If the system locks up, or an application stalls, you often can regain access to the Close Program dialog box by pressing the Ctrl+Alt+Del key combination. After the Close Program dialog box appears, you can close the offending application and continue operating the system without rebooting.

APPLY YOUR KNOWLEDGE

6. **A**. The Alt+F4 key combination can be used to close active windows. Pressing this key combination in an application stops the application and moves to the next active application in the task list. If the Alt+F4 combination is pressed when no applications are active, the Shut Down Windows menu appears on the display. Using it, you can shut down or restart the system in an orderly fashion.

7. **C**. The Dr. Watson utility proves useful in detecting application faults. When activated, Dr. Watson intercepts the software actions, detects the failure, identifies the application, and provides a detailed description of the failure.

8. **A**. The Dr. Watson information is automatically transferred to the disk drive and stored in the `\Windows\Drwatson\*.WLG` file. You can view and print the information stored in the file from a word processor.

9. **A**. In the case of removable media, such as floppy disks and removable hard drives, the Recycle Bin does not retain the files deleted from these media. When a file or folder is removed from one of these devices, the file information is deleted directly from the file system.

10. **A**, **B**, **C**. There are several acceptable methods of launching an application in the Windows environment. They include the following: From the Start menu, select the Applications entry, click on the folder where the desired application is located, and double-click its filename; from the Start menu, select the Run entry, and then enter the full path and filename for the desired executable file; double-click the application's filename in Windows Explorer or in My Computer; click on the File menu option from the menu bar in My Computer or Windows Explorer, and select the Open option; right-click on the application and choose Open.

11. **B**. In Windows NT, Windows 2000, and Windows XP, the Close Program dialog has been replaced by the Task Manager. You can use this utility to determine which applications in the system are running or stopped, as well as which resources are being used. You can also determine the general microprocessor and memory-usage levels. A nonfunctioning application can be removed using Task Manager in Windows 2000 and XP.

12. **D**. To see hidden or system files, open the Windows Explorer, click on Tools, click on Folder Options, click on the View tab, and select the Show Hidden Files and Folders option. These files are not shown by default.

13. **D**. The Dr. Watson utility provided in all Windows versions is used to trace problems that appear under certain conditions, such as starting or using a certain application. When Dr. Watson is started, it runs in the background with only an icon appearing on the taskbar to signify that it is present. As the system operates, the Dr. Watson utility monitors the code moving through the system and logs its key events in the `DRWATSON.LOG` file.

14. **C**. Dr. Watson can also be started through the Tools menu in the System Information screen. You can access this option by selecting Programs, Accessories, System Tools.

15. **C**. To test the Printer spooler, access the Printer folder by selecting Start, Settings, Printers; right-click the printer's icon; click on Properties;

APPLY YOUR KNOWLEDGE

and then select Details. From this point, select Spool Settings and select the Print Directly to the Printer option. If the print job goes through, there is a spooler problem. If not, the hardware and printer driver are suspect.

16. **B**. When printing cannot be carried out across the network, verify that the local computer and network printer are set up for remote printing. In Windows, this task involves sharing the printer with the network users. The local computer that the printer is connected to (referred to as the print server) should appear in the Windows 9x Network Neighborhood window of the remote computer. If the local computer cannot see files and printers at the print server station, file and print sharing may not be enabled there.

17. **D**. The correct format for the UNC network path to a shared network device is `\\computer_name\shared_resource_name`.

18. **C**. A Trojan horse pretends to be a legitimate program that could be found on any system. Trojan horse viruses are more likely to do damage by destroying files and can cause physical damage to disks.

19. **C**. Common practices that increase the odds of a machine being infected by a virus include use of shareware software, software of unknown origin, or bulletin board software. One of the most effective ways to reduce these avenues of infection is to buy shrink-wrapped products from a reputable source.

20. **C**. You should run the Defrag utility to optimize the storage patterns on the drive and thus improve read/write times and virtual memory performance.

21. **B**, **C**. Files and folders deleted from a floppy disk or network drive are permanently deleted and cannot be recovered.

22. **A**, **B**, **C**. Windows 9x, Me, 2000, and XP can all suffer from application problems such as incorrect application properties (filename, path, and syntax), missing or corrupt Registry entries, and conflicting DLL files.

