



Preventive Maintenance and Troubleshooting

By [Cisco Networking Academy](#).

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Contents

1. [Objectives](#)
2. [Key Terms](#)
3. [Introduction \(4.0\)](#)
4. [Preventive Maintenance \(4.1\)](#)
5. [Troubleshooting Process \(4.2\)](#)
6. [Summary \(4.3\)](#)
7. [Practice](#)
8. [Check Your Understanding Questions](#)

Chapter Description

In this sample chapter from *IT Essentials Companion Guide v7* for Cisco Networking Academy, you will learn about the many benefits of conducting preventive maintenance for both hardware and software.

From the Book



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Troubleshooting Process (4.2)

Troubleshooting is a systematic process used to locate the cause of a fault in a computer system and correct the relevant hardware and software issues. Approaching problem solving using a logical and methodical approach is essential to successful resolution. Although experience is very useful to problem solving, following a troubleshooting model will enhance effectiveness and speed.

Troubleshooting Process Steps (4.2.1)

In this section, you will learn that to troubleshoot a problem quickly and effectively, you need to understand how to approach the issue. Troubleshooting is a way of discovering what is causing a problem and fixing it.

Introduction to Troubleshooting (4.2.1.1)

Troubleshooting requires an organized and logical approach to problems with computers and other components. Sometimes issues arise during preventive maintenance. At other times, customers may contact you with problems. Taking a logical approach to troubleshooting allows you to eliminate variables and identify causes of problems in a systematic order. Asking the right questions, testing the right hardware, and examining the right data helps you understand the problem and form a proposed solution.

Troubleshooting is a skill that you refine over time. Each time you solve a problem, you increase your troubleshooting skills by gaining more experience. You learn how and when to combine steps, or skip steps, to reach a solution quickly. The troubleshooting process is

a guideline that is modified to fit your needs.

This section presents an approach to problem solving that you can apply to both hardware and software.

NOTE

The term *customer*, as used in this book, refers to any user who requires technical computer assistance.

Before you begin troubleshooting problems, always follow the necessary precautions to protect data on a computer. Some repairs, such as replacing a hard drive or reinstalling an operating system, might put the data on the computer at risk. Make sure you do everything possible to prevent data loss while attempting repairs. If your work results in data loss for the customer, you or your company could be held liable.

Data Backup

A **data backup** is a copy of the data on a computer hard drive that is saved to another storage device or to cloud storage. **Cloud storage** is online storage that is accessed via the Internet. In an organization, backups may be performed on a daily, weekly, or monthly basis.

If you are unsure about whether a backup has been done, do not attempt any troubleshooting activities until you check with the customer. Here is a list of items to verify with the customer regarding whether a backup has been performed:

- Date of the last backup
- Contents of the backup
- Data integrity of the backup
- Availability of all backup media for a data restore

If the customer does not have a current backup and you are not able to create one, ask the customer to sign a liability release form. A liability release form contains at least the following information:

- Permission to work on the computer without having a current backup available
- Release from liability if data is lost or corrupted
- Description of the work to be performed

Troubleshooting Process Steps (4.2.1.2)

The **troubleshooting process steps** are as follows:

- Step 1.** Identify the problem.
- Step 2.** Establish a theory of probable cause.
- Step 3.** Test the theory to determine the cause.
- Step 4.** Establish a plan of action to resolve the problem and implement the solution.
- Step 5.** Verify full system functionality and, if applicable, implement preventive measures.
- Step 6.** Document findings, actions, and outcomes.

Identify the Problem (4.2.1.3)

The first step in the troubleshooting process is to identify the problem. During this step, gather as much information as possible from the customer and from the computer.

Conversation Etiquette

When you are talking to a customer, follow these guidelines:

- Ask direct questions to gather information.
- Do not use industry jargon.

- Do not talk down to the customer.
- Do not insult the customer.
- Do not accuse the customer of causing the problem.

Table 4-1 lists some of the information to gather from the customer.

Table 4-1 Step 1: Identify the Problem

Customer information	• Company name
	• Contact name
	• Address
	• Phone number
Computer configuration	• Manufacturer and model
	• Operating system
	• Network environment
	• Connection type
Problem description	• Open-ended questions
	• Closed-ended questions
Error messages	
Beep sequences	
LEDs	
POST	

Open-Ended and Closed-Ended Questions

Open-ended questions allow customers to explain the details of the problem in their own words. Use open-ended questions to obtain general information.

