Hardware - Processing

Computer Skills

Physics Department

1st year- 2nd Semester

Lecture 3

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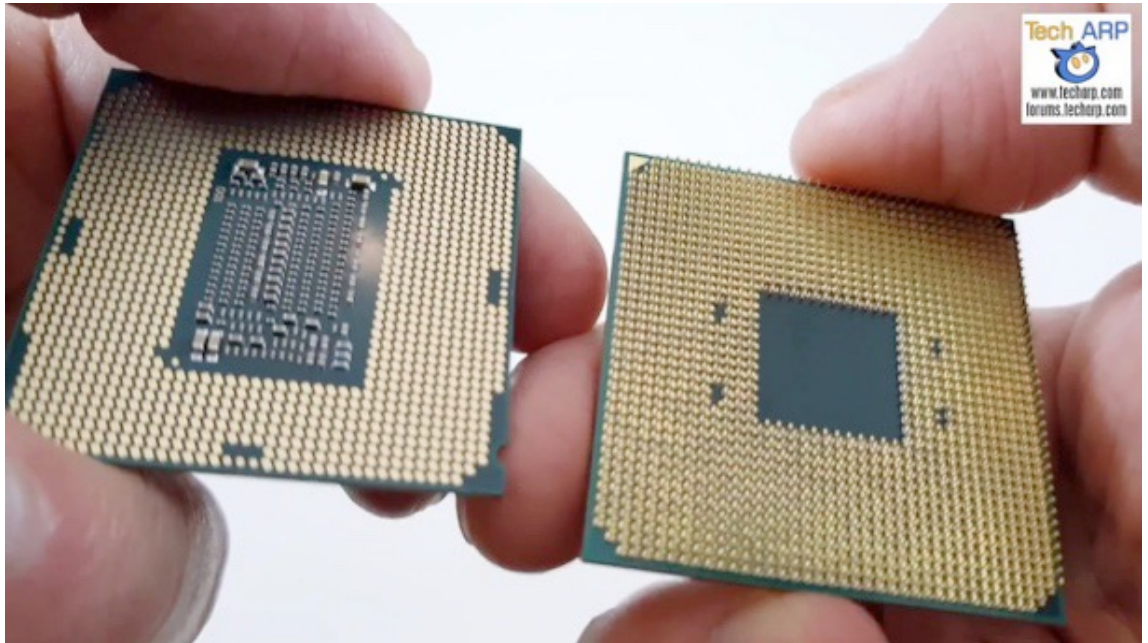
Central Processing Unit (CPU)

- A CPU is brain of a computer. It is responsible for all functions and processes.
- The chip or chips at the heart of a computer that enable it to process data. Also known as a processor.
- Regarding computing power, the CPU is the most important element of a computer system, It determines the speed of your computer, which is measured in **GHz (Giga Hertz).**

- The two main components of CPU are:
  - o *Control Unit (CU)*
  - o *Arithmetic and Logical Unit (ALU)*



Control Unit (CU)

- It tells the computer system how to carry out program instructions from the memory. It controls and coordinates all activities of the computer.
- The process of input, output, processing and storage is performed under the supervision of 'Control Unit'.
- It decides when to start receiving data, when to stop it, where to store data, etc. It takes care of step -by-step processing of all operations inside the computer.
- Provide the necessary data to an ALU.

Arithmetic and Logic Unit (ALU)

- It performs mathematical and logical operations.
- The major operations performed by the ALU are:

1- Arithmetic calculations: addition, subtraction, multiplication, division.

2- Logical operation like compare numbers, letters, or special characters.

Storage Devices

Hardware devices which are used to record and store data are called storage devices, they are of two types.

1. Primary storage devices (MEMORY): Before the data can be processed or a program can be run, it must be in the Memory (RAM & ROM).
2. Secondary storage devices: The devices store data even after the computer is switched off (Internal storage & External storage).

RAM (Random Access Memory)

What is RAM?

An area in the computer system unit that temporarily holds a user's data, operating system instructions and program instructions.

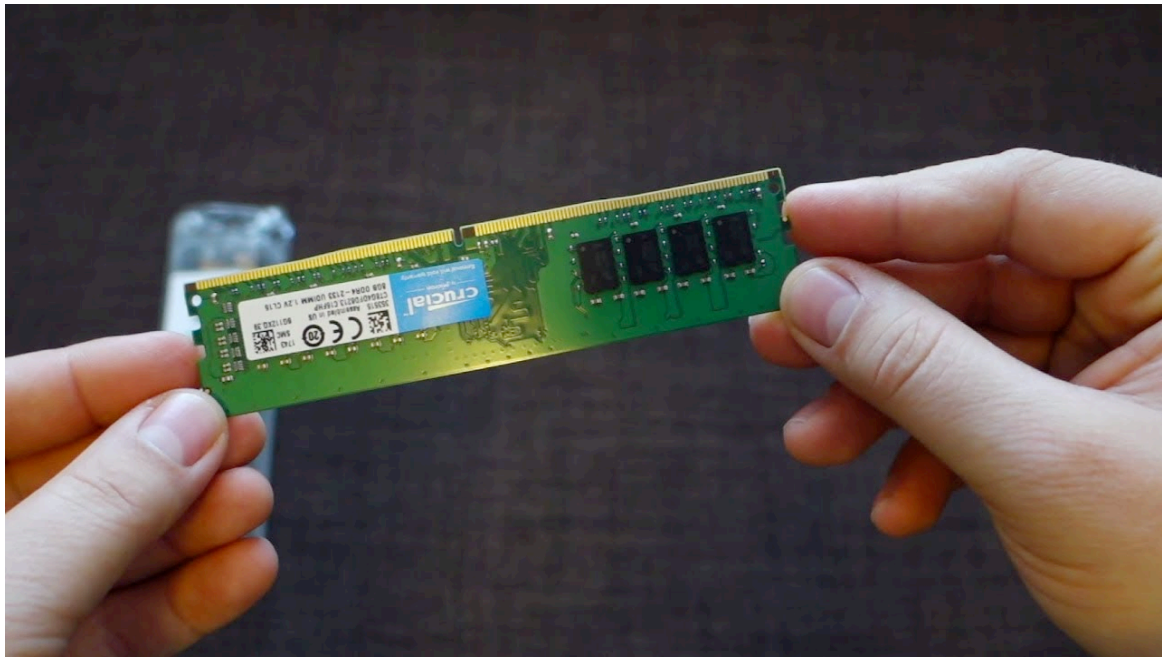
- Used to store data on a temporary basis (e.g. software, text document etc.)
- CPU transfers data from the hard disk drive to RAM
- Data can then be processed
- Data stored in RAM is temporary
- When the computer is switched off, anything stored in RAM is lost
- This type of memory is called **volatile** memory

Example of RAM

Switch on the computer:

- The processor transfers operating system software from the hard disk drive to RAM
- The Windows desktop appears
- Double-click an application icon

  The processor transfers the software from the hard disk drive to RAM



ROM (Read Only Memory)

What is ROM?

A set of chips that contain instructions that help a computer prepare for processing tasks, these instructions are permanent.

- Used to store important data that the CPU needs to keep the PC running
- Data stored in ROM can only be accessed by the CPU and cannot be changed.
- Data stored in ROM is permanent and retained after the computer is switched off
- Can be used repeatedly
- This type of memory is called **non-volatile**

Example of ROM

Switch on the computer

- A boot-up is carried out to make sure your CPU, memory chips and other Vital components are working, if they are, then data is transferred to RAM to start up your operating software; If not, then an error message will appear on screen
- The PC start-up software is stored in ROM so it can be used time and time again.