



Chapter 4: Basics of Preventive Maintenance and Troubleshooting



IT Essentials: PC Hardware and Software v4.0

Purpose of this Presentation

To provide to instructors an overview of Chapter

4:

- List of chapter objectives

- Overview of the chapter contents, including
student activities

 - some potential student misconceptions

- Reflection/Activities for instructors to complete
to prepare to teach

- Additional resources

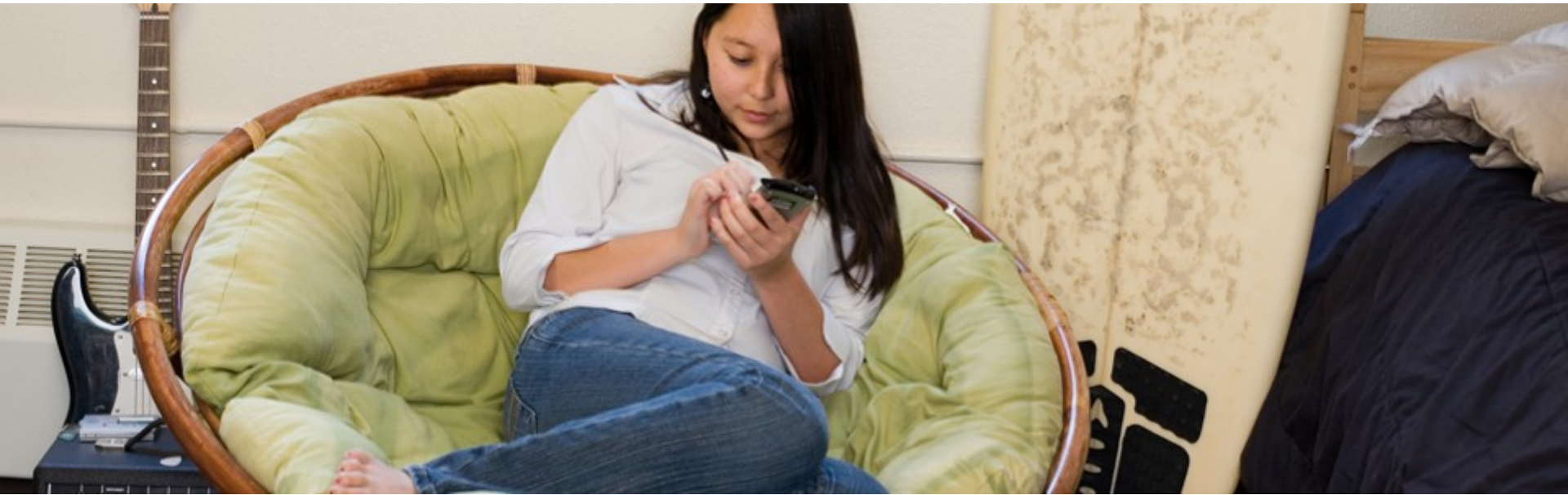
Chapter 4 Objectives

- 4.1 Explain the purpose of preventive maintenance
- 4.2 Identify the steps of the troubleshooting process