Based on the information from the customer, you can proceed with **closed-ended questions**. A closed-ended questions generally requires a yes or no answer.

Documenting Responses

Document the information from the customer in the work order, in the repair log, and in your repair journal. Write down anything that you think might be important for you or another technician. The small details often lead to the solution of a difficult or complicated problem.

Beep Codes

Each BIOS manufacturer has a unique beep sequence, a combination of long and short beeps, for hardware failures. When troubleshooting, power on the computer and listen. As the system proceeds through the POST, most computers emit one beep to indicate that the system is booting properly. If there is an error, you might hear multiple beeps. Document the beep code sequence and research the code to determine the specific problem.

BIOS Information

If the computer boots and stops after the POST, investigate the BIOS settings. A device might not be detected or configured properly. Refer to the motherboard documentation to ensure that the BIOS settings are correct.

Event Viewer

When system, user, or software errors occur on a computer running Windows, the Event Viewer is updated with information about the errors. The **Event Viewer**, shown in [Figure 4-2](#), records the following information about the problem:

- What problem occurred
- The date and time of the problem
- The severity of the problem
- The source of the problem
- The event ID number
- Which user was logged in when the problem occurred



Figure 4-2 Event Viewer

Although the Event Viewer lists details about an error, you might need to further research the problem to determine a solution.

Device Manager

The **Device Manager**, shown in [Figure 4-3](#), displays all the devices that are configured on a computer. The operating system flags the devices that are not operating correctly with an error icon. A yellow triangle with an exclamation point indicates that the device is in a problem state. A red X means that the device is disabled or removed or that Windows can't locate the device. An downward-pointing arrow means the device has been disabled. A yellow question mark indicates that the system does not know which driver to install for the hardware.

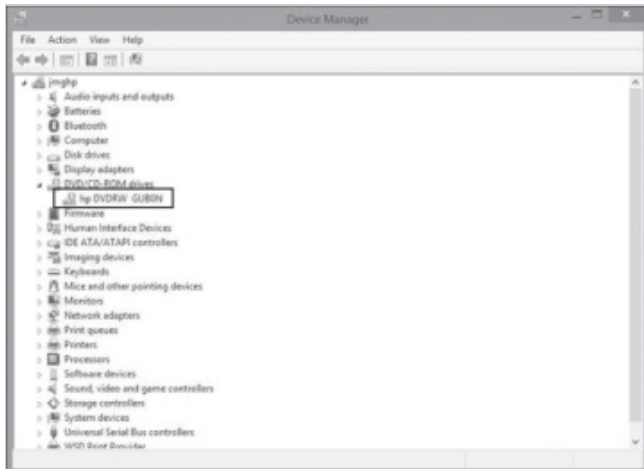


Figure 4-3 Device Manager

Task Manager

The **Task Manager**, shown in [Figure 4-4](#), displays the applications and background processes that are currently running. With the Task Manager, you can close applications that have stopped responding. You can also monitor the performance of the CPU and virtual memory, view all processes that are currently running, and view information about the network connections.

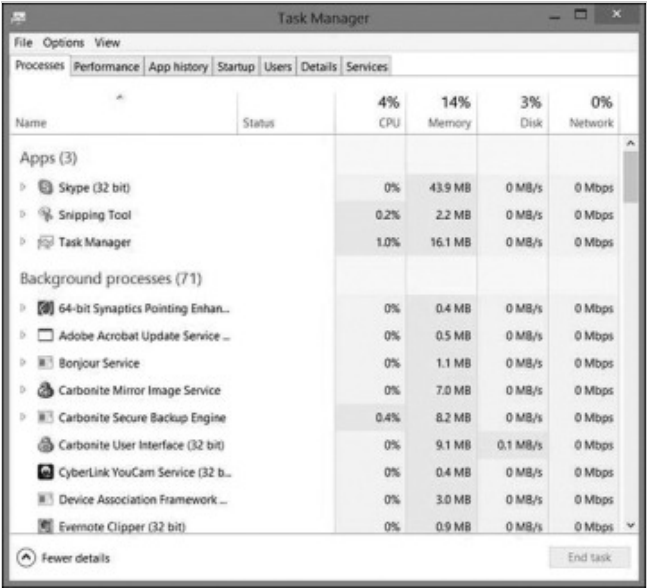


Figure 4-4 Task Manager

Diagnostic Tools

Conduct research to determine what software is available to help diagnose and solve problems. Many programs can help you troubleshoot hardware. Manufacturers of system hardware usually provide diagnostic tools of their own. For instance, a hard drive manufacturer might provide a tool to boot the computer and diagnose why the hard drive does not start the operating system.

