Unit I | Fundamentals of Computers CHAPTER 1

Introduction to Computers

1.Explain the Generations of Computers

Based on various stages of development, computers can be divided into **six** different generations.

First Generation 1942- 1955

Vacuum tubes were used

- Big in size
- Consumed more power
- Malfunction due to overheat
- Machine Language was used
- **Ex.** ENIAC , EDVAC , UNIVAC

Second Generation 1955- 1964

Transistors replaced **Vacuum tubes**

- Smaller compared to First Generation
- Generated Less Heat
- Consumed less power compared to first generation
- Punched cards were used
- First **operating system** was developed - Batch Processing and Multiprogramming Operating System
- Machine language as well as Assembly language was used.

Third Generation 1964 -1975

Integrated Circuits (IC) replaced **Transistors**

- Computers were smaller, faster and more reliable
- Consumed less power
- High Level Languages were used

Fourth Generation 1975-1980

Microprocessor (Very Large Scale Integrated Circuits (VLSI))

- Smaller and Faster
- Microcomputer series such as IBM and APPLE were developed
- Portable Computers were Introduced

Fifth Generation 1980 – till date

Ultra Large Scale Integration (ULSI)

- Parallel Processing
- Super conductors
- Computers size was drastically reduced.
- Can recognize Images and Graphics
- Introduction of Artificial Intelligence and Expert Systems
- Able to solve high complex problems including decision making and logical reasoning

Sixth Generation In future

- Here, computers works based on Artificial Neural Networks.
- Parallel and Distributed computing
- **Natural Language Processing (NLP)** is a component of **Artificial Intelligence (AI).**
- It provides the ability to develop the computer program to understand human language.
- Development of robotics
- The explosive growth of **Wide Area Networking (WAN)**

2.Write short note on sixth Generation computers.

- Here, computers works based on Artificial Neural Networks.
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3.What is a computer?

- A Computer is an **electronic device**.
- It takes data as an input from the user.
- processes it under the control of a set of instructions (called program),
- Produces a result (output),
- Saves it for future use.

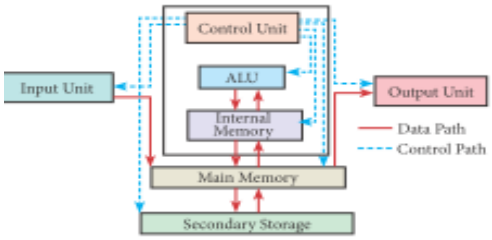
4.Define Data.

- Data is defined as an **un- processed** collection of raw facts,
- The data is a **fact** about people, places or some objects.
- It is an **input** of the computer.
- It will not giving any meaningful message.
  Ex. 134, 16 'Kavitha', 'C'

5.Define Information

- Information is defined **processed** collection of facts.
- Information **conveys** some **meaning** .
- Information is **output** of the computer .
  Ex. Vijay is 16 years old

6.Draw the components of computer (or) Working model of computer. (or) Input- Process- Output Cycle (IPO cycle).



7.What is Data Processing?

- Conversion of **data** into **information** is called data processing.

8.What are Hardware and Software?

- **Hardware** is the **physical component** of a computer
  Ex.motherboard, memorydevices,monitor,keyboard etc.,
- **Software** is the **set of programs** or instructions.
  Ex. System software ,Application

9.What are the important Components of a Computer?

- Input unit , Central processing unit ,Output unit and Memory unit

10.Define Input Unit.

- Input unit is used to **feed** any form of data to the computer,
- Which can be stored in the memory unit for further processing.
- Example: Keyboard, mouse, etc.

11.Define Central Processing Unit

- CPU is the major component which **interprets** and **executes** software instructions.
- It also control the operation of all other components such as memory, input and output units.
- It accepts data as input, process the data according to the instructions and provide the result as output.

12.What are the major components present in CPU?

