

FUNDAMENTAL OF COMPUTER

Full Form of Computer

- C - Commonly
- O - Operating
- M - Machine
- P - Particularly
- U - Used For
- T - Training
- E - Education
- R - Research



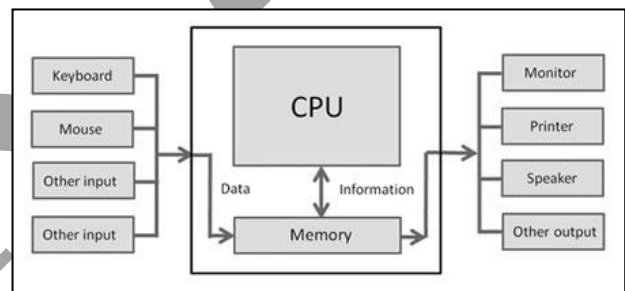
Computer language is “Binary”
 Computer use “United State” English.
 Computer word makes from “Compute”

Definition of Computer:-

Computer is an advanced electronic device that takes raw data as input from the user and processes these data under the control of set of instructions (called program) and gives the result (output) and saves output for the future use. It can process both numerical and non-numerical (arithmetic and logical) calculations.

Process of Computer

Accepts Data	Input
Processes Data	Processing
Produces Output	Output
Stores Results	Storage



Data: - All unknown things which we input into the computer are called data. But the unknown things should be into a-z, 0-9, Songs, movies, picture, special symbol, function key.

Input:

Input is the raw information entered into a computer from the input devices. It is the collection of letters, numbers, images etc.

Processing:

Processing is the operation of data as per given instruction. It is totally internal process of the computer system.

Output:

Output is the processed data given by computer after data processing. Output is also called as Result. We can save these results in the storage devices for the future use.

History of Computer:-

“**Charles Babbage**” is called the Father of the computer. The First mechanical computer designed by Charles Babbage was called Analytical Engine. It uses read only memory in the form of punch cards. Charles Babbage was a Jar man scientist but the first computer made in America. “John Mauchly and J. Presper Eckert” made first electronic Computer in 1946 his name was ENIAC (Electronic Numerical Integrator and Calculator), it have 1500 relays and 18000 vacuum tubes. Its size was 15 meter wide, 10 meter long and height was near 3 meter. The cost of this Computer was 4 lack dolors. International business machine (IBM) makes first fully transistorized Computer in 1948. First super Computer “Seymour Cray’s Cray” and first Personal Computer “Steve Job’s Apple” comes in 1974.

Characteristic of a Computer

1. Speed: - As you know computer can work very fast. It takes only few seconds for calculations that we take hours to complete. You will be surprised to know that computer can perform millions (1,000,000) of instructions and even more per second.

2. Accuracy: - The degree of accuracy of computer is very high and every calculation is performed with the same accuracy. The accuracy level is determined on the basis of design of computer. The errors in computer are due to human and inaccurate data.

3. Diligence: - A computer is free from tiredness, lack of concentration, fatigue, etc. It can work for hours without creating any error. If millions of calculations are to be performed, a computer will perform every calculation with the same accuracy. Due to this capability it overpowers human being in routine type of work.

4. Versatility: - It means the capacity to perform completely different type of work. You may use your computer to prepare payroll slips. Next moment you may use it for inventory management or to prepare electric bills.

5. Power of Remembering: - Computer has the power of storing any amount of information or data. Any information can be stored and recalled as long as you require it, for any numbers of years. It depends entirely upon you how much data you want to store in a computer and when to lose or retrieve these data.

6. No IQ: - Computer is a dumb machine and it cannot do any work without instruction from the user. It performs the instructions at tremendous speed and with accuracy. It is you to decide what you want to do and in what sequence. So a computer cannot take its own decision as you can.

7. No Feeling: - It does not have feelings or emotion, taste, knowledge and experience. Thus it does not get tired even after long hours of work. It does not distinguish between users.

