Installation & Troubleshooting of RAM & Motherboard Part 2

- Yoga (5 mins)
- Attendance (5 mins)

Attendance

Session Objectives

- Define memory and differentiate between primary (RAM) and secondary storage devices, highlighting their roles in temporary and permanent data storage.
- Explore troubleshooting methods for memory issues, including checking hardware connections, testing RAM modules, and diagnosing software-related problems, and discuss solutions such as reseating RAM, running diagnostic tests, and ensuring compatibility for maintaining system performance and stability.

Memory and Types

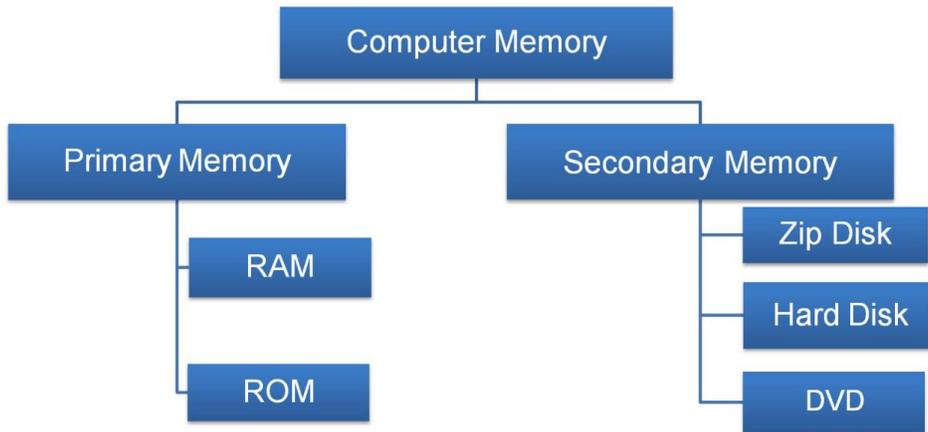A Memory refers to a computing hardware which is used to store information permanently or temporarily.

The device can be external or internal to a computer.

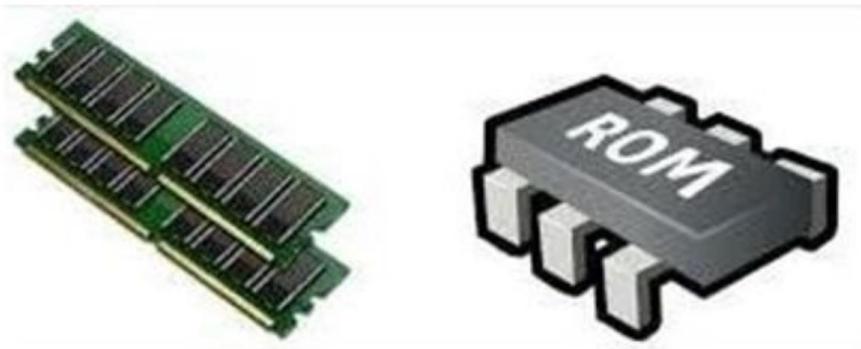There are two types of storage device:

Primary storage device

Secondary storage device

Primary storage device:

A primary storage device is quite smaller in size and it's designed to capture or hold data for a temporary period

Storage Device:

A secondary storage device has a larger storage capacity and can can store data permanently.

The device can be both external and internal to a computer and includes ; compact disk ,USB drive ,hard disk ,etc.

**RAM vs ROM:**

RAM (Random Access Memory):
- RAM is the computer's temporary storage where it keeps information it's actively using.
- Unlike ROM, data in RAM is volatile and lost upon power loss.

ROM (Read-Only Memory):
- ROM functions as permanent memory reserved for storing crucial instructions and data essential for booting up the computer and initializing hardware components.
- In contrast to RAM, data in ROM is non-volatile and retains its integrity even when the power is switched off. ROM offers read-only access, preventing modification or overwriting of stored data. It finds common use in firmware and system initialization processes.