1. Control unit,
2. Arithmetic and logic unit (ALU)
3. Memory unit

13.Write short note on Arithmetic and Logic Unit(ALU)

- The ALU is a part of the CPU.
- Here, various **computing** functions are performed on data.
- The ALU performs **arithmetic operations** such as addition, Subtraction, multiplication, division and logical operations.
- The result of an operation is stored in internal memory of CPU.
- The logical operations of ALU promote the decision-making ability of a computer.

14. Define control unit

- The control unit controls the flow of data between the CPU, memory and I/O devices.
- It also controls the entire operation of a computer.

15. What is the function of memory?

- Memory unit used to store the data and programs **temporarily** or **permanently**
- There are two types of memory, they are **primary** memory and **secondary** memory

16. Define Output

- An Output Unit is any hardware component that conveys information to users in an understandable form.Example: Monitor, Printer, Speaker, plotter etc

17. Explain about Memory unit. Or Distinguish between Primary and secondary memory.

- There are two types of memory, they are primary memory and secondary memory.

primary memory	secondary memory
store the data and programs temporarily	store the data permanently.
It is volatile, that is, the content is lost when the power supply is switched off.	It is non volatile, that is, the content is available even after the power supply is switched off.
Ex. The Random Access Memory (RAM)	Ex.Read Only Memory(ROM),Hard Disk, CD – ROM etc..

19.List some types of Mouse

Differentiate between Optical and Laser Mouse

- Mechanical Mouse , Optical Mouse and Laser Mouse

Mechanical Mouse

- A small ball is kept inside and touches the pad through a hole at the bottom of the mouse.
- When the mouse is moved, the ball rolls.
- This movement of the ball is converted into signals and sent to the computer.

Optical Mouse

- Measures the motion and acceleration of pointer.
- It uses light source to judge the motion of the pointer.
- Optical mouse has three buttons.
- Optical mouse is less sensitive towards surface.

Laser Mouse

- Measures the motion and acceleration of pointer.
- It uses Laser Light to judge the motion of the pointer.
- Laser Mouse is highly sensitive and able to work on any hard surface.

18.Explain Some Important Input Devices.

Keyboard:

- Keyboard is the most common input device used today.
- The data and instructions are given as input to the computer by typing on the keyboard.
- There are different set of keys available in the keyboard such as character keys, modifier keys, system and GUI keys, enter and editing keys, function keys, navigation keys, numeric keypad and lock keys etc..

Mouse:

- Mouse is a **pointing** device used to control the movement of the cursor on the display screen.
- It can be used to select icons, menus, command buttons or activate something on a computer.
- Some mouse actions are i) move, ii)click, iii)double click, iv)right click, v)drag and drop.
- Different types of mouse available are: Mechanical Mouse, Optical, Laser Mouse, Air Mouse, 3D Mouse, Tactile Mouse, Ergonomic Mouse and Gaming Mouse.

Scanner:

- Scanners are used to enter the information directly into the computer's memory.
- The scanner converts any type of printed or written
- Information including photographs into a digital format.

Fingerprint Reader /Scanner:

- Finger print Scanner is a fingerprint recognition device used for computer security,
- It is used in biometric technology.
- It is a very safe and convenient device for security instead of using passwords

Track Ball:

- In Track ball user spins the ball in various directions to navigate the screen movements.

Retinal Scanner:

- It performs a retinal scan which is a biometric technique .

Light Pen:

- A light pen is a pointing device .
- It is connected to a monitor.
- The tip of the light pen contains a light-sensitive element
- Which detects the light from the screen enabling the computer to identify the location of the pen on the screen.

Optical Character Reader:

- It is a device which detects characters printed or written on a paper with OCR
- The Scanned document can be edited using a word processor.

Bar Code :

- A Bar code is a pattern printed in lines of different thickness.
- The Bar code reader scans the information on the bar codes transmits to the Computer for further processing.

QR Code Reader: QR (Quick response) Code:

- The QR code is the two dimension bar code which can be read by a camera .

Voice Input Systems:

- Microphone serves as a voice Input device.
- It captures the voice data and send it to the Computer.

Digital Camera:

- It captures images / videos directly in the digital form.
- It uses a CCD (Charge Coupled Device) electronic chip.
- It converts light rays into digital format.