8. Storage: - The Computer has an in-built memory where it can store a large amount of data. You can also store data in secondary storage devices such as floppies, which can be kept outside your computer and can be carried to other computers.

Units of Computer:-

“Byte” is the basic unit of Computer.

1 Byte	=	8 Bits
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
1 EB (Exa Byte)	=	1024 PB

Types of Computers (According to Functionality)

1. Analog Computer

An analog computer is a form of computer that uses continuous physical phenomena such as electrical, mechanical, or hydraulic quantities to model the problem being solved.

2. Digital Computer

A computer that performs calculations and logical operations with quantities represented as digits, usually in the binary number system

3. Hybrid Computer (Analog + Digital)

A combination of computers those are capable of inputting and outputting in both digital and analog signals. A hybrid computer system setup offers a cost effective method of performing complex simulations.

Types of Computers (According the Size)

1. Micro Computer or Personal Computer

- **Desktop Computer:** A personal or micro-mini computer sufficient to fit on a desk.
- **Laptop Computer:** A portable computer complete with an integrated screen and keyboard. It is generally smaller in size than a desktop computer and larger than a notebook computer.
- **Palmtop Computer/Digital Diary /Notebook /PDAs:** A hand-sized computer. Palmtops have no keyboard but the screen serves both as an input and output device.

2. Mini Computer

In size and power, minicomputers lie between workstation and mainframes. In the past decade, the distinction between large minicomputers and small mainframes has blurred, however, as has the distinction between small minicomputers and workstations. But in general, a minicomputer is a multiprocessing system capable of supporting from 4 to about 200 users simultaneously.

3. Mainframe Computer

A very large and expensive computer capable of supporting thousands of users simultaneously. In the hierarchy that starts with a simple microprocessor at the bottom and moves to supercomputers at the top, mainframes are just below supercomputers. In some ways, mainframes are more powerful than supercomputers because they support more simultaneous programs. But supercomputers can execute a single program faster than a mainframe.

4. Super Computer

The fastest and most powerful type of computer Supercomputers are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations. For example, weather forecasting requires a supercomputer. Other uses of supercomputers include animated graphics, fluid dynamic calculations, nuclear energy research, and petroleum exploration. The chief difference between a supercomputer and a mainframe is that a supercomputer channels all its power into executing a few programs as fast as possible, whereas a mainframe uses its power to execute many programs concurrently.

Workstations

A terminal or desktop computer in a network. In this context, workstation is just a generic term for a user's machine (client machine) in contrast to a "server" or "mainframe."

Parts of Computer (According to Hardware)

1. Keyboard
2. Mouse
3. Monitor
4. **C.P.U. (Central Processing Unit)**

Cabinet

SMPS

Motherboard

Processor / CPU

CPU Fan

Ram

Hard disk

DVD R/W

Cables

Expansion cards

Hardware

Any touchable things and spare part which can be seen by naked eyes called hardware. Hardware is what makes a computer work. A CPU processes information and that information can be stored in RAM or on a hard drive. A sound card can provide sound to speakers and a video card can provide an image to a monitor. All of this is hardware.

Software

Any untouchable things which we cannot see by naked eyes only feel on the output device called software. Software can be installed and allow a person to interact with the hardware. An operating system, like Windows or Mac OS, is software. It provides a graphical interface for people to use the computer and other software on the computer. A person can create documents and pictures using software.