Physical Structure of RAM
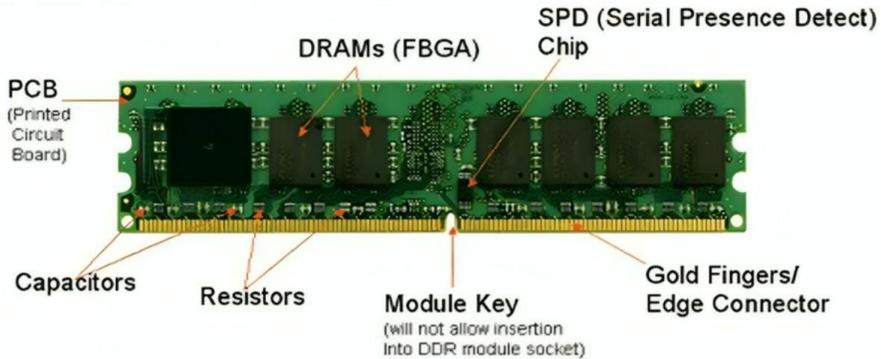
RAM Specification
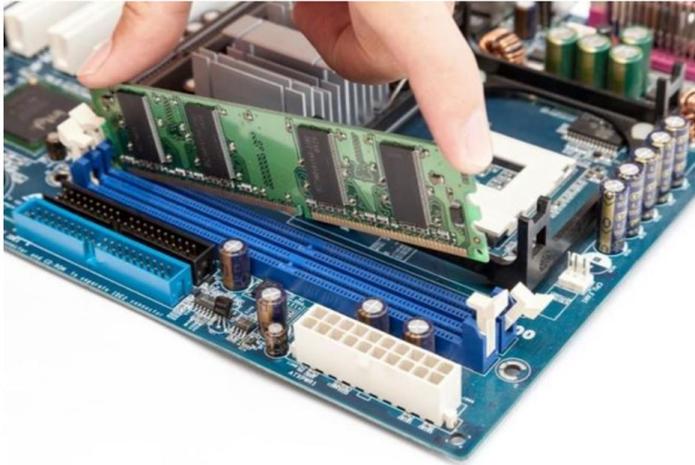
RAM Type	Voltage (V)	Bus Clock (MHz)	Data Rate (MT/s)	Transfer Rate (GB/s)	Number of Pins
DDR	2.5/2.6	133-200	266-400	2.1-3.2	184
DDR2	1.8	266-400	533-800	4.2-6.4	240
DDR3	1.35/1.5	533-800	1066-1600	8.5-14.9	240
DDR4	1.2	1066-1600	2133-3200	17-21.3	288
DDR5	1.1	4800-8400	4800-8400	38.4-67.2	288 or 480

Computer Crashes or Freezes Randomly

Computer Crashes or Freezes Randomly

- Ensure that the RAM modules are securely seated in their slots.
- Power off the computer, open the case and reseat the RAM modules one by one.
- Test the RAM modules individually by removing one module at a time and checking if the crashes still occur.
- This helps to identify, if a specific module is causing the issue.
- If you have multiple RAM slots, try inserting the modules into different slots to check if any specific slot is faulty.
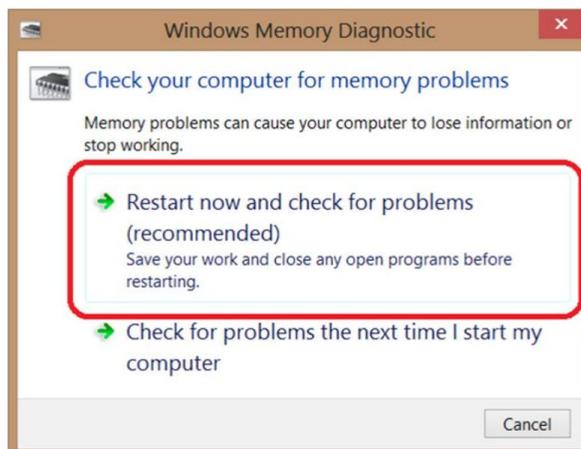
Memory Troubleshooting

Blue screen of death (BSOD) errors

- Run a memory diagnostic test. Windows has a built-in tool called "Windows Memory Diagnostic" that can help identify memory issues.
- To access it search for "Windows Memory Diagnostic" in the Start menu and follow the instructions to run the test.
- If errors are detected during the memory test, try replacing the faulty RAM module with a known-good one.
- Check for BIOS updates for your computer or motherboard.
- Sometimes, BIOS updates include fixes for memory-related issues.

