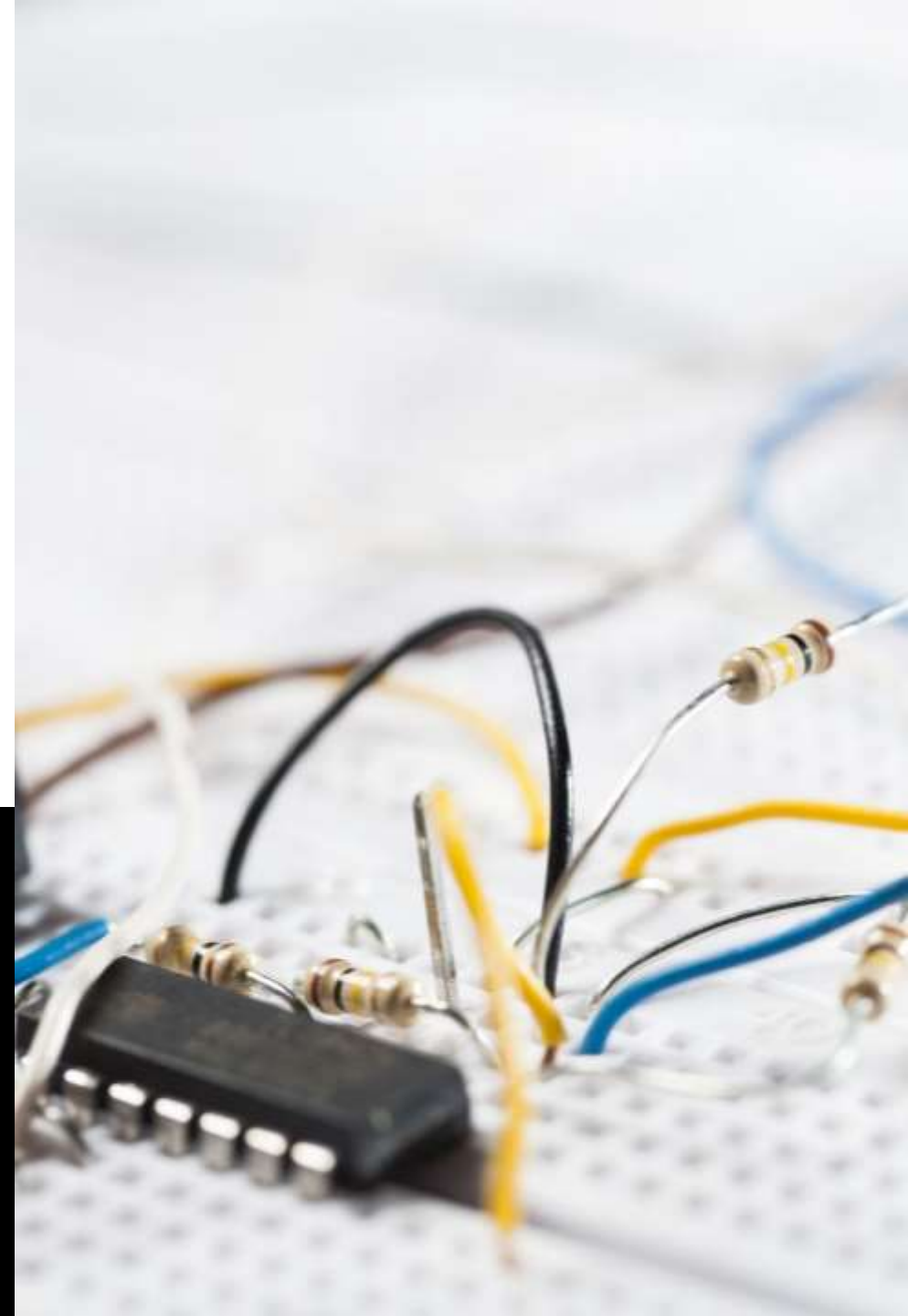


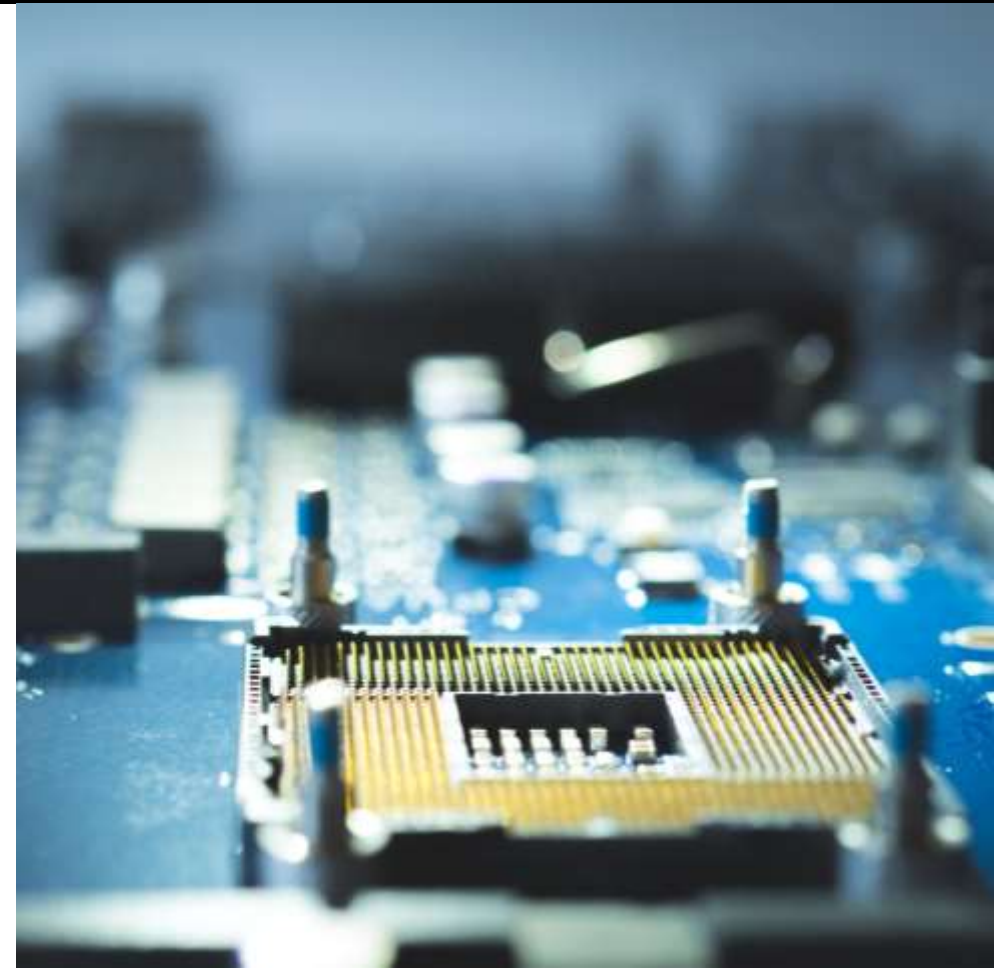
MODULE 3:

DIAGNOSING AND TROUBLESHOOTING HARDWARE ISSUES



Objectives:

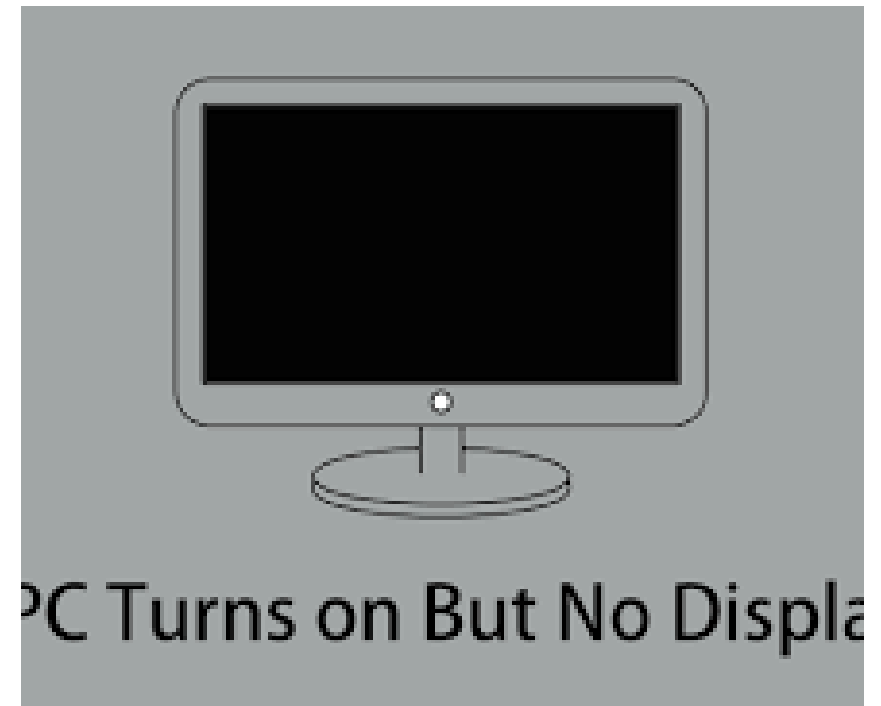
- Identify the common hardware issues.
- Identify the diagnostic tools
- Learn how to troubleshoot power supply issues, faulty RAM, and hard drives



- Graphics Card Issues:** The graphics processing unit (GPU) may be improperly seated in its slot, disconnected, or failing.

- Motherboard Problems:** If the motherboard is faulty, it may not send signals to the GPU or monitor.

- RAM Issues:** Bad RAM can prevent the system from completing the POST (Power-On Self-Test), resulting in no display.



2. Overheating

Explanation: Overheating can lead to performance degradation and hardware damage. Here are some common causes:

- Dust Buildup:** Dust can accumulate in fans, vents, and heatsinks, obstructing airflow and causing components to heat up.
- Faulty Cooling Components:** If fans are not working correctly or thermal paste is worn out, heat may not be dissipated efficiently.



- Poor Airflow:** If the computer case is cramped or poorly designed, hot air can become trapped inside, raising temperatures.