CHECK YOUR UNDERSTANDING 4.2.1.4: IDENTIFY THE PROBLEM



Refer to the online course to complete this activity.

Establish a Theory of Probable Cause (4.2.1.5)

The second step in the troubleshooting process is to establish a theory of probable cause. First, create a list of the most common reasons for the error. Even if the customer thinks there is a major problem, start with the obvious issues before moving to more complex diagnoses, as outlined here:

1. Check whether the device is powered off.
2. Determine whether the power switch for an outlet is turned off.
3. Check whether the surge protector is turned off.
4. Ensure that there are no loose external cable connections.
5. Check whether there is a non-bootable disk in the designated boot drive.
6. Look for the incorrect boot order in the BIOS setup.

List the easiest or most obvious causes at the top. List the more complex causes at the bottom. If necessary, conduct internal (logs, journal) or external (internet) research based on the symptoms. The next steps of the troubleshooting process involve testing each

possible cause.

Test the Theory to Determine the Cause (4.2.1.6)

You can determine an exact cause by testing your theories of probable causes one at a time, starting with the quickest and easiest. Some common steps to determine the cause of the problem are as follows:

1. Ensure that the device is powered on.
2. Ensure that the power switch for an outlet is turned on.
3. Ensure that the surge protector is turned on.
4. Ensure that external cable connections are secure.
5. Ensure that the designated boot drive is bootable.
6. Verify the boot order in the BIOS setup.

Once the theory is confirmed, you can determine the steps to resolve the problem. As you become more experienced at troubleshooting computers, you will work through the steps in the process faster. For now, practice each step to better understand the troubleshooting process.

If you cannot determine the exact cause of a problem after testing all your theories, establish a new theory of probable cause and test it. If necessary, escalate the problem to a technician with more experience. Before you escalate, document each test that you tried, as shown in [Figure 4-5](#).

Work Order

Company Name: Cisco Systems, Inc.
Contact: Office Manager
Company Address: 170 West Tasman Drive, San Jose, CA 95134
Company Phone: 408-526-4000

Generating a New Ticket

Category: HW Code: Status: OPEN
Type: Laptop Business Impacting: ☐ Yes ☒ No Pending: Pending
Item: Laptop Pending Until Date:
Summary: Won't Boot
Case ID: Cisco001 Connection Type: Wireless network connection
Priority: Medium Environment: Mobile
User Platform: Windows 7

Problem Description
User complains that the laptop won't boot up.
No software was added recently. No operating system changes have been made.
No peripherals have been added.

Problem Solution
Repairs attempted:
Replaced AC adapter
Resealed the battery

Figure 4-5 Work Order

Establish a Plan of Action to Resolve the Problem and Implement the Solution (4.2.1.7)

After you have determined the exact cause of the problem, establish a plan of action to resolve the problem and implement the solution. Sometimes quick procedures can correct the problem. If a quick procedure does correct the problem, verify full system functionality and, if applicable, implement preventive measures. If a quick procedure does not correct the problem, research the problem further and then return to Step 2 to establish a new theory of the probable cause.

NOTE

Always consider corporate policies, procedures, and impacts before implementing any changes.

After you have established a plan of action, you should research possible solutions such as the following:

- Help desk repair logs
- Other technicians
- Manufacturer FAQs

- Technical websites
- News groups
- Computer manuals
- Device manuals
- Online forums
- Internet search

Divide large problems into smaller problems that can be analyzed and solved individually. Prioritize solutions starting with the easiest and fastest to implement. Create a list of possible solutions and implement them one at a time. If you implement a possible solution and it does not correct the problem, reverse the action you just took and then try another solution. Continue this process until you have found the appropriate solution.

