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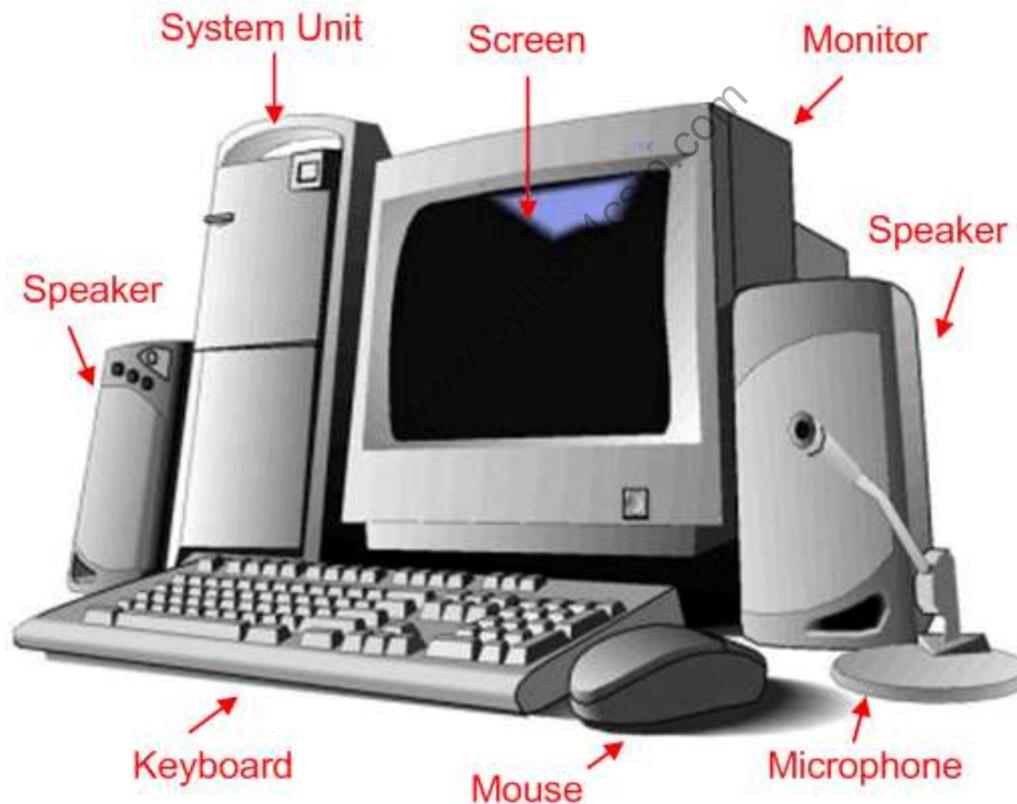
COMPUTER SYSTEM ORGANIZATION

Understanding fundamental of computer

What is Computer?

- A computer is an electronic device that can perform a variety of operations in accordance with set of instructions called program.
- A computer can be defined as an electronic device which accepts input from the user, process the input and produce the desired output.

Basic Computer Components



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Introduction

- Our present day life is so automatic that most of the tasks are accomplished with a click of a button. In every sphere of life, machines dominate human efforts. Let us take the case of cash withdrawal from a bank ATM. The user is required to press only a few buttons to authenticate his identity and the amount he wishes to withdraw. Then within seconds the money pops out of the ATM. During this process, the inside working of bank ATM is beyond imagination of the user. Broadly speaking, the ATM receives certain data from the user, processes it and gives the output (money). This is exactly what a computer does. Formally, a computer can be defined as follows:
- “ An electronic device which is capable of receiving information (data) in a particular form and of performing a sequence of operations in accordance with a predetermined but variable set of procedural instructions (program) to produce a result in the form of information or signals.”

Introduction

- ❑ computer performs basically five major functions irrespective of its size and make.
- ❖ It accepts data or instructions by way of input
- ❖ It stores data
- ❖ It processes data as required by the user
- ❖ It controls operations of a computer
- ❖ It gives results in the form of output