Central Processing Unit (CPU)

The ALU and the CU of a computer system are jointly known as the central processing unit. You may call CPU as the brain of any computer system. It is just like brain that takes all major decisions, makes all sorts of calculations and directs different parts of the computer functions by activating and controlling the operations. It is the main part of computer because it is one only processing device. It is a mind of computer, all input and output devices connect from it. CPU changes our language into computer language and computer language into our language. It connects to the main power supply and all input and output devices connect from

Functional Units

They are divided into three separate units for its operation. They are

- 1) Arithmetic Logical Unit
- 2) Control Unit
- 3) Memory Unit

Arithmetic Logical Unit (ALU)

After you enter data through the input device it is stored in the primary storage unit. The actual processing of the data and instruction are performed by Arithmetic Logical Unit. The major operations performed by the ALU are addition, subtraction, multiplication, division, logic and comparison. Data is transferred to ALU from storage unit when required. After processing the output is returned back to storage unit for further processing or getting stored.

Control Unit (CU)

The next component of computer is the Control Unit, which acts like the supervisor seeing that things are done in proper fashion. Control Unit is responsible for coordinating various operations using time signal. The control unit determines the sequence in which computer programs and instructions are executed. Things like processing of programs stored in the main memory, interpretation of the instructions and issuing of signals for other units of the computer to execute them. It also acts as a switch board operator when several users access the computer simultaneously. Thereby it coordinates the activities of computer's peripheral equipment as they perform the input and output.

Input Devices: - Input devices are those devices which can input the data into the computer. Some example of input device is Keyboard, Mouse, Joystick, Scanner, Digital Camera etc.

Keyboard

It is main input device through this device we can input the data into computer by typing method. It is just like a typewriter, but with some additional keys. We can give all commands by typing method. It has many keys. Keyboards allow you to input letters, numbers, and other symbols into a computer that can serve as commands or be used to type text.

Keyboards are of two sizes 84 keys or 101/102 keys, but now keyboards with 104 keys or 108 keys are also available for Windows and Internet.



Types of Keys

Function Keys: F1, F2, F3

Letter Keys: A,B,C,D,E,

Helping Key: Alt, Shift, Ctrl, Caps Lock

Symbol Keys: @,#,\$,%,&,*

Numeric Keys: 1,2,3,4,5,6

Other Keys: Esc, Enter, Arrow Keys etc.

Types of keyboard (According to Connector)

a) Normal(5 Pins)

The 5-pin connector was the first widespread non-proprietary keyboard cable connector. It was a bit larger than today's connectors, and had five pins which were oriented asymmetrically to ensure a proper connection. This connector is often referred to as an AT connector, referring to the IBM system that popularized the format. These connectors are not widely used today,

b) PS/2(6 Pins)

The 6-pin connector is a replacement for the original 5-Pin design. This connector is smaller, and is typically colored purple to differentiate it from the similar mouse connector. This type of connector is often referred to as a PS/2 connector and is also named for the IBM system that popularized it. This format is widely used in desktop computers.

c) USB

USB is an extremely common keyboard cable connector type. This small rectangular connector provides a major upgrade over the connector types. USB connectors are hot-swappable, meaning that you can unplug them and plug them in without turning off the system. AT and PS/2 devices are not hot-swappable.

d) Wireless

Wireless is latest technology of keyboard. This type of keyboard have no wire, we can connect them with the help of Wi-Fi network, which is connected in CPU.

Mouse

It is another input device through this device we can input the data into Computer by clicking method. Mouse is most popular pointing device. It is a very famous cursor control device which senses the movement of mouse and sends corresponding signals to CPU when the mouse buttons are pressed.

Generally it has two buttons called left and right button and a wheel is present between the buttons. Mouse can be used to control the position of cursor on screen, but it cannot be used to enter text into the computer.



Joystick

Joystick is also a pointing device which is used to move cursor position on a monitor screen. It is a stick having a spherical ball at its both lower and upper ends. The lower spherical ball moves in a socket. The joystick can be moved in all four directions.

The function of joystick is similar to that of a mouse. It is mainly used in Computer Aided Designing (CAD) and playing computer games.



Light Pen

Light pen is a pointing device which is similar to a pen. It is used to select a displayed menu item or draw pictures on the monitor screen. It consists of a photocell and an optical system placed in a small tube. When the tip of a light pen is moved over the monitor screen and pen button is pressed, its photocell sensing element detects the screen location and sends the corresponding signal to the CPU.



