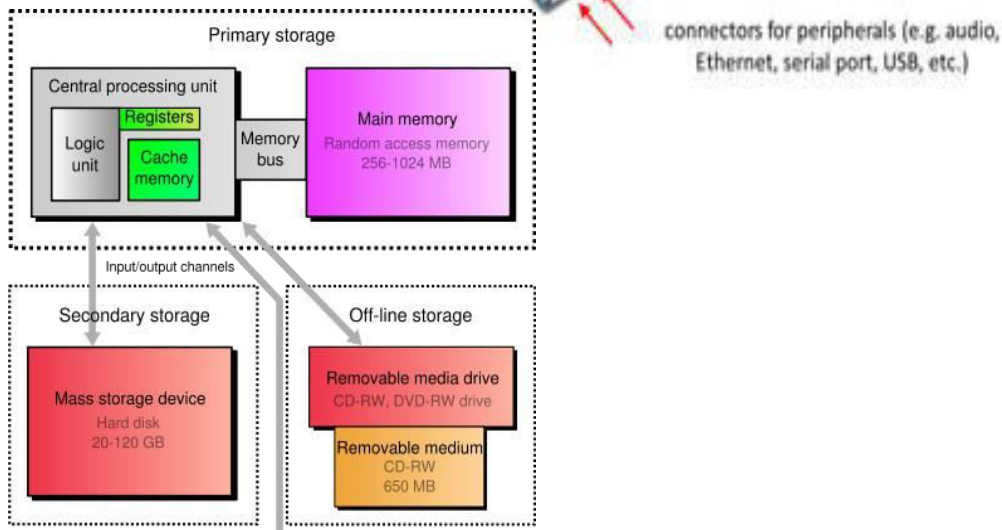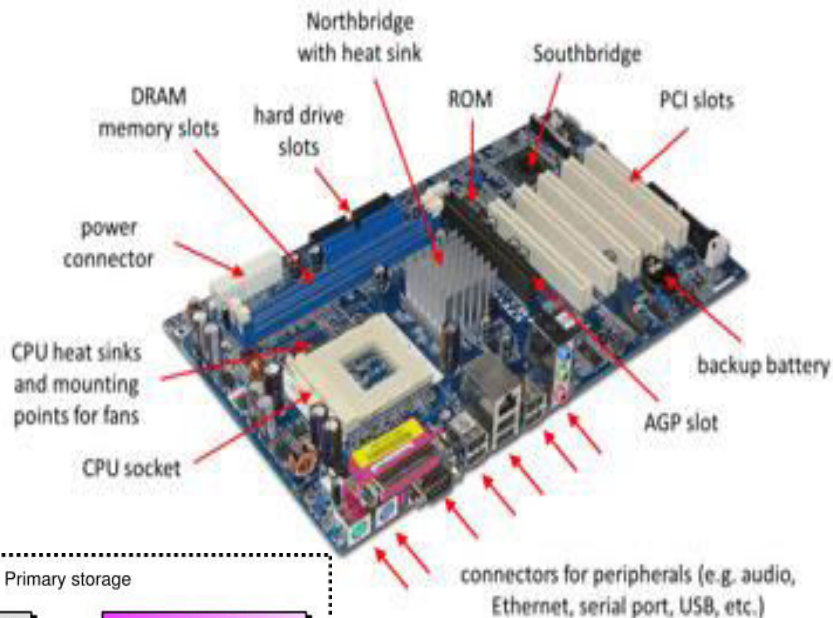# FACULTY OF ENGINEERING & TECHNOLOGY

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Memory
(semiconductor-based integrated circuit)

Northbridge with heat sink
Southbridge
DRAM memory slots
hard drive slots
ROM
PCI slots
power connector
CPU heat sinks and mounting points for fans
backup battery
AGP slot
CPU socket
connectors for peripherals (e.g. audio, Ethernet, serial port, USB, etc.)

Primary storage
Central processing unit
Registers
Logic unit
Cache memory
Memory bus
Main memory
Random access memory
256-1024 MB
Input/output channels
Secondary storage
Off-line storage
Mass storage device
Hard disk
20-120 GB
Removable media drive
CD-RW, DVD-RW drive
Removable medium
CD-RW
650 MB

1. All actual computing starts with the the **CPU** (Central Processing Unit).

2. The **chipset** supports the CPU and contains several **controllers** that control how information travels between the CPU and other components in the PC.

3. The **memory controller** is part of the chipset and establishes the information flow between memory and the CPU.

4. A **bus** is a data path that consists of parallel wires and connects the CPU, memory and other devices. The bus architecture determines how much and how fast data can move around the **motherboard**.

5. The **memory bus** goes from the memory controller to the computer's memory sockets. Newer systems have a **front side bus** (FSB) from the CPU to main memory and a **backside bus** (BSB) from the memory controller to L2 cache.

Role of Memory during Boot-up

- You turn the computer on.

- The computer loads data from read-only memory (**ROM**) and performs a power- on self-test (**POST**) to make sure all the major components are functioning properly. As part of this test, the memory controller checks all of the memory addresses with a quick read/write operation to ensure that there are no errors in the memory chips. Read/write means that data is written to a bit and then read from that bit.

- The computer loads the basic input/output system (**BIOS**) from ROM. The BIOS provides the most basic information about storage devices, boot sequence, security, Plug and Play (auto device recognition) capability and a few other items.

- The computer loads the operating system (**OS**) from the hard drive into the system's RAM. Generally, the critical parts of the operating system are maintained in RAM as long as the computer is on. This allows the CPU to have immediate access to the operating system, which enhances the performance and functionality of the overall system.

- When you open an application, it is loaded into RAM. To conserve RAM usage, many applications load only the essential parts of the program initially and then load other pieces as needed.

- After an application is loaded, any files that are opened for use in that application are loaded into RAM.

- When you save a file and close the application, the file is written to the specified storage device, and then it and the application are purged from RAM.

Type of Semiconductor Memories