

Unit-I Introduction to Computer System

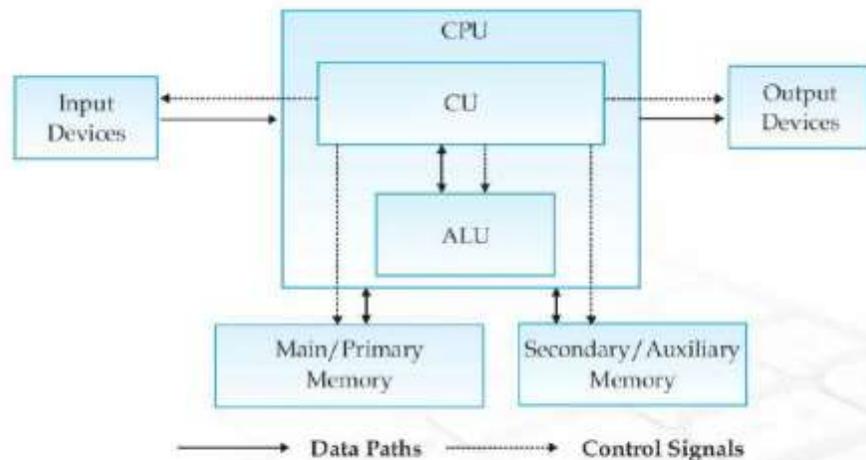
Hardware Concepts

A computer is an electronic device that processes input data and produces result (output) according to a set of instructions called program.

A computer performs basically five major functions irrespective of its size and make.

- It accepts data or instructions with the help of input unit,
- 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.

In order to carry out the operations mentioned above the computer allocates the task among its various functional units.



Block diagram of functional units 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 Secondary/Auxiliary

Types of Computer From the book

Strengths and Weakness of Computer From the book

Input Devices

- 1 Keyboard- This is the most common input device which uses an arrangement of buttons or keys. Apart from alphabet keys (26 keys), there are several other keys for various purposes such as
 - a) Number keys
 - b) Direction keys

- c) Function keys
 - d) Other keys
- 2 Mouse - A mouse is a pointing device that functions by detecting two- dimensional motion relative to its supporting surface. By default, the mouse is configured to work for the right hand.
 - 3 Light Pen- It is a light sensitive stylus attached to a video terminal to draw pictures or to select menu options.
 - 4 Touch Screen - This device allow interacting with the computer without any intermediate device. You may see it at as KIOSKS installed in various public places
 - 5 Graphics Tablet - This device is used to enter data using a stylus. Most commonly it is used to enter digital signatures.
 - 6 Joystick - It is an input device consisting of a stick that pivots on a base and translates its angle or direction as data. Joysticks are often used to control inputs in video games.
 - 7 Microphone - It is used to input audio data into the computer. They are mainly used for sound recording.
 - 8 O C R (Optical Character Reader) - It is used to convert images of text into machine editable text. It is widely used to convert books and documents into electronic files.
 - 9 Scanner - It is a device that optically scans images, printed text or an object and converts it to a digital image.
 - 10 Smart card reader - It is used to access the microprocessor of a smart card. There are two broad categories of smart cards - Memory cards and microprocessor cards. Memory cards contain only non-volatile memory storage components, and some specific security logic. Microprocessor cards contain volatile memory and microprocessor components.
 - 11 Bar Code Reader- This device read the bar code as input data. It consists of a light source, a lens and a light sensor which translates optical impulses into electrical signals.
 - 12 Biometric Sensors- It is used to recognize individuals based on physical or behavioral traits. Biometric sensor is used to mark attendance of employees/students in organizations /institutions. It is also popular as a security device to provide restricted entry for secured areas.
 - 13 Web Camera- This captures video as data for computer with reasonably good quality. It is commonly used for Web Chats.

