Lecture 05

Computer Maintenance and Troubleshooting

CT4005NI - Computer Hardware and Software Architectures

6. Introduction

This chapter introduces *preventive maintenance* and the *troubleshooting process*.

- **Preventive maintenance** is a *regular* and *systematic* inspection, cleaning, and replacement of worn parts, *materials*, and *systems*.

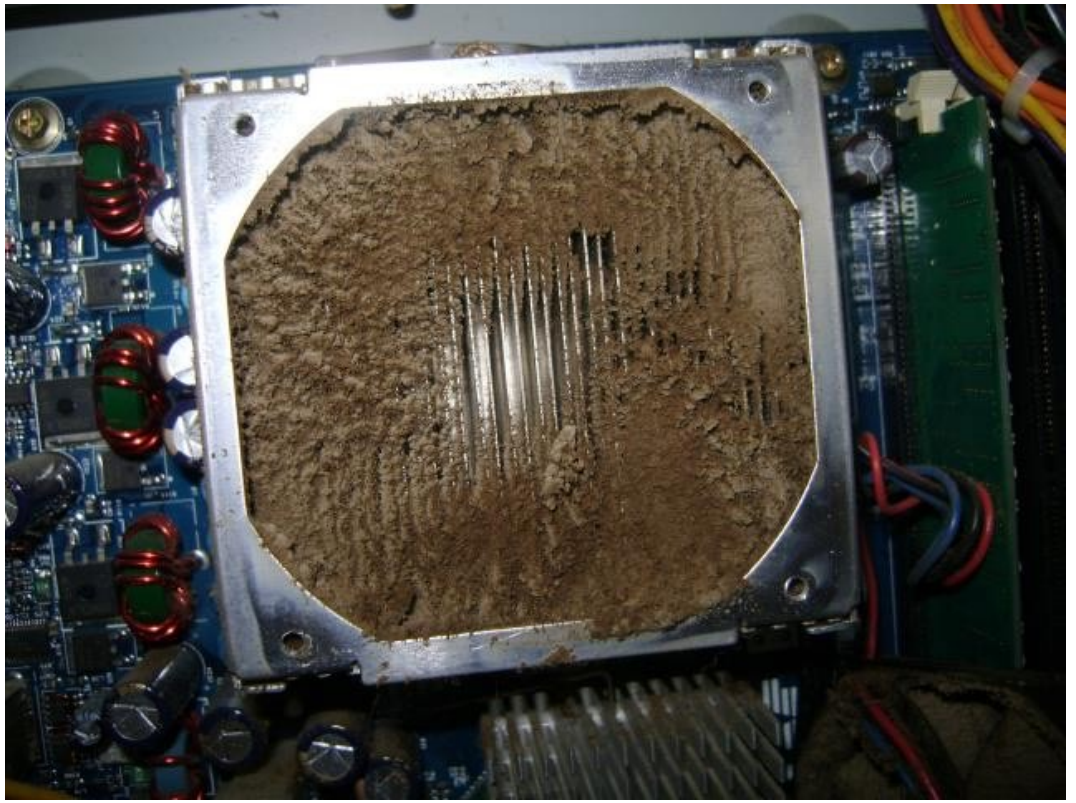
- It helps to *prevent failure* of parts, materials, and systems.

6. Introduction

This chapter introduces *preventive maintenance* and the *troubleshooting process*.

- **Troubleshooting** is a *systematic* approach to locating the *cause of a fault* in a computer system.
- Not all troubleshooting processes are the same, and technicians tend to refine their own troubleshooting skills based on knowledge and personal experience.

The cigarette computer



Dust

6.1 Explain the Purpose of Preventive Maintenance

- Preventive maintenance emphasizes regularly scheduled maintenance tasks.
- The goal of preventive maintenance is to give an asset the care it requires while it's still running.

1. **Hardware Maintenance**
2. **Software Maintenance**

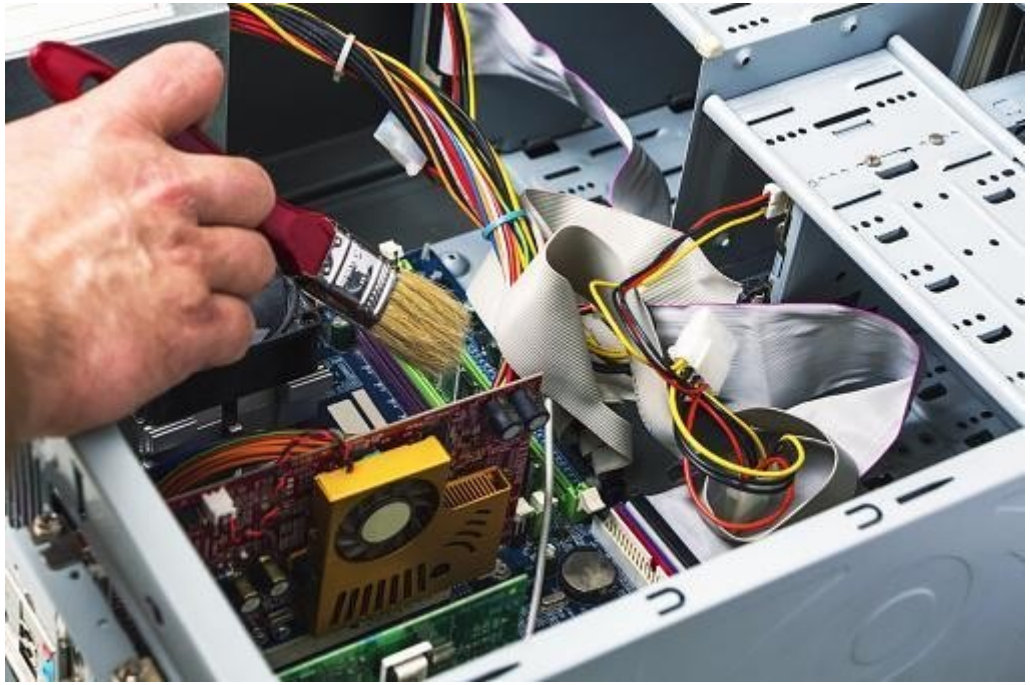
6.1.1 Hardware Maintenance

- Computer hardware maintenance involves taking care of the computer's physical components, such as its keyboard, hard drive and internal CD or DVD drives.
- Cleaning the computer, keeping its fans free from dust, and defragmenting its hard drives regularly are all parts of a computer hardware maintenance program.

