UNIT: 1 INTRODUCTION TO COMPUTER

1. DEFINATIONS:

DATA	Data can be in the form of numbers, letters, symbols, size etc. it can serves as row data from which we cannot take any decisions
INFORMATION	After performing process on inputted data the computer produce output which is known as "information" or "processed data"
INPUT	The process to enter data in computer system is known as input
PROCESS	Computer performs calculations on inputted data this task known as process.
OUTPUT	The result made by computer system is known as output.
INPUT DEVICES	The devices which are used to enter data in computer system known as input devices
OUTPUT DEVICES	The devices that show results made by computer system are known as output devices.
PROCESSING DEVICES	The device that performs calculations on inputted data is known as processing device.

COMPUTER	A computer is an electronic device which takes input from the user, processes it and gives the output as per user's requirement.
	So the main tasks of performed by the computer are:
	    o **Input**
	    o **Process**
	    o **Output**

2. WRITE DOWN THE CHARACTERISTICS OF COMPUTER

Some important characteristics of the computer are as follow:

- **Automatic:**
  - Computers are automatic machines because it works by itself without human intervention.
  - Once it started on a job they carry on until the job is finished.
  - Computer cannot start it selves.
  - It can works from the instructions which are stored inside the system in the form of programs.
- **Accuracy:**
  - The accuracy of a computer is very high.
  - The degree of accuracy of a particular computer depends upon its design.
  - Errors can occur by the computer.
  - But these are due to human weakness, due to incorrect data, but not due to the technological weakness.

- **Speed:**
  - Computer is a very fast device.
  - It can perform the amount of work in few seconds for which a human can take an entire year.
  - While talking about computer speed we do not talk in terms of seconds and milliseconds but in microseconds.
  - The speed of computer system measured in micro second, milliseconds, Pico seconds & nanoseconds.
- **Diligence:**
  - Unlike human beings, a computer is free from monotony, tiredness & lack of concentration.
  - It can continuously work for hours without creating any error & without grumbling.
  - If you give ten million calculations to performed, it will perform with exactly the same accuracy & speed as the first one.
- **Versatility:**
  - It is one of the most wonderful features about the computer.
  - It can able to perform multiple tasks simultaneously.
  - It has an ability to switch over itself from one task to another very rapidly.
  - For e.g. one moment it is preparing the results of a particular examination, the next moment it is busy with preparing electricity bills**.**
- **Power of remembering:**
  - Computer can store and recall any amount of data because of its high storage capacity of its storage devices.
  - The information that we stored inside the system will retained as long as desired by the user & we can be recalled as and when required.
  - Even after several years, if the information recalled, it will be as accurate as on the day when it was filled to the computers.
- **No I.Q.**
  - A computer is not a magical device; it processes no intelligence of its own.
  - Its I.Q. is zero.
  - It has to be told what to do & in what sequence.
  - It cannot take its own decision.

- **No Feelings:**
  - A Computer has no feelings because they are machines.
  - Based on our feelings, task, knowledge and experience we often make certain judgments in our day today life.
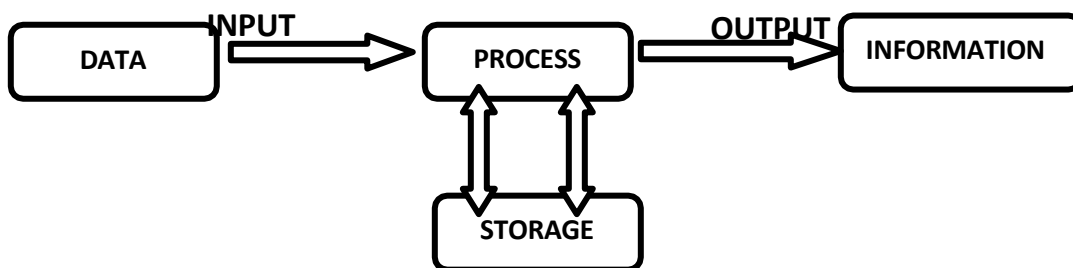
o   But Computer goes exactly the way which we have given the instructions.

3. EXPLAIN THE DATA PROCESSING CYCLE OF COMPUTER.

- The computer Data Processing is any process that a computer program does to enter data & summarise, analyse or convert data into useable information.
- The process may be automated & run on a computer.
- It involves recording, analysing, storing, summarising & storing data.
- Because data are most useful when it is well presented & informative.

The Data Processing Cycle:

- Data Processing cycle described all activities which are common to all data processing systems from manual to electronic systems.
- The main aim of data processing cycle is to convert the data into meaningful information.
- Data processing system are often referred to as "Information System".
- The Information System typically take raw Data as Input to produce Information as Output.

