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## **1**

## **BASIC CONCEPTS OF INFORMATION TECHNOLOGY**

**Q. Define Information technology. Write its advantage.**

### **Information Technology:**

Information technology refers to anything related to computing technology, such as networking, hardware, software, the Internet, or the people that work with these technologies. Many companies now have IT departments for managing the computers, networks, and other technical areas of their businesses.

### **Advantages of Information Technology:**

- Information technology creates electronic storage systems to protect your company's valuable records.
- Students using computers do not feel that they are being watched or judged.
- The another innovation involving self assessment consists of giving the learner the option of working mentally.
- Information technology improves your company's efficiency by developing automated processes to take burden off your staff.
- Information Technology systems give you remote access to your company's electronic network.



### **Characteristic of Computer:**

#### **Speed:**

Since Computer is an electronic machine and electrical pulses travel at the rate of passage of electric current. This speed enables the computer to perform millions of calculations per second.

#### **Storage:**

A computer has too much storage capacity. Once recorded, a piece of information can never be forgotten.

#### **High Accuracy:**

A computer can be considered as 100% accurate. Checking circuits are built directly into the computer, that computer errors that undetected are extremely rare.

#### **Versatility:**

Computer can perform any task, provided it can be reduced to a series of logical steps.

#### **Diligence:**

Computer never gets tired. It performs most boring, repetitive and monotonous task.



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## **Automatic Operation:**

Once a program is fed into computer the individual instructions are processed one after the other. Thus computer works automatically without manual intervention.

## **Obedience:**

The ability to take in and store a sequence of instructions for the computer to obey. Such a sequence of instruction is called a PROGRAM and it must be written in the Computer Language.

## **Decision Making Capability:**

Computer can take simple decisions, such as less than, greater than or equal to. It also determines whether a statement is true or false.

## **Input Devices:**

Input devices are used to provide data or information to the computer. The computer follows the instructions given to it by an input device. A variety of input devices are used with the computer depending on the type and purpose of input information. For example, a keyboard is commonly used to transfer data or information from human readable form to machine readable form.

## **Keyboard:**

A keyboard is the most commonly used input device which helps us in simply keying in required information in a computer. This information is subsequently stored in the computer's memory. A keyboard can be used effectively to communicate with the computer but is considered to be relatively slow as compared to other input devices.

## **Division of Keyboard:**

The keyboard is divided into following divisions:

### **Alphabetic Keys:**

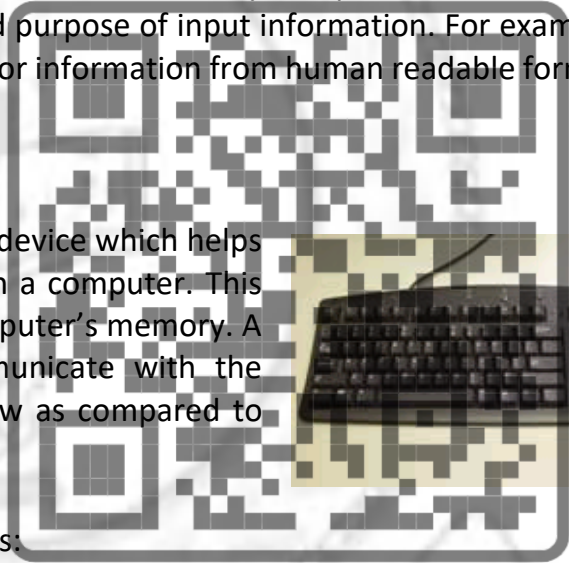
The alphanumeric keys on the keyboard that look like a typewriter's keys are arranged the same way on almost every keyboard. Sometime this common arrangement is called QWERTY.

### **Numeric Keys:**

These keys are used to input numeric data only. These are very useful in case of large numeric data input because all numeric keys can be accessed by one hand only. These keys can also be used as an alternative to the screen navigation and editing keys.

### **Function keys:**

These are keys marked as F1 - F12, located normally at the top of the keyboard. These are special keys provided to a programmer which allow him to attach special functions to each key. Each of these function keys are also given some special function in different packages.



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## **Screen Navigation Keys:**

These keys are provided to move around in the screen. May programs use these keys to let the user move around the screen display.