6.1.1 Hardware Maintenance

Hardware Maintenance steps

- Remove dust from fan intakes
- Remove dust from power supply
- Remove dust from components inside the computer
- Clean mouse and keyboard
- Check and secure any loose cables



6.1.2 Software Maintenance

- Software maintenance is the modification of a software product after delivery to correct faults, to improve performance or other attributes.
- A common perception of maintenance is that it merely involves fixing defects.

6.1.2 Software Maintenance

Software Maintenance steps

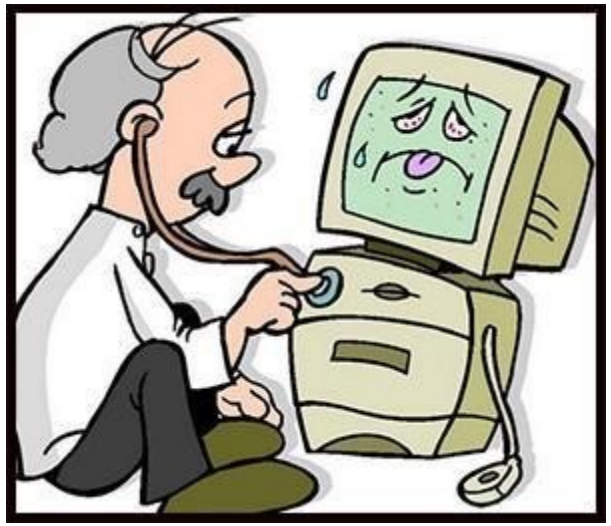
- Review security updates
- Review software updates
- Review driver updates
- Update virus definition files
- Scan for viruses and spyware
- Remove unwanted program
- Scan hard drives for errors
- Defragment hard drives

6.1.3 Preventive Maintenance Benefits

- Increases data protection
- Extends the life of the components
- Increases equipment stability
- Reduce repair costs
- Reduce the number of equipment failures

6.2 Identify the *steps* of the *Troubleshooting* process

- Troubleshooting is a form of problem solving, often applied to repair failed products or processes on a machine or a system.
- It is a logical, systematic search for the source of a problem in order to solve it, and make the product or process operational again.
- Troubleshooting is needed to identify the symptoms.



6.2 Identify the *steps* of the *Troubleshooting* process

Following are the Computer troubleshooting steps:

1. Explain the purpose of data protection.
2. Identify the problem.
3. Establish a theory of probable causes.
4. Test the theory to determine an exact cause.
5. Establish a plan of action to resolve the problem and implement the solution.
6. Verify full system functionality, and if applicable, implement preventive measures.
7. Document findings, actions and outcomes.

6.2.1 Explain the purpose of data protection

•Before you begin troubleshooting problems, **always** follow the necessary precautions to protect *data* on a computer.

•If your work results in **data loss** for the customer, **you or your company could be held liable.**

6.2.1 Explain the purpose of data protection

Data Backup

- A data *backup* is a copy of the data on a computer hard drive that is saved to media such as a CD, DVD, RAID or tape drive.
- In an organization, backups are routinely done on a daily, weekly, or monthly basis based on **company policy**.

- If you are unsure that a backup has been done, do not attempt any troubleshooting activities **until you check with the customer**.

6.2.1 Explain the purpose of data protection

Items to verify with the customer about data backups

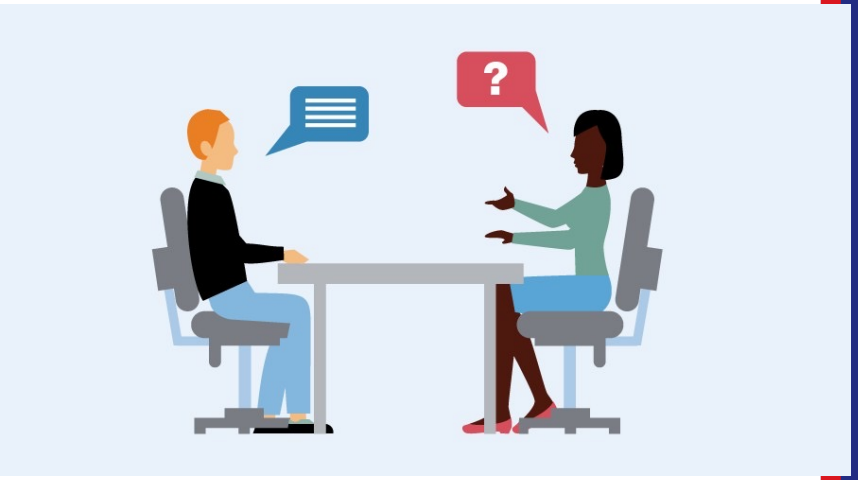
- *Date* of the *last* backup
- *Contents* of the backup
- Data *integrity* of the backup
- *Availability* of all backup media for a data restore

6.2.1 Explain the purpose of data protection

If the customer does not have a current backup and you are not able to create one, you should ask the customer to sign a *liability release form* with following information.

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

6.2.2 Identify the problem



- During the troubleshooting process, gather as much information from the customer as possible.