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  ┌─────────┐    INPUT     ┌─────────┐   OUTPUT   ┌─────────────┐
  │  DATA   │ ══════════▶  │ PROCESS │ ═════════▶ │ INFORMATION │
  └─────────┘              └─────────┘            └─────────────┘
                            ▲    ▲
                            ║    ║
                           ┌──────────┐
                           │ STORAGE  │
                           └──────────┘
```

- The data processing cycle contains main four functions:
    o   Data input
    o   Data process
    o   Data storage
    o   Data output

- **DATA INPUT**
    o   The term input refers to the activities required to record data.
    o   It's a process to entered data in to computer system.
    o   So before we input any data, it is necessary to check or verify the data context.

- **DATA PROCESSING**
    o   The term processing includes the activities like classifying, storing, calculating, comparing or summarising the data.
    o   The processing means to use techniques to convert the data into meaningful information.

- **DATA OUTPUT**
  - It's a communication function which transmits the information to the outside world.
  - After completed the process the data are converted into the meaningful in
  - Sometimes the output also includes the decoding activity which converts the electronically generated information into human readable form.
- **DATA STORAGE**
  - It involves the filling of data & information for future use.

4. EXPLAIN THE CLASSIFICATION OF THE COMPUTER BY DATA PROCESSED

The computers are divided mainly three types on the based on data processed:
1. Analog computers
2. Digital computers
3. Hybrid computers

Analog computers:
- In Analog Computers, data is represented as continuously varying voltage
- As the data is continuously variable, the results obtained are estimated and not exactly repeatable.
- It can able to perform multiple tasks simultaneously.
- It can also capable to work effectively with the irrational number. E.g. 1/8 = 0.125 and 1/6=0.1666
- Voltage, temperature and pressure are measured using analog devices like voltmeters, thermometers and barometers.

Digital Computers
- The digit computer is a machine based on digital technology which represents information by numerical digit.
- In Digital Computers data is represented as discrete units of electrical pulses.
- The data is measured in quantities represented as either the 'on' or 'off' state – either **0 or 1**
- Therefore, the results obtained from a digital computer are accurate.
- e.g. digital clock, computer, calculators

Hybrid Computers
- It combines the good features of both analog & digital computers.
- It has a speed of analog computer & accuracy of digital computer.
- Hybrid Computers accept data in analog form and present output also in digitally.
- The data however is processed digitally.

- Therefore, hybrid computers require analog-to-digital and digital-to-analog converters for output.

5. EXPLAIN THE CLASSIFICATION OF THE COMPUTER BY DATA PROCESSING:

The computers are classified in four types on the based on data processing.

- **Micro computer**
- **Mini computer**
- **Mainframe computer**
- **Super computer**

Micro Computer:

- Micro computers are the computers with having a microprocessor chip as it central processing unit.
- Originated in late 1970s.
- First micro computer was built with 8 bit processor.
- Microcomputer is known as personal computer.
- Designed to use by individual whether in the form of pc's, workstation or notebook computers.
- Small in size and affordable for general people.
- **Ex: IBM PC, IBM PC/XT, IBM PC/AT**

Mini Computer:

- Mini computers are originated in 1960s.
- Small mainframes that perform limited tasks.
- Less expensive than mainframe computer.
- Mini computers are Lower mainframe in the terms of processing capabilities.
- Capable of supporting 10 to 100 users simultaneously.
- In 1970s it contains 8 bit or 12 bit processor.
- Gradually the architecture requirement is grown and 16 and 32 bit.
- Minicomputers are invented which are known as **"supermini computers."**
- **Ex: IBM AS400**

Mainframe Computer:

- A very powerful computer which capable of supporting thousands of user simultaneously.
- It contains powerful data processing system.
- It is capable to run multiple operating systems.
- It is capable to process 100 million instructions per second.
- Mainframes are very large & expensive computers with having larger internal storage capacity & high processing speed.

- Mainframes are used in the organization that need to process large number of transaction online & required a computer system having massive storage & processing capabilities.
- Mainly used to handle bulk of data & information for processing.
- Mainframe system is housed in a central location with several user terminal connected to it.
- Much bigger in size & needs a large rooms with closely humidity & temperature.
- **IBM & DEC are major vendors of mainframes.**
- **Ex : MEDHA, SPERRY, IBM, DEC, HP, HCL**

<u>**Super Computer:**</u>
- Most powerful & most expensive computer.
- Used for complex scientific application that requires huge processing power.
- Used multiprocessor technology to perform the calculation very speedy.
- They are special purpose computers that are designed to perform some specific task.
- The cost of the super computer is depended on its processing capabilities & configuration.
- The speed of modern computer is measured in gigaflops, teraflops and petaflops.
    - Gigaflops= 10^9 arithmetic operation per second.
    - Teraflops=10^{12} arithmetic operation per second.
    - Petaflops=10^{15} arithmetic operation per second.
- **Ex: PARAM , EKA, BLUE GENE/P**

6. EXPLAIN THE GENERATION OF THE COMPUTERS.

<u>**First Generation:**</u>
- Duration is   **1942-1955**
- manufactured by using **vacuum tube**
- Used as a calculating device.
- Performed calculations in milliseconds.
- To bulky in size & complex design.
- Required large room to place it.
- Generates too much heat & burnt.
- Required continuously hardware maintenance.
- Generates much heat so must air-conditioner rooms are required.
- very high power consumption
- Difficult to configure.
- Limited primary & secondary storage
- **ENIAC, EDVAC, EDSAC are example of 1st generation computer.**

<u>**Second Generation:**</u>
- Duration is **1955-1964**
- manufactured by using **transistor**

- o used for scientific & mathematical calculations
- o 10 times **Smaller in size** than 1st generation system.
- o Less heat than 1st generation computers.
- o Consumed less power than 1st generation system.
- o Computers were done calculations in microseconds.
- o Air-conditioner is also required.
- o Easy to configure than 1st generation computers.
- o More reliable in information.
- o Large & fast primary/secondary storage than 1st generation computers.

Third Generation:

- o Duration is **1965-1975**
- o manufactured by using **IC chip**
- o **Smaller in size than 1st & 2nd** generation computers.
- o Perform more fast calculations than 2nd generation systems.
- o Large & fast primary/secondary storage than 2nd generation computers.
- o Air –conditioner is required.
- o Widely used for commercial applications.
- o General purpose computers.
- o High level languages like COBOL & FORTAN are allowed to write programs.
- o Generate less heat & consumed less power than 2nd generation computer.

Fourth Generation:

- o Duration is**: 1975-1989**
- o manufactured by using: **Microprocessor chip**
- o Based on LSI & VLSI microprocessor chip.
- o Smaller in size.
- o Much faster than previous generations.
- o Minimum hardware maintenance is required.
- o Very reliable as computer to previous generation computers.
- o Totally general purpose computer.
- o Easy to configure.
- o Possible to use network concept to connect the computer together.
- o **NO requirement of air-conditioners.**
- o Cheapest in price.
- o higher primary & secondary storage devices

Fifth Generation:

- o Duration is **1989 to Present**
- o manufactured by using **ULSI microprocessor chip**
- o Much smaller & handy.
- o Based on the ULSI chip which contains 100 million electronic components.
- o The speed of the operations is increased.
- o Consumed less power.
- o Air-conditioner is not required.

- o More user friendly interface with multi-media features.
- o High level languages are allowed to write programs.
- o Larger & faster primary/secondary storage than previous generations.
- o Notebook computers are the example of 5[th] generation computers.

7. EXPLAIN THE BLOCK DIAGRAM OF COMPUTER <u>OR</u>

EXPLAIN THE SIMPLE MODEL COMPUTER.

A simple computer system comprises the basic components like;
- **Input Devices**
- **CPU (Central Processing Unit)**
- **Output Devices**
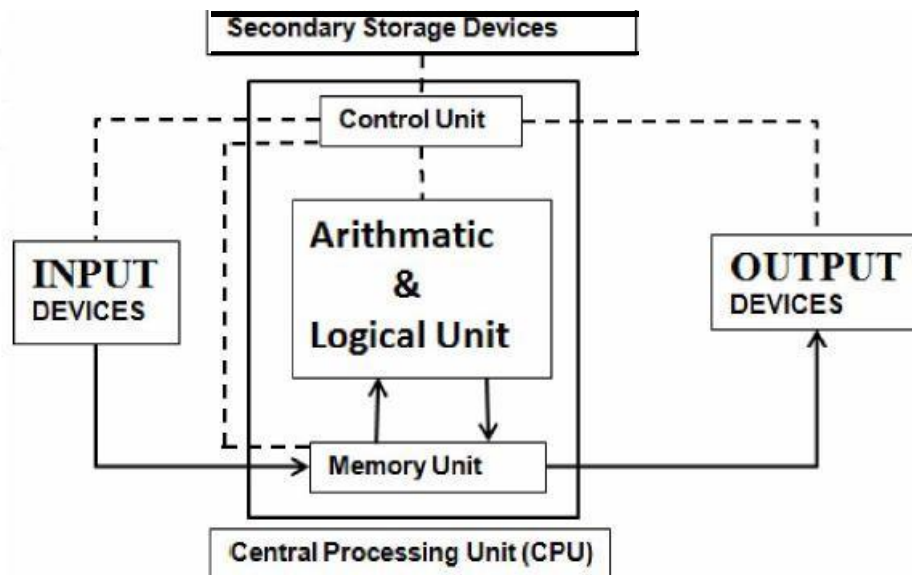
- **Input Devices:**
    - o The devices which are used to entered data in the computer systems are known as input devices.
    - o Keyboard, mouse, scanner, mike, light pen etc are example of input devices.
  <u>FUNCTION OF INPUT DEVICES</u>
    - o Accept the data from the users.
    - o Convert that data into computer coded information.
    - o Supply this data to CPU for further processing.
- **Output Devices:**
    - o The devices which display the result generated by the computer are known as output devices.
    - o Monitor, printer, plotter, speaker etc are the example of output devices.
  <u>FUNCTIONS OF OUTPUT DEVICES</u>
    - o Accept the result form the CPU.
    - o Convert that result into human readable form.
    - o Display the result on the output device.

- **Memory Unit:**
  - The data & instruction have to store inside the computer before the actual processing start.
  - This tasks performed by memory unit.

  FUNCTIONS OF MEMORY UNIT
  - Store data & instruction
  - Store the intermediate results generated by CPU.
  - Store the final result generated by CPU.

- **Arithmetical & Logical Unit:**
  - The ALU is the place where actual data & instruction are processed.
  - All the calculations are performed & all comparisons are made in ALU.
  - Performs all arithmetical & logical operations.
  - An arithmetic operation contains basic operations like addition, subtraction, multiplication, division.
  - Logical operations contains comparison such as less than, greater than, less than equal to, greater than equal to, equal to, not equal to.

- **Control Unit:**
  - Its main function is to manage all the activities within the computer system.
  - Controls the internal parts as well as the external parts related with the computer.
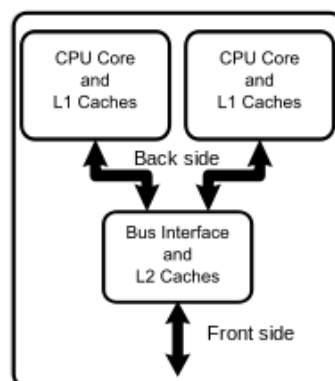- **CPU:**
  - The Unit where all the processing is done is called as Central Processing Unit.
  - It contains many other units under it.
  - Main of them are:- Control Unit And ALU (Arithmetic & Logic Unit)

INTERNAL/EXTERNAL PARTS WITH COMPUTER CABINATE

1. EXPLAIN TYPES OF PROCESSORS.
DUAL CORE

- Dual-core refers to a CPU that includes two complete execution cores per physical processor.
- It has combined two processors and their caches and cache controllers onto a single integrated circuit (silicon chip)

- Multi-core is similar to dual-core.
- it is an expansion to the dual-core technology which allows for more than two separate processors.
- It is basically two processors, in most cases, residing reside side-by-side on the same die.
- Dual-core processors are well-suited for multitasking environments
- Each with an independent interface to the front side bus.
- Since each core has its own cache,

ADVANTAGES:
- Performance is faster than single-core processors.
- Able to divide information for processing by multiple units.
- Core processor uses slightly less power
- Allows higher performance at lower energy.

CORE 2 DUOS
- Core 2 Duo is the name given by Intel to its second batch of dual core processors.
- Intel's dual core processors were simply 2 Pentium 3 processors that were fabricated in a single chip.
- As they refined their product more, they decided to differentiate their second set of processors from the Core Duo and decided to call it Core 2 Duo.
- If we translate this to the single core processors, we can say that Core Duo is Pentium 1 while Core 2 Duo is Pentium 2.
- But all these are still single core processors.
- We can therefore say that Core 2 Duo is simply a subset of all the dual core processors that are out in the market today.

Features and benefits
- You will get performance-rich technologies.
- Provides greater multitasking performance.
- Execution improves execution time.
- More instructions per clock cycle.
- Power Capability enables smarter, more energy-efficient performance.

2. EXPLAIN PRIMORY STORAGE DEVICE.

- It's a temporary storage.
- It consists of some chips.
- The data & instruction are resided in this memory when the CPU executing programs.
- This memory can capable to store & retrieved data very quickly.
- Primary memory is only the memory that is directly access to the CPU.

RAM
- The complete name of RAM is random access memory which is also known as Primary memory.
- It is called read/write memory because data can be read as well as write in RAM.
- It is called random access because you can directly access any data from RAM.

- The RAM chip is fixed on the mother board & the mother board is designed in such a way that its memory capacity can be enhanced by adding more RAM chip.
- RAM is a VOLETILE memory.
- RAM chips are of two types:

DRAM:

- Dynamic Random Access Memory.
- It is a volatile memory that allows fast access to data and is ideal for use as the primary store of computer systems.
- However, the information is stored as electrical charges and the charges need to be constantly refreshed in order for the data to be maintained.

SRAM:

- Static Random Access Memory is also a volatile memory.
- Once data is written into the chip, it is maintained as long as power is supplied to it;
- It does not need refreshing.
- However, SRAM is slower than DRAM and it is also more expensive.

ROM

- The complete name of ROM is read only memory.
- The data stored permanently & can't be altered by the programmer.
- Data stored in RAM chip can be read & used but cannot be changed.
- This memory also known a field storage permanent storage or dead storage.
- It is basically used to store manufacturer programmed & user program.
- Most of the basic operations are carried out by electronic circuits which are known as micro programs.
- These programs are stored in ROM.
  - For ex. System Boot Loader.

PROM

- **PROM** stands for Programmable Read Only Memory
- PRO is a non-volatile memory which allows the user to program the chip with a PROM writer.
- The chip can be programmed once, thereafter, it cannot be altered.

EPROM & EEPROM

- Erasable Programmable Read Only Memory and Electrically Erasable Programmable Read Only Memory chips can be electrically programmed.
- Unlike ROM and PROM chips, EPROM chips can be erased and reprogrammed.

3. EXPLAIN FOLLOING PORTS

SERIAL PORT

- **Known as asynchronous port or RS-232-C port.**
- This type of port is sends & receives data using only two line.
- Therefore this type of port is ideal for connection to the phone circuits which uses 2 data lines.

- The communication process of data transfer is slower.
- Due to this reason it is not used for printer.
- <u>It has high signal travelling capacity</u>.

PARALLEL PORT
- Known as **"centronics"** or **"printer port"**
- It's a type of socket found on personal computer for connecting various types of computer devices.
- Normally it is reserved for printer.
- They carry 8 bits at the same time so that communication becomes very faster.
- Due to the faster data communication capability it is used in input & output devices.
- The signal travel capacity is less than serial port.

USB PORT
- It's a new interface technology which is used to connect computer peripherals such as keyboard, mouse, scanner, joysticks, printer, web camera etc.
- USB operate at two speeds 1.5 mbps & 12 mbps.
- The speed is depending upon the devices which are attached with the port.
- For example the devices such as mouse, keyboard Use the law band while digital camera use high speed channel/
- Main advantage is that when devices are attached the appropriate drivers are loaded automatically.

PS/2 PORT
- Developed by IBM for connecting mouse or keyboard to PC.
- It supports the plug that contains 6 pins.
- Also called mouse port.

4. EXPLAIN FOLLOWING CABLES

Serial Cable
- Serial Cables are typically used for RS-232 communication.
- it can be used to transfer information between two devices using serial communication.
- The maximum working length of a cable varies depending on the characteristics of the transmitters and receivers.
- This cable has short transmission distance because of noise limiting the transmission of high numbers of bits per second when the cable is more than 15 meters long.
- It is cheap in cost
- It is simple to join and connect.
- It is suitable for unbalanced data standards.
- Only one device can be connected to the cable.

Parallel Cable
- On many legacy peripherals, the parallel cable utilized both the 25 pin Sub-D connector and the 36 pin Centronics connector.
- This was a common printer interface and is still in service in great numbers.

- With the advent of "intelligent" laser and ink jet printers, the IEEE-1284 bi-directional printer cable was introduced.
- This parallel interface allows for bi-directional communication.
- It is 10 times faster than conventional cables.

USB Cable
- To Connecting a USB device to a computer is simple -- you find the USB connector on the back of your machine and plug the USB connector into it.
- If it's a new device, the operating system auto-detects it and asks for the driver disk.
- If the device has already been installed, the computer activates it and starts talking to it.
- USB devices can be connected and disconnected at any time.

5. <u>SHORT NOTE: GRAPHIC CARDS.</u>

- A graphics card is the component in your computer that handles generating the signals that are sent to the monitor or "graphics".
- It is responsible for generating all the text and pictures that are displayed on your screen.
- The images you see on your monitor are made of tiny dots called pixels.
- At most common resolution settings, a screen displays over a million pixels, and the computer has to decide what to do with everyone in order to create an image.
- To do this, it needs a translator -- something to take binary data from the CPU and turn it into a picture you can see.
- This task is performed by Graphic Card which is built into motherboard.
- A graphics card's job is complex, but its principles and components are easy to understand.
- The CPU, working in conjunction with software applications, sends information about the image to the graphics card.
- The graphics card decides how to use the pixels on the screen to create the image.
- It then sends that information to the monitor through a cable.
- The graphics card accomplishes this task using four main components:
    - **A motherboard**:
        - connection for data and power
    - **A processor:**
        - to decide what to do with each pixel on the screen
    - **Memory:**
        - to hold information about each pixel and to temporarily store completed pictures
    - **A monitor:**
        - connection so you can see the final result

6. <u>WRITE A DETAIL NOTE ON MOTHER BOARD.</u>

- A computer has many components, each with their own roles and functions.
- The role of the motherboard is to allow all these components to communicate with each other.
- The motherboard is the central piece of a PC, the component that brings it all together.

- All the other components are installed on the motherboard or connected to it