Memory Troubleshooting
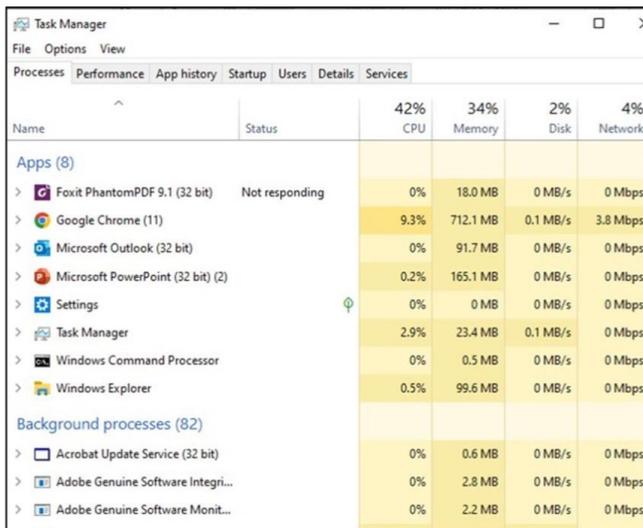
Blue screen of death (BSOD) errors

Memory Troubleshooting

Slow performance or frequent system hangs

- Check the RAM usage in the Task Manager (Ctrl + Shift + Esc on Windows) to see if it's abnormally high.
- If so, there might be a software or memory leak issue causing excessive RAM usage. Identify and close any resource-intensive programs or processes.
- Perform a clean boot to eliminate software conflicts. Disable all non-essential startup programs and services using the System Configuration tool on Windows.
- If the issue is resolved, you can gradually enable the disabled items to identify the problematic one.
- Update your operating system and drivers to the latest versions. Outdated software or drivers can sometimes cause compatibility issues with RAM

Memory Troubleshooting

Memory Troubleshooting

Beeping sounds or no display on startup

- Check if the RAM modules are fully inserted into their slots. Remove and reseat them, ensuring they are properly aligned and locked in place.
- Verify that the RAM modules are compatible with your motherboard. Refer to the motherboard's manual or manufacturer's website for the supported RAM specifications.
- Test the RAM modules individually in different slots to identify if a specific module or slot is causing the issue.
- In some cases, faulty RAM can cause no display or beeping sounds. Consider replacing the RAM modules with new ones to see if the problem persists

Memory Troubleshooting

| Beep Code	Description
1 Beep	Refresh Failure
2 Beeps	Parity Error
3 Beeps	Memory Error (first 64KB)
4 Beeps	Timer Failure
5 Beeps	Processor Failure
6 Beeps	Keyboard Controller Failure
7 Beeps	Virtual Mode Exception Error
8 Beeps	Display Memory Failure
9 Beeps	ROM BIOS Checksum Failure
10 Beeps	CMOS Shutdown Register Failure
11 Beeps	L2 Cache Failure

1. Discuss about primary storage device.

Mind Map

- Draw a Mind Map to summarize the session.
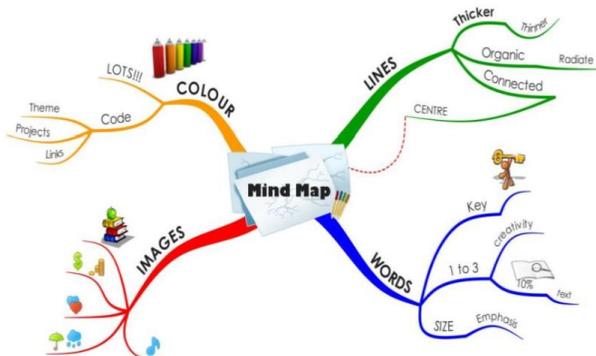
Lesson Key Takeaways

- Memory encompasses hardware used for storing data, categorized into primary and secondary storage.
- Primary storage devices like RAM hold data temporarily, while secondary storage devices offer larger capacity for permanent storage.
- RAM is volatile and used for actively processed data, whereas ROM stores essential instructions permanently.
- Troubleshooting memory issues involves checking hardware connections, testing RAM modules, and diagnosing software-related problems.
- Solutions include reseating RAM modules, running diagnostic tests, updating software, and ensuring compatibility with hardware components.
- Understanding memory types and troubleshooting techniques is crucial for maintaining optimal system performance and stability.