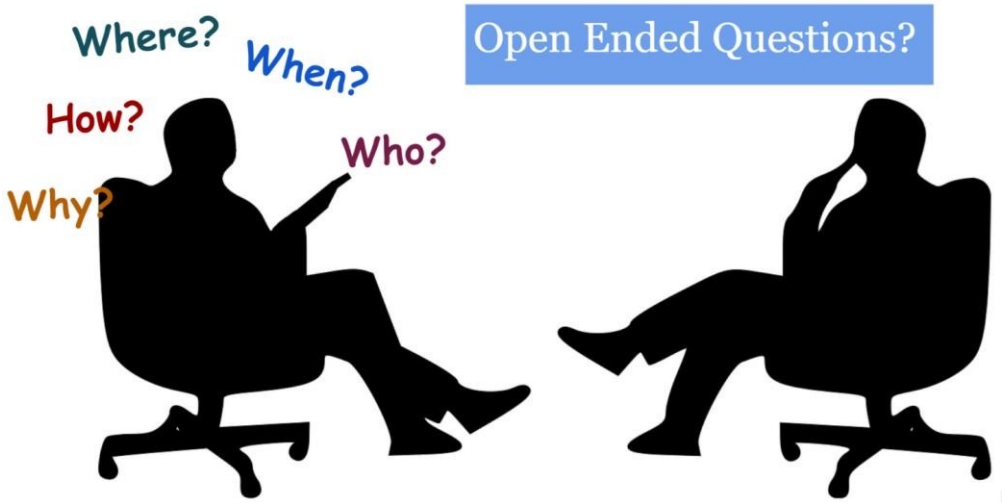
Conversation Etiquette

- Ask direct questions to gather information.
- Do not use industry jargon when talking to customers.
- Do not talk down to the customer.
- Do not insult the customer.
- Do not accuse the customer of causing the problem.

6.2.2 Identify the problem

Open-Ended Questions

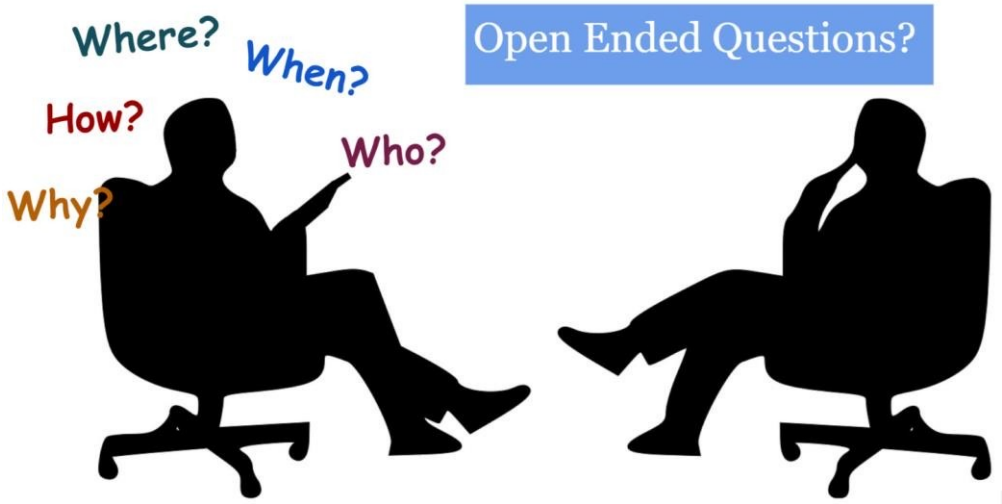
- Open-ended questions are used to obtain general information.
- Allow customers to explain the details of the problem in their own words.



6.2.2 Identify the problem

Examples:

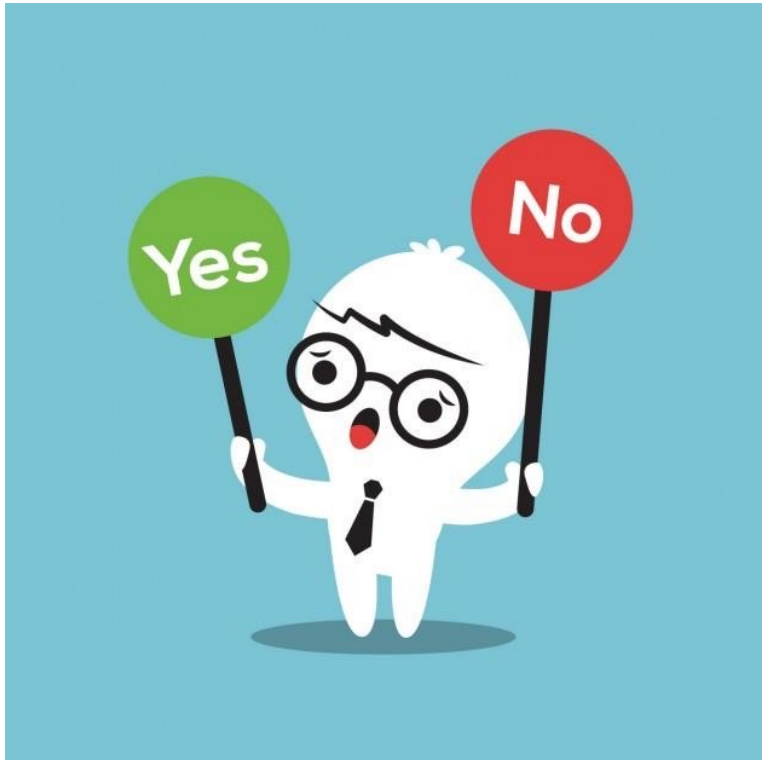
- What problem are you experiencing with your computer?
- What Software has been installed on your computer recently?
- What were you doing when the problem was identified ?