Processor Socket
- The processor socket is the central piece of a motherboard.
- Usually processor socket is placed near the centre of the motherboard.
- It's also the central piece because it holds the processor – **the brain of your computer.**

Power Connectors
- Any component cannot be operating without power.
- The power connector, commonly a 20 or 24-pin connector.
- It can be placed either near the right edge of the motherboard, or somewhere close to the processor socket.
- It providing power to the motherboard and all the other components.

Memory Slots
- Memory slots are placed in the upper-right part of the motherboard
- The memory slots are used to house the computer's memory modules.
- The number of slots can be different depending on motherboard

Video Card Slot
- This is the type of slot that doesn't need an explanation, as its name doesn't leave much room for interpretation as to what its role is.
- Coming in the form of a PCI-Express slot on newer motherboards or AGP on older ones, the video card slot is situated right below the processor.
- High-end gaming motherboards come with multiple video card slots.

Expansion Slots
- Expansions have the role of letting you install additional components to enhance or expand the functionality of your PC.
- You can install a TV tuner, a video capture card, a better soundcard, etc. – you get the idea.
- These ports are located under the video card slot, and come in the form of PCI slots (on older motherboards) or a scaled-down version of PCI-Express slots (on newer motherboards).

IDE and SATA Ports

- IDE and SATA ports are used to provide connectivity for the storage devices and optical drives.
- The IDE interface is somewhat outdated
- It was replaced by the smaller and much faster SATA interface
- SATA interface currently reached its 3rd revision.
- It ca able to achieve maximum speeds of up to 600 MB/s, as opposed to the IDE interface, which can reach a maximum of 133 MB/s.

BIOS Chip and Battery

- The BIOS- Basic Input Output System.

- The BIOS chip contains the basic code needed to take your computer through the boot process, up to the point where the operating system takes over.
- Since the BIOS code is stored on a memory chip that needs constant power to function,
- A battery is also present to keep the chip powered when the computer is unplugged.

Northbridge and Southbridge

- The square metal component somewhere in the lower-right part of the board.
- The Northbridge is responsible for coordinating the data flow between the memory, the video card and the processor.
- Southbridge has a similar function, coordinating the data flow between the processor and peripherals such as sound cards or network cards.

Front Panel Connectors, USB Headers and Audio Header

- The front panel connector is where all the elements present on the front of your case are connected.
- Power button, reset button, power led, audio connectors and USB connectors – they are all connected to the front panel or the corresponding headers.

Rear Connectors
- These connectors are the bridge between the outside of your computer and the inside.
- The connectors located on the left edge of the motherboard
- These connectors are accessible from the outside, the name simply implies where they are accessible from – the rear of the PC case.
- External peripherals such as keyboard, mouse, monitor, speakers and so on

7. WRITE A DETAIL NOTE ON UPS.

- UPS stands for uninterruptible power supply.
- It known as uninterruptible power source, UPS or battery/flywheel backup.
- UPS is a device that allows a computer to keep running for at least a short time when the primary power source is lost.
- it is an electrical equipment that provides emergency power to a load when the input power source or mains power fails
- A UPS is typically used to protect hardware such as computers, data centres, telecommunication equipment or other electrical equipment where an unexpected power disruption could cause injuries, serious business disruption or data loss.
- UPS units range in size from units designed to protect a single computer to large units powering entire data centres or buildings.
- The main functions of UPS are as below:
    - It provides immediate temporary power in case of main power supply failure.
    - It provides the stable/constant voltage even during voltage fluctuation
    - It saves the equipment from power surges or any other electrical disturbances.
    - It also charges the backup battery using the power from main/secondary power supply.

8. WRITE A NOTE ON NIC.

- NIC stands for network interface card.
- Its network adapter hardware in the form of an add-in card that fits in an expansion slot on a computer's motherboard.
- Most computers have them built-in but you can also add your own NIC to expand the functionality of the system.
- The NIC is what provides the hardware interface between a computer and a network.
- This is true whether the network is wired or wirelesses since the NIC can be used for Ethernet networks as well as Wi-Fi ones.
- It is used for desktop or laptop.
- There are two types of NIC
    - **Ethernet NIC card**
        - Wired NICs just use an RJ45 port since they have an Ethernet cable attached to the end.
    - **Wireless NIC card**
        - Wireless NICs need to use wireless technologies to access the network, so they have one or more antennas sticking out of the card.
- All NICs feature a speed rating, such as 11 Mbps, 54 Mbps or 100 Mbps, that suggest the general performance of the unit.

9. EXPLAIN FOLLOWING SLOT.

ISA SLOT	- Industry Standard Architecture - A receptacle on a motherboard that accepts an ISA card. See ISA bus. - It is used for 8-bit IBM-compatible systems. - An ISA bus provides a basic route for peripheral devices that are attached to a motherboard to communicate with different circuits or other devices that are also attached to the same motherboard.
PCI SLOT	- Peripheral Component Interconnect - PCI was introduced by Intel in 1992. - These tools are built into the motherboards of computers and devices in order to allow for the addition of PCI devices like modems, network hardware or sound and video cards - The PCI bus came in both 32-bit (133MBps) and 64-bit versions and was used to attach hardware to a computer.
MEMORY SLOT	- A memory slot, memory socket, or RAM slot - It allows computer memory (RAM) to be inserted into the computer. - Depending on the motherboard, there may be two to four memory slots
Secondary Storage Devices	- It is also known as external memory, secondary memory, and auxiliary storage, a secondary storage device is a non-volatile device that holds data on permanent basis. - example: hard disk drive, floppy disk drive, USB, CDROM, DVD,

SDRAM	• SDRAM stands for Synchronous dynamic random access memory (SDRAM) is dynamic random access memory (DRAM) • SDRAM has a rapidly responding synchronous interface, which is in sync with the system bus. • SDRAM waits for the clock signal before it responds to control inputs. • data transfer rate is 0.8gb to 1.3 gb
DDR	• DDR stands for double data rate • It's an advance version of SDRAM. • DDR transfers data twice per clock cycle • data transfer rate is 2.1 gb to 3.2 gb with lower voltage • so it is idle for notebook computer
SOCKET	• Socket provides a communication link between computer peripherals & CPU. • It serves as an interface between computer & other external parts

10. WRITE A NOTE ON SOUND CARD.

- Sound card is also Known as audio output device, sound board, or audio card.
- A sound card is an expansion card or IC for producing sound on a computer that can be heard through speakers or headphones.
- Uses of a computer sound card
  - Games
  - Audio CDs and listening to music
  - Watch movies
  - Audio conferencing
  - Creating and playing Midi
  - Educational software
  - Business presentations
  - Voice recognition
- It contain different colours ports where each port used to connect different devices:
- **White or Yellow; words:**
  - "Digital" or "Digital Out") - Used with surround sound or loudspeakers.
- **Blue**
  - Arrow pointing into waves
- **Pink**
  - Microphone
- **Green:**
  - The primary sound connection for your speakers or headphones
- **15 pin yellow connector:**
  - Used with earlier sound cards to connect MIDI keyboard or joystick.

UNIT: 2 INPUT DEVICES

1. WHAT IS INPUT DEVICES?

- The Input devices are the devices which are used to enter the data in the computer system.
- **Keyboard, mouse, scanner, microphone are the example of input devices.**

FUNCTIONS OF INPUT DEVICES:

- o Accept the data from the outside worlds.
- o Convert that data into computer coded information.
- o Supply this data to Central Processing Unit for further processing.

TYPES OF INPUT DEVICES:

- **STANDARD INPUT DEVICE**
  - o **KEYBOARD**
- **POINTING DEVICES**
  - o **MOUSE**
  - o **TRACK BALL**
  - o **JOY STICK**
  - o **LIGHT PEN**
  - o **GLID PAD**
- **SPECIAL INPUT DEVICES**
  - o **SCANNER**
  - o **TOUCH SCREEN**
  - o **MIKE**
  - o **WEB CAMERA**
  - o **POINT ON SALE TERMINAL**
  - o **DIGITIZER**

2. EXPLAIN STANDARD INPUT DEVICE: KEYBOARD.

- Keyboard is most commonly used input device.
- It is similar like a type writer which is used to enter data in the computer.
- It contains sets of keys such as alphabets, number & special signs.
- **There are two types of keyboard.**
  - o **General purpose keyboard**
  - o **Special purpose keyboard**

GENERAL PURPOSE KEYBOARD:

- Standard keyboard which are used in personal computers.
- It contains enough keys which are used in all types of applications so they are known as general purpose keyboard.
- Most popular general purpose keyboard contains 101 keys.

- The general purpose keyboard are divided into following parts:

ALPHANUMERAIC KEYPAD

- The centred part of the keyboard is known as alphanumeric keypad.
- It contains alphabets, numbers & special signs such as *, @, #, $, %,* etc.

NUMERAIC KEYPAD

- The right most part of the keyboard is known as numeric keypad.
- It contains 0 to 9 numbers & mathematical signs such as +, *, -, /.
- Mainly used for fast data entry in mathematical applications.

ARROW KEYS

- Set of four keys up, down, left & right.
- Used to move the cursor at left & right or up and down on the screen.
- They are referred as "cursor-control" or "cursor-movement" keys.

FUNCTION KEYS

- The first line of the keyboard contains a Set of 12 keys with name f1 to f2 are known as function keys.
- Used to generate short-cuts in different software package.

SPECIAL KEYS

There are lots of keys that are used for some specific task describes follows:

TAB:	Used for gives multiple spaces or move the cursor to next defined position
ENTER:	Used for generate the output of any command
SPACE:	Used to make one blank space between two words
BACKSPACE:	Used to remove the left-most character at cursor position
DELETE:	Used to remove the right-most character at cursor position.
HOME:	Moves the cursor at the beginning of the line.
END:	Moves cursor at the end of the line.
PAGE UP:	Moves or scroll the screen up or previous page of the current page.
PAGE DOWN	Moves the screen to the next page from the currently displayed page.
PRINT SCREEN	Used to print what is currently displayed on the screen.
INSERT	Used to enter text between two characters
ESC:	Used to negate current command or terminate the execution of the program.
ALT:	Used to generate shortcuts in different application.
CTRL:	Used to generate shortcuts in different application.
NUMLOCK:	Used to on or off the numeric keypad.
CAPSLOCK:	Used to type the all inputted text capitally.

SPECIAL PURPOSE KEYBOARD

- Special purpose keyboard is used for special purpose applications which required faster data entry and rapid interaction with the computer system.
- For example ATM used in banks used special purpose

3. EXPLAIN IN BRIEF <u>MOUSE.</u>

- Mouse is Small hand-hold device Input device which is generally used for drawing purpose.
- It's a Pointing device.
- It contains two or three buttons.
- Left button is used to point out or select any item by clicking.
- Right to generate context menu.
- When user moves mouse across flat surface, the graphic cursor moves on screen.
- Graphic cursor contains verity of symbols such as arrow, wrist, pointing finger etc.
- Depending on application text & graphic cursors are changed.
- The following 5 techniques are used to carry out various operations:
- **POINT:**
  - To move the mouse on top of icon
- **CLICK:**
  - To press & release the left button of mouse at once.
  - Used to open any currently selected icon, menu.
- **DOUBLE CLICK:**
  - To press & release the left button of mouse twice.
  - Used to open any application or program.
- **SIMULTANEOUS-CLICK:**
  - Press & release left & right button to gather.
  - Used in some software package to added some functionality.
- **DRAG:**
  - Press the left button down & moved the mouse on screen.
  - Used to move the graphics on screen.
- Many types of mouse are available such as mechanical mouse, optical mouse, serial mouse, wireless mouse which are used for different purpose.

4. WRITE A NOTE ON TRACK BALL

- Trackball is a pointing device which is similar to a mouse.
- A ball is placed on the track ball device which is used to move the graphic cursor on the screen.
- It also contains buttons which are used to select a particular item on the screen.
- To move the graphic cursor on screen, the ball is rolled with the fingers or thumb.
- It needs not to move the whole device to move the cursor so it is often attached with some keyboards.
- Track balls come in various shapes with same functionality.
- Commonly three shapes are used: ABALL, A SQUARE, and A SQUARE.

- In case of ball we need to move it with the help of finger.
- In case of button pushed with finger in desired direction of the cursor movement.
- In case of button press finger to up or down & left or right to move cursor.

ADVANTAGES OF TRACK BALL
- Takes less desk space.
- Takes less arm movements than mouse.
- Doesn't require any mouse pad & large area to move the mouse.
- Less strain on the wrist.
- Finger trip control which may offer more accuracy than mouse.
- faster than mouse

5. SHORT NOTE: GLIDE-PAD

- Glide-pad is also known as touch pad, pressure sensitive tablet, or track pad touch pad.
- A touch pad is a device for pointing on a computer display screen.
- It is an alternative to the mouse.
- Originally incorporated in laptop computers, touch pads are also being made for use with desktop computers.
- it is used to move a cursor with your finger device for pointing on a computer display screen
- A touch pad works by sensing the user's finger movement and downward pressure.
- A touchpad is a pointing device featuring a tactile sensor.
- It translate the motion and position of a user's fingers to a relative position on the OS that is outputted to the screen
- The touch pad contains several layers of material.
- The top layer is the pad that you touch.

6. SHORT NOTE : JOYSTICK

- Joystick is a pointing device which is works on the same principle of track ball.
- It contains a stick which is placed on the spherical ball.
- The stick is used to move the cursor at desired position left or right or backward or forward.
- It also contain button that is clicked to make selection of currently pointed item.
- A joystick is similar to a mouse, except that with a mouse the cursor stops moving as soon as you stop moving the mouse.
- With a joystick, the pointer continues moving in the direction the joystick is pointing.
- To stop the pointer, you must return the joystick to its upright position.
- Some of the systems using joysticks are

- o **Aircrafts, UAVs for flight control**
- o **Motorized Wheelchairs as input device**
- o **Microscopes**
- o **Submarines**
- o **Security Systems**
- o **Video Games**
- Joysticks are widely used for video games

Advantages of joystick

- It is very easy to learn to use.
- Very simple design.
- Cheap in cost.
- faster entry
- It has a big analogue stick in the middle so it's easier to control.

7. SHORT NOTE: LIGHT PEN

- Light pen is a pointing device which is used to draw directly draw on the screen.
- It is called light pen because it is similar to a pen & senses light.
- It's an input device in the form of light-sensitive stick used in conjunction with a CRT display.
- The light pen allows the user to point out or draw any object on the screen.
- The user brings the pen to the desired point on screen and presses the pen button to make contact.
- It has a switch on its top which allows the user to make contact with screen.
- It is useful for drawing or graphics in the program such as CAD (computer aided design).
- An engineer, architect or fashion designer can draw directly on screen.
- Used in application such as gaming, graphic arts, healthcare applications etc.
- Light pen cannot scratch or damage a screen.

Advantages of light pen

- o Less expensive than touch screen.
- o Give the user the full range of mouse capabilities.
- o it doesn't required any pad or any horizontal surface
- o Cannot scratch or damage screen.
- o Works on any size screen.
- o easy to use

8. EXPLAIN IN DETAIL : TOUCH SCREEN

- Touch screen is a pointing device.
- It is most simple & easiest to learn of all input devices.
- It's a touching the display of the device with a finger or hand.

- Touch screens are common in devices such as computers, tablet computers & Smartphone.
- It allows the user to choose from available options by simply touching with their figure to item displayed on the computer screen.
- A touch screen is an electronic visual display that can detect the presence and location of a touch within the display area.
- It's a very easy to operate device which users can use the system without any formal training.
- Uses **optical sensors** that detect the touch of the finger on screen.
- Sensors communicate the position of touch to the computer which interprets the input made by the users.
- It contains **pressure sensitive monitors** which are placed inside the base of computer screen.
- Pressure sensitive monitors contain sensors to measure the monitor's weight at many points.
- When user touches the screen, the changes on weights & forces transferred down to sensor which allows the device to detect the location of the touch.
- This type of monitors required little pressure to transmit the desired input.
- Touch screen are commonly used in following places.
    - An airport or railway station.
    - Large departmental stores.
    - In large museums or zoos to guide visitors to the locations of various attractions.
    - Self service check out
    - In ATM machines
    - In I-phones or PDA's
    - Computer based training
- Any type of touch screen contains Three main components:

A touch screen sensor panel:
- Which sits above the display & generate appropriate voltage according to where precisely it is touched?

A touch screen controller:
- Processes the signal received from the sensor & translates this touch event data & passed to pc's processor via serial or USB interface.

A soft ware driver:
- Provides an interface to the pc's operating system & which translates the touch event data into mouse event.

ADVANTAGES:

- o fast data entry
- o easy to operate
- o no needs of formal training to operate
- o allows user to interact with screen directly
- o no needs of any other device to operate screen

9. EXPLAIN DIGITIZER /GRAPHIC TABLET

- An input device.
- Used for converting pictures, map & drawing into digital form.
- Allows user to hand-draw images and graphics, similar to the way one draws images with a pencil and paper.
- Also be used to capture data or handwritten signatures.
