



Computer Troubleshooting

Lecture 3

Assis Lec: Hadi Salah

Lecture Objectives

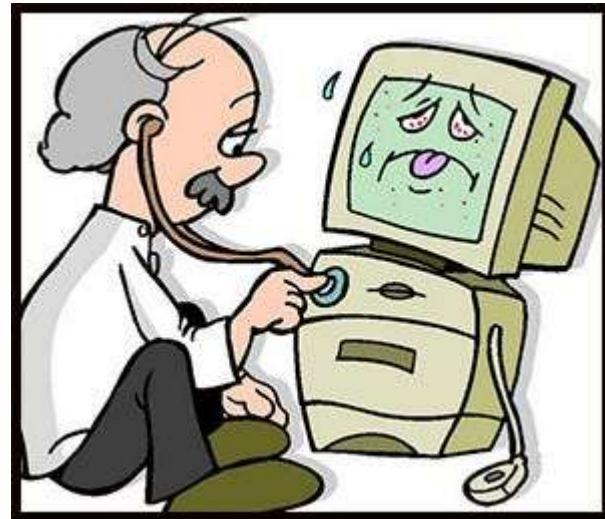
By the end of this lecture, students will be able to:

- Define troubleshooting and its importance
- Identify common hardware and software issues
- Apply basic troubleshooting techniques
- Use essential troubleshooting tools
- Follow a logical diagnostic process

What is Computer Troubleshooting?

Computer troubleshooting is the process of identifying, diagnosing, and resolving problems in computer systems.

It includes both hardware and software issues and aims to restore normal performance.



Why Troubleshooting Matters

- Reduces downtime
- Improves productivity
- Prevents data loss
- Extends device lifespan
- Reduces maintenance cost



Types of Computer Problems

Computer issues are usually classified into:

- Hardware problems (physical components)
- Software problems (programs/OS)
- Network/connection problems
- User configuration errors

Common Hardware Problems

- Computer does not power on
- Overheating and sudden shutdown
- Hard disk failure
- RAM errors
- Peripheral failure (keyboard, mouse, printer)



Common Hardware Problems

Computer does not power on: The computer fails to start due to power supply issues, faulty cables, or motherboard problems.

Overheating and sudden shutdown: The computer overheats because of poor cooling or dust buildup, causing it to shut down automatically for protection.

Hard disk failure: The hard disk stops working properly, leading to data loss, slow performance, or failure to boot the system.

RAM errors: Faulty or improperly installed RAM causes system crashes, freezes, or startup errors.

Peripheral failure (keyboard, mouse, printer): External devices stop functioning due to driver issues, connection problems, or hardware damage.

Common Software Problems

- Slow operating system
- Application crashes
- Boot errors
- Driver conflicts
- Malware infection



Common Software Problems

Slow operating system: The operating system runs slowly due to low system resources, too many background programs, or insufficient storage.

Application crashes: Programs stop working unexpectedly because of software bugs, missing files, or compatibility issues.

Boot errors: The computer fails to start properly due to corrupted system files or boot configuration problems.

Driver conflicts: Hardware devices do not work correctly because incompatible or outdated drivers interfere with each other.

Malware infection: Malicious software infects the system, causing performance issues, data theft, or unauthorized access.

Troubleshooting Methodology

A structured troubleshooting process:

- 1) Identify the problem
- 2) Establish a theory of probable cause
- 3) Test the theory
- 4) Plan and implement solution
- 5) Verify full functionality
- 6) Document findings

Step 1: Identify the Problem

Gather accurate information:

- Ask the user what happened and when
- Observe error messages
- Check recent changes (updates, new software, hardware)
- Reproduce the issue if possible

Step 2: Establish a Theory

Based on symptoms, suggest possible causes.

Examples:

- No display → monitor cable/GPU problem
- Slow PC → low storage/malware/background processes

Step 3: Test the Theory

Use safe tests to confirm root cause:

- Swap cables/devices
- Boot in safe mode
- Check Task Manager and Event Viewer
- Run built-in diagnostics

Step 4: Implement the Solution

Apply the best fix with minimal risk:

- Restart device
- Update drivers/OS
- Remove problematic software
- Repair or replace hardware
- Restore system settings

Step 5 & 6: Verify and Document

After the fix:

- Confirm the issue is fully resolved
- Test normal operation
- Check for side effects
- Document cause, actions, and final solution

Basic Hardware Troubleshooting Techniques

- Check power source and cables
- Reseat RAM and connectors
- Clean dust and ensure cooling
- Listen for beep codes
- Test with known-good components

Basic Software Troubleshooting Techniques

- Restart and update system
- Scan for malware
- Uninstall recent problematic apps
- Check startup programs
- Use System Restore / recovery tools

Essential Troubleshooting Tools

Software tools:

- Task Manager
- Device Manager
- Event Viewer
- Antivirus/anti-malware

Hardware tools:

- Screwdriver set
- Multimeter
- Bootable USB

Network Troubleshooting Basics

Common checks:

- Verify Wi-Fi/Ethernet connection
- Restart router and PC
- Check IP configuration
- Use ping/traceroute
- Test DNS settings

Safety and Best Practices

- Back up important data before major fixes
- Use anti-static precautions
- Avoid unknown software tools
- Keep OS/drivers updated
- Follow least-risk-first approach

Case Study Example

Problem: Computer is very slow.

Diagnosis: High CPU usage + too many startup apps + low free disk space.

Solution: Disable unnecessary startup apps, clean storage, run malware scan, restart.

Result: System performance improved.

Conclusion

Computer troubleshooting is a practical skill for every IT student.

A structured approach helps solve problems quickly and accurately.

Using the right techniques and tools improves system reliability and user satisfaction.