BLOCK DIAGRAM OF COMPUTER

Mainly computer system consists of three parts that are central processing unit (CPU), Input Devices, and Output Devices. The Central Processing Unit (CPU) is divided into two parts again: arithmetic logic unit (ALU) and the control unit (CU). The set of instruction is in the form of raw data.

A large amount of data is stored in the computer memory with the help of primary and secondary storage devices. The CPU is like the heart/brain of the computer. The user does not get the desired output, without the necessary option taken by the CPU. The Central processing unit (CPU) is responsible for the processing of all the instructions which are given by the user to the computer system.
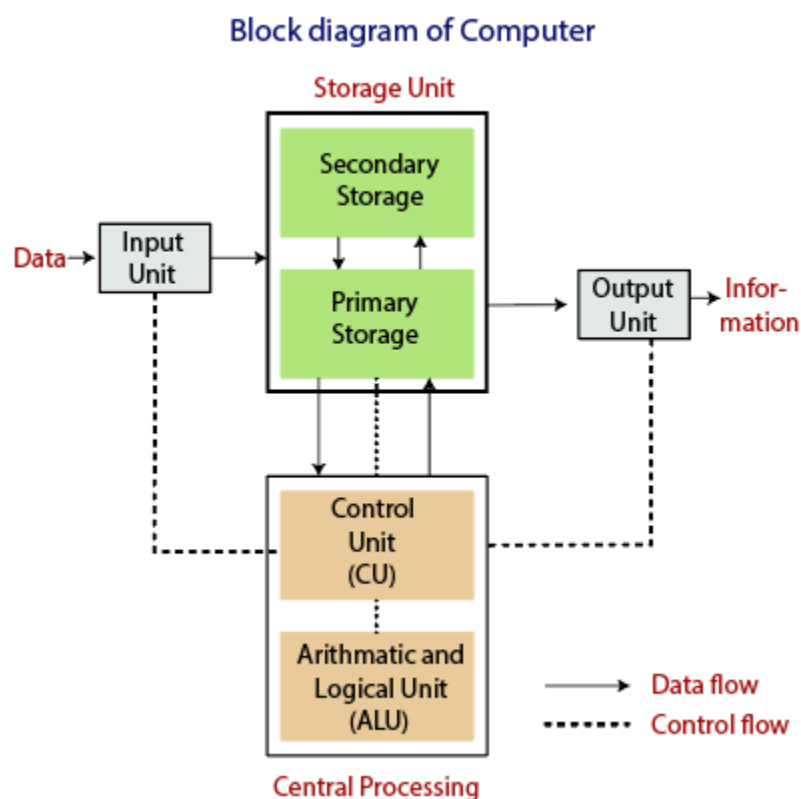

Fig: Block Diagram of the computer.

The data is entered through input devices such as the keyboard, mouse, etc. This set of instruction is processed by the CPU after getting the input by the user, and then the computer system produces the output. The computer can show the output with the help of output devices to the user, such as monitor, printer, etc.

- CPU (Central Processing Unit)
- Storage Unit
- ALU(Arithmetic Logic Unit)
- Control Unit

Central Processing Unit (CPU)

The computer system is nothing without the Central processing Unit so, it is also known as the brain or heat of computer. The CPU is an electronic hardware device which can perform different types of operations such as arithmetic and logical operation.