- The device consists of a flat surface upon which the user may "draw" an image using an attached stylus, a pen-like drawing tool.
- These devices are usually connected via a Serial port.
- Placed on the desk n connected with the computer.
- Digitizer consists of graphic tablets which are associated with a stylus.
- The stylus is like a pen with a button.
- Stylus connected with a tablet and can press down at a point on the tablet to input (x, y) co-ordinates of point.
- It contains hundreds of copper wires forming a grid that receives electric pulsed.
- When stylus moves on tables the cursor on screen moves simultaneously.
- Allows the user to draw sketches directly.
- Commonly used in
  - o CAD by architects & engineers.
  - o Used in GIS for digitizing maps.

10. EXPLAIN IN BRIEF POS

- A point-of-sale (POS) terminal is a computerized replacement for a cash register.
- The point of sale (POS) or point of purchase (POP) is the time and place where a retail transaction is completed
- it's an electronic device used to process card payments at retail locations
- A POS terminal generally does the following:
  - o Reads the information off a customer's credit or debit card
  - o Checks whether the funds in a customer's bank account are sufficient
  - o Transfers the funds from the customer's account to the seller's account
  - o Records the transaction and prints a receipt
- Some point of sale vendors refer to their POS system as "Retail Management System".

24

- This software is no longer just about processing sales but comes with many other capabilities such as:
    - inventory management
    - membership system
    - supplier record
    - Bookkeeping
    - issuing of purchase orders
    - quotations and stock transfers
    - sale reporting

11.   SHORT NOTE : MICROPHONE

- It's an input device.
- Used to stores the voice data into the computer system.
- Microphones are a type of *transducer* - a device which converts energy from one form to another.
- Microphones convert sound waves into electrical energy.
- Different types of microphone have different ways of converting energy.
- All the microphones share one common thing: The diaphragm.
- Thin piece of material which vibrates when it is struck by sound waves.
- When the diaphragm vibrates, it causes other components in the microphone to vibrate.
- These vibrations are converted into an electrical current which becomes the audio signal.
- The microphones are divided in mainly two types
    - **The type of conversion technology they use**
    - **The type of application they are designed for**

12.   SHORT NOTE: WEB CAMERA

- It's an input device.
- Used to feeds the image to a computer or computer network often via USB or Wi-Fi.
- Web camera allows everyone to connect to internet to view either pictures or motion video.
- Most Web cameras are embedded to display with laptop computer or connected with USB or Wi-Fi with a computer.
- Simple web cam. Consists a digital camera attached to your computer typically through USB.
- The camera part of web camera is just a digital camera.
- Web camera comes with software which preset interval & transfer it to another location of viewing.
- It allows you to using video also for that you have web camera with high frame rate.

- Web camera is a digital camera which taking picture over & over & again one after another.
- These images are stored image into the physical memory of camera in built in.
- After capture image & stored in memory it reduced the amount of data need to transmit.
- Web camera software takes image & converts data in jpeg (compressing format).

13.   EXPLAIN SCANNER & ITS TYPES.
- Scanners are input devices.
- They are capable of entering information directly into the computer.
- Provides faster and more accurate data entry.
- two types of scanner:
  - image scanner
  - optical scanner

Image scanner:
- It's an input device, which translates paper documents into an electronic format
- The input document may be typed text, pictures, graphics or even handwritten material.
- There are two types of image scanner:

Flatbed scanner
  - It's like a zerox machine.
  - It consists of box having a glass plate on its top and a lid.
  - The document placed inside the glass plate & light source is situated blow glass plate which moves horizontally from left to write & scanning document line by line.

Handheld scanner
  - It is a handy scanner.
  - It contains a set of light emitting diodes encased in small case
  - To scan a document the scanner is slowly dragged on the document.
  - The scanner has to be dragged carefully & steadily otherwise the document cannot scan properly.
  - Used when higher accuracy is not required**.**

14.   EXPLAIN THE OPTICAL SCANNERS

OMR (OPTICAL MARK READER)
- OMR is a device that is capable of recognised pre-specified type of mark made by pencil or pen.
- OMR is a device which can detect the presence or absence of a mark on a paper.

- it is always used with its software
- The OMR recognise the marks by focusing a light on the paper being scanned & detect the reflected light pattern from mark.
- Pencil marks made with soft lead pencil reflect the light which allowing the OMR to determine which response are mark.
- OMR is used in reading answers sheets, questionnaires.

ADVANTAGES
- Speedy and accurate to generate result.
- Cheap in cost.
- can able to read shape

DISADVANTAGES:
- Cannot read characters.
- roughly handle paper cannot be scan properly
- Erasing or cancellation is not possible.
- Good quality expensive paper is required.

OCR (OPTICAL CHARACTER READER) DEVICE
- OCR capable of recognizing alphabets & numbers printed on paper.
- It can also capable of recognise shape & identify character directly from source document.
- It is always used with character recognized software.
- It converts bitmap images of character to equivalent ASCII code.
- The type of document must be type using OCR fonts.
- The software design to recognised two types of font:
    - **OCR standard A** (American standard)
    - **OCR standard B** (European standard)

ADVANTAGES
- Speedy entered data.
- cheap in cost
- Accept wide range of font using ordinary mark.
- roughly handle paper can scan
- no needs of high quality paper

DISADVANTAGES:
- Expensive
- cannot read shapes
- limited font
- Scanned properly only if the characters are standard size.
- Dusty paper cant scanned properly.

MICR (MAGNETIC INK CHARACTER RECOGNITION)

- MICR systems use special ink which can be magnetized, to print characters that can then be read and decoded by special magnetic devices.
- it is used by banking sector to read cheques
- The common E13B font is used to write these special kinds of cheques.
- E13B font contains 0-9 numbers & 4 symbols.

ADVANTAGES

- Speedy data entry.
- cheap in cost
- Accurate output.
- Folded or roughly handled cheques are also scanned with same accuracy.

DISADVANTAGES:

- MICR software is required.
- only detect characters written by magnetisable ink
- Limited fonts are used so used in banking industries only.

BCR (BAR CODE READER) DEVICE

- Data can be coded in the form of small lines which are known as Bar Codes.
- Bar codes represent the alphanumeric data by combination of vertical lines which contains different width & spacing between them.
- Bar Code Reader is a device which are used to recognized bar code data.
- It scanned the barcode image & converted into alphanumeric value & fed to computer.
- It uses laser-beam technology.
- Laser stroke across the pattern of bar which sensed by light sensitive decoder & their reflection of light pattern are converted into alphanumeric value.
- Various barcodes are available for different use.
- Most common is UPC (UNIVERSAL PRODUCT CODE).
- It contains 10 digits first 5 identify the manufacturer name & remaining identify a specific product.

ADVANTAGES

- Speedy data entry.
- cheap in cost
- Accurate output.
- Handy scanner.

DISADVANTAGES:

- Software is required.
- only detect barcode
- dusty image can't scan

15. EXPLAIN FOLLOWING TERMS:

MIDI	• MIDI stands for Musical Instrument Digital Interface • It's an interface that allows you to connect electronic keyboard, electronic drum, electronic guitar etc
CLOUD STORAGE	• Cloud storage is a cloud computing model in which data is stored on remote servers accessed from the internet, or "cloud.". • It provides a facility to store and maintain your data on cloud with higher security. • For example. google drive

DATA STORAGE

1. WRITE A NOTE ON MAGNETIC TAPE

- Sequentially access storage device.
- Most popular storage medium for storage large data.
- Its plastic ribbon which is ½ or ¼ inch wide and 50 to 2400 feet long.
- It is coated with a magnetisable recording material.
- In a magnetic tape data are recorded serially.
- Information is recorded on the tape in the form of tiny invisible magnetized and non magnetized spots.
- The tape ribbon is itself stored in reels or small cassette.
- Whenever we stored new data on the tape that contains old data the old data are automatically erased and new data are recorded in the same area.
- Older tape used 6-bit BCD code while modern tape used 8-bit EBCDIC code format for data recording.
- There are various types of magnetic tape are used. Most commonly are:
  - ○ ½ inch tape reel
  - ○ ½ inch tape cartridge
  - ○ ¼ inch streamer tape
  - ○ 4 mm digital audio tape

ADVANTAGES:
- Large or unlimited storage capacity.
- Low cost.
- Light weight and compact in size.
- Copying of data is easy and fast.
- Possible to erase older data n store new data.

DISADVANTAGES:
- Cannot be accessed directly because it's a Sequential access device.
- Must be located in dust free environment.
- Data are stored in coded form so cannot interpret or verify directly.

2. WRITE A NOTE ON MAGNETIC DISK

- Directly access storage device.

- It's a thin circular plate that is made up with plastic material.
- Plate is coated both side with magnetic material such as iron oxide.
- Information is recorded on the tape in the form of tiny invisible magnetized and non magnetized spots.
- 8-bit EBCDIC code is used for data recording.
- Like magnetic tapes, magnetic disks are also erased & reuse.
- The disk is divided into number of circles called tracks.
- The tracks are further divided into sectors.
- A sector typically contains 512 bytes.

> **storage capacity of disk =number of recording surface * number of track per surface * number of sector per tracks * number of bytes per sectors**
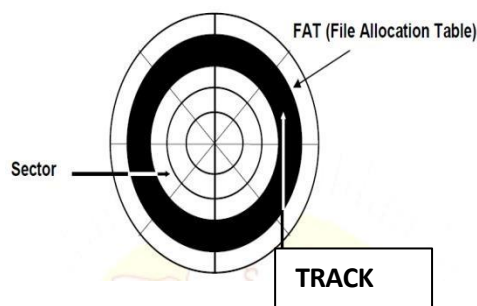
- **Two common types of magnetic disks are used widely.**
  - **Floppy disks**
  - **Hard disks**

3. SHORT NOTE: FLOPPY DISK
- Floppy disks were introduced by IBM in 1972.
- A floppy disk is a round, flat piece of flexible plastic which is coated with magnetic oxide.
- It is encased in square plastic cover that gives protection to the disk.
- They are also referred as diskettes.
- The data is read and write in floppy disk is using a device called FLOPPY DISC DRIVE.
- The long lit is provided for the read / writes head to access the disk.
- A hub in the centre is used for mounting the disk drive.
- A hole is used to sense index marking.
- The floppy disks are available in two sizes.
  - 8.5 inch
  - 5 ¼ inch (1.2 MB)
  - 3 ½ inch (1.44 MB)

ADVANTAGES:
- Cheap in cost.
- used to move data
- light weight
- Convenient offline storage for small computer users.

DISADVANTAGES:

- Low storage capacity.
- A floppy disk drive device is required to use read/write data.

4. WRITE A DETAIL NOTE ON HARD DISK

- Hard disks are most popular secondary storage device.
- It supports the direct access of the data.
- It's a thin magnetic plate which is made of metal n both side coated with magnetic material.
- The disk is divided in many tracks & the data is store in both side of the disk.
- The disk pack consists of multiple disk plates.
- The disk drive pack has a separate read/write head for each disk surface.
- The drive also has a set of magnetic heads mounted on arms.
- The arm assembly is capable of moving in & out in radial direction.
- The hard disk drive has become the most indispensable secondary storage device in micro-computers.
- It is fast and speeds of less than 10 (ms) milliseconds are achievable.
- Storage capacity is **10GB to 1 TB**.

ADVANTAGES:

- Permanent storage.
- Direct access storage device
- Huge storage capacity
- Convenient offline storage

5. SHORT NOTE : CD-ROM

- CD-ROM stands for Compact Disk – Read Only Memory
- It is a non-erasable backing store which can hold large amounts of data.
- It's a shiny silver colour metal disk of 5 ¼ inch and the storage capacity about 650 megabytes.
- Large volume production is achieved by automated processes similar to that of audio compact disks.
- Many of today's micro-computers come with CD-ROM readers.
- CD-ROM is popularly used for distribution of software, digitized graphic images as well as multi-Media material.
- Information is written on the disk surface by shining a laser beam.
- As a disk rotates the laser beam traces out a continuous spiral.
- It's known as WORM (Write Once Read Many) disk technology.
- The data can be read time and again but, once the data is stored, it cannot be erased or changed.

ADVANTAGES:

- Cost per bit is Low.
- Need not have any mechanical read/write heads to read/write data.
- Compact in size.

- Light weight

DISADVANTAGES:
- Read only storage medium.
- Slower access speed than magnetic disk.

6. EXPLAIN IN BRIEF: DVD
- DVD (Digital Versatile Disk) is optical disk storage.
- primarily to store movies
- a thin circular plate with 0.6 mm thickness
- able to store data either single or both side
- Basically it is used for storing large amount of data including movies with high video & sound quality.
- Work on the same principle of CDROM
- two types of DVD:
    - single layer disk - storage capacity 4.7 GB
    - double layer disk – storage capacity up to 8.5 GB
- Data is recorded on each layer so that the storage capacity is become large.

Advantages
- Larger capacity than CD.
- cheap in cost than magnetic storage

DISADVANTAGES:
- Expensive than CD
- data access speed is slower than magnetic disk
- required DVD drive
- Damaged if not handled properly.

7. SHORT NOTE: PEN DRIVE
- USB is a data storage device includes flash memory with an integrated USB interface.
- It is easy to carry in pocket.
- so also known as Pen Drive
- USB flash drives are typically removable and rewritable device
- supported by all new operating system such as windows, Linux, Unix like system
- Physically much smaller than an optical disc.
- Most weigh less than 30 grams
- It uses standard-A type connection which allows it to directly connect with the computer.
- **It contains following components:**
    - **USB COVER-**
        - made up with plastic or metal that provide protection
    - **Male type-A USB connector-**
        - Provides an interface to computer.
    - **USB mass storage controller-**
        - A small microcontroller with a small amount of on-hip ROM and RAM.
    - **NAND flash memory chip-**

- Stores data.
  - o **Crystal oscillator-**
    - Controls device data.
- Available in different size & storage capacity from 1 GB up to 256GB

ADVANTAGES:
- Portable in size.
- easy to carry
- Can easily work with all new operating system.
- reusable
- More reliable than floppy disk

DISADVANTAGES:
- Expensive than optical disk
- Do not provide protect mechanism.

8. SHORT NOTE: BLUE RAY DISK
- Blue-Ray disk is an optical disc storage media format.
- It was developed by blue-ray disc associations.
- It is mainly used to store high definition video and data.
- It has same dimensions as CD or DVD.
- The violet coloured laser is used to read and write the data.
- Because of its shorter wavelength more data can be stored than DVD format.
- Its storage capacity is 50 GB.

9. EXPLAIN MEMORY CARD IN BRIEF.
- Memory card is similar to flash drive or pen drive.
- It stores data in digital format
- It is used as a removable storage device.
- used in different types of equipment such as
  - o cell phone
  - o digital camera
  - o laptop
  - o tablets
- This device allows to store & transfer data
- There are a number of memory cards on the market, including the SD card (secure digital card), the CF card (compact flash card), the smart media card, the memory stick, and the multimedia card (MMC).
- These cards are of varying sizes, and each is available in a range of storage capacities that typically corresponds directly to the price.
- storage capacity 1 GB to 256 GB

TRACK	• The hard disk platter contain tiny invisible circle which is known as tracks
SECTORS	• Tracks are divided into pie shape segments which are known as sector. • each sector of 512 bytes
CLUSTER	• Sectors are often grouped together to form Clusters.
CYLINDERS	• Each platter is divided into tracks. • The cylinder value is the number of tracks on one side of each platter. • There are the same number of cylinders on each side of each platter
SEEK TIME	• the amount of time it takes a hard drive's read/write head to find the physical location of a piece of data on the disk known as seek time
LATENCY	• The time you wait for the sector to be accessible by your head here is known as latency.
ACCESS TIME	• Access time is also frequently used to describe the speed of disk drives. • Disk access times are measured in milliseconds
ROTATIONAL DELAY	• A rotational delay is the amount of time between information requests and how long it takes the hard drive to move to the sector where the requested data is located.

UNIT: 3 OUTPUT DEVICES

1. WHAT IS OUTPUT DEVICE.

- The output devices are the devices which are used to display the result generated by the computer system.
- Monitor, printer, plotter, speaker are the example of output devices.

FUNCTIONS OF OUTPUT DEVICES:

- Accept the result from the CPU.
- Convert that result into human readable form.
- Supply this result to output device**.**

EXAMPLE OF OUTPUT DEVICES:

- MONITER
- PRINTER
- PLOTTER
- SPEAKER
- HEADPHONE
- FAX
- SGD
- COM
- SLM
- GOOGLE GLASS

2. EXPLAIN THE VISUAL DISPLAY UNIT OR CRT BASED DISPLAY

- The monitor is the common output device mostly used It is a softcopy output device.
- It can be thought of as a high resolution TV set.
- The monitor can colour or black and white (monochrome).
- Two types of monitors are used.
    - **CRT monitors.**
    - **Non CRT monitors.**
- Most computer monitors are based on Cathode Ray Tube (CRT) technology.
- The basic operation of these tubes is similar to that in television sets.
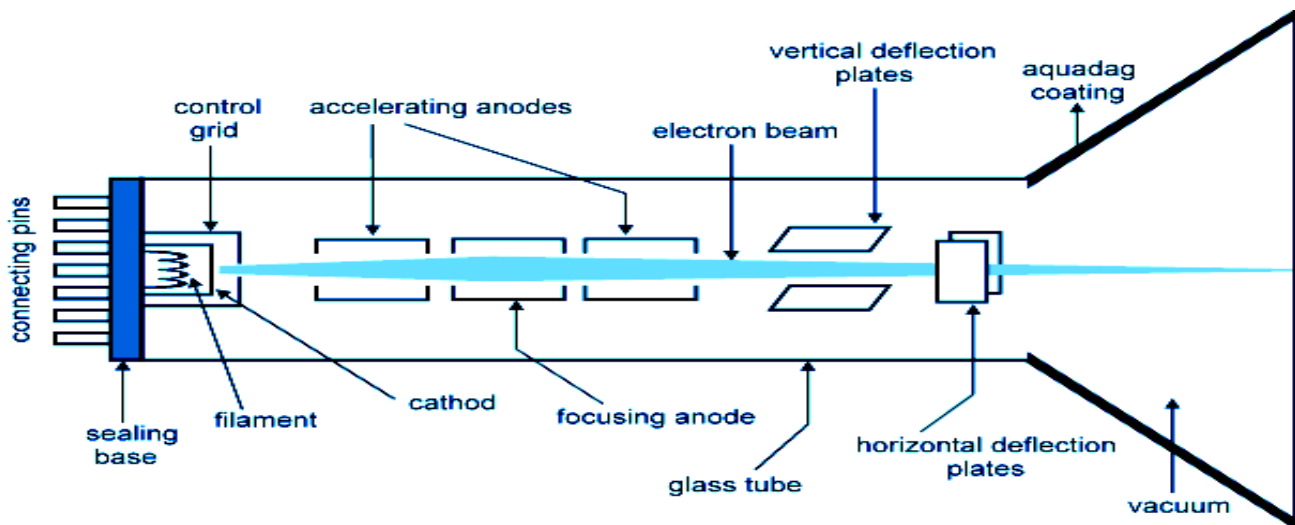
- CRT is a specialised vacuum tube in which images are produced when electron beam strikes a phosphor surface.
- CRT monitor contains cathode, control grid, acceleration anode, deflection plates & phosphor coated screen.
- **Cathode:**
  - The cathode is heated by filament and produced high speed & large amount of electrons.
- **Control Grid:**
  - Used to control the brightness of the screen. It controls the number of electrons.
- **Accelerating anodes:**
  - They are with focusing lens are applied with positive electrons.
- **Horizontal deflection plate:**
  - Moves electron side by side.
- **Vertical deflection:**
  - Moves electrons up & down.
- **Screen:**
  - Contains millions of tiny red, green, blue phosphor dot that glow when struck by electron beam that travels across screen to create a visible image.

ADVANTAGES
- Produce more colours.
- Price is lower than LCD & Plasma.
- High contrast ratio.
- Can easily increase brightness of monitor by reflecting the light.

DISADVANTAGES
- High power consumed.
- Heavy to pick up and carry.
- Large space required.
- Limited viewing angle.

3. EXPLAIN THE NON CRT DISPLAY.

LCD (Liquid Crystal Display)

- In LCD, a liquid crystalline material is sandwiched between two glass and a plastic plates.