I-P-O Cycle

Block Diagram of Computer

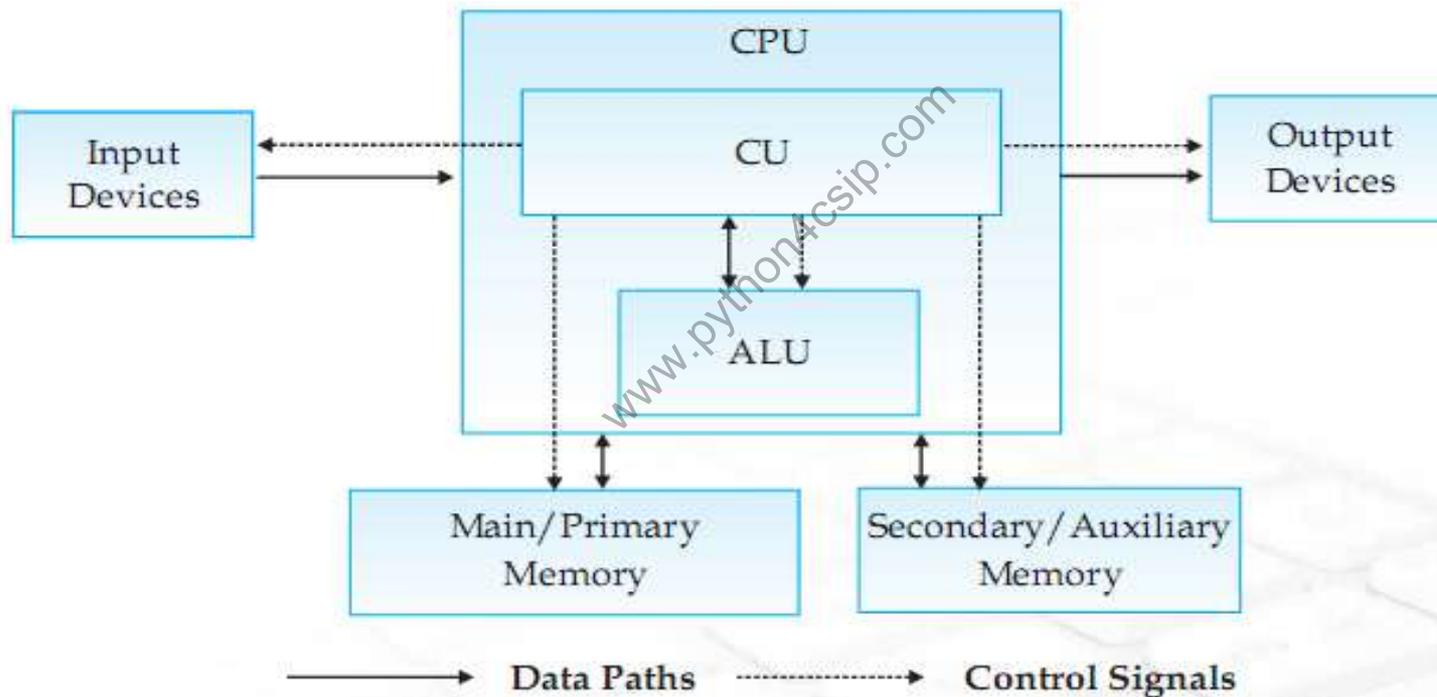


Figure 1.1 Block diagram of functional units of a computer

Block Diagram of Computer

- The above diagram describes the basic layout of a computer. A computer receives data and instructions through "Input Devices" which get processed in Central Processing Unit, "CPU" and the result is shown through "Output Devices". The "Main / primary Memory" and "Secondary / Auxiliary Memory" are used to store data inside the computer. These are the basic components that each computer possess. Each of these components exists in various types and variety that differ in shape, size, usage and performance. The user makes a choice according to his specific requirement.

CPU

- Stands for Central Processing Unit
- Also known as the Brain of Computer.
- It convert the Input into Output
- CPU perform its operation with the help of its 2 subunits :-
 - ▣ ALU : Arithmetic and Logic Unit
 - ▣ CU : Control Unit

ALU

- ALU Perform all the arithmetical and logical operations.
- Arithmetic operations like +, -, *, /
- Logical operation like comparison or decision making like: >, <, =, >=, <=, <>

CU

- Control and guides the interpretation of all the data and information.
- It coordinates the different units attached to computer system.
- It takes input from Input device and store it in main memory, then it send the data to ALU if any arithmetic operation is required after this it transfer the output to output devices.

Memory of Computer

- Memory refers to the place where data is stored temporarily or permanently.
- Input must go to Memory Unit then only any action on it can be performed.
- Computer Memory is basically of 2 types:
 - ▣ Primary Memory
 - Primary or main memory stores information (data and instruction)
 - ▣ Secondary Memory
 - Stores the data permanently for future retrieval

Primary Memory

- Random Access Memory (RAM)
 - It is the working memory, right from the booting of computer till the computer is shutdown this memory is in use to store all the operation done by the computer
 - is used for primary storage in computers to hold active information of data and instructions.
 - It holds data temporarily i.e. Volatile Memory
 - Data is lost if Power Off



Primary Memory

- Read Only Memory (ROM)
 - ▣ ROM (Read Only Memory) is used to store the instructions provided by the manufacturer, which holds the instructions to check basic hardware inter connector and to load operating system from appropriate storage device
 - ▣ It is also known as **FIRMWARE**
 - ▣ Its data is stored permanently on it so it is non-volatile device.



Unit of Memory

**The elementary unit of memory is a bit (binary digit)
Zero(0) & One(1)**

GROUP OF	KNOWN AS
4 BIT	NIBBLE
8 BIT	BYTE
1024 BYTES	1 KILO BYTE(KB)
1024 KB	1 MEGA BYTE(MB)
1024 MB	1 GIGA BYTE(GB)
1024 GB	1 TERA BYTE(TB)
1024 TB	1 PETA BYTE(PB)

Secondary Storage Devices

- If we want to save data for future reference and retrieval then it needs to be saved in memory other than primary memory, which is called secondary memory, or auxiliary memory. Normally hard disk of computer is used as secondary memory but this is not portable so there are many other secondary storage media in use.
- Example:
 - ▣ Hard Disk
 - ▣ CD/DVD
 - ▣ Pen Drive
 - ▣ Floppy, etc.