Verify Full Functionality and, if Applicable, Implement Preventive Measures (4.2.1.8)

After the repairs to the computer have been completed, continue the troubleshooting process by verifying full system functionality and implementing the preventive measures needed, as outlined here:

1. Reboot the computer.
2. Ensure that multiple applications work properly.
3. Verify network and Internet connections.
4. Print a document from one application.
5. Ensure that all attached devices work properly.
6. Ensure that no error messages are received.

Verifying full system functionality confirms that you have solved the original problem and ensures that you have not created another problem while repairing the computer. Whenever possible, have the customer verify the solution and system functionality.

Document Findings, Actions, and Outcomes (4.2.1.9)

After the repairs to the computer have been completed, finish the troubleshooting process with the customer. Explain the problem and the solution to the customer verbally and in writing. The steps to take when you have finished a repair are as follows:

1. Discuss the solution implemented with the customer.
2. Have the customer verify that the problem has been solved.
3. Provide the customer with all paperwork.
4. Document the steps taken to solve the problem in the work order and in the technician's journal.
5. Document any components used in the repair.
6. Document the amount of time spent on resolving the problem.

Verify the solution with the customer. If the customer is available, demonstrate how the solution has corrected the computer problem. Have the customer test the solution and try to reproduce the problem. When the customer can verify that the problem has been resolved, you can complete the documentation for the repair in the work order and in your journal. Include the following information in the documentation:

- Description of the problem
- Steps to resolve the problem
- Components used in the repair

CHECK YOUR UNDERSTANDING 4.2.1.10: NUMBER THE STEPS



Refer to the online course to complete this activity.

Common Problems and Solutions for PCs (4.2.2)

As a technician, you will run into technical problems in your day-to-day routine that need your attention. As the issues arise, take the time to better understand the causes of problems and work through possible fixes. Be sure to document all that you do. This section discusses several common PC problems and suggested solutions.

PC Common Problems and Solutions (4.2.2.1)

Computer problems can be attributed to hardware, software, networks, or some combination of the three. You will resolve some types of problems more often than others.

Some common hardware problems are as follows:

- **Storage device:** Storage device problems are often related to loose or incorrect cable connections, incorrect drive and media formats, and incorrect jumper and BIOS settings.
- **Motherboard and internal components:** Motherboard and internal component problems are often caused by incorrect or loose cables, failed components, incorrect drivers, and corrupted updates.
- **Power supply:** Power problems are often caused by a faulty power supply, loose connections, and inadequate wattage.
- **CPU and memory:** Processor and memory problems are often caused by faulty installations, incorrect BIOS settings, inadequate cooling and ventilation, and compatibility issues.
- **Displays:** Display problems are often caused by incorrect settings, loose connections, and incorrect or corrupted drivers.

Common Problems and Solutions for Storage Devices (4.2.2.2)

Table 4-2 shows the probable causes and possible solutions for storage devices.

Table 4-2 Common Problems and Solutions for Storage Devices

Identify the Problem	Probable Causes	Possible Solutions
	The power cable is loose.	Secure the power cable.
	The data cable is loose.	Secure the data cable.
The computer does not recognize a storage device.	The jumpers are set incorrectly.	Reset the jumpers.
	A storage device failed.	Replace the storage device.
	The storage device settings in BIOS are incorrect.	Reset the storage device settings in BIOS.

The computer does not recognize an optical disc.	The disc is inserted upside down.	Insert the disc correctly.
	There is more than one disc inserted in the drive.	Ensure that there is only one disc inserted in the drive.
	The disc is damaged.	Replace the disc.
	A disc is the wrong format.	Use the correct type of disc.
The computer will not eject an optical disc.	The optical drive is faulty.	Replace the optical drive.
	The optical drive is jammed.	Insert a pin in the small hole next to the eject button on the drive to open the drive.
	The optical drive has been locked by software.	Reboot the computer.
	The optical drive is faulty.	Replace the optical drive.
The computer does not recognize a removable external drive.	The removable external drive cable is not seated properly.	Remove and re-insert the drive cable.
	The external ports are disabled in the BIOS settings.	Enable the ports in the BIOS settings.
	The removable external drive is faulty.	Replace the removable external drive.
A media reader cannot read a memory card that works properly.	The media reader does not support the memory card type.	Use a different memory card type.
	The media reader is not connected correctly.	Ensure that the media reader is connected correctly in the computer.
	The media reader is not configured properly in the BIOS settings.	Reconfigure the media reader in the BIOS settings.
	The media reader is faulty.	Install a known good media reader.
	The motherboard does not support USB 3.0 or 3.1.	Replace the motherboard with a USB 3.0-capable motherboard or add a USB 3.0 expansion card.
Retrieving or saving data from the USB flash drive is slow.	The USB Flash drive might be	

connected to a USB port The port is set to full speed in
rated slower or not configured the BIOS settings.
properly.