6.2.2 Identify the problem

Closed-Ended Questions

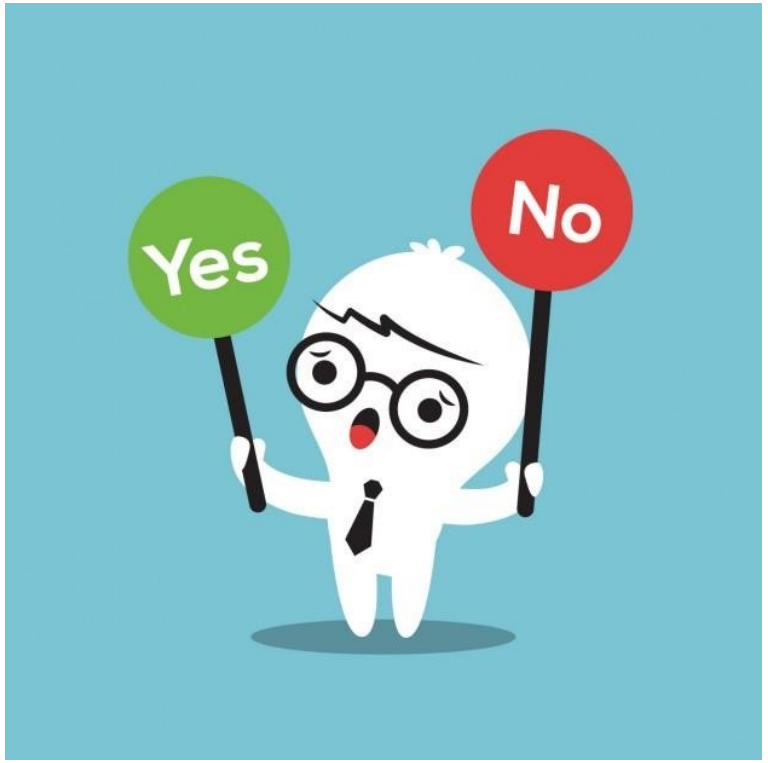
- Closed-ended questions generally require a "yes" or "no" answer.
- These questions are intended to get the most relevant information in the shortest time possible.



6.2.2 Identify the problem

Examples:

- Has anyone else used your computer recently?
- Can you reproduce the problem?
- Have you received any error message on your computer?



6.2.2 Identify the problem

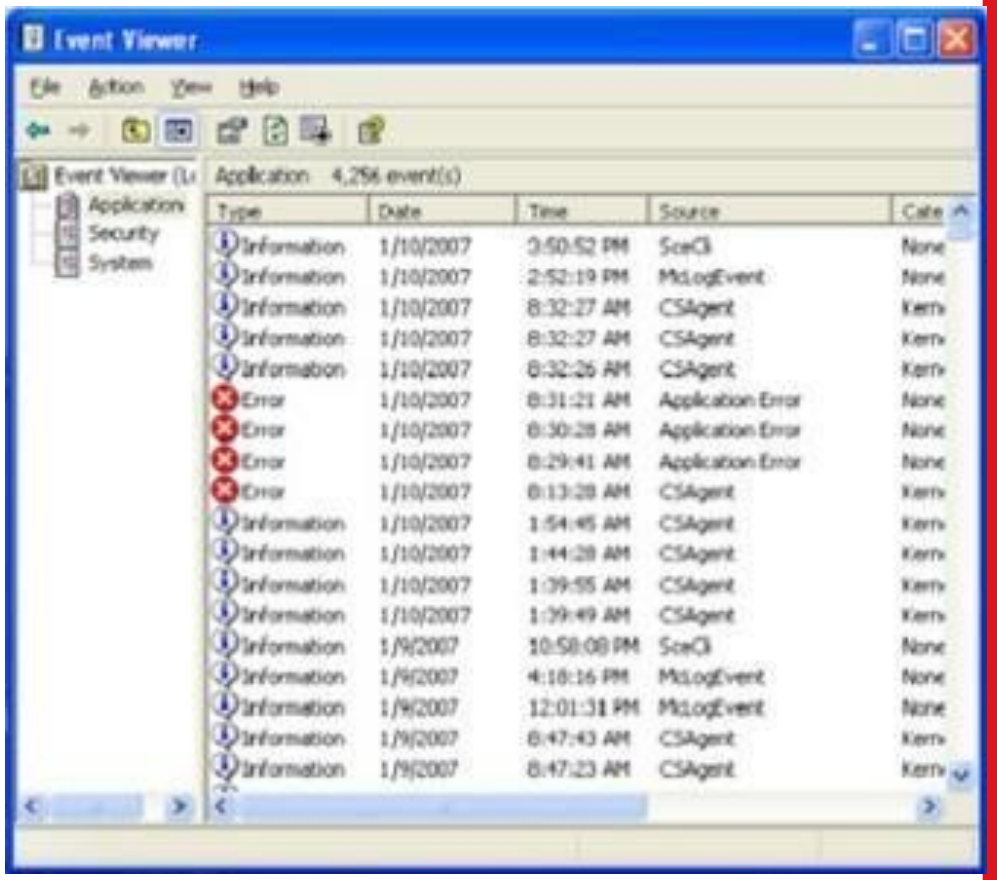
Documenting Responses

- *Document* the information obtained from the customer in the work order and in the repair journal.
- Further, verify the customer's description of the problem by gathering data from the computer.
- Following slides discuss about how to verify the customer description of the problem.