Chapter 4 Worksheets, Labs, and Activities

- 4.2.7 Activity: Troubleshooting Process



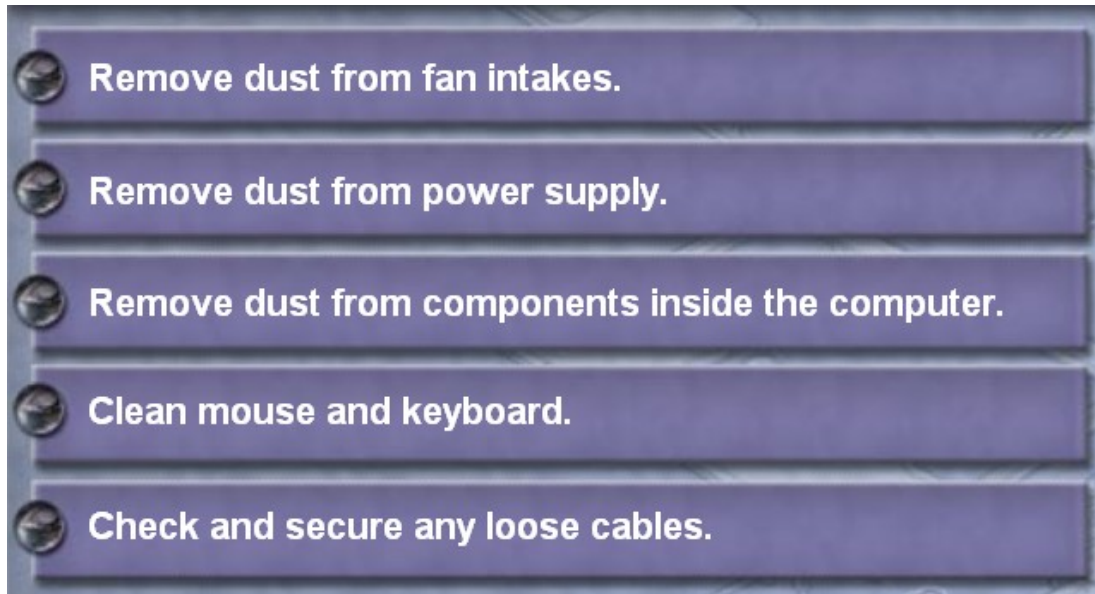
The Purpose of Preventive Maintenance

- Reduce the likelihood of hardware or software problems by systematically and periodically checking hardware and software to ensure proper operation.
- Monitoring tools for networked items
 - Nagios,
 - Big Brother,
 - I-Doit, Zenos tools
- Reduce computer down time and repair costs.

Hardware Maintenance

Make sure that the hardware is operating properly.

- Check the condition of parts.
- Repair or replace worn parts.
- Keep components clean.
- Create a hardware maintenance program.