- The front plate is transparent and the back plate is reflective.
- There is a coating of thin film on the front plate.
- The coating is transparent and conductive.
- Its sections (segments) are in the shape of desired characters.
- LCDs do not emit their own light. Therefore, a light source is to be used.
- LCDs simply change the reflection of available light.
- Today, most LCDs used are of the type that produces dark images on a silver background.

ADVANTAGES:

- Light weight as compares to CRT.
- Perfectly flat screen.
- Consumed low electricity power.
- Able to generate higher brightness in images.

DISADVANTAGES:

- Fixed resolution that cannot be changed.
- Expensive than CRT display.
- Limited viewing angle.
- Short life.

LED (Light Emitted Diode)

- A flat display which is 1" inch thickness
- A liquid crystalline material is sandwiched between two glass and a plastic plate.
- Back plate contains light emitted diode plate that used to manage brightness of screen
- It contains various plates Front panel, Back panel, Crystalline panel & LED panel

ADVANTAGES:

- Light weight as compares to CRT.
- Perfectly flat screen.
- Consumed low electricity power.
- Larger viewing angle
- Able to generate higher brightness in images.

DISADVANTAGES:

- Fixed resolution that cannot be changed.
- Expensive than CRT display.
- Short life

PDP (Plasma Displays Panel)

- In Plasma Displays, ionized gas is sandwiched between two glass plates.
- A number of parallel wires run horizontally as well as vertically.
- A plasma cell contain three red , green & blue cell
- A small amount of current is passed through one horizontal and one vertical wire.
- It is used to cause the gas to glow at a spot at the intersection of the wires

ADVANTAGES:

- Large viewing angle.
- Thinner in width.
- Free standing or can be easily mounted on wall.
- Clear image, brighter viewing angle, better colour quality & high contrast ratio.

DISADVANTAGES:

- The plasma displays screens are costly.
- These are available on the selected models of portable computers.
- More electricity than LCD.
- As your plasma get older the brightness get dimmer.

4. WHAT IS PRINTER? EXPLAIN THE TYPES OF PRINTER.

Printer

- The printer is a most commonly used output device.
- It is used to producing the hard copy output.
- It prints characters, symbols & graphics on the paper.
- Printer can be categorised according to the technology used in printer, speed, and approach of printing, colours, language & the quality of printing.
- Mainly printer can be classified in two types:
  - Impact printer
  - Non-impact printer

IMPACT PRINTER:

- It works on the same mechanism of type-writer.
- It forms a character or image by striking mechanism such as hammer or wheel against to ink ribbon, leaving an image on paper.
- It is oldest technology and still is in used.
- It can capable to print single character or line at the same time.
- Commonly types of impact printers are dot matrix, daisy wheel, chain, drum printer.

CHARACTERISTICS OF IMPACT PRINTER:

- o Physical contact with paper to produce output.
- o Low cost
- o Very noisy
- o Very slow in printing
- o Low quality print out
- o Stand with dusty or extreme environment

NON IMPACT PRINTER:

- Non impact printer forms characters & images on paper without actually striking the paper.
- Paper & print head come in contact & hence the text or image is formed.
- Ink jet & laser printer are example of non-impact printer.

CHARACTERISTICS OF NON-IMPACT PRINTER

- o Faster than impact printer.
- o Ability to change type face automatically.
- o High quality output.
- o Support transparency.
- o More expensive than impact printer.
- o Less maintenance than impact printer.

5. DIFFERENCE: IMPACT & NON-IMPACT PRINTER.

Impact printer	Non impact printer
Printing character by striking hammer against ink ribbon to produce output	Printing characters or graphics by spraying ink on paper.
Slow in speed	Faster than impact printer
Work with any environment	Can't work with all environment
Less expensive than non-impact printer	More expensive than impact printer
Noisy during printing	Silent during printing
Able to produced carbon copy output	Can't able to produced carbon copy output
Generally, impact printers are character or line printer	Generally, impact printers are character or **page** printer
Speed measured in CPS or LPM	Speed measured in PPM
Except dot matrix printer, impact printer can't not print graphics	These printers print graphics
e.g.: daisy wheel, drum, chain, dot matrix	e.g.: inkjet, laser

6. EXPLAIN IMPACT PRINTERS.

Dot matrix printer:

- Character printer.
- Capable to print single character at the same time.
- Forms characters & images as a pattern of dots.
- Contains a print head which moves horizontally across paper.
- Uses 5 × 7 matrix to form a character.
- Print by hammering the pins on inked ribbon to leave ink impressions on the paper.
- speed measured in CPS
- **Able to print 30 to 600 characters per second**.

ADVANTAGES:

- Low cost & easily available.
- Cheap in cost.
- Can make carbon copy of print out.
- Low maintenance cost.
- Low quality output.
- not environment sensitive

DISADVANTAGES:

- Slow in speed.
- Very noisy.
- Cannot work perfectly in graphics.

DAISY WHEEL PRINTER:

- Character printer.
- Able to print a single character at the same time.
- Contain a metal wheel on which the characters & numbers are raised on the each petal.
- The wheel is rotated very fast when the desired characters arrive at correct position a print hammer strike to produce output.
- Different type of font face can be used by replacing the daisy wheel.
- Able to print bold letter by striking on specific characters twice or thrice.
- speed measured in CPS
- **Capable to print 10 to 50 characters per second.**

ADVANTAGES:

- Low cost.
- Can make carbon copy of print out.
- Low maintenance cost.
- Printing quality is similar to a type writer.
- Able to print bold characters.
- Allows using different font-face in same document.

o not environment sensitive

DISADVANTAGES:
- o Very slow in speed.
- o Very noisy.
- o Cannot print graphics.

DRUM PRINTER:
- It's a line printer.
- Able to print a line at the same time.
- Consist of a solid cylindrical drum with characters embossed on it in circular band.
- Each band consists of character set which contains 96 characters.
- Drum rotates fast when desired characters arrive an appropriate hammer strike on ribbon & character is print on paper.
- speed measured in LPM
- **Capable to print 300 to 2000 lines per minute.**

ADVANTAGES:
- o Low cost than non impact printer.
- o Can make carbon copy of print out.
- o Low maintenance cost.
- o not environment sensitive
- o Faster than other impact printer.
- o Printing quality is similar to a type writer.

DISADVANTAGES:
- o Very slow in speed.
- o Very noisy.
- o Large & heavy.
- o Cannot print graphics.
- o Only prints predefined set of characters.

CHANIN PRINTER:
- It's a line printer.
- Able to print a line at the same time.
- Consist of a metallic chain on which all characters of character set are embossed.
- Character set contains 48, 64 or 96 characters.
- Characters are embossed several times.
- Chain rotates at high speed when the desired characters in correct position the hammer strikes & the characters are print on paper.
- speed measured in LPM
- **Capable to print 400 to 2500 lines per minutes.**

ADVANTAGES:

- Low cost than non-impact printer.
- Can make carbon copy of print out.
- Chain can be easily changed.
- Allowed to print different type font.
- Printing quality is similar to a type writer.
- not environment sensitive

DISADVANTAGES:

- Slower than non-impact printer.
- Very noisy.
- Large & heavy.
- Cannot print graphics.
- Only prints predefined set of characters.

7. EXPALAIN NON-IMPACT PRINTERS.

INK-JET PRINTER:

- It's non-impact printer.
- It's a character printer.
- Forms characters and all kinds of images by spraying drops of ink on to the paper.
- Print head contains 64 tiny nozzles.
- To print a character the printer the printer selectively heats the appropriate set of nozzle as the print head moves horizontally.
- Inkjet printer can either colour or monochrome.
- speed measured in CPM
- **Capable to print 30 to 400 characters per minutes.**

ADVANTAGES:

- High quality output.
- Silent during the operation.
- Able to print graphics.
- Able to print any characters & graphics.
- Able to generate colour & monochrome output.

DISADVANTAGES:

- Slower than dot matrix printer.
- Cannot make carbon copy of print out.
- Expensive than impact printer.
- Environment sensitive

LASER PRINTER:

- It's non-impact printer.

- It's a page printer.
- Three main components laser beam, a multi-sided mirror, a photoconductive drum & toner.
- To print page laser beam is focused on drum by spinning multisided mirror.
- Drum is electric charged.
- Toner which is composed of oppositely charged ink particles, stick to the drum.
- Then toner focused on the paper with heat & pressure to generate output.
- speed measured in PPM
- **Low speed laser printer can print 4 to 12 page per minute.**
- **High speed laser printer Capable to print 500 to 1000 pages per minutes.**

ADVANTAGES:
- High quality output.
- Very faster in speed.
- Silent during the operation.
- Able to print graphics.
- Able to print any characters & graphics.
- Able to generate colour & monochrome output.

DISADVANTAGES:
- Very expensive.
- Cannot make carbon copy of print out.
- high maintenance cost
- not environment sensitive

8. WHAT IS PLOTTER? EXPLAIN ITS TYPE.

Plotter:
- Plotter is an output device which is capable to producing hardcopy output of graphics.
- Used to producing wide format printing.
- It is an ideal for architects, engineers, city planners and other who need to generate hardcopy output of widely varying in sizes.
- Woks on the same mechanism of human holding pen & moving on paper.
- Contains multiple pens & pencil which can be easily changed out in order to create drawing of different colours.
- Normally generate output very slowly.
- Mainly two types of plotters are used:
  - Drum plotter
  - Flatbed

Drum plotter:
- In the case design has to be made is placed over a drum.
- It consist one or more than penholders which are mounted to the drum surface.

- The drum plotter both the paper and the pen move.
- The paper is contained on two rollers and passes over a drum.
- The pen is driven along fixed arm set across the length of the drum.
- It is especially useful for plotting continuous line graph.

Flatbed Plotter

- The Flatbed Plotter is generally more expensive and can produce very detailed and accurate drawings.
- The paper is mounted on a stationary flatbed.
- The pen is mounted on a moveable arm.
- Colour drawing can be produced by some plotters through interchangeable pens.
- Able to draw output in small size as A4 size or can able to generate very large size can be up to 20ft by 50ft.
- Specially used in the design of cars, ships, aircrafts, buildings, highways etc.

9. SHORT NOTE : HEADPHONE

- Headphones are a pair of small listening devices that are designed to be wear on or around the head over a user's ears.
- Headphones are also known as ear speakers, earphones.
- Headphones are designed to allow a single user to listen to an audio source.
- It is different than a loudspeaker, which emits sound into the open air, for anyone nearby to hear.
- In the context of telecommunication, a headset is a combination of headphone and microphone.
- Headphones that use cables typically have either a 1/4 inch or 1/8 inch phone jack for plugging the headphones into the audio source.
- Headphones either connect directly to a signal source such as
  - an audio amplifier
  - radio
  - CD player
  - portable media player
  - mobile phone
  - video game console
  - electronic musical instrument
  - Use wireless technology such as blue tooth or FM radio.
- Headphones are made in a range of different audio reproduction quality capabilities.
- They are electro audio transducers, which convert an electrical signal to a corresponding sound in the user's ear.

9. <u>SHORT NOTE: FASCIMILE</u>

- Fax sometimes called telescoping or tele-fax
- FAX is the telephonic transmission of scanned printed normally to a telephone number connected to a printer or other output device.
- The original document is scanned with a fax machine which processes the contents as
    - a single fixed graphic image
    - then converting it into a bitmap
    - and then transmitting it through the telephone system in the form of audio-frequency tones.
- The receiving fax machine interprets the tones and reconstructs the image, printing a paper copy.
- It transmits data at different rates, from 4,800 bps to 28,800 bps.
- A 9,600-bps fax machine typically requires 10 to 20 seconds to transmit one page.
- Most of all FAX machine uses CCITT group 3 protocol

10. <u>EXPLAIN: SGD (Speech Generating Device)</u>

- Its complete name is Speech generating device.
- It's an electronic device that allows the user to select messages to be spoken clearly, thereby assisting people who are unable to use natural speech.
- It is also known as
    - Electronic communication aids
    - High Tech Communication aids
    - Talkers
    - AAC devices
    - Voice Output Communication Aids (VOCA)
- There are many speech generating devices on the market.
- SGD technology ranges from simple to complex.
- It's an assistive technology that assists with communication.
- They are a form of "high tech" alternative communication designed to enable an individual to communicate words and messages with speech output.
- The speech generating device has an abilities to customized according to the requirements of the individual

11. <u>EXPLAIN : GOOGLE GLASS</u>

- Google Glass is a wearable, voice-controlled device that resembles a pair of eyeglasses.
- it was released on February 2013
- It displays information directly in the user's field of vision.

- Google Glass displayed information in a Smart phone-like hands-free format
- Google Glass is powered by the Android mobile operating system.
- It compatibility with both Android-powered mobile devices and Apple IOS-powered devices
- Google glass contain following components:

Display	• Shows you all the information that's available on your Glass, including e-mails, pictures, videos, and any other content.
Camera button	• Used to take photo & video
Touch pad	• Used to navigate the screen display
USB power connector	• Used to charge glass
Power button	• Used to turn on & off glass
LED	• displays white light when Glass is charging, starting up, or shutting down
Battery	• Powered your device
Frame	• Used to fit glass on face

9. SHORT NOTE: OLED

- OLED stands form organic light emitted diode.
- It is a flat light emitting technology, made by placing a series of organic thin films between two conductors.
- When electrical current is applied, a bright light is emitted.
- OLEDs can be used to make displays and lighting.
- Because OLEDs emit light they do not require a backlight and so are thinner and more efficient than LCD displays

ADVANTAGES:-
  o Lower power consumption
  o ultra thin than LCD display
  o better durability than LCD
  o better contrast & higher brightness
  o fuller viewing angle
  o Provide a wider colour range and much faster refresh rates.
  o Cannot make carbon copy of print out.
  o high maintenance cost

10. SHORT NOTE : COM

- COM stands for Computer output microfilm
- Computerized system that converts online or stored data directly into microfilm, as images for archiving.

- It is the product of copying information from electronic media onto microfilm.
- An important advantage to using computer output microfilm for document archival is its storage capacity.
- different COM can have different storage capacity
- Simple microfilm can hold 230 images while a1 – cubic can store 1,380, 000 images.
- COM technology offers superior image quality that produce high quality printing

UNIT: 4 NUMBER SYSTEM & CODES

1. WHAT IS NUMBER SYSTEM?

- A number system is a set of numbers, together with one or more operations such as addition or multiplication.
- There are mainly two types of number system
  - Positional number system
  - Non positional number system

NON POSITIONAL NUMBER SYSTEM

- In this system each symbol represents the same value;
- So it is difficult to perform arithmetic operation with such numbers.

POSITIONAL NUMBER SYSTEM

- In this system each number is identified by the position where it is placed. It means that the value of number is depended on the position. In this kind of system it is possible to perform the arithmetic operation very easily.
- There are mainly 4 types of positional number systems are commonly used.
  - Binary
  - Octal
  - Decimal
  - Hexadecimal

BINARY NUMBER SYSTEM

- This number system is used in computers or digital systems
- Each digit enter in the system is represented in the form of 0 and 1s

OCTAL NUMBER SYSTEMS

- In this system there are 8 different characters are used to represent the numbers.
- We can use 0 to 7 different symbols are used.
- In octal number system base is 8
- In this number system values increase from right to left as 1, 8, 64, 512, 4096...

DECIMAL NUMBER SYSTEM

- In this system there are 10 different characters are used to represent the numbers.
- We can use 0,1,2,3,4,5,6,7,8,9 different symbols are used.
- In octal number system base is 10.
- In this number system each positions of number is given depending on weight.
- For example: 4123

    =4 * 103 + 1 * 102 + 2 * 101 + 3 * 100

    =4 * 1000 + 1 * 100 + 2 * 10 +3 * 1

    =4000+100+20+3

    =4123

HEXADECIMAL NUMBER SYSTEM

- This system is very useful in microprocessor
- There are 16 different characters are used to represent the numbers.
- We can use 0,1,2,3,4,5,6,7,8,9 and A, B, C, D, E, F different symbols are used.

- The values are increases from right to left of hexadecimal points as 1, 16, 256, and 65536 and so on.

2. <u>WRITE DOWN THE RULES FOR BINARY ADDITION</u>

input		Sum of A + B	Carry
A	B		
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

- **e.g. 1 Add two binary numbers 11011 and 111**
- **Carry 1 1   1**

           1 0 1 1 1

      +   1 1 1

           1 1 1 1 0 (Answer)

3. <u>WRITE DOWN THE RULES FOR SUBSCTRACTION</u>

input		Substract A - B
A	B	
0	0	0
0	1	1 bit borrow
1	0	1
1	1	0

4. <u>WRITE DOWN STEPS TO PERFORM SUBSTRACTION USING 1'S COMPLEMENT</u>

- **To perform subtraction using 1's complement perform following steps:**
  - Find the complement of the number that you want to subtract.
  - perform addition
  - if any carry arise add into the answer;
  - If not arise than find out 1's complement of the answer & put minus sign before number.

e.g. 1

           1010101 – 1001100
- Step-1. Find the complement of 1001100
           0110011
- Step-2. Add the number you are subtracting from

Carry 1 1 1 0 1 1 1

     1 0 1 0 1 0 1

+ 0 1 1 0 0 1 1

————————

  0 0 0 1 0 0 0

      + 1 (Continue since there is a carry of 1)

————————

  0 0 0 1 0 0 1 (Answer)

5. WRITE DOWN STEPS TO PERFORM SUBSTRACTION USING 2'S COMPLEMENT

- **To perform subtraction using 2's complement perform following steps:**
    - ○ Find the 2's complement of the number that you want to subtract.
    - ○ perform addition
    - ○ if any carry arise avoid it ;
    - ○ If not arise than find out 2's complement of the answer & put minus sign before number.

    e.g. 11010 – 1001
- Step-1. Find the 2's complement of

    0111
- Step-2. Add the number you are subtracting from

    Carry   1 1

         1 0 1 0

       + 0 1 1 1

    ————————

        10001 (carry avoided)

     0 0 0 1 (Answer)

6. WRITE DOWN THE RULES FOR BINARY MULTIPLICTION

input		Multiply A * B
A	B	
0	0	0
0	1	0
1	0	0
1	1	1

- **e.g.:::** 1010 * 1001

