Lecture(3):

Computer troubleshooting

identifying and solving common hardware and software problems that computer user encounter basic troubleshooting techniques and tools for

diagnosing and resolving issues

1. Computer Troubleshooting

The process of identifying and analyzing faults in computer components (hardware or software) and resolving them using a scientific methodology and specialized tools. The goal is to restore normal system functionality in the shortest possible time and at the lowest possible cost.

Source: Chapter 1, "Introduction to Troubleshooting" (23rd Edition, 2023).

2. Common Hardware Problems

A. Main Hardware Failures:

Overheating:

Causes: Dust buildup, fan failure, and poor processor cooling.

Solution: Clean components, replace thermal paste, or upgrade the cooling system.

Tools: Temperature monitoring software (such as HWMonitor).

Hard Disk (HDD/SSD) Failure:

Symptoms: Crackling noises, extreme slowness, or data loss.

Solution: Use tools like CrystalDiskInfo to scan and replace the drive if necessary.

RAM Issues:

Symptoms: Blue Screen (BSOD), system freezes.

Solution: Run MemTest86 to detect errors.

Power Supply Failures:

Symptoms: System not turning on, random reboots.

Solution: Use a multimeter to check the output voltage.

Source: Chapter 2 (Main Components), Chapter 5 (Storage), and Chapter 6 (Power Supplies).

B. Peripheral Failures:

Keyboard/Mouse: Check the USB/PS2 ports are connected or update the drivers.

Monitor: Check the cables or resolution settings.

3. Common Software Problems

A. OS Issues:

System Crashes:

Causes: Driver conflict, corrupted system files. Solution: Use Windows Recovery Environment or reinstall the system.

Extremely slow:

Causes: Programs running in the background, or malware.

Solution: Use Task Manager to stop unnecessary processes, or scan for viruses.

B. Application Errors:

Frequent freezing: Reinstall or update the application.

Compatibility errors: Run the application in compatibility mode.

Source: Chapter 25 (Software Troubleshooting).

4. Basic Troubleshooting Techniques

Scientific Methodology:

Step 1: Identify the problem (e.g., the device is not working).

Step 2: Develop a hypothesis (e.g., a faulty power supply).

Step 3: Test the hypothesis (check the power supply).

Step 4: Implement the solution (replace the power supply).

Divide and Conquer Principle:

Isolate components one by one to identify the source of the failure.

Swap Testing:

Replace the problematic component with a working one (such as RAM).

Source: Chapter 1, "Troubleshooting Methodology" section.

5. Troubleshooting Tools

Hardware Diagnostic Tools:

MemTest86: To check RAM.

Crystal Disk Info: To check the health of hard drives.

Operating System Tools:

Windows Troubleshooter: To fix network and sound problems.

CHKDSK: To fix hard drive errors.

External Tools:

Multimeter: To check voltage.

Multi-head screwdriver: To remove and replace components.

Source: Chapter 30 (Maintenance Tools).

6. Preventive Tips

Routine Maintenance: Clean the computer of dust every 6 months.

Backup: Use tools such as Acronis True Image.

Software Update: Install the latest security and software updates.

Source: Chapter 28 (Preventive Maintenance).