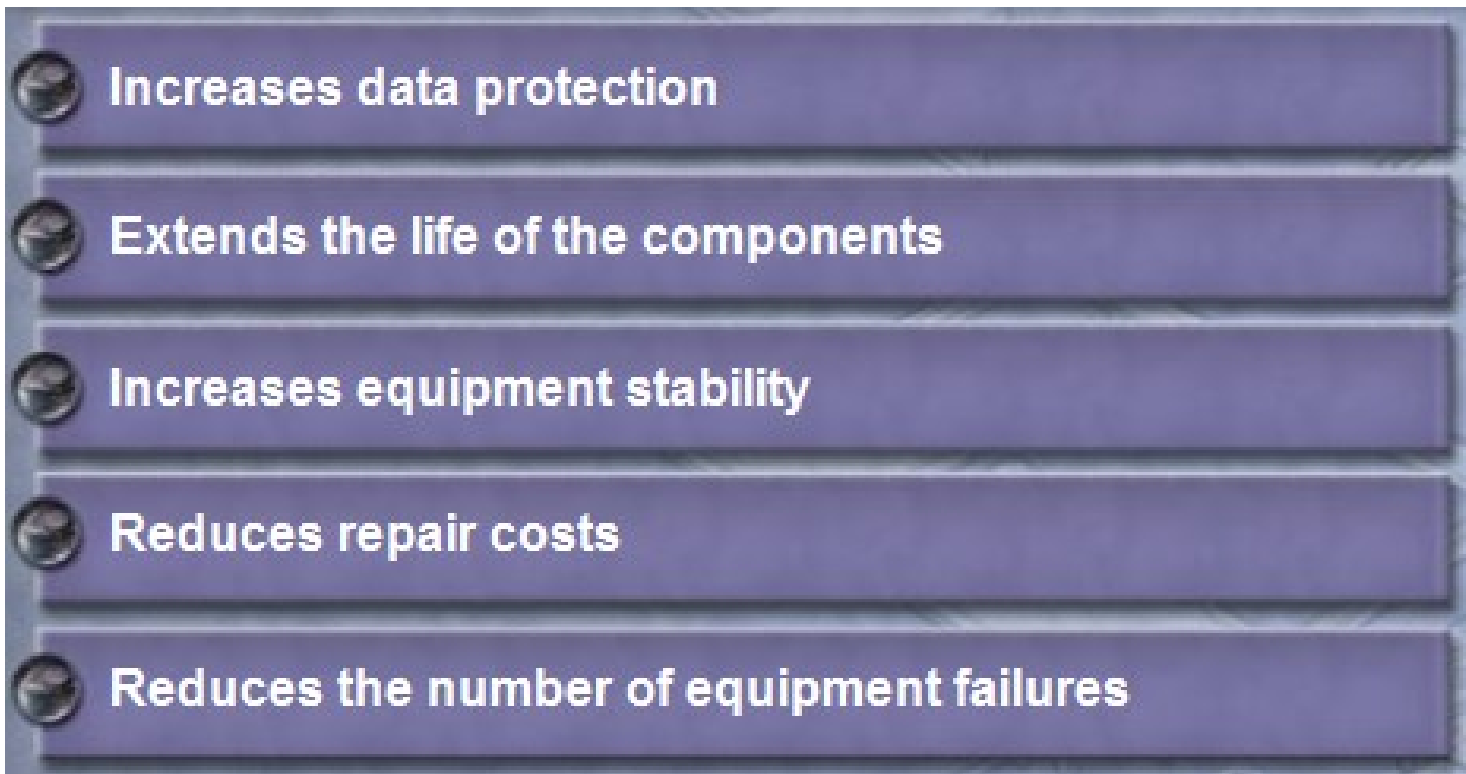
Software Maintenance

- Review updates
- Follow policies of your organization
- Create a schedule



Preventive Maintenance Benefits

- Reduce computer down time.
- Reduce repair costs.
- Reduce loss of worker productivity.



The Troubleshooting Process



- Follow an organized and logical procedure.
- Eliminate variables one at a time.
- Troubleshooting is a skill that is refined over time.
- The first and last steps involve effectively communicating with the customer.

Data Protection

Check with customer

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



If no backup can be created, ask customer to sign a release form

Gather Data from the Customer

Customer Information

- Company Name
- Contact Name
- Address
- Phone Number

Computer Configuration

- Manufacturer and Model
- Operating System Information
- Network Environment
- Connection Type

Description of Problem

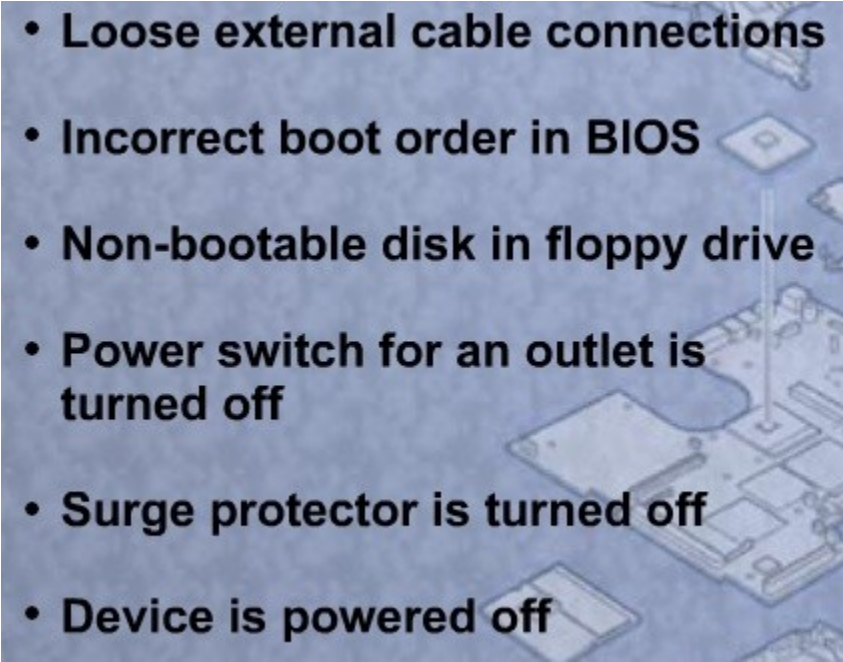
- Open-Ended Questions
- Closed-Ended Questions

