UNIT -III

💻 Computer Components – Input, Processing, Output, and Storage (IPOS Cycle)

The working of a computer can be understood by dividing it into four main components. These are:

1. **Input**
2. **Processing**
3. **Output**
4. **Storage**

Together, these four components make up the **IPOS cycle**, which represents how data flows through a computer system to complete any task.

🖱️ 1. Input Devices

Input refers to the data and instructions that are entered into a computer system using various devices. Input devices allow users to interact with and control the computer. These devices convert human-readable information into a form that the computer can process.

🔷 Examples of Input Devices:

- **Keyboard:** Used to enter text, numbers, and commands. It includes keys for letters, numbers, and function keys.
- **Mouse:** A pointing device that allows the user to select and open files or folders. It controls the cursor on the screen.
- **Scanner:** Converts physical documents or images into digital format.
- **Microphone:** Captures audio and converts it into digital sound for recording or communication.
- **Webcam:** Captures real-time video input and sends it to the computer.

🧠 Real-Life Example:

When a user types an email using a keyboard or clicks on icons using a mouse, they are giving input to the computer. This input is then sent to the processing unit for action.

🧠 2. Processing Unit (CPU – Central Processing Unit)

Processing is the operation of manipulating the input data according to the given instructions. This is done by the **CPU (Central Processing Unit)**, also called the "brain of the computer."

The CPU performs all calculations, logical comparisons, and data management tasks. It is responsible for understanding the instructions provided by the user and taking action accordingly.

🔹 Main Parts of CPU:

- **ALU (Arithmetic Logic Unit):** Performs all arithmetic operations like addition, subtraction, multiplication, and division. It also handles logic operations like comparisons (greater than, less than, equal to).
- **CU (Control Unit):** Manages and coordinates all parts of the computer. It tells the system how to respond to the instructions given.
- **Registers:** Small storage areas within the CPU used to hold temporary data and instructions during processing.

🧠 Real-Life Example:

Suppose you calculate `45 + 67` using a calculator on your computer. The numbers are input through the keyboard. The CPU processes the calculation using the ALU and gives the result `112`.

🖥️ 3. Output Devices

Output is the result produced by the computer after processing the input data. Output devices convert the machine-readable data into human-readable form so that users can see, hear, or use the results.

🔹 Examples of Output Devices:

- **Monitor (Display Screen):** Shows the processed data in the form of text, images, or videos.
- **Printer:** Produces a hard copy (printed paper) of digital documents.
- **Speakers:** Convert digital audio signals into sound.
- **Projector:** Displays information on a large screen for presentation purposes.

🧠 Real-Life Example:

After typing a document and clicking "Print," the computer sends the data to the printer (output device), and the result is a printed paper of your document.

💽 4. Storage Devices

Storage refers to the components used to save data permanently or temporarily for future use. Data and instructions that are not currently in use but need to be saved are stored using various storage devices.

🔷 Types of Storage:

A. Primary Storage (Temporary):

- **RAM (Random Access Memory):** Holds the data and instructions that are currently being used by the CPU. Data in RAM is erased when the computer is turned off.
- **ROM (Read Only Memory):** Contains permanent instructions that help start the computer when it is powered on.

B. Secondary Storage (Permanent):

- **Hard Disk Drive (HDD):** Stores large amounts of data permanently. Slower than SSDs.
- **Solid State Drive (SSD):** Faster, durable, and more expensive storage option.
- **Pen Drives/Flash Drives:** Portable storage devices used for transferring data.
- **CD/DVDs:** Optical disks used for storing media and data.

🧠 Real-Life Example:

If you are writing a project in Microsoft Word, the temporary data is stored in RAM while you are working. Once you save the file, it is stored permanently on your hard drive or pen drive.

🔁 How These Components Work Together (IPOS Cycle)

Here's a simple flow of how these components interact:

1. You **input** data using a keyboard (Input).
2. The **CPU processes** this data using instructions (Processing).
3. The result is displayed on the **monitor** (Output).
4. The result is then **saved** to a file on your hard disk (Storage).

💡 Example of Full IPOS Cycle:

You scan a document (Input) → the CPU processes the scan (Processing) → you view the scanned image on the monitor (Output) → you save it in a folder on the desktop (Storage).