6.2.2 Identify the problem

Event Viewer - eventvwr.msc

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



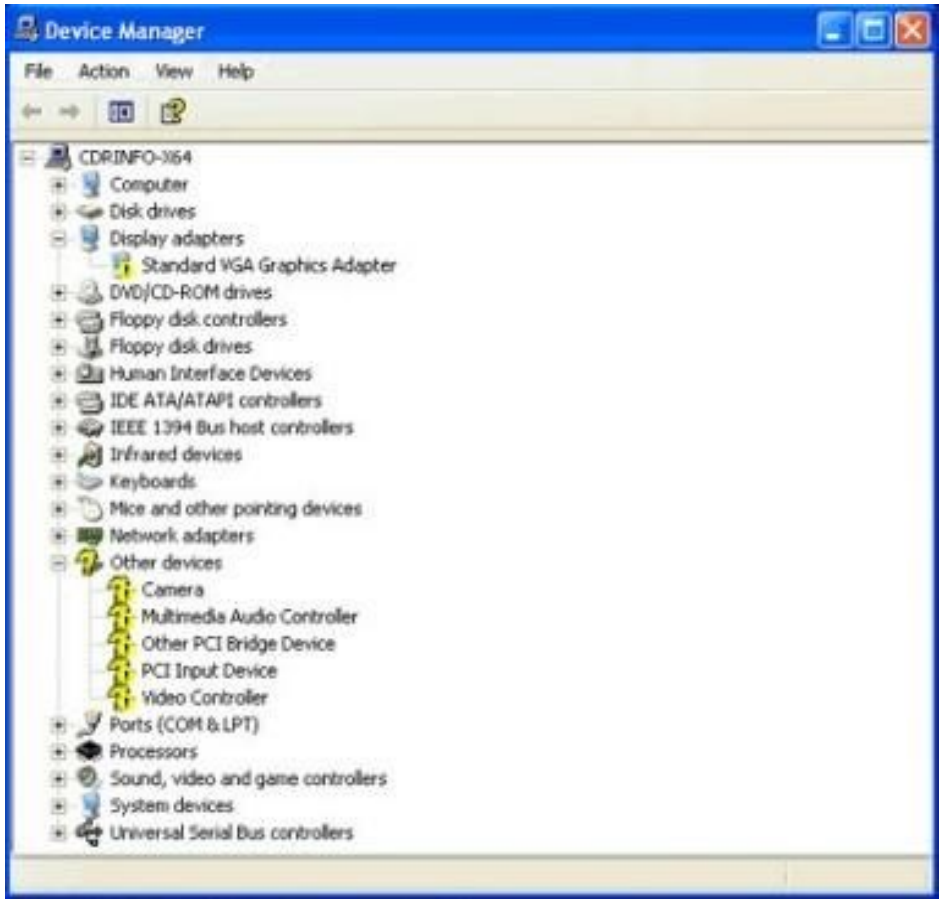
Following types of information can be found.

- What problem occurred
- Date and time of the problem
- Severity of the problem
- Source of the problem
- Event ID number
- Which user was logged in when the problem occurred

6.2.2 Identify the problem

Device Manager - devmgmt.msc

- It displays all of the devices that are configured on a computer.
- Any device that the operating system determines to be acting incorrectly is flagged with an error icon.
- **Yellow circle with an exclamation point (!):** Device acting incorrectly
- **Red circle with an "X":** Device is disabled
- **A yellow question mark:** Hardware not functioning properly due to unknown driver to install



6.2.2 Identify the problem

Beep Codes

- Each BIOS manufacturer has a unique beep sequence for hardware failures.
- Document the beep code sequence, and research the code to determine the specific hardware failure.