- Communicate respectfully with the customer
- Start with open-ended questions

“What types of problems are you having with your computer or network?”
- Then, ask closed-ended (yes/no) questions

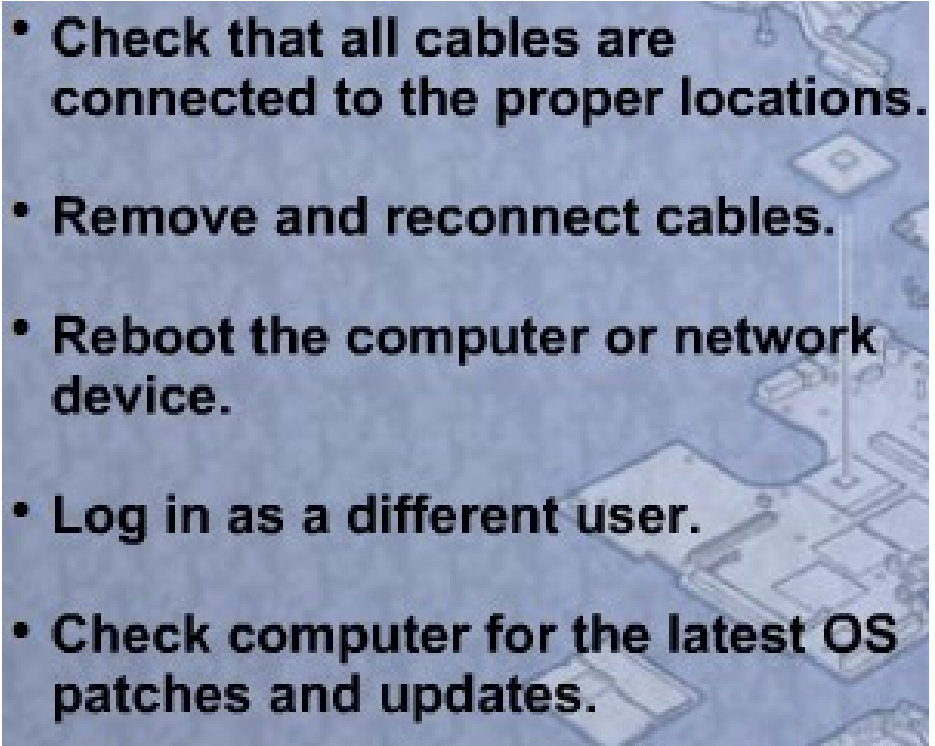
“Have you changed your password recently?”

Verify Obvious Issues

- 
- Loose external cable connections
 - Incorrect boot order in BIOS
 - Non-bootable disk in floppy drive
 - Power switch for an outlet is turned off
 - Surge protector is turned off
 - Device is powered off

- Problem may be simpler than the customer thinks.
- Checking for obvious issues can save time.
- If this step turns up nothing, continue to the next step of the troubleshooting process.

Try Quick Solutions

- May provide additional information, even if they do not solve the problem.
 - Document each solution you try.
 - May need to gather more information from the customer.
 - If you find the problem at this stage, document it and proceed to the end of the troubleshooting process.
- 
- Check that all cables are connected to the proper locations.
 - Remove and reconnect cables.
 - Reboot the computer or network device.
 - Log in as a different user.
 - Check computer for the latest OS patches and updates.