Track Ball

Track ball is an input device that is mostly used in notebook or laptop computer, instead of a mouse. This is a ball which is half inserted and by moving fingers on ball, pointer can be moved. Since the whole device is not moved, a track ball requires less space than a mouse. A track ball comes in various shapes like a ball, a button and a square.



Scanner

Scanner is an input device which works more like a photocopy machine. It is used when some information is available on a paper and it is to be transferred to the hard disc of the computer for further manipulation. Scanner captures images from the source which are then converted into the digital form that can be stored on the disc. These images can be edited before they are printed.



Digitizer

Digitizer is an input device which converts analog information into digital form. Digitizer can convert a signal from the television or camera into a series of numbers that could be stored in a computer. They can be used by the computer to create a picture of whatever the camera had been pointed at. Digitizer is also known as Tablet or Graphics Tablet because it converts graphics and pictorial data into binary inputs. A graphic tablet as digitizer is used for doing fine works of drawing and image manipulation applications.



Microphone

Microphone is an input device to input sound that is then stored in digital form. The microphone is used for various applications like adding sound to a multimedia presentation or for mixing music.



Magnetic Ink Card Reader (MICR)

MICR input device is generally used in banks because of a large number of cheques to be processed every day. The bank's code number and cheque number are printed on the cheques with a special type of ink that contains particles of magnetic material that are machine readable. This reading process is called Magnetic Ink Character Recognition (MICR). The main advantages of MICR are that it is fast and less error prone.



Optical Character Reader (OCR)

OCR is an input device used to read a printed text. OCR scans text optically character by character, converts them into a machine readable code and stores the text on the system memory.



Bar Code Readers

Bar Code Reader is a device used for reading bar coded data (data in form of light and dark lines). Bar coded data is generally used in labeling goods, numbering the books etc. It may be a hand held scanner or may be embedded in a stationary scanner. Bar Code Reader scans a bar code image, converts it into an alphanumeric value which is then fed to the computer to which bar code reader is connected.



Optical Mark Reader (OMR)

OMR is a special type of optical scanner used to recognize the type of mark made by pen or pencil. It is used where one out of a few alternatives is to be selected and marked. It is specially used for checking the answer sheets of examinations having multiple choice questions.



Output Devices:-

An output device is any peripheral that receives data from a computer, usually for display, projection, or physical reproduction. For example, the image shows an inkjet printer, an output device that can make a hard copy of any information shown on your monitor. Another example of an output device is a computer monitor, which displays an image that is received from the computer. Monitors and printers are two of the most common output devices used with a computer.

1. Monitor:-

It is main output device with the help of this device we can see the all input data on the screen. It is also called V.D.U (Visual display unit) or C.R.T (Cathode Ray Tube). It is like a television. We take output on monitor by softcopy so we can call him softcopy output device. It forms images from tiny dots, called pixels that are arranged in a rectangular form. The sharpness of the image depends upon the number of pixels.



There are two kinds of viewing screen used for monitors.

- Cathode-Ray Tube (CRT)
- Flat- Panel Display

• Cathode-Ray Tube (CRT) Monitor

The CRT display is made up of small picture elements called pixels. The smaller the pixels, the better the image clarity, or resolution. It takes more than one illuminated pixel to form whole character, such as the letter 'e' in the word help.

A finite number of characters can be displayed on a screen at once. The screen can be divided into a series of character boxes - fixed location on the screen where a standard character can be placed. Most screens are capable of displaying 80 characters of data horizontally and 25 lines vertically.

There are some Disadvantages of CRT:

Large in Size

High power consumption

- **Flat-Panel Display Monitor**

The flat-panel display refers to a class of video devices that have reduced volume, weight and power requirement in comparison to the CRT. You can hang them on walls or wear them on your wrists. Current uses of flat-panel displays include calculators, video games, monitors, laptop computer, graphics display.