- High Ambient Temperature:** External environmental factors, such as high room temperature, can contribute to overheating.



3. Random Shutdowns

Explanation: Unexpected shutdowns can be alarming and may be due to various underlying issues:

- Overheating:** Many systems are designed to shut down automatically to prevent damage from excessive heat.
- Power Supply Issues:** A failing power supply may not provide stable power, leading to sudden shutdowns. Voltage fluctuations can also cause instability.



- Faulty Hardware Components:**

Issues with RAM, the motherboard, or other critical components can lead to system crashes and shutdowns.

- Software Conflicts:** While less common, certain software issues or driver conflicts can also lead to system instability and shutdowns.



DIAGNOSTIC TOOLS

1. BIOS (Basic Input/Output System)

BIOS is the firmware that initializes hardware during the boot process before handing over control to the operating system. It provides an interface for hardware configuration.

Diagnostic Features:

- Hardware Configuration:** You can check if all components (CPU, RAM, storage, etc.) are detected correctly.
- Settings Adjustment:** You can modify settings such as boot order, fan speeds, and voltage levels.
- System Monitoring:** Many BIOS versions offer hardware monitoring features to check temperatures and voltages.

PC DIAGNOSTIC TOOLS



2. POST (Power-On Self-Test)

POST is a diagnostic process that runs when you first power on your computer. It checks the hardware components to ensure they are functioning properly.

Diagnostic Features:

- **Component Checks:** POST tests critical components like RAM, CPU, and storage devices.
- **Error Codes:** If POST encounters issues, it may return error codes or fail to complete the boot process, indicating specific hardware problems.



3. Beep Codes

Overview: Beep codes are auditory signals emitted by the motherboard during POST to indicate hardware errors. The pattern of beeps corresponds to specific issues.

Common Beep Codes:

- **One Short Beep:** Indicates a successful POST.
- **Continuous Beeps:** Often indicates a RAM issue.
- **Repeating Long and Short Beeps:** Can indicate a video card problem or motherboard failure



HOW TO TROUBLESHOOT POWER SUPPLY ISSUES



Steps:



Check Connections:

Ensure that all power cables (24-pin ATX, 4/8-pin CPU, and any GPU power connectors) are securely connected.



Inspect for Damage:

Look for visible signs of damage like burnt components, bulging capacitors, or frayed wires.



Test with a Multimeter:

If you have a multimeter, test the voltage output from the power supply. Compare readings against the standard voltage levels (e.g., +12V, +5V, +3.3V).



Use a Power Supply Tester:

A power supply tester can quickly check if the PSU is functioning properly.



Try a Different Power Supply:

If possible, swap in a known working power supply to see if the issue resolves.

2. TROUBLESHOOTING FAULTY RAM

1

Reseat RAM Modules:

- Turn off the computer and reseat the RAM sticks in their slots. Ensure they click into place.

2

Test One Stick at a Time:

- If you have multiple RAM sticks, remove all but one and boot the system. Rotate through each stick in different slots to identify a faulty module.

3

Run Memory Diagnostics:

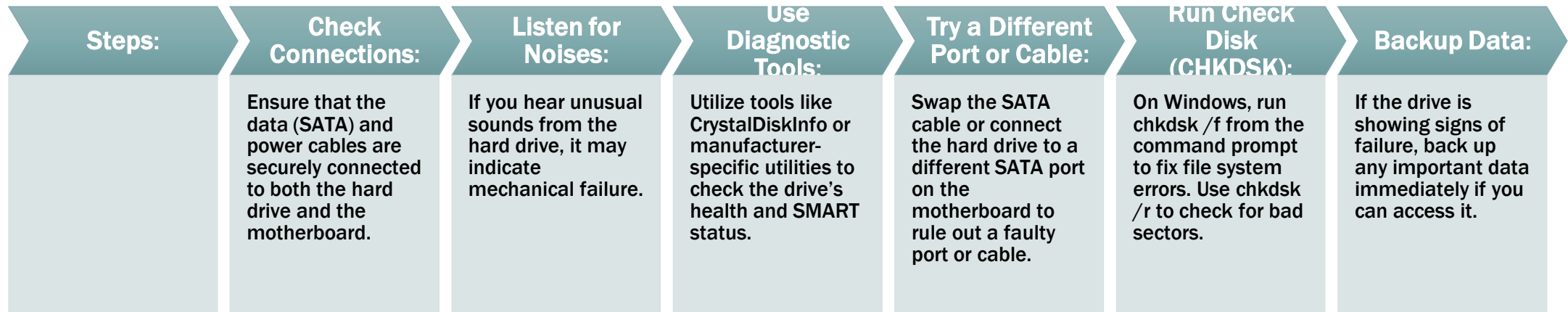
- Use tools like Windows Memory Diagnostic or MemTest86 to check for errors. Let the test run multiple passes for thorough results.

4

Check for Compatibility:

- Ensure that the RAM is compatible with the motherboard (check speed, size, and type).

3. TROUBLESHOOTING HARD DRIVES



Assessment:

(20 points)

Virtual troubleshooting exercises

Identify the issue simulated environment.



Thank you