Central Processing Unit (CPU)
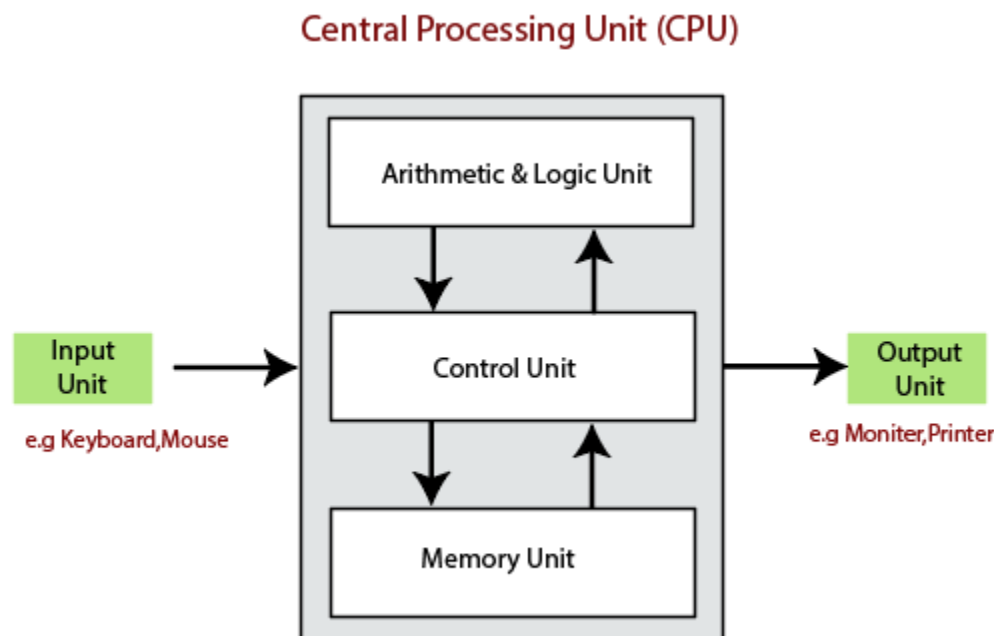
The CPU contains two parts: the arithmetic logic unit and control unit. We have discussed briefly the arithmetic unit, logical unit, and control unit which are given below:

Control Unit

The control unit (CU) controls all the activities or operations which are performed inside the computer system. It receives instructions or information directly from the main memory of the computer.

When the control unit receives an instruction set or information, it converts the instruction set to control signals then; these signals are sent to the central processor for further processing. The control unit understands which operation to execute, accurately, and in which order.

Arithmetic and Logical Unit

The arithmetic and logical unit is the combinational digital electronic circuit that can perform arithmetic operations on integer binary numbers. It presents the arithmetic and logical operation. The outputs of ALU will change asynchronously in response to the input. The basic arithmetic and bitwise logic functions are supported by ALU.

Storage Unit

The information or set of guidelines are stored in the storage unit of the computer system. The storage unit provides the space to store the data or instruction of processed data. The information or data is saved or hold in computer memory or storage device. The data storage is the core function and fundamental of the computer components.

Secondary Storage Media

There are the following main types of storage media:

1. Magnetic storage media:

Magnetic media is coated with a magnetic layer which is magnetized in clockwise or anticlockwise directions. When the disk moves, the head interprets the data stored at a specific location in binary 1s and 0s at reading.
Examples: hard disks, floppy disks and magnetic tapes.

- **Magnetic Tape memory: In** magnetic tape only one side of the ribbon is used for storing data. It is sequential memory which contains thin plastic ribbon to store data and coated by magnetic oxide. Data read/write speed is slower because of sequential access. It is highly reliable which requires magnetic tape drive writing and reading.

  The width of the ribbon varies from 4mm to 1 Inch and it has storage capacity 100 MB to 200 GB.

  Let's see various advantages and disadvantages of Magnetic Tape memory.

  Advantages:

  1. These are inexpensive, i.e., low cost memories.
  2. It provides backup or archival storage.
  3. It can be used for large files.
  4. It can be used for copying from disk files.
  5. It is a reusable memory.
  6. It is compact and easy to store on racks.

Disadvantages:

1. Sequential access is the disadvantage, means it does not allow access randomly or directly.
2. It requires caring to store, i.e., vulnerable humidity, dust free, and suitable environment.
3. It stored data cannot be easily updated or modified, i.e., difficult to make updates on data.

- **Floppy Disk:** A floppy disk is a flexible disk with a magnetic coating on it. It is packaged inside a protective plastic envelope. These are one of the oldest type of portable storage devices that could store up to 1.44 MB of data but now they are not used due to very less memory storage.
- **Hard disk:** A hard disk consists of one or more circular disks called platters which are mounted on a common spindle. Each surface of a platter is coated with a magnetic material. Both surfaces of each disk are capable of storing data except the top and bottom disk where only the inner surface is used. The information is recorded on the surface of the rotating disk by magnetic read/write heads. These heads are joined to a common arm known as access arm.