The flat-panel display is divided into two categories:

Non-Emissive Displays - The Non-emissive displays use optical effects to convert sunlight or light from some other source into graphics patterns. Example is LCD (Liquid-Crystal Device)

Emissive Displays - The emissive displays are devices that convert electrical energy into light. Examples are Plasma panel and LED (Light-Emitting Diodes).

2. Printer:-

It is another output device through this device we can print all input data on a blank paper. So we can say it hard copy output device.



Types of Printer:-

- **Impact printer**
- **Non-impact printer**

Impact Printer:-

- **Dot-matrix printer**

In the market one of the most popular printers is Dot Matrix Printer. These printers are popular because of their ease of printing and economical price. Each character printed is in form of pattern of dots and head consists of a Matrix of Pins of size (5*7, 7*9, 9*7 or 9*9) which comes out to form a character that is why it is called Dot Matrix Printer.

- **Daisywheel printer**

Head is lying on a wheel and pins corresponding to characters are like petals of Daisy (flower name) that is why it is called Daisy Wheel Printer. These printers are generally used for word-processing in offices which require a few letters to be sent here and there with very nice quality.

Non-Impact:-

Non-impact printers print the characters without using ribbon. These printers print a complete page at a time so they are also called as Page Printers.

- **Inkjet printer**

Inkjet printers are non-impact character printers based on a relatively new technology. They print characters by spraying small drops of ink onto paper. Inkjet printers produce high quality output with presentable features.

They make less noise because no hammering is done and these have many styles of printing modes available. Colour printing is also possible. Some models of Inkjet printers can produce multiple copies of printing also.

- **Laser printer**

These are non-impact page printers. They use laser lights to produce the dots needed to form the characters to be printed on a page.

3. Plotter: - With the help of this device we can take a large size of prints. This is useful Engineer's architecture and designers.

4. Speaker: - Speaker converts electronic signal into audio signal.

Software: -

Any untouchable things which we cannot see by naked eyes only feel on the output device called software.

There are two types of software:-

1. System Software: -

A set of program that manages or control all over activities of computer system are called system software. System software is also called low-level software as it runs at most basic level of the computer. It just creates a graphical user interface thorough which the user can interact with hardware with the help of operating system. System software just runs at the back so you don't need to bother about it.

The system software provides an environment to run application software and it controls the computer as well as the applications installed on the machine.

Example: - Dos/ Win95/Win98/Win2000/Win XP etc.

2. Application Software: -

All the programs which perform the specific task for the computer using. We can run all application software of system software. The subclass of a computer program which utilizes the capabilities of computer is called application software. Application here means the application software and the implementation. The example of application software programs includes media players, spreadsheets and word processors. When multiple applications are packaged together then it is called application suite.

There is a common user interface in each application suite which makes it easier for the user to learn different applications. In some cases, such as Microsoft Office, the various application programs have the ability to interact with each other. This facility is very handy for the user. For example, a user can embed the spreadsheet in a word processor using the application software. Application software cannot run without the presence of system software.

Example: - MS-Office, Photoshop, Coral Draw, PageMaker.

Operating System: -

The operating system (OS) is the most important program that runs on a computer. Every general-purpose computer must have an operating system to run other programs and applications. Computer operating systems perform basic tasks, such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk, and controlling peripheral devices such as printers.

For large systems, the operating system has even greater responsibilities and powers. It is like a traffic cop—it makes sure that different programs and users running at the same time do not interfere with each other. The operating system is also responsible for security, ensuring that unauthorized users do not access the system.

Classification of Operating systems

Multi-User: Allows two or more users to run programs at the same time. Some operating systems permit hundreds or even thousands of concurrent users. All mainframes and minicomputers are multi-user systems, but most personal computers and workstations are not. Another term for multi-user is time sharing.

