# ****Computer Studies Notes: Introduction to Computers and Components****

## ****1. What is a Computer?****

A **computer** is an electronic machine that:

* Receives input
* Processes it under given instructions (program)
* Stores data for future use
* Produces output in a meaningful form

### ****The Basic Functions of a Computer (IPO Model):****

* **Input** – Receiving raw data from the user
* **Processing** – Converting data into useful information
* **Storage** – Holding data permanently or temporarily
* **Output** – Displaying or communicating results
* **Control** – Directing and managing all operations

## ****2. Components of a Computer System****

A computer system consists of:

* **A. Hardware**
* **B. Software**
* **C. Orgware**

### ****A. Hardware**** (Tangible components of a computer)

**Hardware** refers to the physical parts of a computer that can be seen and touched. It includes:

1. Input Devices
2. Output Devices
3. Processing Unit
4. Memory Devices
5. Storage Devices
6. Communication Devices

### 🔹 ****1. Input Devices****

Used to enter data and instructions into the computer.

| ****Device**** | ****Function**** |
| --- | --- |
| Keyboard | Types letters, numbers, and commands |
| Mouse | Points, selects, and drags on screen |
| Scanner | Digitizes documents |
| Microphone | Records sound |
| Webcam | Captures real-time images/videos |
| Touchscreen | Allows finger gestures for input |

### 🔹 ****2. Output Devices****

Used to convey processed information to the user.

| ****Device**** | ****Function**** |
| --- | --- |
| Monitor | Displays visual information |
| Printer | Produces hardcopy output on paper |
| Speaker | Outputs audio/sound |
| Projector | Enlarges display onto a wall or screen |

### 🔹 ****3. Processing Unit (CPU)****

The **Central Processing Unit (CPU)** is the brain of the computer where actual processing takes place.

**Components of the CPU:**

* **ALU (Arithmetic and Logic Unit)** – Performs calculations and logical operations
* **CU (Control Unit)** – Directs all computer operations
* **Registers** – Small, high-speed memory units that temporarily store data during processing

### 🔹 ****4. Memory Devices****

**Memory** is part of hardware and is essential for temporary data storage during processing.

| ****Type**** | ****Description**** |
| --- | --- |
| RAM | Random Access Memory – volatile, temporary memory |
| ROM | Read Only Memory – non-volatile, permanent memory |
| Cache Memory | Very fast memory located close to CPU |
| Registers | Smallest and fastest memory inside the CPU |
| Virtual Memory | Part of storage (like HDD) used to expand RAM when needed |

**Volatile memory** loses content when power is off (e.g., RAM), while **non-volatile memory** retains data (e.g., ROM).

### 🔹 ****5. Storage Devices****

These store data permanently or semi-permanently for future use.

#### ➤ a) ****Primary Storage (Main Memory)****

Includes RAM and ROM (covered above)

#### ➤ b) ****Secondary Storage (Long-Term Storage)****

| ****Device**** | ****Description**** |
| --- | --- |
| Hard Disk Drive (HDD) | Magnetic storage; large capacity, slower |
| Solid-State Drive (SSD) | Electronic storage; faster, durable, no moving parts |
| USB Flash Drive | Portable and removable storage device |
| Memory Cards | Used in phones, cameras, tablets |
| CD/DVD (Optical Discs) | Use laser to read/write data |
| External Hard Drive | Used for backups and transferring large files |

**Storage** is essential for saving programs, documents, media files, backups, and the operating system.

### 🔹 ****6. Communication Devices****

Allow the computer to connect and share data with other computers or networks.

| ****Device**** | ****Function**** |
| --- | --- |
| Modem | Converts digital to analog signals and vice versa |
| Router | Directs internet/network traffic between devices |
| NIC | Enables connection to a network (wired or wireless) |
| Switch | Connects multiple devices within a LAN |

## ****B. Software**** (Intangible components of a computer)

**Software** is a collection of programs and instructions that tell hardware what to do.

### 🔸 ****Types of Software****

| ****Category**** | ****Description**** | ****Examples**** |
| --- | --- | --- |
| System Software | Manages computer hardware and system tasks | Windows, Linux, macOS, Device Drivers |
| Application Software | Performs user-specific tasks | MS Word, Excel, Chrome, Photoshop |
| Programming Software | Helps programmers write code | Python, Java, Visual Studio, IDEs |

### ****Comparison: Hardware vs. Software****

| ****Hardware**** | ****Software**** |
| --- | --- |
| Physical/tangible parts of a computer | Instructions/programs (intangible) |
| Can be touched or seen | Cannot be physically touched |
| Affected by physical damage | Affected by viruses and bugs |
| Cannot be copied easily | Can be duplicated or downloaded |
| Needs software to function | Needs hardware to run |

## ****C. Orgware**** (Human and policy framework)

**Orgware** refers to the people and organizational procedures required to run and manage a computer system effectively.

### Examples of Orgware:

* **IT Personnel** – Technicians, programmers, network admins
* **User Training** – Guides and training to use computers effectively
* **Policies and Procedures** – Security guidelines, data usage policies