Hard disk drive components:

Most of the basic types of hard drives contain a number of disk platters that are placed around a spindle which is placed inside a sealed chamber. The chamber also includes read/write head and motors. Data is stored on each of these disks in the arrangement of concentric circles called tracks which are divided further into sectors. Though internal Hard drives are not very portable and used internally in a computer system, external hard disks can be used as a substitute for portable storage. Hard disks can store data upto several terabytes.
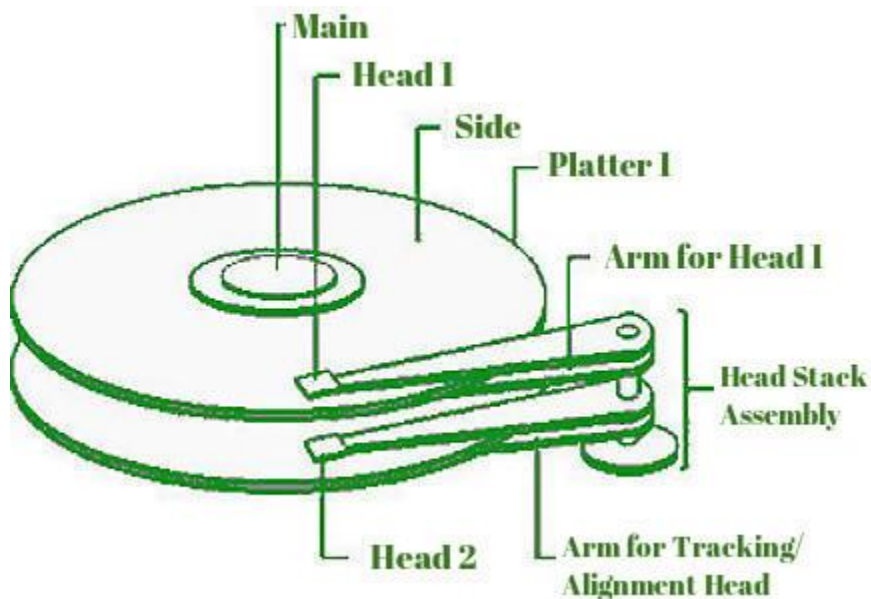
2. Optical storage media

In optical storage media information is stored and read using a laser beam. The data is stored as a spiral pattern of pits and ridges denoting binary 0 and binary 1.
Examples: CDs and DVDs

- **Compact Disk:** A Compact Disc drive (CDD) is a device that a computer uses to read data that is encoded digitally on a compact disc (CD). A CD drive can be installed inside a computer's compartment, provided with an opening for easier disc tray access or it can be used by a peripheral device connected to one of the ports provided in the computer system. A compact disk or CD can store approximately 650 to 700 megabytes of data. A computer should possess a CD Drive to read the CDs. There are three types of CDs:
- **DVD:**
  It stands for Digital Versatile Disk or Digital Video Disk. It looks just like a CD and use a similar technology as that of the CDs but allows tracks to be spaced closely enough to store data that is more than six times the CD's capacity. It is a significant advancement in portable storage technology. A DVD holds 4.7 GB to 17 GB of data.
- **Blue Ray Disk:**
  This is the latest optical storage media to store high definition audio and video. It is similar to a CD or DVD but can store up to 27 GB of data on a single layer disk and up to 54 GB of data on a dual layer disk. While CDs or DVDs use red laser beam, the blue ray disk uses a blue laser to read/write data on a disk.

Answer the following questions:

1. **List any four advantages of Magnetic tape memory.**
   Ans:
   - These are inexpensive, i.e., low cost memories.
   - It provides backup or archival storage.
   - It can be used for large files.
   - It can be used for copying from disk files.
   - It is a reusable memory.

2. **List any five functions of Control unit.**
   Ans:

   a. Fetching instructions one by one from primary memory and gather required data and operands to perform those instructions.
   b. Sending instructions to ALU to perform additions, multiplication etc.
   c. Receiving and sending results of operations of ALU to primary memory
   d. Fetching programs from input and secondary memory and bringing them to primary memory
   e. Sending results from ALU stored in primary memory to output

3. **Differentiate between magnetic tape and magnetic disk.**
   Ans:

S.NO	Magnetic Tape	Magnetic Disk
1.	The cost of magnetic tape is less.	The cost of magnetic disk is high.
2.	Reliability of magnetic tape is less.	Reliability of magnetic disk is more.
3.	Access time for magnetic tape is more.	Access time for magnetic disk is less.
4.	Data transfer rate for magnetic tape is comparatively less.	Data transfer rate for magnetic disk is more.
5.	Magnetic tape is used for backups.	Magnetic disk is used as a secondary storage.
6.	In magnetic tape data accessing rate is slow.	In magnetic disk data accessing rate is high or fast.
7.	In magnetic tape data can't be updated after fed-up of data.	In magnetic disk data can be updated.
8.	Magnetic tape is more portable.	Magnetic disk is less portable.