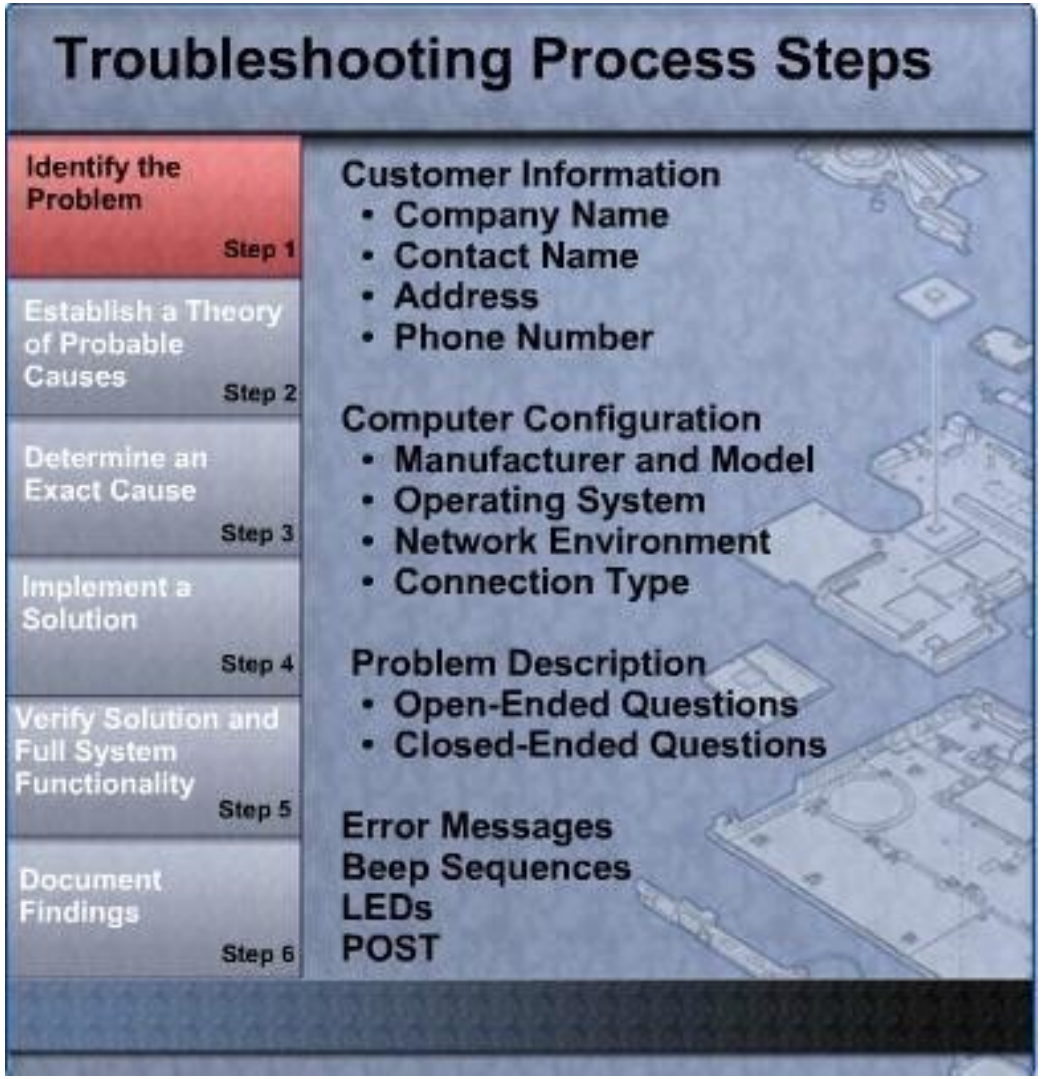
BIOS Information

- 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.

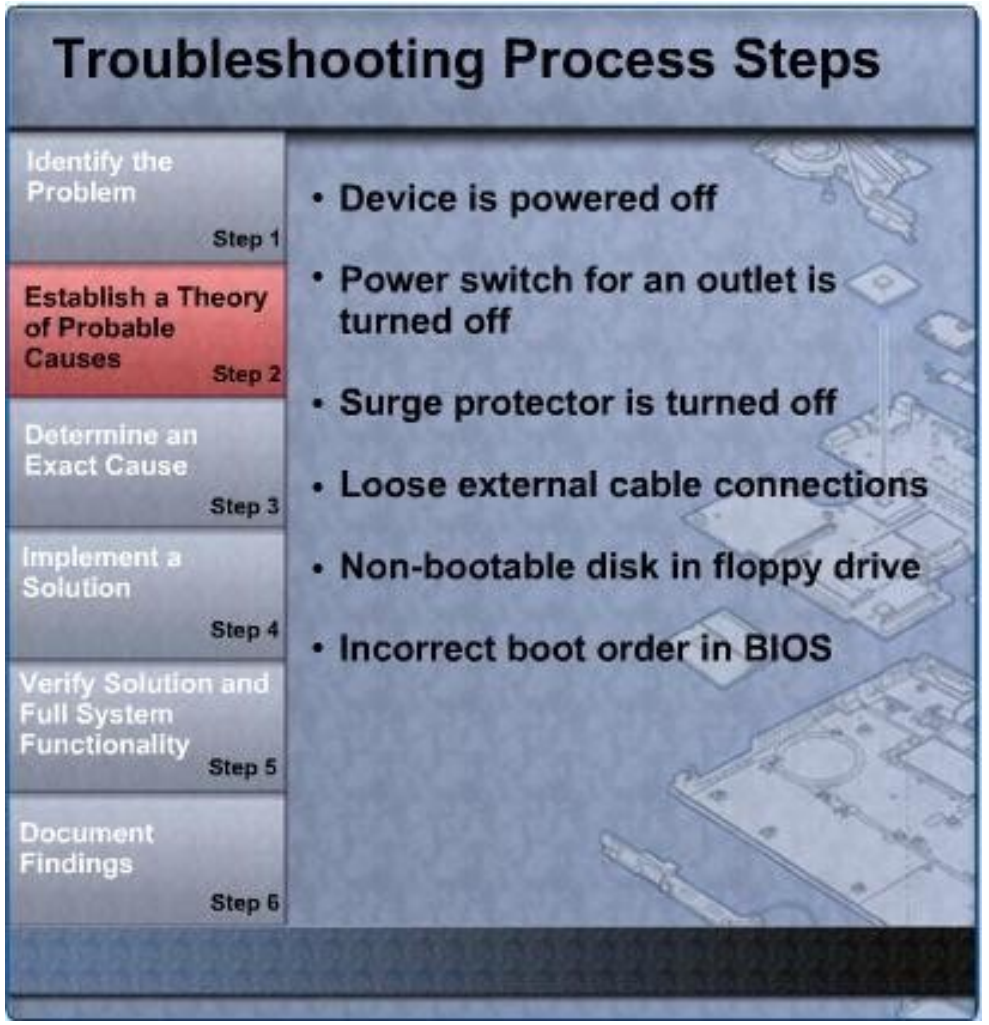
6.2.2 Identify the problem

The outcome of this step would be



6.2.3 Establish a theory of probable causes

- The second step in the troubleshooting process is to establish a theory of probable causes.
- Even though the customer may think that there is a major problem, start with the obvious issues before moving to more complex diagnoses.
- **For instance, "if the computer doesn't start".**