Gather Data from the Computer

- When system, user, or software errors occur on a computer, the **Event Viewer** is updated with information about the errors:

What problem occurred

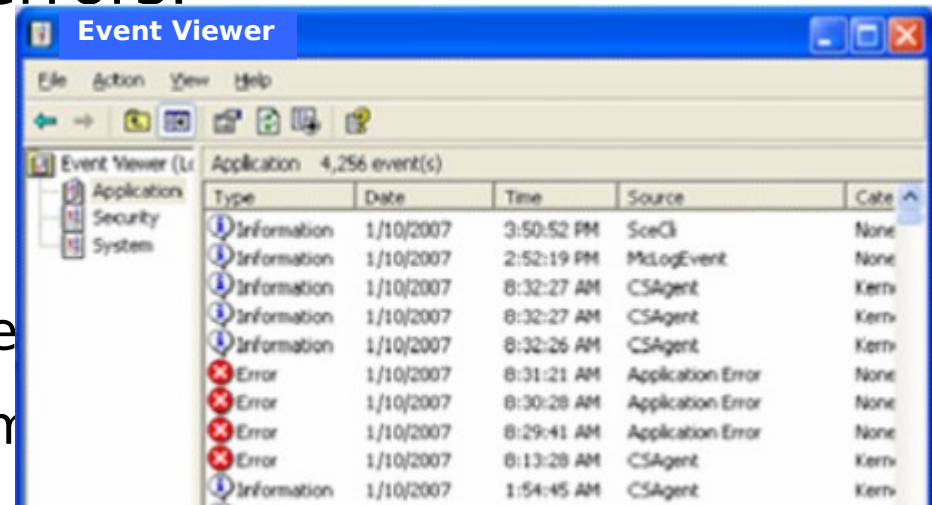
The date and time of the problem

The severity of the problem

The source of the problem

Event ID number

Which user was logged in when the problem occurred

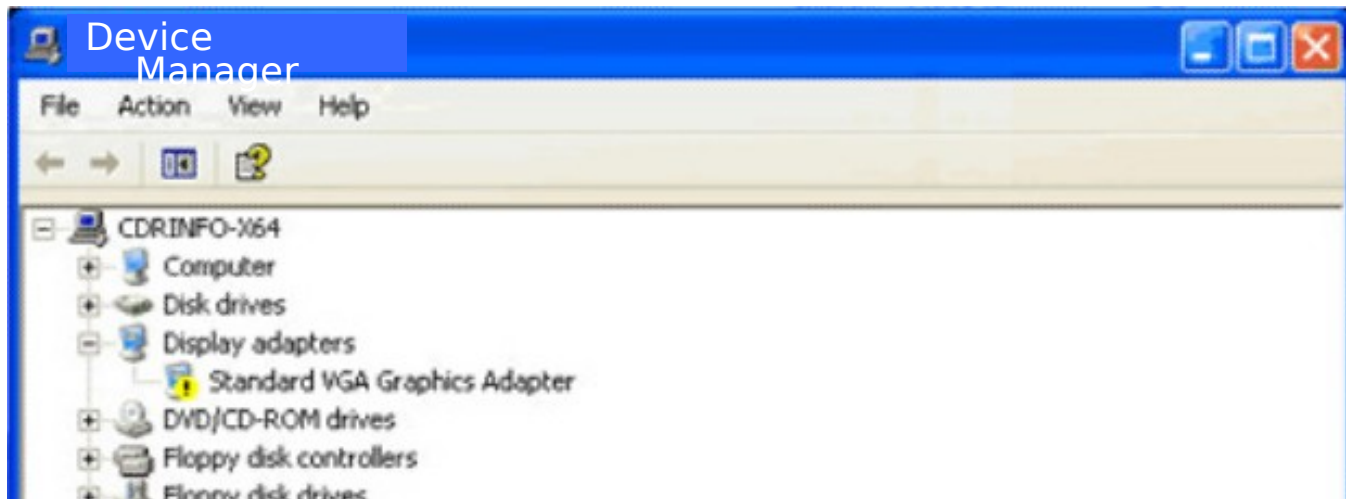


- Although this utility lists details about the error, you may still need to research the solution.