CPU

It is responsible for processing the data and instruction. This unit can be divided into three sections:

- Control Unit
- Arithmetic and Logical Unit (ALU)
- Central Processing Unit

Control Unit - This unit coordinates various operations of the computer like:

- It directs the flow of data and instructions in the computer system
- It interprets the instructions of a program in storage unit and produces signals
- It executes the instructions

Arithmetic and Logical Unit- This unit is responsible for performing various Arithmetic operation subtraction, multiplication, division and relational operations such as equal to , greater than , less than, greater than or not equal to and logical operation etc.

Primary Memory Unit The main or primary memory stores information (instruction and data) The memory unit is divided into : Random Access Memory (RAM) Read Only Memory(ROM)

Random Access Memory is used for primary storage in computers to hold active information of data and instructions.

ROM (Read Only Memory) is used to store the instructions provided by the manufacturer, which holds the instructions to check basic hardware interconnected and to load operating system from appropriate storage device.

Cache Memory It lies between CPU and main memory, it is the fast memory Information that is used frequently is stored here.

Memory: The elementary unit of memory is a bit. A group of 4 bits is called a nibble and a group of 8 bits is called a byte. One byte is the minimum space required to store one character. Other units of memory are:

1 KB(Kilo Byte) =1024 bytes

1 MB(Mega Byte) = 1024 KB

1 GB(Giga Byte) =1024 MB

1 TB(Tera Byte) =1024 GB

1 PB(Peta Byte) =1024 TB

Output Devices These are used to display results on video display or are used to print the result. These can also be used to store the result for further use.

- 1 Monitor or VDU-It is the most common output device. It looks like a TV. Its display may be CRT, LCD, Plasma or touch sensitive.
- 2 Speakers-These are used to listen to the audio output of computer.
- 3 Printers-These are used to produce hard copy of output as text or graphics.

Dot Matrix Printer-This printer prints characters by striking an ink soaked ribbon against the paper.

Inkjet/Deskjet/Bubble jet printers-These all are low cost printers which use a controlled stream of ink for printing.

Laser Printers :- These printers use laser technology to produce printed documents. These are very fast printers and are used for high quality prints.

- 4 Plotters- These are used to print graphics. It is mainly used in computer aided designing.

Communication Bus:- In computer architecture, a bus is a system that transfers data between computer components or between computers.

Address Bus: This is a system of bus, which is used to specify the address of a memory location.

Data Bus-This system of bus is a medium, which transfer the data from one place to another in a computer system.

Control Bus-This system of bus carries the signals that give the report about the status of a device.

Ports - A motherboard has a set of connection points called ports to connect units such as disk, VDU, keyboard etc. In a parallel port data bits are transmitted in parallel (16 or 32 bits simultaneously) to peripherals via a set of parallel wires (called ribbon cables). Serial ports transmit single bits serially, one after another. Serial ports come in the form of 9-pin or 25-pin male connector. Faster peripherals such as hard disk are connected to parallel ports. Slower devices such as keyboard are connected to serial port. A standard serial port is known as Universal Serial Bus (USB)

RJ-45 Port-This port is used for Ethernet connections and can be used between computer and any networked device, such as a cable modem or a network hub.

USB stands for Universal Serial Bus, used for short distance digital data communications. This port allows data transfer between devices with little electric power.

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.

Hard disk-This is a high capacity storage device ranging from 1GB to Tera Bytes nowadays. Generally hard disks are sealed units fixed in the cabinet.

Compact Disk-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 600 KB/s.

DVD-Digital Versatile Disc or Digital Video Disc 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

Memory Cards 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. These are data storage devices mainly used with digital cameras, computers, mobile phones, music players, video game console etc. They offer high recordability with power free storage.

E-Waste-It refers to the discarded electronic devices such as old version computers, office electronic equipment , mobile phones, TVs and refrigerators.

E-waste disposable mechanism- E-waste contains metallic and nonmetallic components , alloys and compounds like Copper, Aluminum, Gold, Silver etc. E-waste management involves proper recycling and recovery of the disposed material.