4. **Differentiate between hard disk and floppy disk.**
   Ans:

HARD DISK	FLOPPY DISK
It is magnetic disk made of aluminium.	It is magnetic disk made of plastic.
It is used as main storage device of computer.	Initially it was used as main storage device but now-a-days it is not used.
It uses 2-4 metallic disk called platter.	It contains single plastic disk.
Data storing surface is coated by magnetic oxide.	Data storing surface is exposed.
It is reliable.	It is not as reliable as hard disk.
Storage capacity is very high.	Storage capacity is low.
Stores data at high speed.	Stores data at low speed.
Retrieves data at high speed.	Data access relatively slow.

5. **Write any four advantages of CD.**
   Ans:
   a. Up to 650 MB of data fit on a single 5-inch disc.
   b. The CD is a portable medium.
   c. A CD is read-only, which prevents accidental erasure of programs or files.
   d. CD-ROMs are audio-capable, allowing special compression of audio, image, and video data. They can be used to play standard audio CDs and have the capacity to store and record video data.

6. **Write a short note on ALU.**
   Ans: The ALU, as its name suggests performs mathematical calculations and takes logical decisions. Arithmetic calculations include addition, subtraction, multiplication and division. Logical decisions involve comparison of two data items to see which one is larger or smaller or equal.

7. **Write a short note on CD.**
   Ans:
   Compact Disk is a portable secondary storage device in the shape of a round medium disk. It is made of polycarbonate plastic. The concept of CD was co-developed by Philips and Sony in 1982.
   In the beginning, it was used for storing and playing sound recordings, later it was used for various purposes such as for storing documents, audio files, videos, and other data like software programs in a CD.
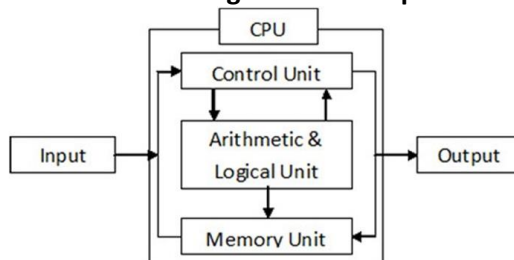
8. **Draw the cross sectional view of HDD.**
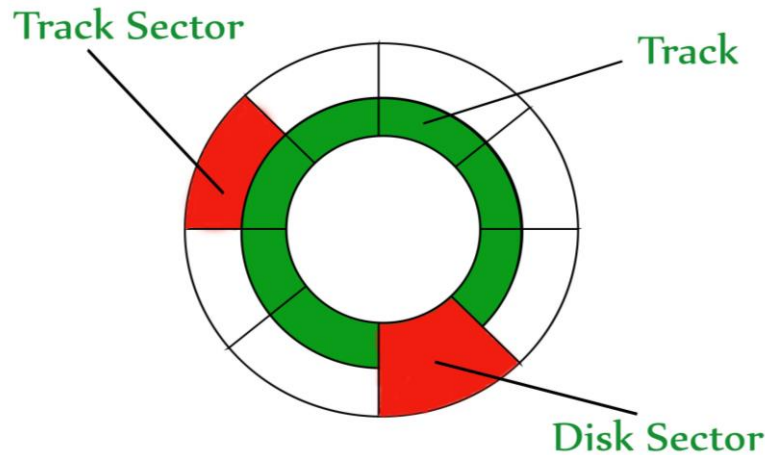
9. **Explain various types of system buses.**
   Ans:
   A standard CPU system bus is comprised of a control bus, data bus and address bus.

Address Bus	Carries the addresses of data (but not the data) between the processor and memory
Data Bus	Carries data between the processor, the memory unit and the input/output devices
Control Bus	Carries control signals/commands from the CPU (and status signals from other devices) in order to control and coordinate all the activities within the computer

10. **Draw the block diagram of a computer.**

Phalguni Pramanik