```
        1010
      x 1001
      _____
        1010
       0000
      0000
      1010
      _____

      101101 0
```

- **The answer is (1011010)**

7. WRITE DOWN THE RULES FOR BINARY MULTIPLICTION

input		Divide A / B
A	B	
0	0	Undefined
0	1	0
1	0	Undefined
1	1	1

- **e.g. : 100001 / 110**

```
            0101        (quotient)
       _____
110 |  100001
       110
       _____
        1000
         110
        _____
         100
         110
        _____
         1001
          110
        _____
          11      (reminder)
```

8. EXPLAIN COMPUTER CODES IN BRIEF

- Most computers do not represent characters as pure binary numbers.
- They use a coded version of true binary to represent letters and special symbols as well as decimal numbers.
- Coding of characters has been standardized to enable transfer of data between computers.
- **Codes used are:**
  - **BCD**
  - **ASCII**
  - **EBCDIC**

51

BCD

- BCD stands for Binary Coded Decimal.
- BCD code is one of the early computer codes.
- It is based on the idea of converting each digit of a decimal number into its binary equivalent rather than converting the entire decimal into binary form.
- All decimal digits are represented in BCD by 4 bit.
- Each decimal digit is independently converted into a 4 bit binary number & so the conversion process is very easy.
- 4 bit BCD can be used to represents only decimal numbers because 4 bits are insufficient to represent various characters.
- By using 4 bit BCD only 16 possible characters are represented.
- So the BCD code was extended from 6-bit code and it is possible to represent 64 characters.

ASCII

- ASCII stands for American Standard Code for Information Interchange.
- In this form of representation, each character (which includes alphabets, digits and symbols) is assigned a particular pattern of bits.
- For example, A is represented as binary 1000001_2, B as 1000010_2 and so on.
- The standard ASCII character set uses 7 bits and can be used to represent 128 different characters.
- It uses one extra parity bit for parity check.
- Other forms of ASCII codes use an extra bit to extend the representation to 256 characters.
- However, characters represented from binary are not universally agreed upon.
- The most popular form is the set used by IBM.
- ASCII is commonly used to exchange data between data processing and communication systems.

EBCDIC

- EBCDIC stands for Extended Binary Coded Decimal Interchange Code.
- It uses 8 bits and can represent 256 distinct characters.
- It also uses one extra parity bit for parity check.
- The EBCDIC code is used in IBM mainframe models and other similar machines.
- Electronic Circuits are available to transform characters from ASCII to EBCDIC and vice-versa and can also be achieved using computer programs.

UNICODE

- With the onset of globalization through Internet, there emerged a need to Cater for data interchange of the more common languages of the different nationalities like Chinese, Korea and Japanese.
- ASCII, EBCDIC and other forms of representation proved insufficient.
- The Unicode/ISO 10646 standard was devised to overcome this problem.
- The 16 bits used by Unicode can represent 65536 symbols, one extra parity bit for parity check, which is more than enough to represent all the worlds written characters.

52

Parity Check

- A parity bit is an extra bit included with a binary message to make the total number of 1's either odd or even.
- Generally there are 2 techniques even and odd parity is used.
- In even parity bit the sum of all 1's is even while in odd parity the sum of all 1's is odd.
- For e.g. for three bit message has two possible parity shown in bellow table.

Message Xyx	P(odd)	P(even)
000	1	0
001	0	1
010	0	1
011	1	0
100	0	1
101	1	0
110	1	0
111	0	1

9. EXPLAIN FOLLOWING TERMS:

NIBBLE	• group of 4 bits is called 1 nibble
BIT	• binary digit either 0 or 1 is called bit
BYTE	• group of 8 bits is called byte
PARITY BIT	• parity is an extra bit which is added with message to check that whether the message is correct or not
SIGN BIT	• a bit to check that whether the bit is positive or not
KB	• group of 1024 bytes is called kilo byte
MB	• group of 1024 kilo bytes is called mega byte
GB	• group of 1024 mega bytes is called giga byte
TB	• group of 1024 giga bytes called terra byte
PB	• group of 1024 terra bytes is called peta byte

LANGUAGES, OPERATING SYSTEM & SOFTWARE PACKAGES

1. WHAT IS LANGUAGE? EXPLAIN IN BRIEF:
- Languages are tools human can use to communicate with the hardware of a computer system.
- Each language has a systematic method of using symbols of that language.
- In English, this method is given by the rules of grammar.
- Similarly, the symbols of particular one computer language must also be used as per set of rules which are known as the "Syntax" of that language, the language which you are using.
- Computer Languages can be classified into three broad categories:

