



Computer Components and Measurements Units

Lecture 3

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2022-2023

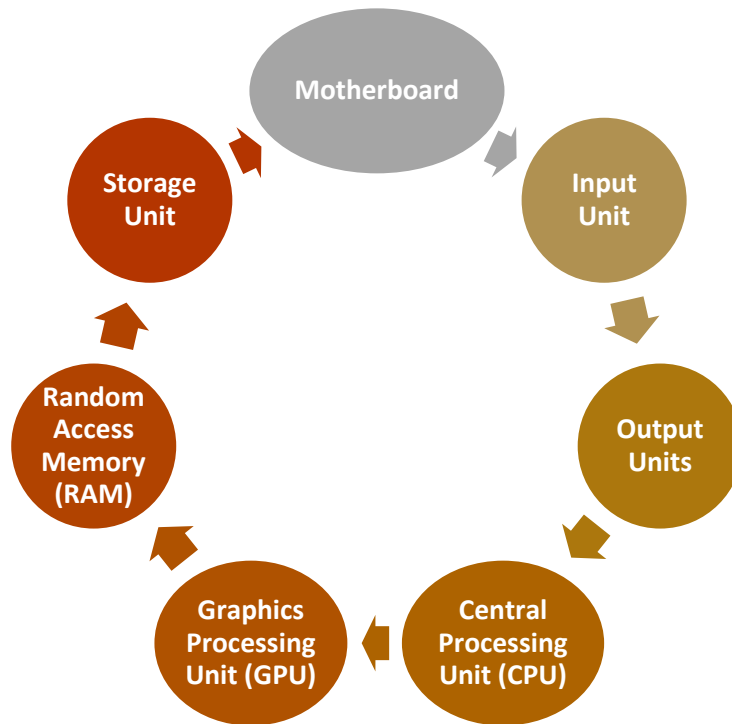


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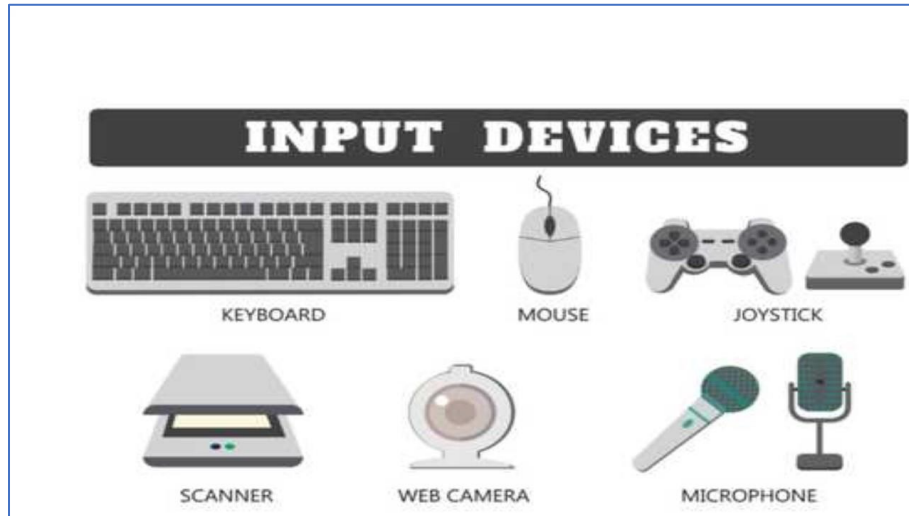
I. Hardware

Computer hardware is the collection of physical elements that constitutes a computer system. Computer hardware refers to the physical parts or components of a computer such as the monitor, mouse, keyboard, computer data storage, hard drive disk (HDD), system unit (graphic cards, sound cards, memory, motherboard and chips), etc. all of which are physical objects that can be touched.



1- Input Devices

Input device is any peripheral (piece of computer hardware equipment to provide data and control signals to an information processing system such as a computer or other information appliance. Input device Translate data from form that humans understand to one that the computer can work with. Most common are keyboard and mouse.



Example of Input devices:

- Keyboard
- Mouse
- Joy Stick
- Light pen
- Track Ball
- Scanner
- Graphic Tablet
- Microphone
- Magnetic Ink Card Reader(MICR)
- Optical Character Reader(OCR)
- Bar Code Reader
- Optical Mark Reader(OMR)

2- Output devices

An output device is any piece of computer hardware equipment used to communicate the results of data processing carried out by an information processing system (such as a computer) which converts the electronically generated information into humanreadable form.