Multiprocessing: Multiprocessing refers to a computer system's ability to support more than one process (program) at the same time. Multiprocessing operating systems enable several programs to run concurrently. UNIX is one of the most widely used multiprocessing systems, but there are many others, including OS/2 for high-end PCs. Multiprocessing systems are much more complicated than single-process systems because the operating system must allocate resources to competing processes in a reasonable manner.

Multitasking: The ability to execute more than one task at the same time, a task being a program. The terms multitasking and multiprocessing are often used interchangeably, although multiprocessing implies that more than one CPU is involved. In multitasking, only one CPU is involved, but it switches from one program to another so quickly that it gives the appearance of executing all of the programs at the same time.

Multithreading: The ability of an operating system to execute different parts of a program, called threads, simultaneously. The programmer must carefully design the program in such a way that all the threads can run at the same time without interfering with each other.

Real Time: Real-time operating systems are systems that respond to input immediately. They are used for such tasks as navigation, in which the computer must react to a steady flow of new information without interruption. Most general-purpose operating systems are not real-time because they can take a few seconds, or even minutes, to react.

Real time can also refer to events simulated by a computer at the same speed that they would occur in real life. In graphics animation, for example, a real-time program would display objects moving across the screen at the same speed that they would actually move. Responds to input instantly. General-purpose operating systems, such as DOS and UNIX, are not real-time.

A Software Platform for Applications

Operating systems provide a software platform on top of which other programs, called application programs, can run. The application programs must be written to run on top of a particular operating system. Your choice of operating system, therefore, determines to a great extent the applications you can run. For PCs, the most popular operating systems are DOS, OS/2, and Windows, but others are available, such as Linux.

Popular Operating Systems

The three most popular types of operating systems for personal and business computing include Linux, Windows and Mac.

1. Linux Operating Systems

Linux is a freely distributed open source operating system that runs on a number of hardware platforms. The Linux kernel was developed mainly by Linus Torvalds and it is based on Unix.

2. Windows Operating Systems

Microsoft Windows is a family of operating systems for personal and business computers. Windows dominates the personal computer world, offering a graphical user interface (GUI), virtual memory management, multitasking, and support for many peripheral devices.

3. Mac Operating Systems

Mac OS is the official name of the Apple Macintosh operating system. Mac OS features a graphical user interface (GUI) that utilizes windows, icons, and all applications that run on a Macintosh computer have a similar user interface.

Post: - Post stands for Power on Self-Testing. Computer reads all plug and play devices in this process.

Bootng: - In the bootng, computer load all three system file into the memory of computer.

Three type of system file.

1. IO. System file (Input Output System File)
2. MS. System file (Microsoft system file)
3. Command. Com

Types of Bootng: -

1. Cold bootng
2. Warm bootng

Languages of Computer: -

1. Machine

Example: - 0, 1

2. Assembly

Example: - sum, sub

3. High Level

Example: - C, C++, COBOL, FORTRAN

Memory:

There are two types of computer memory Primary and Secondary. Example of primary memory is Ram; all the data which is store in primary memory will be lost when you will shut down your computer. Hard Disk is the Example of Secondary memory. If the data will be in secondary memory it will be save after shut down computer. There are two types of Memory **1. Primary 2. Secondary**

Primary Memory: -

RAM:

RAM stands for Random Access Memory. It is also called Read/write Memory. The storage of data and Instructions inside this type of memory are temporary. It disappears as soon as the power to the computer switched off.

ROM:

Rom stands for Read Only Memory, the storage of program and data in Inside this type of memory is permanent. The Rom stores some standard processing programs supplied by the manufactures to operate the Computer. It can only be read by the CPU but it cannot be changed.

PROM:

It stands for Programmable Read Only Memory. You can't remove or modify programs which are store in ROM, but you can store your program in PROM chip. Which programs or instructions written in ROM or Prom cannot be erased or changed.