```
                    LANGUAGES


   MACHINE           ASSEMBLY          HIGH-LEVEL
   LANGUAGE          LANGUAGES         LANGUAGES
```
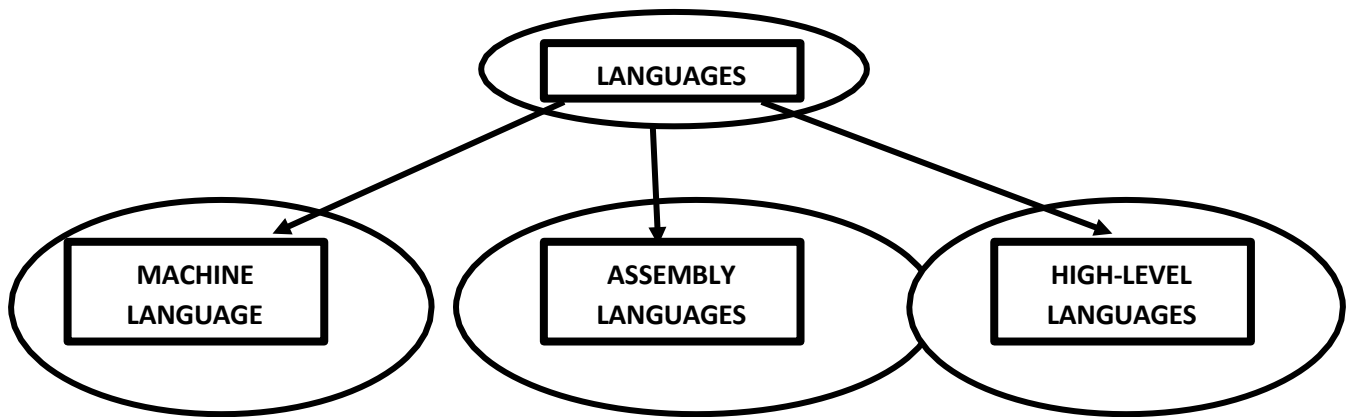
2. WHAT IS MACHINE LANGUAGE?
- The language which is understood by the computer without translating program is called machine language.
- Machine language is normally written as string of binary 1s and 0s.
- A machine language instruction has two part format**.**

OPCODE (OPERATION CODE)	OPERAND (ADDRESS)

- The 1st part is the operation code which tells the computer what function to be performed.
- The 2nd part is the operand which tells the computer where to find & store data to be manipulated.
- So each instruction tells the computer what operation to perform & the length & location of the data field which are involved in the operation.

ADVANTAGES
- Programs can be executed immediately.
- It doesn't require any translation.
- Now extra storage space is needed.
- Programmer has complete control over the performance of the hardware**.**

DISADVANTAGES:
- Tedious to program
- Difficult to program
- Difficult to modify
- Time consuming to code
- Error prone
- Operation codes have to be memorised
- Assignment of memory is done by programmer
- Time consuming for development
- Programs development are machine dependent
- Preparation of programs was slow and costly.

3. EXPLAIN ASSEMBLY LANGUAGE.

- Assembly language is a language which allows instruction & storage location to be represented by letters & symbols, instead of number.
- A program written in an assembly language is called <u>assembly language program or symbolic program.</u>
- Assembly language was introduced in 1952.
- Machine language was tedious to code and errors were expected to arise in bulk.
- To solve these problems mnemonic codes and symbolic addresses were developed.
- It allows using alphanumeric mnemonic codes instead of numeric code for the instructions in instruction set.
- The storage locations are to be represented in the form of alphanumeric addresses instead of numeric address.
- Format of assembly language is similar to machine language:

MNEMONIC CODE	SYMBOLIC ADDRESS

- The symbolic language made program writing so much easier for the Programmers but it must be translated into machine code before being used for operation.
- The translation is actually done by a special translating program.

Assembler
- Assembler is a special program (translator) which translates symbolic operation codes into machine codes, and symbolic address is addressed into an actual machine address.

ADVANTAGES:
- Easier to use, code and understand.
- Easier to correct error.
- Easier to modify.
- No worry about addresses.
- Easily reloadable.
- Efficiency of machine language.
- Can use Macros (Macro is a bunch of instruction referred as a single name)

DISADVANTAGES:
- Machine depended.
- Programs have to be translated before execution.
- Translation of programs takes up time.
- Knowledge of hardware is required.
- Additional storage area needed for the source programs and object code.

4. WRITE A NOTE ON HIGH LEVEL LANGUAGE.
- The machine language & assembly language requires a good knowledge of internal structure of computer.
- The both languages are machine dependent & it is difficult to solve error.
- To remove this limitation the high level language are introduced.
- The high level languages machine independent so it can be easily ported & executed on any computer.
- The high level language programs do not require any knowledge of internal structure of computer so the programmer concentrate on the logic of problem rather than internal structure of computer.
- It enables the programmer to write instructions using English words & familiar mathematical symbols & expression so the program makes easier to code & understand.
- It requires a translator program to convert high level program into machine language.

Compiler
- Compiler is a special program (translator) which translates high level programs into machine codes.

ADVANTAGES:
- Machine independent.
- Easier to learn, use and understand.
- Easier to correct error.
- Easier to maintain.
- Less time & efforts.
- Easily re locatable.
- Program preparation cost is low.
- Few errors.

DISADVANTAGES:
- Less flexible.
- Lower efficiency.
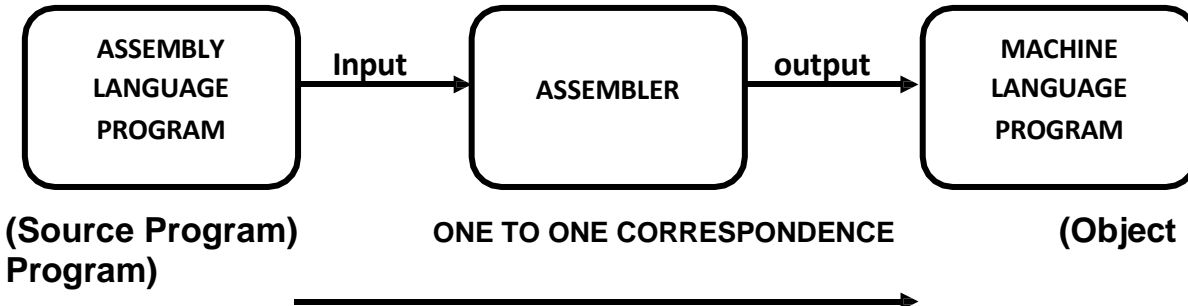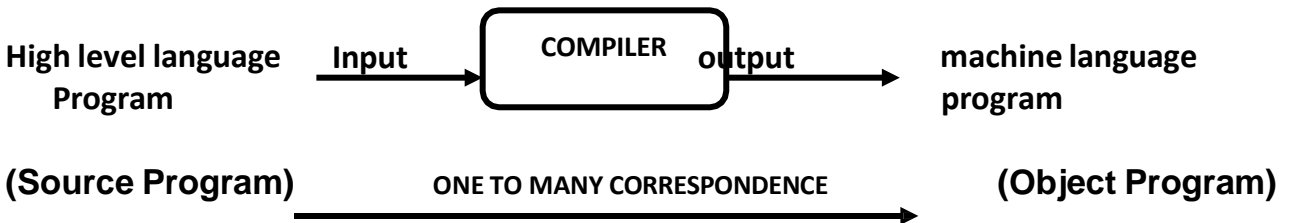- Require more time & storage space.

5. EXPLAIN 3GL,4GL & 5GL

3GL	- Third-generation language (3GL). 3GLs are much more machine independent and more programmer-friendly - First introduced in the late 1950s, - Fortran, ALGOL, C, C++, C#, Java, BASIC ,Pascal , visual basic

	and COBOL are examples of early 3GLs.
4GL	• Fourth-generation language (4GL). • Fourth-generation computer programming language that closer to human language than other high-level languages. • They allow multiple common operations to be performed with a single programmer-entered command. • example: SQL , database query language, Methemetica , perl, php, python
5GL	• Fifth-generation languages (5GL) • 5 GL are programming languages that contain visual tools to help develop a program. • Examples of fifth generation languages include Mercury, Artificial Intelligence , Prolog

6. SHORT NOTE: ASSEMBLER

- A computer can directly execute only machine language programs so the assembly language program must be converted into its equivalent machine language program before can be executed.
- This translation is done with the help of a translator program which is known as assembler.
- Assembler is a special program (translator) which translates symbolic operation codes into machine codes, and symbolic address is addressed into an actual machine address.

| ASSEMBLY LANGUAGE PROGRAM | → Input → | ASSEMBLER | → output → | MACHINE LANGUAGE PROGRAM |

(Source Program)   **ONE TO ONE CORRESPONDENCE**   **(Object Program)**

As shown in figure that:

- The input to assembler is the assembly language program (source program) and the output is the machine language program (object program).
- Assembler translates each assembly language instruction into equivalent machine language instruction.
- There is one to one correspondence between the assembly language instructions of source program & the machine language instruction of its equivalent object program.
- In case of assembly language program the computer not only has to run the program but also must first run assembler program to translate the original assembly language program into machine language program.
- So the computer has to spend more time in getting desired answer.

7. WRITE A NOTE ON COMPILER

- A computer can directly execute only machine language programs.
- So the high level language program must be converted into its equivalent machine language program before can be executed.
- This translation is done with the help of a translator program which is known as compiler.
- A compiler is a translator program which translates a high level language program into equivalent machine language program.
- The process of translating is shown in below figure:

High level language Program   **Input** → COMPILER **output** →   **machine language program**

(Source Program)   ONE TO MANY CORRESPONDENCE →   **(Object Program)**

- As shown in figure that
- The input to compiler is the high level language program (source program) and the output is the machine language program (object program).
- High level language instructions are macro instructions.
- The compiler translates each high level language instruction into set of machine language instructions rather than a single machine language instruction.
- There is **one to many correspondence** between high level language instructions of source program into equivalent object program.
- During the translation the source program is **only translates not executed.**
- A compiler can translates only those source programs which have written in the language for which compiler is designed.
- A compiler can also detect & indicates the syntax errors during the compilation process but **cannot able to detect logical errors**.

8. <u>WRITE A NOTE ON INTERPRETER.</u>
- An interpreter is another type of translator which is used for translating program written using high level languages.
- It takes one statement of high level language, **translates into machine language & immediately executes** the resulting machine language instructions.
- The main difference between compiler & interpreter is that compiler can translates the entire code but not involve in execution.

High level language Program   **Input** →   INTERPRETER (Translates & executes statement by   **output** →   **Result of program execution**

-
  As shown in figure that the input to an interpreter is a source program & the output is the result of an execution program.

- Interpreter translates & executes a high level language program statement-by-statement.
- A program statement is reinterpreted every time it is encountered during program execution.
- The main advantage of interpreter is that interpreter makes it easier & faster to correct programs.
- The main DISADVANTAGES: is that interpreter is slower than compilers when running a finished program.

9. WHAT IS OPERATING SYSTEM?

- An operating system is a software program that provides an interface between user & the computer and manages thousands of applications.
- It's a collection of system software that co-ordinates between the hardware, provides a platform for software to run on.
- An operating system is an integrated set of programs that the resources (the CPU, memory, I/O devices etc) of computer system & provides an interface to the user to run the machine.
- The main two primary objective of operating system are:
  - Making a computer system convenient to use
  - Managing the resources of a computer system

FUNCTION OF OPERATING SYSTEM

1) PROCESS MANAGEMENT
  - The process management of OS taking care about the creation & deletion of user & system process, providing mechanism for process synchronization & process communication.

2) MEMORY MANAGEMENT
  - The memory management of OS taking care about the allocation & deal location of memory space to the various programs in need of this resource.

3) FILE MANAGEMENT
  - The file management of OS is taking care about the file related activities such as creation, storing, retrieving, naming, sharing & organization of files.

4) SECURITY
  - The security model of OS protects the resources & information of a computer system against destruction & unauthorized access.

5) COMMAND INTERPRETATION
  - This model taking care of interpreting user commands & directing the system resources to handle the requests.

10. WHAT IS BATCH OPERATING SYSTEM?

- In Batch operating system, data is collected over a period of time and the processing of the data is deferred to a later time.
- This approach was used very commonly in the past when punch cards served as data storage media.
- In batch processing, the data have first to be captured, normally as a form of source documents, like time cards where data is gathered through remote terminals.
- The data will then be transmitted to the computer or the source document will be physically transported to the data centre where transcription is performed.
- The data is processed by the computer and the resulting output is given to the users.
- Batch processing is suitable in application where there are large amounts of data and when the turnaround times are not critical.
- As data are transcribed into machine readable form before submitting for processing, the speed of processing is therefore determined by the computer and not by the operator.

ADVANTAGES:
- Less complicated.
- After input process is over, while processing is going on, user can attend other jobs.

DISADVANTAGES:
- Long turnaround time.
- Access to one is not possible.
- Difficult to provide priority scheduling.
- Not convenient for program development**.**

11. EXPLAIN ONLINE AND REALTIME OPERATIN SYSTEM.
- Real-Time systems are always on-line but on-line systems need not be real-time systems.
- By definition, a real time system receive data and process it quickly enough to produce output which can be used to control or affect the outcome of an ongoing activity of process.
- In general, real-time systems handle small volumes of data at any one time and the turnaround time is critical.
- Most real-time systems are used in mission critical application like process control and therefore, reliability and availability is of paramount importance.
- Missile guidance systems are examples of real-time systems.

ADVANTAGES
- Error messages are immediate
- Source documents are available at the time the error occurs.
- Faster than on-line systems.

DISADVANTAGES:
- Direct access devices have to be used.
- Elaborate controls and backup procedures to guard against unwarranted access to the system.
- Control checks are difficult since updating occurs at the time of processing**.**

12. EXPLAIN TIME SHARING OPERATING SYSTEM

- Time-sharing is a mechanism that allows the many users to use a computer system in such a way that each user is given the impression that they use their own system.
- It has many user terminals simultaneously connected to the same computer.
- Using these terminals multiple users can simultaneously work on the system.
- The multiprogramming feature allows multiple programs to simultaneously reside in the memory.
- The special scheduling algorithm used in a time-sharing system.
- In this very short period of CPU time allocates to each user process.
- When the CPU is allocated to user process, the process will use CPU until the allocate time slice is expires or the execution process is over during this time period.

ADVANTAGES:
- Reduce CPU idle time
- Provides advantages of quick response time.
- Offers good computing facility to small users.

13. EXPLAIN: MULTIPROCESSING OPERATING SYSTEM

- It is the type of operating system that makes the use of more than one CPU.
- The term multiprocessing describe interconnected two or more CPUs that have an ability to execute several programs simultaneously.
- In such system, instruction from different independent programs can be processed at same instant of time by different CPU.

ADVANTAGES:
- It improves the performance of computer.
- Less turnaround time.
- In case of failure of one CPU other can take over without any loss.

DISADVANTAGES:
- Large main memory required.
- Expensive
- Design of the system makes time consuming process.

14. EXPLAIN TYPES OF SOFTWARE PACKAGES

- The software is set of programs, procedure and associated documents which describe the programs and how they are used.
- On the base of task performed by software it can be divided in following tasks.

1. WORD PROCESSING SOFTWARE :
- It enables you to make use of computer system for creating, editing, and viewing, formatting, storing, retrieving & printing documents.

2. SPREAD SHEET SOFTWARE:
- Spreadsheet software is a numeric data analysis tool, which allows us to create kinds of computerised ledger.
- Provides a predefined sheet which contains rows and columns.

61

3. **DATABASE SOFTWARE**
    - o A database is a collection of related data stored & treated as a unit for information retrieval purpose.
    - o Database software is a set of one or more programs which enables us to create a database, maintain it, and organize it.
4. **GRAPHICS SOFTWARE:**
    - o Graphic software enables you to use a computer system for creating, editing, viewing, storing, retrieving and printing designs, drawings, pictures, graphs.
5. **PERSONAL ASSITANCE SOFTWARE:**
    - o It allows you to use personal computers for storing & retrieving your personal information & planning & managing schedules, contacts, inventory & important items.
6. **PRESENTATION SOFTWARE:**
    - o It allows you to provide the tools which help you to develop a presentation on specific subject.
7. **ANIMATION/VIDEO/SOUND PACKAGE:**
    - o Provides the different kinds of application that allows you to generate animation, watching or creating videos, playing or producing sound data.

EMERGING TECHNOLOGIES AND VIRUS

1. SHORT NOTE: GIS

- A GIS - <u>Geographic Information System</u> is combination of two words: Geo and Information system.
- Geo- means to writing about earth
- Information system is a chain of operation that starts from planning & ends with information.
- GIS is a tool that uses for the answer of the geographic question.
- It's a collection system, data storage system that allows manipulating information;
- this information get output which is used by user & performs planning.
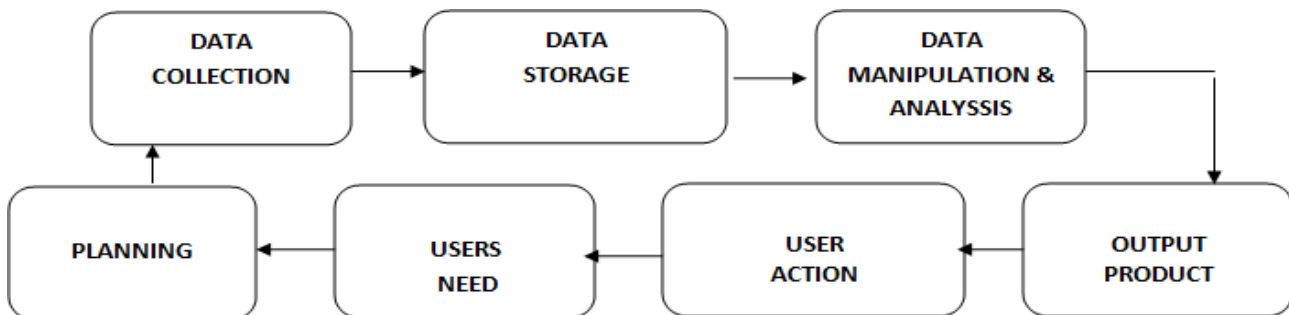
- GIS allows us to view, understand, question, interpret, and visualize data in many ways that reveal relationships, patterns, and trends in the form of maps, globes, reports, and charts.
- A GIS helps you answer questions and solve problems by looking at your data in a way that is quickly understood and easily shared.
- By using GIS tool, user can arrange and display the data about places on the earth in variety of ways including maps, charts and tables.
- We can store, analyze and manage the data about places on the earth with the help of GIS tool.
- User can zoom in and out of maps, charts and tables freely and study in details.

COMPONENTS OF GIS

There are 5 types components of a GIS like
- o Hardware
- o Software
- o Data
- o People
- o Method

- data: in the form of map (captured from satellite)

- hardware: keyboard, mouse, cpu , harddisk, plotter, printer, scanner, web cam, display , digitizer
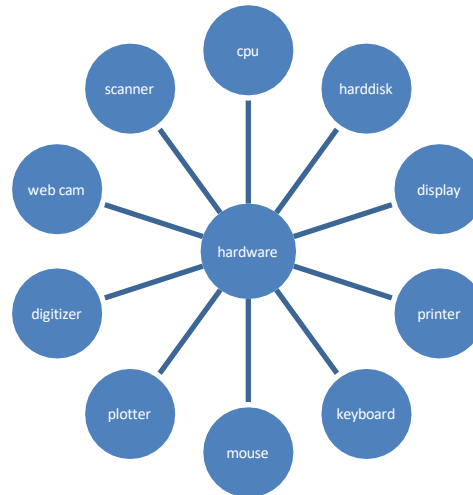
- software:
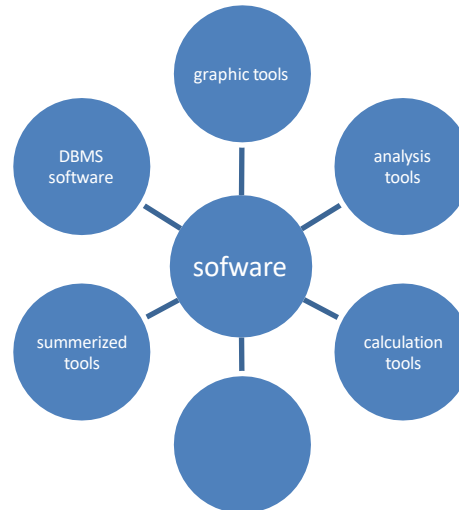
- people
- method

GIS IS USED FOR

- Allows to find the geographical locations
- Maintain an up-to-date planning & environmental inventory.
- Create a library of regional & community infrastructure resources.
- Plan major facilities and services
- Facilities management.
- Define natural resource areas.

GIS USED IN:

- o In Agriculture
- o In Business
- o In Electric-Gas

- In Environment
- In Forestry
- In Military
- In Land Planning
- In Site Planning
- In Water Industry

2. SHORT NOTE: GPS

- GPS means Global Positioning System and it is a satellite based navigation system.
- GIS is a system that can provide a position at any point on the Earth's surface to a very high degree of accuracy.
- GPS provides the position information of the earth.
- GPS is a system that measures the distances from the satellites that are in path around the Earth.
- A GPS is the satellite-based system that provides accurate information about position, speed and time of the earth.
- There are 24 satellites in GPS that orbits the earth at a height of about 12000 miles.
- Each of this satellite are constantly moving and making two complete orbits in less than 24 hours.
- The speed of satellite is 7000 miles per hour.
- By knowing the distance from the satellites, it is possible to calculate the position on the Earth's surface.
- The satellite sends all the timing and position information to the receiver so the receiver knows when the message was sent and also the receiver is able
- To calculate the distance from the satellite about their position.
- The satellite contains an atomic clock so that the satellite sends the timing information to the receiver that is very accurate.
- A GPS contains 3 types of segments like User, Control and Space.

GPS APPLICATIONS:

- Navigation
- Agriculture
- Space Shuttle
- Tourism
- Air Traffic Control
- Surveying and mapping
- Remote sensing
- military

3. SHORT NOTE: CDMA

- CDMA stands for Code Division Multiple Accesses.
- CDMA is a spread spectrum technology that allows many users to occupy the same time & frequency allocations in a given space.

- CDMA assigns unique codes to each user to differentiate it from other in the same spectrum.
- Its platform on which 2G & 3G advanced services are built.
- The foremost application of CDMA technology is digital cellular phone technology operating in 800MHz and 1.9HZ bands.
- After the speech the codec converts voice into digital, CDMA spread the voice stream over the full 1.25MHz bandwidth of the CDMA channel, coding each stream separately so it can be decoded at the receiving end.'
- The rape of spreading signal is known as the 'chip rate' as each bit in the spreading single is known as 'chip'.
- All voice conversations use the full bandwidth at the same time.
- One bit from each conversation is multiplied into 128 bits by the spreading techniques.

ADVANTAGES:
- Provides good quality & low power consumption
- Avoid interceptions.
- Require fewer cell sites than GSM
- This technology provides good resistance to fading problems.

4. SHORT NOTE: GSM