Common Problems and Solutions for Motherboards and Internal Components (4.2.2.3)

Table 4-3 shows common problems and solutions for motherboards and internal components.

Table 4-3 Common Problems and Solutions for Motherboards and Internal Components

Identify the Problem	Probable Causes	Possible Solutions
The clock on the computer is no longer keeping the correct time or the BIOS settings are changing when the computer is rebooted.	The CMOS battery may be loose.	Secure the battery.
	The CMOS battery may be drained.	Replace the battery.
After updating the BIOS firmware, the computer will not start.	The BIOS firmware update did not install correctly.	Contact the motherboard manufacturer to obtain a new BIOS chip. (If the motherboard has two BIOS chips, the second BIOS chip can be used.)
The computer displays incorrect CPU information when the computer boots.	The CPU settings are not correct in the advanced BIOS settings.	Set the advanced BIOS settings correctly for the CPU.
	BIOS does not properly recognize the CPU.	Update the BIOS.
The hard drive LED on the front of the computer does not light.	The hard drive LED cable is not connected or is loose.	Reconnect the hard drive LED cable to the motherboard.
	The hard drive LED cable is incorrectly oriented to the front case panel connections.	Correctly orient the hard drive LED cable to the front case panel connection and reconnect it.
The built-in NIC has stopped working.	The NIC hardware has failed.	Add a new NIC to an open expansion slot.
	BIOS settings are set to use the built-in video.	Disable the built-in video in the BIOS settings.

The computer does not display any video after a new PCIe video card is installed.	The monitor cable is still connected to the built-in video.	Connect the monitor cable to the new video card.
	The new video card needs auxiliary power.	Connect any required power connectors to the video card.
	The new video card is faulty.	Install a known good video card.
The new sound card does not work.	The speakers are not connected to the correct jack.	Connect the speakers to the correct jack.
	The audio is muted.	Unmute the audio.
	The sound card is faulty.	Install a known good sound card.
System attempts to boot to an incorrect device.	BIOS settings are set to use the on-board sound device.	Disable the on-board audio device in the BIOS settings.
	Media was left in a removable drive.	Check that the removable drives do not contain media that is interfering with the boot process and ensure that the boot order is configured correctly.
	Boot order configured incorrectly.	Check that the removable drives do not contain media that is interfering with the boot process and ensure that the boot order is configured correctly.
User can hear fans spinning, but the computer does not start, and there are no beeps from the speaker.	POST procedure is not executing.	Faulty cabling or damaged or mis-seated CPU or other motherboard component needs to be replaced.
Motherboard capacitors are distended, swollen, emitting residue, or bulging.	Damage has occurred due to heat, ESP, power surge, or spike.	Replace the motherboard.

Common Problems and Solutions for Power Supplies (4.2.2.4)

Table 4-4 lists common problems and solutions for power supplies.

Table 4-4 Common Problems and Solutions for Power Supplies

Identify the Problem	Probable Causes	Possible Solutions
The computer will not turn on.	The computer is not plugged into the AC outlet.	Plug the computer into a known good AC outlet.
	The AC outlet is faulty.	Plug the computer into a known good AC outlet.
	The power cord is faulty.	Use a known good power cord.
	The power supply switch is not turned on.	Turn on the power supply switch.
	The power supply switch is set to the incorrect voltage.	Set the power supply switch to the correct voltage setting.
	The power button is not connected correctly to the front panel connector.	Correctly orient the power button to the front case panel connector and reconnect.
The computer reboots and turns off unexpectedly; or there is smoke or the smell of burning electronics.	The power supply has failed.	Install a known good power supply.
	The power supply is starting to fail.	Replace the power supply.

Common Problems and Solutions for CPUs and Memory (4.2.2.5)

Table 4-5 lists common problems and solutions for CPUs and memory.