EPROM:

This stands for Erasable Programmable Read Only Memory. With the help of this memory chip we can be programmed time and again by erasing the information stored earlier in it.

DRAM:

It stands for Dynamic Random Access Memory. It is used in most of the computers. It is the least expensive kind of RAM. It requires an electric current to maintain its electrical state. The electrical charge of DRAM decreases with time that may result in loss of DATA. The processor cannot access the data of DRAM when it is being refreshed. That is why it is slow.

SRAM:

It stands for Static Random Access Memory. It can store data without any need of frequent recharging. CPU does not need to wait to access data from SRAM during processing. That is why it is faster than DRAM. It utilizes less power than DRAM. SRAM is more expensive as compared to DRAM. It is normally used to build a very fast memory known as cache memory.

MRAM:

It stands for Magneto resistive Random Access Memory. It stores data using magnetic charges instead of electrical charges. MRAM uses far less power than other RAM technologies so it is ideal for portable devices. It also has greater storage capacity. It has faster access time than RAM. It retains its contents when the power is removed from computer

Secondary Memory:

Storage Device: With the help of storage device we can save our data or information for future permanently.

Floppy Disk:-

A floppy disk, also called a floppy, diskette or just disk, is a type of disk storage composed of a disk of thin and flexible magnetic storage medium, sealed in a rectangular plastic enclosure lined with fabric that removes dust particles. Floppy disks are read and written by a floppy disk drive (FDD).



Floppy disks, initially as 8-inch (200 mm) media and later in 5¼-inch (133 mm) and 3½-inch (90 mm) sizes, were a ubiquitous form of data storage and exchange from the mid-1970s into the late 2000s.

- **3.5” Floppy:** - The advantages of the 3½-inch disk were its smaller size and its rigid case, which provided better protection from dirt and other environmental risks, while the 5¼-inch disk was available cheaper per piece throughout its history, usually with a price in the range of a third to half that of a 3½-inch disk. This type of floppy runs at A drive. It stored maximum 1.44 MB data.
- **5.25” Floppy:** - In 1976, Shugart Associates introduced the first 5¼-inch FDD. By 1978 there were more than 10 manufacturers producing such FDDs. This type of floppy runs at B drive. It stored maximum 1.28 MB data.

Hard Disk:-

It is another secondary storage device. The hard disk drive is the main, and usually largest, data storage hardware device in a computer. The operating system, software titles, and most other files are stored in the hard disk drive.



Hard Disk was introduced by IBM in 1956; HDDs became the dominant secondary storage device for general-purpose computers by the early 1960s. Continuously improved, HDDs have maintained this position into the modern era of servers and personal computers. More than 200 companies have produced HDDs historically, though after extensive industry consolidation most current units are manufactured by Seagate, Toshiba, and Western Digital.

It covered by a metal cover and it has a media which is also made from metal. There are a Read/Write head which reads all data from media. We can save large amounts of data in a hard disk. Now all computers have a hard disk drive. A hard disk is very safe for data storage.

“Generations of Computer”

First Generation (1940-1955)

There was no 'best' way of storing instructions and data in a computer memory. There were four competing technologies for providing computer memory: electrostatic storage tubes, acoustic delay lines (**mercury or nickel**), **magnetic drums** (and disks?), and **magnetic core storage**.

The digital computers using **electronic valves** (Vacuum Tubes) are known as first generation computers. The first 'computer' to use electronic valves (vacuum tubes). The high cost of vacuum tubes prevented their use for main memory. They stored information in the form of propagating sound waves.

The vacuum tube consumes a lot of power. The Vacuum tube was developed by Lee DeForest in 1908. These computers were large in size and writing programs on them was difficult.

Limitations of First Generation Computer

Followings are the major drawbacks of First generation computers.

1. They used valves or vacuum tubes as their main electronic component.
2. They were large in size, slow in processing and had less storage capacity.
3. They consumed lots of electricity and produced lots of heat.
4. Their computing capabilities were limited.
5. They were not so accurate and reliable.
6. They used machine level language for programming.
7. They were very expensive.