OUTPUT DEVICES



MONITOR



PRINTER



SPEAKER



HEADPHONE



PROJECTOR

Example of Output devices

Monitor

LCD Projection Panels

Printers (all types)

Computer Output Microfilm (COM)

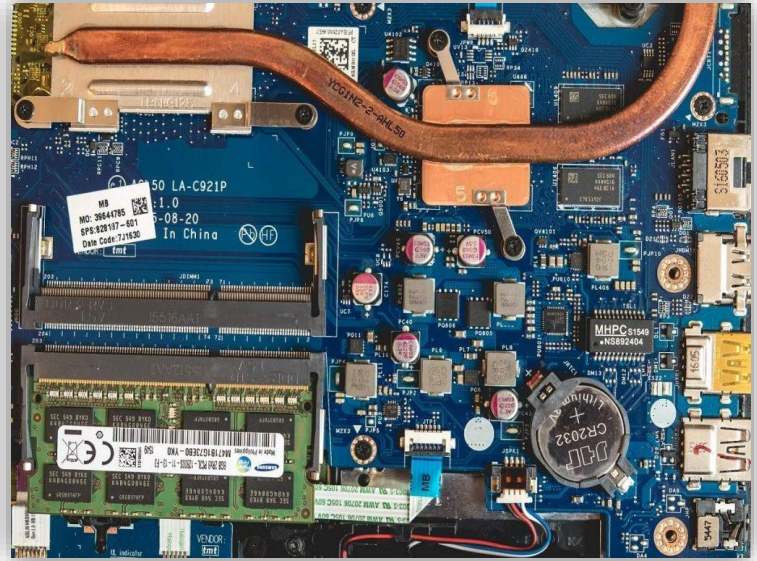
Plotters

Speaker(s)

Projector

3- Motherboard

A motherboard is a circuit board through which all the different components of a computer communications and it keeps everything together. The input and output devices are plugged into the motherboard for function.



4- Central Processing Unit (CPU)

The CPU is called the brain of the computer since no action can take place without its permission and execution as the main processing unit. It communicates with all the other components of the computer and has 3 components that help in the smooth functioning of the CPU. Components of the CPU are:

a. Memory Unit

The information entered through the input devices is saved in the memory of the CPU and then passed on to the other parts. Similarly, when the output is ready it is saved in the memory before the result is given to the user.

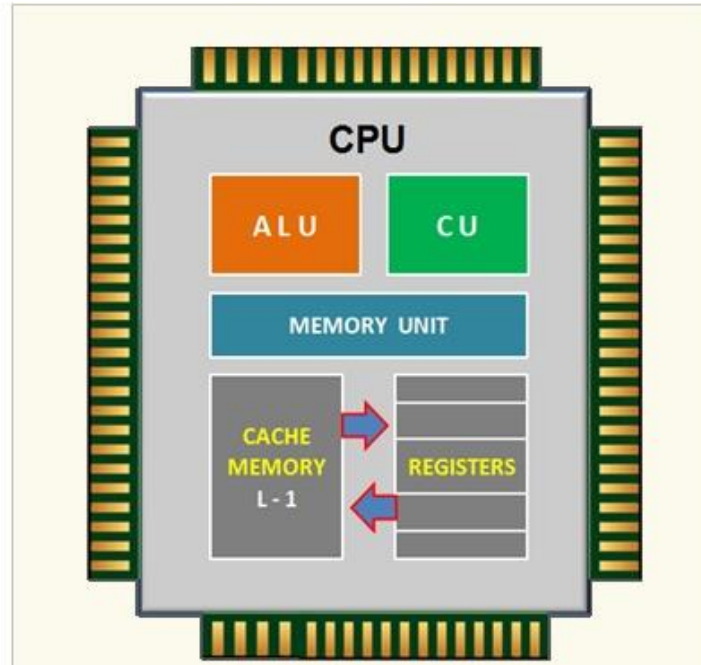
b. Control Unit

This unit controls the functioning component of the computer. It collects the data entered, leads it on for processing after the processing is done, receives the output and provides it to the user. So getting instructions, decoding it, signalling the execution and receiving the output is done by the control centre and hence it is called the centre of all processing actions that happen in the computer.

c. Arithmetic and Logical Unit

This unit does mathematical calculations, arithmetic operations, comparison of data and decision making. It has circuits that are built for addition, subtraction, multiplication, division and other calculations.

