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Chapter 4 Preventive Maintenance and Troubleshooting

Class	CompTIA A+
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Importance	☐
Materials	4.2.2.2 Common Problems and Solutions for Storage Devices.pdf 4.2.2.3 Common Problems and Solutions for Motherboards and Internal Components.pdf 4.2.2.4 Common Problems and Solutions for Power Supplies.pdf 4.2.2.5 Common Problems and Solutions for CPUs and Memory.pdf 4.2.2.6 Common Problems and Solutions for Displays.pdf 4.2.3.4 Advanced Problems and Solutions for Hardware.pdf
Packet Tracer	
Reviewed	☑
↗ Study Schedule (Class notes)	
Type	Lecture

Preventive Maintenance

PC preventive maintenance

- Computer location or environment: dusty environment
- Computer use: high traffic networks

Regular preventive maintenance:

- Reduces potential hardware and software problems, computer downtime, repair costs, and the number of equipment failures.
- Improves data protection, equipment life and stability, and saves money

Internal components

- CPU heat sink and fan assembly: the fan should spin freely, the fan power cable should be secure, and the fan should turn when the power is on
- RAM modules must be seated securely in the RAM slots.
- Storage devices: all cables should be firmly connected
- Screws: a loose screw in the case can cause a short circuit
- Adapter cards: ensure that adapter cards are seated properly and secured with the retaining screws
- Cable connections are secured
- Power devices: inspect power strips, surge suppressors (surge protectors), and UPS devices

Environment concerns

- Do not obstruct vents or airflow to the internal components
- Keep the room temperature between 45 to 90 degrees Fahrenheit (7 to 32 degrees Celsius)
- Keep the humidity level between 10 and 80 percent
- Temperature and humidity recommendations vary by computer manufacturer

Software

- Verify the installed software is current
- Create a software maintenance schedule to:
  - Review and install the appropriate security, software, and driver updates
  - Update the virus definition files and scan for viruses and spyware
  - Remove unwanted or unused programs
  - Scan hard drives for errors and defragment hard drives

Troubleshooting Proces

Troubleshooting process steps

Before beginning troubleshooting problems:

- Data backup is a copy of the data on a computer hard drive that is saved to another storage device or to cloud storage.
- Date of the last backup
- Contents of the backup
- Data integrity of the backup
- Availability of all backup media for a data restore

Liability release form for not data backup:

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

The troubleshooting process

1. Identify the problem: gather as much information as possible from the customer and from the computer.
   a. Talk to the customer, follow these guidelines:
      i. Ask direct questions to gather information
      ii. Do not use industry jargon
      iii. Do not talk down to the customer

iv. Do not insult the customer

v. Do not accuse the customer of causing the problem

b. Open-ended and Closed-ended questions

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

   b. Closed-ended questions generally require a yes or no answer

c. Documenting responses

   a. Work order

   b. Repair log

   c. Repair journal

d. Beep codes

e. BIOS information

f. Event viewer

   a. What problem occurred

   b. Date and time of the problem

   c. Severity of the problem

   d. Source of the problem

   e. Event ID number

   f. Which user was logged in when the problem occurred

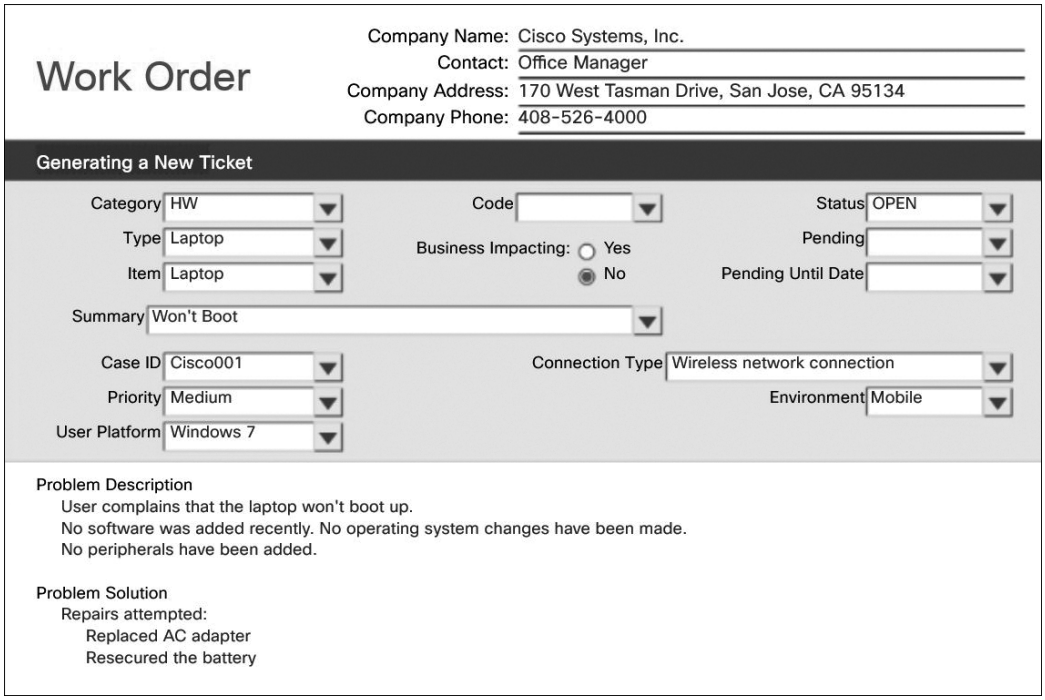
g. Device manager

h. Task manager

i. Diagnostic tools

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	

2. Establish a theory of probable cause
    a. Device is powered off
    b. Power switch for an outlet is turned off
    c. Surge protector is turned off
    d. Loose external cable connections
    e. Non-bootable disk is designated boot drive
    f. Incorrect boot order in BIOS setup
3. Test the theory to determine the cause
    a. Ensure the device is powered on
    b. Ensure the power switch for an outlet is turned on
    c. Ensure the surge protector is turned on
    d. Ensure external cable connections are secure
    e. Ensure that the designated boot drive is bootable
    f. Verify the boot order in BIOS setup



4. Establish a plan of action to resolve the problem and implement the solution
    a. Helpdesk repair logs

b. Other technicians
c. Manufacturer FAQ websites
d. Technical websites
e. News groups
f. Computer manuals
g. Device manuals
h. Online forums
i. Internet search

5. Verify full system functionality and if applicable, implement preventive measures
    a. Reboot the computer
    b. Ensure multiple applications work properly
    c. Verify network and Internet connections
    d. Print a document from one application
    e. Ensure all attached devices work properly
    f. Ensure no error messages are received
6. Document findings, actions, and outcomes
    a. Discuss the solution implemented with the customer
    b. Have the customer verify that the problem has been solved
    c. Provide the customer with all paperwork
    d. Document the steps taken to solve the problem in the work order and in the technician's journal
    e. Document any components used in the repair
    f. Document the amount of time spent to solve the problem

Common problems and solutions for PCs

- Storage device: related to loose, or incorrect cable connections, incorrect drive and media formats, and incorrect jumper and BIOS settings
- Motherboard and internal components: related to incorrect or loose cables, failed components, incorrect drives, and corrupted updates
- Power supply: related to faulty power supply, loose connections, and inadequate wattage

- CPU and memory: related to faulty installations, incorrect BIOS settings, inadequate cooling and ventilation, and compatibility issues
- Displays: related to incorrect settings, loose connections, and incorrect or corrupted drives

Applying troubleshooting process to computer components and peripherals

Personal reference tools

- Notes
- Journal
- History of repairs

Internet reference tools

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