Example: ENIAC, UNIVAC, IBM 650 etc.

Second Generation (1956-1963)

The second-generation computer used **transistors** for CPU components & **ferrite cores for main memory** & **magnetic disks** for secondary memory. I/O processor was included to control I/O operations.

Around 1955 a device called **Transistor** replaced the bulky Vacuum tubes in the first generation computer. Transistors are smaller than Vacuum tubes and have higher operating speed. They have no filament and require no heating. Manufacturing cost was also very low. Thus the size of the computer got reduced considerably.

It is in the second generation that the concept of Central Processing Unit (CPU), memory, programming language and input and output units were developed. This generation computer uses the programming languages such as COBOL, FORTRAN were developed during this period.

Features:

1. Transistors were used instead of Vacuum Tube.
2. Processing speed is faster than First Generation Computers (Micro Second)
3. Smaller in Size (51 square feet)
4. The input and output devices were faster.

Example:

IBM 1620: Its size was smaller than 1st Generation and mostly used for scientific purpose.

IBM 1401: Its size was small to medium and used for business applications.

CDC 3600: Its size was large and is used for scientific purposes.

Third Generation (1964-1971)

By the development of a small chip consisting of the capacity of the **300 transistors**. These ICs are popularly known as **Chips**. A single IC has many transistors, registers and capacitors built on a single thin slice of **silicon**. So it is quite obvious that the size of the computer got further reduced. Higher level language such as **BASIC (Beginners All-purpose Symbolic Instruction Code)** was developed during this period. Computers of this generation were small in size, low cost, large memory and processing speed is very high. Very soon ICs were replaced by **LSI (Large Scale Integration)**, which consisted about 100 components. An IC containing about 100 components is called LSI.

Features:

1. They used Integrated Circuit (IC) chips in place of the transistors.
2. Semi-conductor memory devices were used.
3. The size was greatly reduced; speed of processing was high and more accurate and reliable.
4. Large Scale Integration (LSI) and Very Large Scale Integration (VLSI) were also developed.
5. The mini computers were introduced in this generation.
6. They used high level language for programming.

Example: IBM 360, IBM 370 etc.

Fourth Generation (1972-1990)

It uses large scale Integrated Circuits (LSIC) built on a single silicon chip called microprocessors. Due to the development of microprocessor it is possible to place computer's central processing unit (CPU) on single chip. These computers are called microcomputers. Later very large scale Integrated Circuits (VLSIC) replaced LSICs. Thus the computer which was occupying a very large room in earlier days can now be placed on a table. The personal computer (PC) that you see in your school is a Fourth Generation Computer Main memory used fast semiconductors chips up to 4 M bits size. Hard disks were used as secondary memory. Keyboards, dot matrix printers etc. were developed. OS-such as **MS-DOS, UNIX, Apple's Macintosh** were available. Object oriented language, **C++ etc.** were developed.

Features:

1. They used Microprocessor (VLSI) as their main switching element.
2. They are also called as micro computers or personal computers.
3. Their size varies from desktop to laptop or palmtop.
4. They have very high speed of processing, 100% accurate, reliable, diligent and versatile.
5. They have very large storage capacity.

Example: IBM PC, Apple-Macintosh etc.

Fifth Generation (1997-Till Today)

In This generation computers used ULSI (Ultra-Large Scale Integration) chips. Millions of transistors are placed in a single IC in ULSI chips. 64 bit microprocessors have been developed during this period. Data flow & EPIC architecture of these processors have been developed. RISC & CISC, both types of designs are used in modern processors. Memory chips and flash memory up to 1 GB, hard disks up to 600 GB & optical disks up to 50 GB have been developed. Fifth generation digital computer will be **Artificial intelligence**.

Example: Super Computer, Notebook