23. **A**. To recover from conditions in which you cannot control the Windows 9x operating system properly, press the Ctrl+Alt+Del combination to access the Close Programs dialog box and shut down the system in a proper manner. If you cannot use the mouse, pressing the Ctrl+Alt+Del combination again immediately shuts down the operating system and any unsaved data in other open applications.

24. **D**. A macro virus hides in the macro programs of word processing document files. These files can be designed to load when the document is opened or when a certain key combination is entered. In addition, these types of viruses can be designed to stay resident in memory after the host program has been exited (similar to a TSR program), or they might just stop working when the infected file is terminated.

APPLY YOUR KNOWLEDGE

Challenge Solutions

1. To correct this problem under the Windows 2000 system, you should select the VGA Mode option to gain access to the video configuration by loading a standard VGA driver. This action causes Windows to start the system normally using the standard VGA video driver, enabling you to then change the display properties of the video card.

2. If the system locks up or an application stalls, you often can regain access to the Close Program dialog box by pressing the Ctrl+Alt+Del key combination. When the Close Program dialog box appears, you can close the offending application and continue operating the system without rebooting. Pressing the Ctrl+Alt+Del key combination twice will restart the system, but the unsaved information in the other open applications will be lost.

3. In Windows, the properties of each icon must correctly identify the filename and path of the application's executable file. If not, Windows cannot start the application. If the folder or file containing the executable is moved, renamed, or removed in the upgrade, Windows cannot find it when asked to start the application. Check the application's Properties to verify that its filename, path, and syntax are correct. You can access an application's Properties by right-clicking on its desktop icon, as well as right-clicking its entry in the Start menu, My Computer page, or Windows Explorer screen.

   One of the application's core files, such as a DLL, could have been erased or become corrupted in the upgrade. In this case, you would need to reinstall the application.

4. Begin by making sure that the printer is not in an offline condition and that the physical connection is correct. Next, change the settings in the Printer Properties page so that it prints directly to the port, instead of to the spooler. If the information begins moving to the printer, reinstall the printer driver. This should reset the spooler in the process. Other options for repairing the spooler include extracting the spooler files from the Windows distribution CD or simply reinstalling the operating system.

5. This system shows classic symptoms of a virus infection. The virus is using excessive amounts of memory, slowing down the computer's operation. The other possible cause of this symptom is a nearly full hard drive. The lack of disk-drive space for the print spooler and other temporary files caused by either of these situations makes it difficult for the system to process information for the printer. Check the hard drive's Temporary folder for `.TMP` files that have accumulated there.

APPLY YOUR KNOWLEDGE

Suggested Readings and Resources

1. General Protection Faults

   http://support.microsoft.com/default.aspx?scid=kb;EN-US;q82710

2. Fatal Exception Error

   http://support.microsoft.com/default.aspx?scid=kb;en-us;Q150314

3. Converting from FAT to FAT32

   http://www.happytech.net/Articles/KenWincel/Fat32Info.htm

4. Ctrl+Alt+Del

   http://www.atlguide2000.com/eng/win2k/ctrldel.htm

5. Locating Hidden Files

   http://digital.ni.com/public.nsf/websearch/42c48f8709e53ce886256b6d006334d7?OpenDocument

6. Microsoft's Super Hidden Files

   http://netsecurity.about.com/library/weekly/aa020402a.htm

7. Windows 2000 Task Manager

   http://www.labmice.net/troubleshooting/taskmgr.htm

8. Windows-Related Printing Problems

   http://www.michigan.gov/sos/1,1607,7-127-1633_11976_12001-31042—CI,00.html

9. Troubleshooting Network Printing

   http://www.iup.edu/helpdesk/service/pc/network/netprint.shtm

10. Symantec Antivirus Center

    http://www.symantec.com/avcenter/

11. Boot-Sector Virus

    http://www.itsecurity.com/asktecs/jul2101.htm

12. Method to Detect a Boot-Sector Virus in Windows

    http://support.microsoft.com/default.aspx?scid=kb;EN-US;q82923

13. Trojan

    http://www.xtra.co.nz/help/0,,5739-544116,00.html