- GSM stands for Global System for Mobile communication.
- GSM is the most popular standard for mobile phones in the world.
- Its promoter, the GSM association, estimates that 80% of the global mobile market uses the standard.
- GSM is used by over 3 billion people across more than 212 countries.
- Its ubiquity makes international roaming very common between mobile phone operators, enabling subscribers to use their phones in many parts of the world.
- GSM differs from its predecessors in both signalling & speech channels are digital & thus it is considered as 2G mobile phone system.
- The GSM standard has been an advantage to the both consumers and also network operators.
- GSM pioneered a low cost alternative to voice calls, SMS which is now supported on other mobile standard as well.
- Another advantage of GSM is that the standard includes one worldwide emergency telephone number, 112.
- This makes it easier for international travellers to connect to emergency services without knowing the local emergency numbers.
- There are 5 different cell sizes in a GSM network: macro, micro, picot, femto and umbrella cells.
- The coverage area of each cell varies according to the implementation environment.

5. WRITE A NOTE ON MODEM
- Converting digital signal into analog is called modulation.
- Converting analog signal into digital signals is called demodulation.

- The word "MODEM" comes from the term modulation-demodulation
- Computer can store & transmit data digitally while our telephone lines can transmit data in analog signals.
- When an analog facility is used for data communication between two digital devices, two modems are required, one near each digital device.
- The analog signal is transmitted through the telephone line which is converted into digital by modem.
- To connect a computer network by using telephone line then modems must be used at both ends to do the modulation & demodulations.
- The modem is an essential piece of hardware for any application in which two digital devices want to communicate over an analog transmission channel.
- Different capacity modems are available according to different data transfer rate.

INFRARED

- Infrared are widely used for short-range communications.
- Distance is about to only 1 meters range.
- Remote controls used on television, VCRs and stereos all used in infrared communications.
- They are directional, cheap and easy to build but do not pass through solid objects.
- Infrared is used for indoor wireless LANs.
- Two types of infrared given below:
  - **Point to point**
    - Point to point systems requires direct alignment between devices.
    - Many laptop systems and PDAS use point-to-point transmission.
  - **Broadcast**
    - Broadcast infrared transmissions use a spread signal.
    - One broadcast in all directions instead of a direct beam.
    - This help to reduce the problems of proper alignment & obstructions.
    - It allows multiple receivers of a signal.

BLUETOOTH

- Bluetooth is the technology using short range radio links to connecting portable/fixed electronic devices.
- By using Bluetooth the users can have all mobile and fixed computer devices can be totally coordinated.
- The standard defines a unique structure for a wide range of devices to communicate with each other and minimal user efforts.
- This technology offers wireless access to LANs, the mobile phone network and the internet.
- Bluetooth technology use license-free 2.4GHz frequency band.
- You can connect wireless device up to 10 meter.
- The main advantage of Bluetooth is it can able to handle both data & voice transmissions at the same time

ADVANTAGES:
- licence free
- Less power consumptions.
- Provide security & flexibility.
- Voice conferencing & video clips on cell phone is possible.
- Connect devices without using cable.

WI-FI

- Wi-Fi stands for wireless fidelity.
- It is used to define any of the wireless technology in the IEEE 802.11.
- It is also known as 802.11 networking or wireless networking.
- It is useful to get internet access.
- It's a wireless way to handle networking.
- It provides the facility to connect computers anywhere in your home office without need of physical connection.
- Wi-Fi allows connecting the computers within up to 100 feet area.
- Wi-Fi setup contains one or more access points & one or more clients.
- Wi-Fi transmit in the air, it has some properties as a non-switched wired Ethernet network therefore collisions can occur.
- Wi-Fi cannot do collision detection.
- Wi-Fi network can be used to connect computer to each other to the internet & wired networks.
- Wi-Fi networks operate in the unlicensed 2.4 and 5 GHZ radio bands.

ADVANTAGES:
- Allows connecting device without cabling.
- Secure & reliable wireless connectivity.
- Allows you to connect any place within up to 100feet area.
- Connect with one or more clients.
- Wi-Fi products are widely available in market.

DISADVANTAGES:
- Limited range.
- Power consumption is higher than Bluetooth.
- Wi-Fi devices do not have channels to avoid interference.

6. WHAT IS LIFI?

- Li-Fi stands for Light Fidelity.
- Li-Fi is a technology for wireless communication between devices using light to transmit data and position.
- It is a Visible Light Communications (VLC) system which runs wireless communications that travel at very high speeds.
- With Li-Fi, your light bulb is essentially your router.
- It uses common household LED light bulbs to enable data transfer, boasting speeds of up to 224 gigabits per second.

7. SHORT NOTE : SLM

- SLM stands for spatial light modules
- It is an object that force some form of spatially varying modulation on a beam of light.
- A simple example is an overhead projector transparency.
- Usually when the phrase SLM is used, it means that the transparency can be controlled by a computer.
- In modern projectors have been developed where the SLM is built inside the projector.
- Usually, an SLM modulates the intensity of the light beam.
- However, it is also possible to produce devices that modulate the phase of the beam or both the intensity and the phase simultaneously.
- Device that "spatially modulates" a coherent beam of light.
- There are two basic types
- **Optically Addressed:**
  - "Converts" incoherent light to spatial modulation.
- **Electrically Addressed:**
  - "Converts" electrical signals to spatial modulation

8. WHAT IS COMPUTE VIRUS? EXPLAIN TYPES OF VIRUS

- A computer virus is a program that can copy itself & infect a computer without permission or knowledge of the user.
- It's a small piece of software that damages the real programs.
- A virus can only spread from one computer to another when it host is taken to the uninfected computer by internet or removable medium such as CD or USB.
- In computers virus is a program that replicates to another program, computer boot sector or document.
- Virus can be transmitted as attachments to an e-mail or downloaded file or be present on CD.
- The virus is classified in main five types.

FILE INFECTORS
  - It infects program files.
  - Normally infect executable files such as .COM or .EXT files.
  - Some virus can infect any program when the program is requested for execution such as .SYS, .OVL, .PRG and .MNU files.
  - Many of this virus are memory resident.

BOOT SECTOR VIRUS
  - This virus infects executable code found in certain system areas on a disk.
  - They attached to the DOS boot sector or the master boot record on hard disks.
  - Boot sector virus attaches themselves to the boot record information and activate when user attempt to start up form disk.
  - This virus are always memory resident.

MULTI-PARTITE VIRUSES:
  - Known as polypartite.

- They infect both boot records and program files.
- This virus is difficult to repair.
- If the boot area is cleaned, but the files are not than boot area infected again.

MACRO VIRUSES:
- These are the most common virus and they tend to do the least damage.
- These types of virus infect data files such as it can infect your word document and insert unwanted words or phrases.
- **Ex. W97M, Melissa**

STEALTH VIRUSES:
- These viruses use certain techniques to avoid detection.
- They may either redirect disk head to read another sector instead of the one which they are reside or alter the reading of infected files.

9. <u>PROTECTION FROM VIRUS.</u>

- You can protect system against virus with a few simple steps.
  - Write protected your floppy when suing them on the other computer.
  - Remove floppy while booting.
  - Install software from original write- protected disks.
  - Use secure operating system like UNIX
  - Do not install pirated software.
  - Scans files downloaded from the internet.
  - Scan your system regularly if you continue using internet.
  - Use good antivirus program to scan removable devices as well as system.
  - Do not open attachments who contains an executable files.
  - Do not open spam or junk mails
  - Prepare a reuse disk with critical system files. Probably it should bootable.

10. <u>WHAT IS CLOUD COMPUTING?EXPLAIN ITS CHARACTERISTICS</u>

- Cloud Computing refers to manipulating, configuring, and accessing the hardware and software resources remotely.
- It offers online data storage, infrastructure, and application.
- It offers platform independency, as the software is not required to be installed locally on the PC.
- Hence, the Cloud Computing is making our business applications mobile and jointly

CHARACTERISTICS OF CLOUD COMPUTING

- **On Demand Self Service**
  - Cloud Computing allows the users to use web services and resources on demand.
  - One can logon to a website at any time and use them.
- **Broad Network Access**
  - Since cloud computing is completely web based, it can be accessed from anywhere and at any time.

- **Resource Pooling**
  - Cloud computing allows multiple tenants to share a pool of resources.
  - One can share single physical instance of hardware, database and basic infrastructure.
- **Rapid Elasticity**
  - It is very easy to scale the resources vertically or horizontally at any time.
  - Scaling of resources means the ability of resources to deal with increasing or decreasing demand.
  - The resources being used by customers at any given point of time are automatically monitored.
- **Measured Service**
  - In this service cloud provider controls and monitors all the aspects of cloud service.
  - Resource optimization, billing, and capacity planning etc. depend on it.

11. EXPLAIN SERVICE MODEL OF CLOUD COMPUTING

- There are certain services and models working behind that make cloud computing possible and accessible to end users.
- Following are the working models for cloud computing:
  - Deployment Models
  - Service Models

DEPLOYMENT MODELS
- Deployment models define the type of access to the cloud, i.e., how the cloud is located?
- Cloud can have any of the four types of access:
  - Public:
    - Allows systems and services to be easily accessible to the general public.
  - Private:
    - Allows systems and services to be accessible within an organization
  - Hybrid:
    - Allows systems and services to be accessible by a group of organizations
  - Community:
    - It's a mixture of public and private cloud, in which the critical activities are performed using private cloud while the non-critical activities are performed using public cloud

SERVICE MODELS
- Cloud computing is based on service models.
- These are categorized into three basic service models which are -
  - Infrastructure-as–a-Service (IaaS)
  - Platform-as-a-Service (PaaS)
  - Software-as-a-Service (SaaS)

1. **INFRASTRUCTURE-AS–A-SERVICE (IAAS)**
   - It provides access to fundamental resources such as physical machines, virtual machines, virtual storage, etc.
   - the IAAS also offers:
     - Virtual machine disk storage
     - Virtual local area network (VLANs)
     - Load balancers
     - IP addresses
     - Software bundles

ADVANTAGES:
   - Virtual machines with pre-installed software.
   - Virtual machines with pre-installed operating systems such as Windows, Linux, and Solaris.
   - On-demand availability of resources.
   - Allows storing copies of particular data at different locations.
   - The computing resources can be easily scaled up and down.
   - Platform-as-a-Service (PaaS)

2. **PLATFORM-AS-A-SERVICE(PAAS)**
   - It offers the runtime environment for applications.
   - It also offers development and deployment tools required to develop applications.
   - PAAS has a feature of point-and-click tools that enables non-developers to create web applications.

ADVANTAGES:
   - It offers browser-based development environment.
   - It allows the developer to create database and edit the application code.
   - Built-in security, scalability, and web service interfaces.
   - Provides built-in tools for defining workflow, approval processes, and business rules.
   - It is easy to integrate with other applications on the same platform.
   - provide web services interfaces that allow us to connect the applications outside the platform

3. **SOFTWARE-AS-A-SERVICE(SAAS)**
   - Allows providing software application as a service to the end users.
   - It refers to a software that is deployed on a host service and is accessible via Internet

ADVANTAGES:
   - SaaS makes the software available over the Internet.
   - The software applications are maintained by the vendor.
   - The license to the software may be subscription based or usage based. And it is billed on recurring basis.
   - SaaS applications are cost-effective since they do not require any maintenance at end user side.
   - Applications available on demand.
   - Automatically upgraded and updated.

- o SaaS offers shared data model.
- o Therefore, multiple users can share single instance of infrastructure.
- o It is not required to hard code the functionality for individual users.
- o All users run the same version of the software.

12. EXPLAIN ARCHITECTURE OF CLOUD COMPUTING

- Cloud Computing architecture comprises of many cloud components, which are freely tied.
- We can divide the cloud architecture into two parts:
  - o Front End
  - o Back End
- Each of the ends is connected through a network, usually Internet.
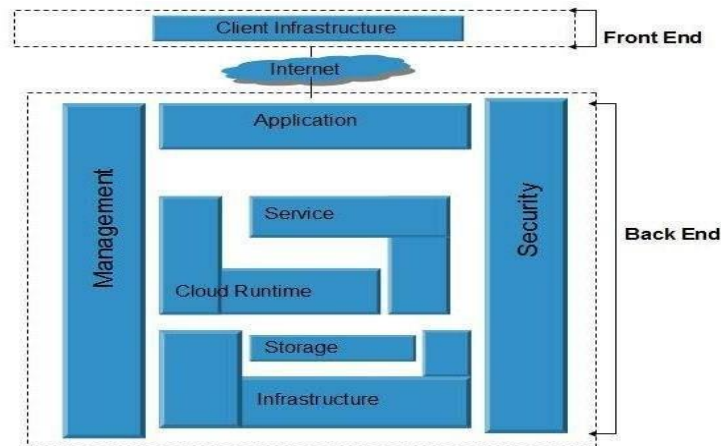
Front End:

- o It refers to the client part of cloud computing system.
- o It consists of interfaces and applications that are required to access the cloud computing platforms.
- o Example - Web Browser.

Back end:

- It refers to the cloud itself.
- It consists of all the resources required to provide cloud computing services.
- It comprises of huge data storage, virtual machines, security mechanism, services, deployment models, servers, etc.

13. EXPLAIN SECURITY OF CLOUD COMPUTING

- The risk in cloud deployment mainly depends upon the service models and cloud types.

Data security:

- Data is transferred using Internet; data security is of major concern in the cloud.
- Here are key mechanisms for protecting data.
    - Access Control
    - Auditing
    - Authentication
    - Authorization

Isolated Access to Data

- Data stored in cloud can be accessed from anywhere, we must have a mechanism to isolate data and protect it from client's direct access.

Encryption

- Encryption helps to protect data from being compromised.
- It protects data that is being transferred as well as data stored in the cloud.

IMPORTANT TERMS AND ACRONYMS

ATM	• ATM stands for automatic teller machine. • ATM is a machine that is used in a bank that allows the customers to deposit or withdraw cash by using an electronic card without the need to interact with a bank employee

BACKUP /RESTORE	• **Backup:**
	    ○ Alternate facility of programs, data files, hardware equipment etc. Which are used in case the original one is destroyed, lost or fail to operate.
	• **Restore:**
	    ○ A facility of program that allows the data files get back from the back up place.

HARDCOPY/ SOFTCOPY	• **Hardcopy:**
	    ○ Printed copy of document is known as hardcopy.
	• **Softcopy:**
	    ○ Computer output that is temporary nature and vanished after use.

BUS/DATA BUS	• **Bus:**
	    ○ Cables used inside the system which is used to transfer data or addresses or signals are known as buses.
	• **Data bus:**
	    ○ A data bus is a cable that used transfer data form one I/O to storage.

BUFFER/ SPOOLING	• **Buffer:** ○ Small storage area used to store information temporarily to compensate for the difference in rates of data flow between various units of computer.

	- **Spooling:**
	    o Spooling is a process in which data is temporarily held to be used and executed by a device, program or the system.
	    o Data is sent to and stored in memory or other volatile storage until the program or computer requests it for execution.

CURSOR/ POINTER/ ICON	- **Cursor:**
	    o A highlighting line displayed on screen that indicates the location of the next keyed in character.
	 - **Pointer:**
	    o an arrow of a mouse that point out a particular location of screen
	 - **Icon:**
	    o a graphical object displayed on screen that is used to select of open any program by the users

EMAIL/ ATTACHMENT	- **Email (ELECTRONIC MAIL):**
	    o A service on internet that allows internet users to send a mail to other internet users.
	 - **Attachments:**
	    o Users can attach files, images or other data with their emails. This other files are known as attachments of email.

CLI /GUI	- **CLI (COMMAND LINE INTERFACE):**
	    o A textual user interface in which user gives instructions to the computer by typing commands by using keyboard.
	 - **GUI (GRAPHICAL USER INTERFACE):**
	    o An interface for computer users that provides icons and menus which instruction to the computer.

COMPILER	o A translator program that translates a high level language program into machine language program.
	    o Two types of compiler.
	 - **Native Compiler:**
	    o The compiler that used to compile source code for the same platform only are known as Native compiler. for e.g. turbo c compiler
	 - **Cross Compiler**
	    o The compiler that used to compile source code for different platform only are known as Cross compiler.
	    o For example a compiler that runs on a Windows 7 PC but generates code that runs on Android smartphone is a cross compiler.

DRIVE /DIRECTORY /FILE /PATH	- **Directory:**
	    o a mapping table that is used by the operating system to map file names to their corresponding file attributes and file data
	 - **Path:**
	    o A location where a file is actually stores.
	 - **File:**
	    o A collection of related information.

	• **Path** o a path is the route through a file system to a particular file.

**MENU
/POPUP MENU
/TOOLBAR**
	• **Menu:**
	    o A list of options for particular choices displayed on the screen from which user may select any option.
	• **Popup menu:**
	    o A right click menu is known as popup menu.
	• **Toolbar**
	    o a horizontal bar displayed on application software which contains list of tools

**SHUTDOWN
/REBOOT
/RESTART**
	• **Shut down:**
	    o Turning off the computer system.
	• **Restart:**
	    o a restart is the situation when the system is turning off and again starts
	• **Reboot:**
	    o it's a process that start booting process of computer system

**SYNTAX
/WILD CARD
CHARACTER**
	• **Syntax:**
	    o a set of rules of a programming language which define the pattern or structure of the word order and punctuation of an instruction
	• **Wild card character:**
	    o A special characters, usually a "?" an "*" which is used in software as a commands as a generic reference to any character, or the combination of characters.

OPICAL FIBER	• A thin cable which is made of glass or plastic and used as a data transmission medium.
NET MEETING	• A facility provided by the system which allows the LAN users to communicate with each other.
UPS	• UPS stands for uninterrupted power supply. • A battery supported power unit between external power source and a computer system.

**PRINTING
SPEED
(CPS, CPM,
LPM, DPI, PPM)**
	• **CPS (CHARACTER PER SECOND):**
	    o A measurement of a printer's speed that indicates how many characters will be print by a printer in a second.
	• **CPM (CHARACTER PER MINUTE):**
	    o A measurement of a printer's speed that indicates how many characters will be print by a printer in a minute.
	• **LPM (LINE PER MINUTE):**
	    o A measurement of a printer's speed that indicates how many lines will be print by a printer in a minute.
	• **PPM (PAGE PER MINUTE):**
	    o A measurement of a printer's speed that indicates how much number

	of pages will be print by a printer in a minute. • **DPI (DOT PER INCH):** o A measurement of a quality of a printed output.
PRIPHERALS	• Various input/output devices and auxiliary storage unit of computers are known as peripherals.