CPU Units



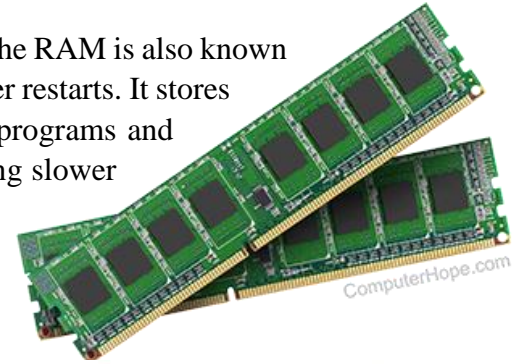
5- Graphics Processing Unit (GPU)

Another vital component of the computer is GPU. The Graphics Processing Unit or the video card helps generate high-end visuals like the ones in video games. Good graphics like these are also helpful for people who have to execute their work through images like 3D modellers and others who use resource-intensive software. It generally communicates directly with the monitor.



6- Random Access Memory (RAM)

RAM is the most commonly referred component in a computer. The RAM is also known as the volatile memory since it gets erased every time the computer restarts. It stores the data regarding the programs which are frequently accessed programs and processes. It helps programs to start up and close quickly. It being slower has made it more obsolete these days.



7- Storage Unit

The computers need to store all their data and they have either a Hard Disk Drive (HDD) or a Solid State Drive (SDD) for this purpose. Hard disk drives are disks that store data and this data is read by a mechanical arm. Solid-State drives are like SIM cards in mobile phones. They have no moving parts and are faster than hard drives.



II. Software

Comparison Application Software and System Software

	System Software	Application Software
	Computer software, or just software is a general term primarily used for digitally stored data such as computer programs and other kinds of information read and written by computers. App comes under computer software though it has a wide scope now.	Application software, also known as an application or an "app", is computer software designed to help the user to perform specific tasks.
Example:	<ol style="list-style-type: none"> 1) Microsoft Windows 2) Linux 3) Unix 4) Mac OSX 5) DOS 	<ol style="list-style-type: none"> 1) Opera (Web Browser) 2) Microsoft Word (Word Processing) 3) Microsoft Excel (Spreadsheet software) 4) MySQL (Database Software) 5) Microsoft PowerPoint (Presentation Software) 6) Adobe Photoshop (Graphics Software)
Interaction:	Generally, users do not interact with system software as it works in the background.	Users always interact with application software while doing different activities.
Dependency:	System software can run independently of the application software.	Application software cannot run without the presence of the system software.



III. Unit of Measurements

1. Storage measurements:

Bits are the basic building blocks of not only data storage, but all computers. Computers work in binary digits, combining 0's and 1's in countless patterns. These binary digits are known as bits, and are the smallest possible unit for data storage.

When 8 bits are combined, you get a **byte**. Bytes are used to store a single character; whether's it a letter, number, or punctuation. All memory storage is expressed in terms of bytes, so although bits might be the foundation upon which data storage is built, bytes are the building blocks that truly denote the usability of any one storage solution.

Because storage is expressed in terms of bytes, all greater units are typically referred to by their shortened names. This means that you could keep adding more prefixes to talk about more and more data. Above terabyte, we have petabyte (PB), exabyte (EB), zettabyte (ZB), and yottabyte (YB).

Data Storage Units Chart: From Smallest to Largest

Unit	Shortened	Capacity
Bit	b	1 or 0 (on or off)
Byte	B	8 bits
Kilobyte	KB	1024 bytes
Megabyte	MB	1024 kilobytes
Gigabyte	GB	1024 megabytes
Terabyte	TB	1024 gigabytes
Petabyte	PB	1024 terabytes
Exabyte	EB	1024 petabytes
Zettabyte	ZB	1024 exabytes
Yottabyte	YB	1024 zettabytes



2. Speed measurement

The speed of Central Processing Unit (CPU) is measured by Hertz (Hz), Which represent a CPU cycle. The speed of CPU is known as Computer Speed.

CPU SPEED MEASURES	
1 hertz or Hz	1 cycle per second
1 MHz	1 million cycles per second or 1000 Hz
1 GHz	1 billion cycles per second or 1000 MHz