Gather Data from the Computer

Device Manager

- A flag of **!** indicates the device is acting incorrectly.
- A flag of **X** indicates the device is disabled.



Gather Data from the Computer

- When troubleshooting, power on the computer and listen to the **beep code sequence**. Document the beep code sequence and research the code to determine the specific hardware failure.
- If the computer boots and stops after the POST, investigate the **BIOS settings** to determine where to find the problem. Refer to the motherboard manual to make sure that the BIOS settings are accurate.
- Conduct research to find software to use to diagnose and solve problems. Often, manufacturers of system hardware provide **diagnostic tools** of their own.
- What third-party tools are you aware of to use in computer troubleshooting?

Evaluate the Problem, Implement the Solution

- Research possible solutions:

- 
- Problem Solving Experience
 - Other Technicians
 - Internet Search
 - News Groups
 - Manufacturer FAQs
 - Computer Manuals
 - Device Manuals
 - Online Forums
 - Technical Websites

- Prioritize solutions to try.
- Try easiest solutions first.
- After an unsuccessful try, undo any changes you have made.

Unnecessary changes could complicate finding the solution.

Close with the Customer

- Discuss the solution with the customer
- Have the customer confirm that the problem has been solved
- Document the process
 - Problem description
 - Solution
 - Components used
 - Amount of time spent in solving the problem

Completed Work Order

The gratifying results of a day's work



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

Work Order

Generating a New Ticket

GENERATING A NEW TICKET

Category: <u>HW</u>	Close Code: <u></u>	Status: <u>CLOSED</u>
Type: <u>Laptop</u>	Escalated?: <u>N</u>	Pending: <u></u>
Item: <u>Laptop</u>	Pending Until Date: <u></u>	

Business Impacting? ☐ Yes ☒ No

Summary: Won't Boot

Case ID#: Cisco001 Connection Type: Wireless network connection

Priority: Medium Environment: Mobile

User Platform: Windows XP

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:

The existing battery is three years old. The existing battery does not boot the laptop even when the AC adapter is connected. A known good battery was installed and the laptop booted and passed all POST tests. The old battery appears to have a short in it that is causing the problem. The customer was advised that the old battery will need to be replaced, preferable with a new one. Time to complete repairs: 30 minutes.

Chapter 4 Summary

- Regular preventive maintenance reduces hardware and software problems.
- Before beginning any repair, back up the data on a computer.
- The troubleshooting process is a guideline to help you solve computer problems in an efficient manner.
- Document everything that you try, even if it fails. The documentation that you create will become a useful resource for you and other technicians.



Instructor Training Activities



Activities for Instructor Training

1. Take the Quiz provided in Chapter 4 course content.
2. In 4.1, there are 3 questions posed to the students. Generate lists of additional tasks and benefits to refer to when teaching this course.

What additional hardware maintenance tasks can you add to the list?

What other software maintenance tasks can you add to the list?

Can you think of any other benefits that preventive maintenance provides?

3. Conduct research to collect samples of work order forms and liability release forms.
4. In 4.2.5, software diagnostic tools are presented. List any third-party tools that you are familiar with that can be used to troubleshoot computers.

Instructor Training Discussion

- Share with the other instructors, your lists of additional hardware and software maintenance tasks and additional benefits of preventive maintenance.
- Share the samples of work order forms and liability release forms you have collected.
- Share your list of third-party software diagnostic tools that can be used to troubleshoot computers.

Q and A