## **Modifier Keys:**

The SHIFT, ALT(Alternate), and CTRL(Control) keys are called modifier keys because they modify the input of other keys.

## **SCANNER:**

Scanner is an input device. It is also called Optical Reader or Digital Scanner. It scans or reads text and picture printed on a paper and enters them directly into the computer memory.

The advantage of a scanner is that the user needs not type the input data in. This is a fast and accurate method for entering data into the computer. The scanner takes electronic images, of text or pictures from the paper it breaks each image into light and dark dots and stores them into the computer memory in machine codes.

## **Types of Scanner:**

There are now different types of scanners which vary according to the needs of its users and have evolved around them only.

## **Different Types of Scanners:**

### **Flatbed Scanner:**

Another type of scanner is the flatbed scanner. A flatbed scanner is usually made of a glass pane, which is illuminated with a bright light found underneath, and a moving optical CCD or CIS array. In the flatbed scanner images to be scanned are placed face down on the glass and the sensor and light source move across the glass pane reading the entire area.

### **Hand-Held Scanner:**

A Hand scanner is a manual device that is dragged across the surface of the image to be scanned. Scanning documents in this manner is difficult as this requires a steady hand, to avoid uneven scanning rate that would produce distorted images. They have a "start" button which is held by the user during the scan, some switches to set the optical resolution, and a roller which generates a clock pulse for synchronization with the computer.





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## **Sheet-Fed Scanner:**

The sheetfed scanners find common application in the offices where they need to scan a large number of documents. In addition, many scanners sheetfed scanners come with software programs to convert typed documents into text that can be used by a word processing program.



## **MOUSE:**

A mouse is an input device that you can move around on a flat surface and control the pointer. The pointer is an on-screen object, usually an arrow, that is used to select text, access menu and interact with program. It has less ability to insert textual data.

## **JOYSTICKS:**

Joysticks and other game controllers can also be connected to a computer as pointing devices. They are generally used for playing games, and not for controlling the on-screen cursor in productivity software.

## **LIGHT PEN:**

Light pen is a hand-held shaped device connected by cable too the computer and is used with special software to detect light.

The pen is pointed at the screen. A photoelectric cell mounted at the front end of the pen detects the light. The computer works out by timing the position of pen on the screen. The light pens are generally used in mehcanical and arethitectoral drawing software.

## **TRACKBALL:**

A Trackball is a pointing device almost like a mouse turned upside down. The user controls the cursor on the screen by rolling a plastic ball with a fingertip or wrist. To execute commands with a Trackball, one or more buttons are pressed, much in the same way as is done with a mouse. The cursor can be moved around on the screen by rolling the ball with a thumb or finger.

Trackball is popular among users of laptop computers when space is limited and may be mounted on either side of the keyboard.



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**Q. What is CPU? Define its various components with diagram.**

## Central Processing Unit (CPU)

CPU is the main part of the computer system. It performs all operations on the data according to the program instructions. It carries out instruction and tells other parts of the computer system what to do. The central processing unit (CPU), also called the microprocessor, the processor or central processor is the brains of the computer. The CPU is housed on a tiny silicon chip. This chip contains millions of switches and pathways that help your computer make important decisions. The switches control the flow of the electricity as it travels across the miles of pathways. The CPU knows which switches to turn on and which to turn off because it receives its instructions from computer programs. Programs are a set of special instructions written by programmers that control the activities of the computer. Programs are also known as software.

The CPU has two primary sections:

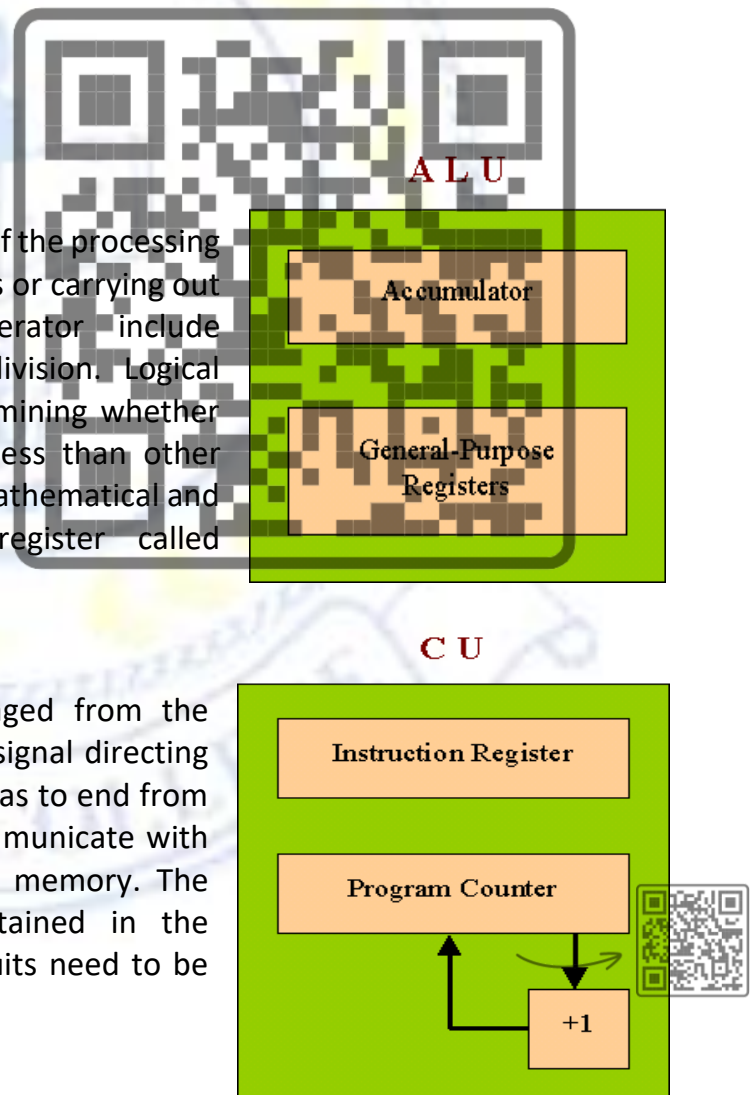
- Control Unit
- Arithmetic/Logic Unit

## Arithmetic/Logic Unit:

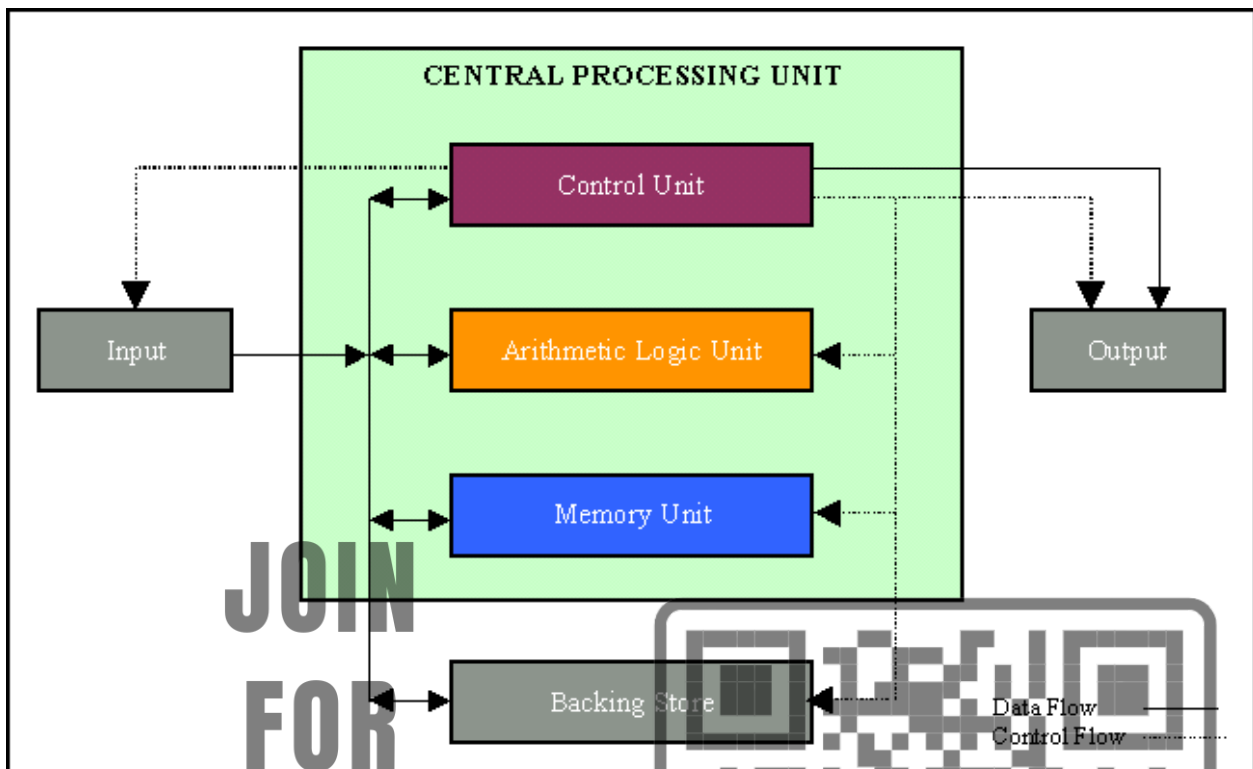
All computer data is stored as number, much of the processing that takes place involving comparing numbers or carrying out mathematical operations. Arithmetic operator include addition, subtraction, multiplication and division. Logical operator include comparison, such as determining whether nor number is equal to, greater than, or less than other number also there is "not equal to". All the mathematical and logical operations are take place in register called Accumulator.