Touch Screen:

- A touch screen is a display device that allows the user to interact with a computer by using the finger.
- It is an alternative to a mouse or keyboard.
- Touch screens are used in computers, laptops, monitors, smart phones, tablets, ATM etc..

20.Explain Some Output Devices.

Write the significant features of monitor

Monitor:

- Monitor is the most commonly used output device to display the information.
- Pictures on a monitor are formed with picture elements called **PIXELS**.
- Monitors are two types i) Monochrome ii) color
- CRT (Cathode Ray Tube), LCD (Liquid Crystal Display) and LED (Light Emitting Diodes) are the types of monitor.
- Monitor works with the VGA (Video Graphics Array) card.
- It acts as an interface between the computer and display monitor.

Plotter:

- Plotter is an output device used to produce graphical output on papers.
- It uses single color or multi color pens to draw pictures.

Printers:

- Printers are used to print the information on papers.
- Printers are divided into two main categories:
  - Impact Printers
  - Non Impact printers

Differentiate between Impact and No Impact printers.

Impact Printers	Non-Impact Printers
It prints with striking of hammers or pins on ribbon.	do not use striking mechanism for printing.
It can print on multi-part (using carbon papers) by using mechanical pressure	They use electrostatic or laser technology.
It makes noise while printing	It is silent while printing
Poor Quality and speed	Good Quality and speed
Ex. Dot Matrix printers , Line matrix printers	Ex. Laser printers , Inkjet printers

Laser Printers

- Laser printers mostly work with similar technology used by photocopiers.
- It makes a laser beam scan back and front across a drum inside the printer, make up a pattern.
- It can produce very good quality of graphic images.
- The resolution range is around 1200 dpi.(Dots per inch).
- Approximately it can print 100 pages per minute(PPM).

Inkjet Printers:

- Inkjet printers work by spraying ionised ink at a sheet of paper.
- They use the technology of firing ink by heating it.
- An Inkjet printer can spread millions of dots of ink at the paper every single second.
- Inkjet Printers use colour cartridges which combined Magenta, Yellow and Cyan inks.
- A black cartridge is used for monochrome output.
- The speed of Inkjet printers generally range from 1-20 PPM (Page Per Minute).

Speakers:

- Speakers produce voice output (audio) .
- This has become very common in places like airlines, schools, banks, railway stations, etc..

Multimedia Projectors:

- Multimedia projectors are used to produce computer output on a big screen.
- These are used to display presentations in meeting halls or in classrooms.

21.Booting of computer

- When a computer is switched on, there is no information in its RAM.
- In ROM, the pre-written program called **POST** (Power on Self Test) will be **executed first.**
- This program checks if the devices like RAM, keyboard, etc., are connected properly and ready to operate.
- If these devices are ready, then the **BIOS** (Basic Input Output System) gets executed.
- This process is called **Booting**.
- Thereafter, a program called "**Bootstrap Loader**" transfers **OS** from hard disk into main memory(**RAM**).
- Now the OS gets loaded (Windows/Linux, etc.,) and will get executed.
- Booting process is of **two** types.
  1)Cold Booting 2) Warm Booting

Cold Booting:

- When the system starts from **initial state** is called cold booting or Hard Booting.
- Booting process initiate by pressing **Power** button.
- All diagnostic tests could be carried out in this process.

Warm Booting:

- When the system **restarts** or the system does not start from initial state is called Warm Booting or Soft Booting
- Booting process initiate by pressing **Reset** button.
- All diagnostic tests need not be carried out in this case.
- There are chances of data loss and system damage as the data might not have been stored properly.

22.Characteristics of a computer

The computer characteristics are

- It gives the desired output at a very fast rate and accurate.
- Computers are very versatile as they do a lot of different tasks.
- It can store and retrieve data
- It works based on instructions.

23. Applications of computer:

The various applications of computer are,

- Business
- Education
- Banking
- Communication
- Weather forecasting,
- Booking airlines, railway or movie tickets
  Games