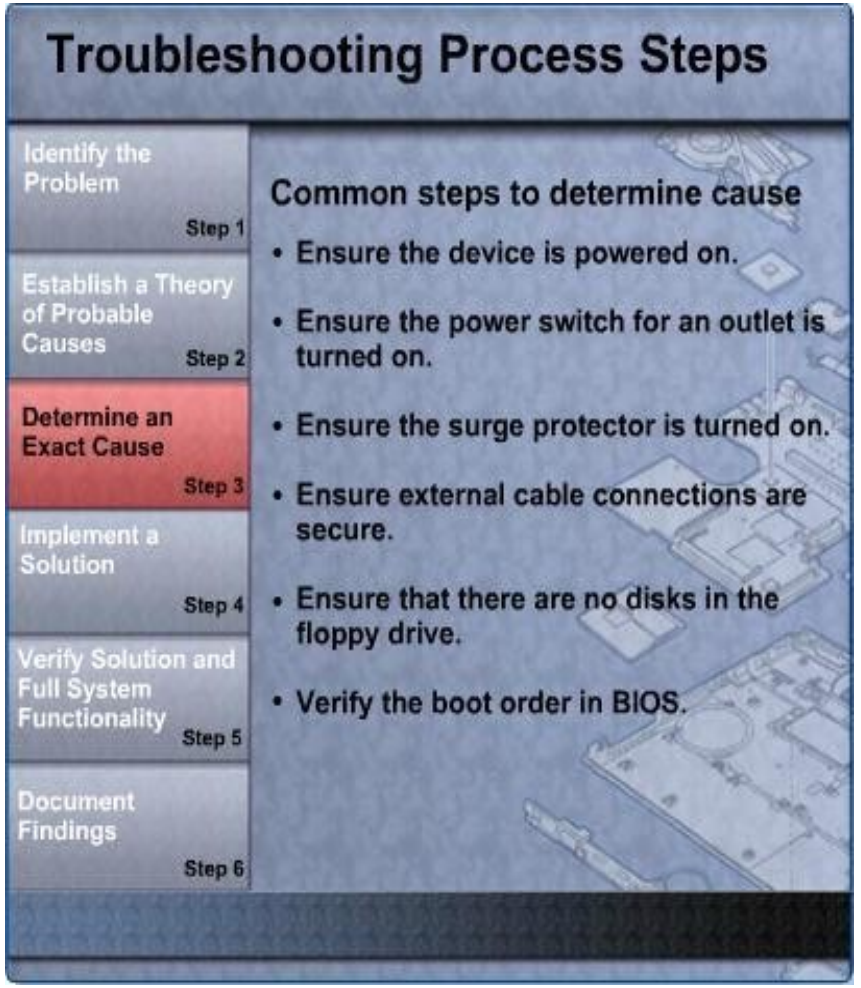


6.2.4 Determine an exact cause

- The next step in the troubleshooting process is to determine an exact cause.
- You determine an exact cause by testing your theories of probable causes one at a time, starting with the quickest and easiest.

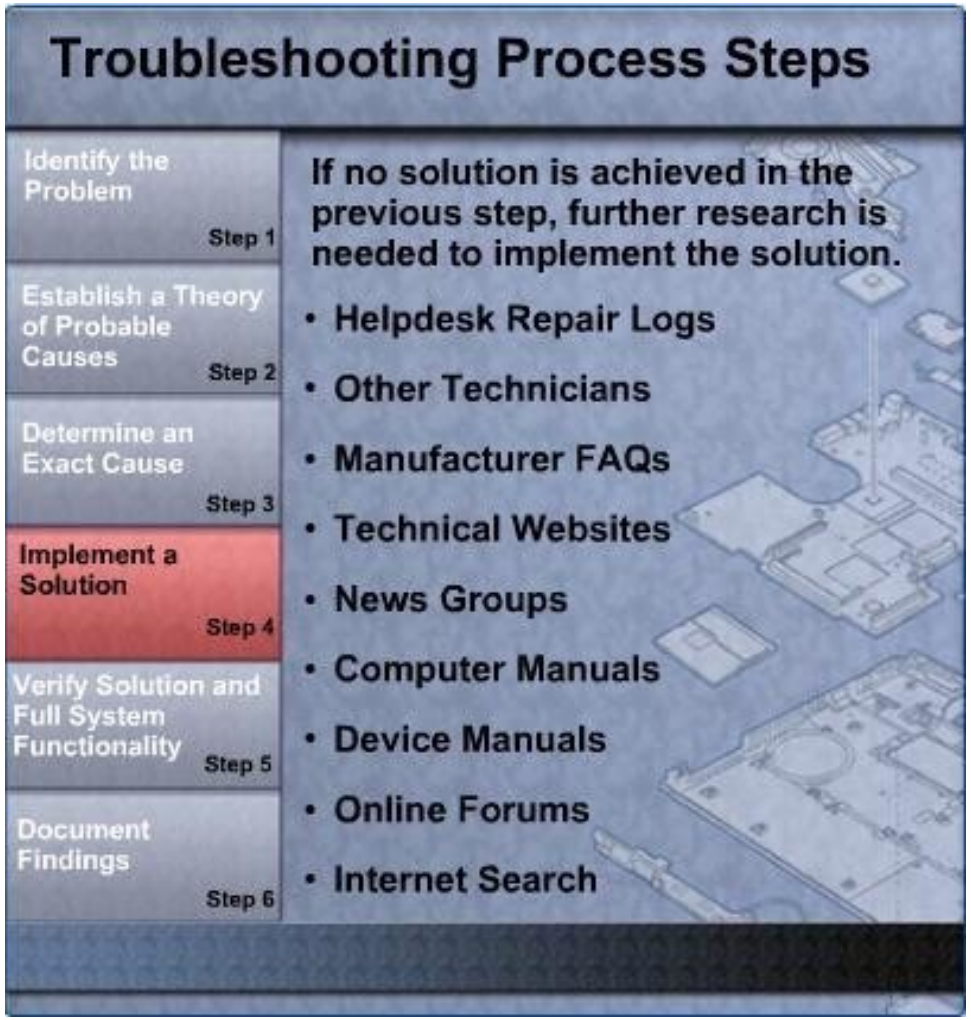
Taking same scenario as before

- As you become more experienced at troubleshooting computers, you will work through the steps in the process faster.
- **If the exact cause of the problem has not been determined** escalate the problem to a technician with more experience after proper documentation.



