



# Computer Troubleshooting

Lecture 3

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# Lecture Objectives

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

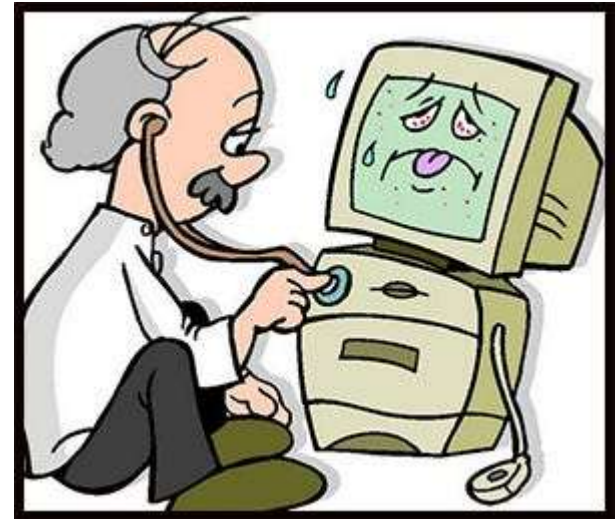
- Define troubleshooting and its importance
- Identify common hardware and software issues
- Apply basic troubleshooting techniques
- Use essential troubleshooting tools
- Follow a logical diagnostic process

# What is Computer Troubleshooting?

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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

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



# Types of Computer Problems

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Computer issues are usually classified into:

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

# Common Hardware Problems

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



# Common Hardware Problems

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**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

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





# Common Software Problems

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**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

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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

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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

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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

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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

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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

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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

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- 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

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

# Essential Troubleshooting Tools

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## Software tools:

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

## Hardware tools:

- Screwdriver set
- Multimeter
- Bootable USB

# Network Troubleshooting Basics

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Common checks:

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

# Safety and Best Practices

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- 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

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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

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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.