Secondary Storage Devices

□ HARD DISK :

- A **hard disk drive (HDD; also hard drive, hard disk, or disk drive)** is a device for storing and retrieving digital information, primarily computer data.
- It consists of one or more rigid (hence "hard") rapidly rotating discs (often referred to as platters), coated with magnetic material and with magnetic heads arranged to write data to the surfaces and read it from them.
- Generally hard disks are sealed units fixed in the cabinet. It is also known as fixed disk



Secondary Storage Devices

- FLOPPY DISK : It is a data storage medium that is made up of a disk of thin, flexible magnetic material enclosed in a cover. Its capacity is 1.44 MB.



- COMPACT DISK (CD): Capacity of standard 120mm CD is 700MB. It is a thin optical disk which is commonly used to store audio and video data. Transfer speed is mentioned as multiple of 150 KB/s. 4x means



Secondary Storage Devices



- DIGITAL VIDEO DISK (DVD) : This is an optical disc storage device. It can be recorded on single side or on double side. Its capacity may range from 4.7 GB to 8.5 GB.
- PEN DRIVE :This is small, portable memory, which can be plugged into a computer with USB Port.

They have capacity lesser than hard disk but much larger than a floppy or CD. They are more reliable also. They are also called pen drive.



Input Devices

- These are the devices used to give input to computer for processing.
- Input may be in form of text, images, audio, etc.
- Input Devices example:
 - ▣ Keyboard
 - ▣ Mouse
 - ▣ Joystick
 - ▣ Scanner
 - ▣ Etc.

KEYBOARD



This is the most common input device which uses an arrangement of buttons or keys. In a keyboard each press of a key typically corresponds to a single written symbol. However some symbols require pressing and holding several keys simultaneously or in sequence. While most keyboard keys produce letters, numbers or characters, other keys or simultaneous key presses can produce actions or computer commands.

MOUSE



Mechanical Mouse



Wired



Wireless

Optical Mouse

A mouse is a pointing device that functions by detecting two-dimensional motion relative to its supporting surface. The mouse's motion typically translates into the motion of a cursor on a display, which allows for fine control of a Graphical User Interface. A mouse primarily comprises of three parts: the buttons, the handling area, and the rolling object. Using left button of mouse different operations like selection, dragging, moving and pasting can be done. With the right button we can open a context menu for an item, if it is applicable.

SCANNER

Scanner is a device that optically scans images, printed text, handwriting, or an object, and converts it to digital image.



JOYSTICK

A **joystick** is an input device consisting of a stick that pivots on a base and reports its angle or direction to the device it is controlling.

Many people use joysticks on computer games involving flight such as flight simulator.

Joysticks are often used to control video games, and usually have one or more push-buttons whose state can also be read by the computer



TOUCH SCREEN



A touch screen is a computer display screen that is also an input device. The screens are sensitive to pressure; a user interacts with the computer by touching pictures or words on the screen.

You may see it at as KIOSKS installed in various public places like ATM machines, Railway's PNR Checking machine etc.

MICROPHONE



It is used to input audio data into the computer. They are mainly used for sound recording.

OUTPUT DEVICE

- Output device is used to display the output to user either in soft copy or hard copy.
- Soft copy output appears on monitor whereas hard copy output appears on paper by printer.
- Various output devices are:
 - ▣ Monitor
 - ▣ Printer
 - ▣ Speaker
 - ▣ Projector etc.

Monitor

- Also known as Visual Display Unit (VDU)
- It is the primary output device where we see the output. It looks like TV.
- Its display may be CRT, LCD or LED
- CRT – Cathode ray tube
- LCD – Liquid Crystal Display
- LED – Light Emitting Diode



Printer

- Printer produces output on paper.
- There are various types of printer available in market like:
- **Dot Matrix Printer** : uses ribbon and hammer technology. Its quality is not very good. Output is printer by making object using small dots.



Printer



- Inkjet/Deskjet Printer: is a type of computer printer that creates a digital image by propelling droplets of ink onto paper.
- Laser Printer : These printers use laser technology to produce printed documents. These are very fast printers and are used for high quality prints.



CMOS

- ❑ **complementary metal-oxide semiconductor**
- ❑ CMOS is an onboard, battery powered semiconductor chip inside computers that stores information.
- ❑ This information ranges from the system time and date to system hardware settings for your computer.
- ❑ CMOS battery is generally used to give backup support to BIOS program.



BIOS

- The basic input/output system (BIOS) is also commonly known as the System BIOS. The BIOS is boot firmware, a small program that controls various electronic devices attached to the main computer system.
- It is designed to be the first set of instructions run by a Computer when powered on. The initial function of the BIOS is to initialize system devices such as the RAM, hard disk, CD/DVD drive, video display card, and other hardware.