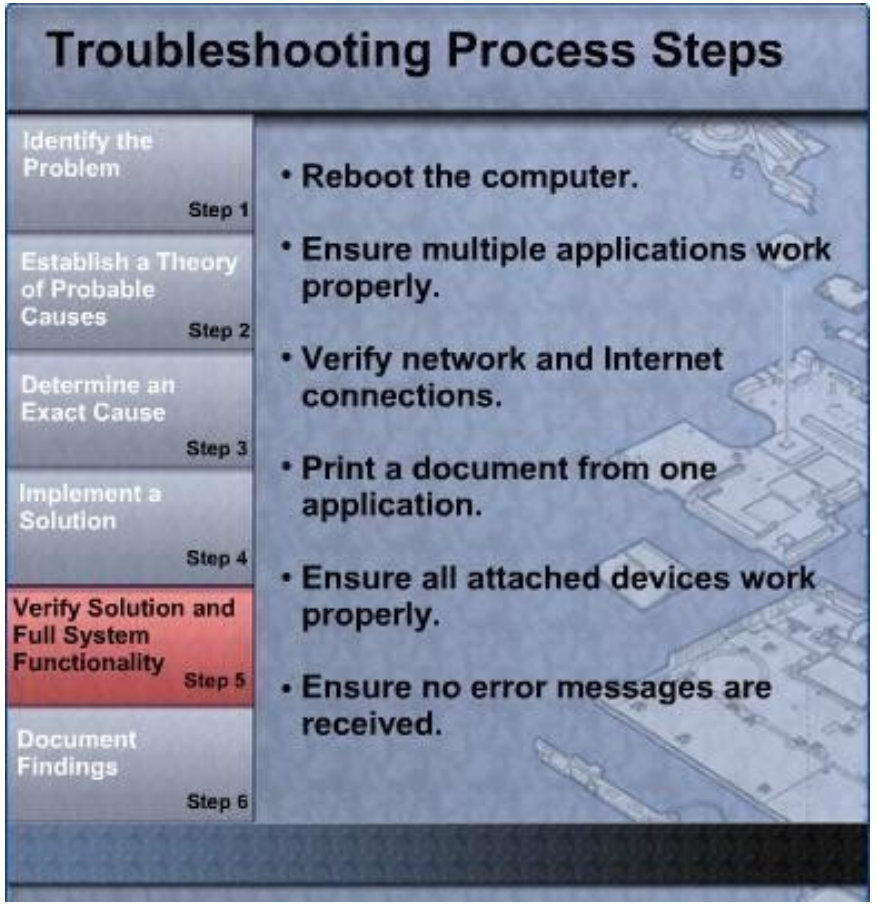
6.2.5 Implement the solution

- After you have determined the exact cause of the problem, establish a plan of action to resolve the problem and implement the solution.



6.2.6 Verify solution and full system functionality

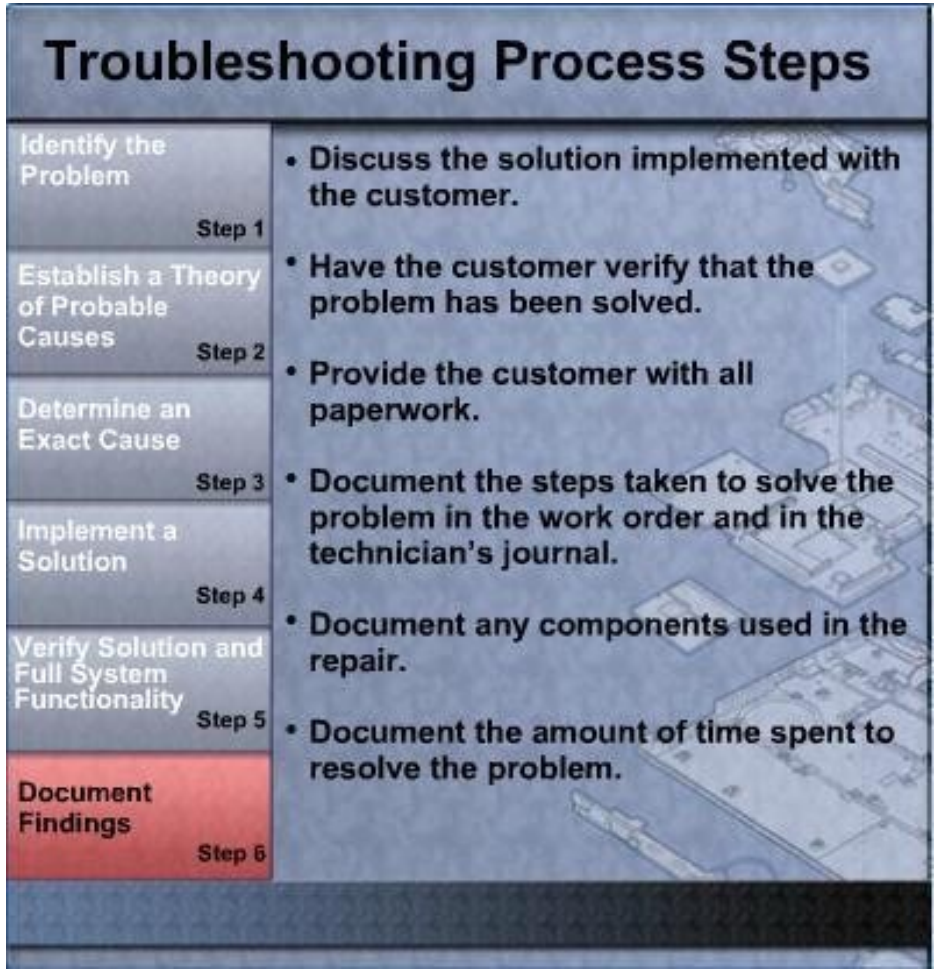
- After the repairs to the computer have been completed, continue the troubleshooting process by verifying full system functionality and implementing any preventive measures if needed.
- Whenever possible, have the customer verify the solution and system functionality.



6.2.7 Document Findings

- After the repairs to the computer have been completed, finish the troubleshooting process by closing with the customer.

- After customer verifies the resolved problem, complete the documentation for the repair in the work order and in your journal.



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