Table 4-5 Common Problems and Solutions for CPUs and Memory

Identify the Problem	Probable Causes	Possible Solutions
The computer will not boot or it locks up.	The CPU has overheated.	Reinstall the CPU.
	The CPU fan is failing.	Replace the CPU fan.
		Add fan(s) to the case.
	The CPU has failed.	Replace the CPU fan.

		Replace the CPU.
The CPU fan is making an unusual noise.	The CPU fan is failing.	Replace the CPU fan.
	The front-side bus is set too high.	Reset to the factory default settings for the motherboard.
The computer reboots without warning, locks up, or displays error messages.		Lower the front-side bus settings.
	The CPU multiplier is set too high.	Lower the multiplier settings.
	The CPU voltage is set too high.	Lower the CPU voltage settings.
After upgrading from a single-core CPU to a dual-core CPU, the computer runs more slowly and shows only one CPU graph in the Task Manager.	The BIOS does not recognize the dual-core CPU.	Update the BIOS firmware to support the dual-core CPU.
A CPU does not install onto the motherboard.	The CPU is the incorrect type.	Replace the CPU with a CPU that matches the motherboard socket type.
	The new RAM is faulty.	Replace the RAM.
	The incorrect type of RAM was installed.	Install the correct type of RAM.
The computer does not recognize the RAM that was added.	The RAM that has been added is not the same type of RAM that was already installed.	Install the correct type of RAM.
	The new RAM is loose in the memory slot.	Secure the RAM in the memory slot.
	The computer does not have enough RAM.	Install additional RAM.
After upgrading Windows, the computer runs very slowly.	The video card does not have enough memory.	Install a video card that has more memory.

Common Problems and Solutions for Displays (4.2.2.6)

Table 4-6 lists common problems and solutions for displays

Table 4-6 Common Problems and Solutions for Displays

Identify the Problem	Probable Causes	Possible Solutions
Display has power but no image on the screen.	The video cable is loose or damaged.	Reconnect or replace the video cable.
	The computer is not sending a video signal to the external display.	Use the Fn key along with the multi-purpose key to toggle to the external display.
The display is flickering.	Images on the screen are not refreshing fast enough.	Adjust the screen refresh rate.
	The display inverter is damaged or malfunctioning.	Disassemble the display unit and replace the inverter.
The image on the display looks dim.	The LCD backlight is not properly adjusted.	Check the repair manual for instructions about calibrating the LCD backlight. Adjust the LCD backlight properly.
Pixels on the screen are dead or not generating color.	Power to the pixels has been cut off.	Contact the manufacturer.
	The display is not properly connected.	Disassemble the display and check the connections.
The image on the screen appears to flash lines or patterns of different color and size (artifacts).	The GPU is overheating.	Disassemble and clean the computer, checking for dust and debris.
	The GPU is faulty or malfunctioning.	Replace the GPU.
Color patterns on a screen are incorrect.	The display is not properly connected.	Disassemble the display and check the connections.
	The GPU is overheating.	Disassemble and clean the computer, checking for dust and debris.
	The GPU is faulty or malfunctioning.	Replace the GPU.
	Display settings	

have been changed. Restore the display settings to the original factory settings.

Images on a display screen are distorted.	The display is not properly connected.	Disassemble the display to a point where you can check the display connections.
	The GPU is overheating.	Disassemble and clean the computer, checking for dust and debris.
	The GPU is faulty or malfunctioning.	Replace the GPU.
The display has a "ghost" image.	The display is experiencing burn-in.	Power off the display and unplug it from the power source for a few hours.
		Use the degauss feature, if it is available.
		Replace the display.
The images on the display have distorted geometry.	The driver has become corrupted.	Update or reinstall the driver in safe mode.
	The display settings are incorrect.	Use the display's settings to correct the geometry.
The monitor has oversized images and icons.	The driver has become corrupted.	Update or reinstall the driver in safe mode.
	The display settings are incorrect.	Use the display's settings to correct the geometry.
	The fan has failed.	Replace the fan.
The projector overheats and shuts down.	The vents are clogged.	Clean the vents.
	The projector is in an enclosure.	Remove the enclosure or ensure proper ventilation.
In a multiple-monitor setup, the displays are not aligned or are incorrectly oriented.	The settings for multiple monitors are not correct.	Use the display control panel to identify each display and set the alignment and orientation.
	The driver has become corrupted.	Update or reinstall the driver in safe mode.

The computer is in safe mode. Reboot the computer.

The display is in VGA mode.

The driver has become corrupted. Update or reinstall the driver in safe mode.

Apply Troubleshooting Process to Computer Components and Peripherals (4.2.3)

Troubleshooting requires that you always have a plan of action. Asking the right questions, narrowing down the cause, re-creating the problem, and attempting to fix the issue based on your plan is a good process for both internal and peripheral components. Once you start troubleshooting, write down each step you take for your future use and that of other technicians.

Personal Reference Tools (4.2.3.1)

Good customer service includes providing the customer with a detailed description of the problem and the solution. It is important for a technician to document all services and repairs and that this documentation be available to all other technicians. The documentation can then be used as reference material for similar problems.

Personal reference tools include troubleshooting guides, manufacturer manuals, quick reference guides, and repair journals. In addition to an invoice, a technician keeps a journal of upgrades and repairs:

- **Notes:** Make notes as you go through the troubleshooting and repair process. Refer to these notes to avoid repeating steps and to determine what needs to be done next.
- **Journal:** Include descriptions of the problem, possible solutions that have been tried to correct the problem, and the steps taken to repair the problem. Note any configuration changes made to the equipment and any replacement parts used in the repair. Your journal, along with your notes, can be valuable when you encounter similar situations in the future.
- **History of repairs:** Make a detailed list of problems and repairs, including the date, replacement parts, and customer information. The history allows a technician to determine what work has been performed on a specific computer in the past.

Internet Reference Tools (4.2.3.2)

The Internet is an excellent source of information about specific hardware problems and possible solutions. Visit the following for helpful information:

- Internet search engines
- News groups
- Manufacturer FAQs
- Online computer manuals
- Online forums and chat
- Technical websites

CHECK YOUR UNDERSTANDING 4.2.3.3: REFERENCE TOOLS



Refer to the online course to complete this activity.

Advanced Problems and Solutions for Hardware (4.2.3.4)

Table 4-7 lists advanced problems and solutions for hardware.

Table 4-7 Advanced Problems and Solutions for Hardware

Identify the Problem	Probable Causes	Possible Solutions
RAID cannot be found.	The external RAID controller is not receiving power.	Check the power connection to the RAID controller.
	The BIOS settings are incorrect.	Reconfigure the BIOS settings for the RAID controller.
	The RAID controller has failed.	Replace the RAID controller.
RAID stops working.	The external RAID controller is not receiving power.	Check the power connection to the RAID controller.
	The RAID controller has failed.	Replace the RAID controller.
The computer exhibits slow performance.	The computer does not have enough RAM.	Install additional RAM.
	The computer is overheating.	Clean the fans or install additional fans.
The computer does not recognize a removable external drive.	The OS does not have the correct drivers for the removable external drive.	Download the correct drivers for the drive.
	The USB port has too many attached devices to supply adequate power.	Attach external power to the device or remove some of the USB devices.
		Restore the original firmware from the onboard backup, if one is available.
After updating the BIOS firmware, the computer will not start.	The BIOS firmware update did not install correctly.	If the motherboard has two BIOS chips, the second BIOS chip can be used.

		Contact the motherboard manufacturer to obtain a new BIOS chip.
	RAM is failing.	Test each RAM module to determine if they are operating correctly.
		Reset to the factory default settings of the motherboard.
The computer reboots without warning, locks up, or displays error messages or the BSOD.	The front-side bus is set too high.	Lower the FSB settings.
		Lower the multiplier settings.
	The CPU multiplier is set too high.	Lower the CPU voltage settings.
After upgrading from a single-core CPU to a multi-core CPU, the computer runs more slowly and shows only one CPU graph in Task Manager.	The BIOS does not recognize the multi-core CPU.	Update the BIOS firmware to support the multi-core CPU.

LAB 4.2.3.5: USE A MULTIMETER AND A POWER SUPPLY TESTER



In this lab, you will learn how to use and handle a multimeter and a power supply tester.

LAB 4.2.3.6: TROUBLESHOOT HARDWARE PROBLEMS



In this lab, you will diagnose the causes of various hardware problems and solve them.

[Previous Section](#)

6. Summary (4.3) | [Next Section](#)