## Control Unit:

All the computer's resources are managed from the control unit. The control unit as a traffic signal directing the flow of data through the CPU, as well as to end from other devices. The control unit must communicate with both the arithmetic logic unit and main memory. The control unit uses the instruction contained in the Instruction Register to decide which circuits need to be activated.



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## **Memory Unit:**

Memory unit is the place where the computer program and data are stored during processing. It is the area, through which all the data which is input into or output of the CPU must pass. It is monitored by CU which keeps track of every thing in the storage. It is a random access device, which consists of thousands upon thousands of storage locations, each of which can be directly reached by the CU. Each storage location is distinguished by the address.

## **Memory:**

Memory of a computer is used to store the data, instructions and programs. There are two types of computer memory i.e. Primary Memory and Secondary Memory.

**Q. What do the term bit, byte and word stand for?**

## **Measuring Unit of Memory:**

### **BIT:**

The smallest unit of information that is recognized by a microcomputer. Shorthand term for Binary Digit. There are only two possible binary digits; 0 and 1.





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## **NIBBLE:**

This is non-addressable unit of memory is a group of 4 bits and known as “NIBBLE”. It is also called “Half Bytes”.

## **BYTE:**

A group of 8 bits that represent 1 character of information (for instance, pressing one key on the keyboard). A byte is the standard unit of measuring memory in a microprocessor.

## **WORD:**

This term is used in IBM / AT computers, which are starting from 80286 microprocessor. And it is the combination of two consequent bytes or 16 bits known as “WORD”.

## **DOUBLE WORD:**

This term is also used in IBM / AT computers but stating from 80386 microprocessor. And it is the combination of four consequent bytes or 32 bits known as “Double Word”.

## **KILOBYTES (KB):**

A unit of memory equal to 1024 characters or bytes (1 KB = 1024 Bytes)

## **MEGA BYTES (MB):**

An amount of computer memory equal to  $2^{16}$  KB or 1024 x 1024 bytes. One megabytes can store more than one million characters. (1 MB = 1024 Kilo Bytes)

## **GIGA BYTES (GB):**

This huge unit of memory measuring contains 1024 MB or 1024 x 1024 Kilobytes. It is represented as “GB”. (1 GB = 1024 Mega Bytes)

## **TERA BYTES (TB):**

This unit of memory contain 1024 GB or 1024 x 1024 MB. It is represented as “TB”. (1 TB = 1024 Giga Bytes)

## **PETA BYTES (PB):**

This unit of memory contain 1024 TB or 1024 x 1024 GB. It is represented as “PB”. (1 PB = 1024 Tera Bytes)

## **EXA BYTES (EB):**

This unit of memory contain 1024 PB or 1024 x 1024 TB. It is represented as “PB”. (1 EB = 1024 Peta Bytes)



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## **ZETTA BYTES (ZB):**

This unit of memory contain 1024 EB or 1024 x 1024 PB. It is represented as "EB". (1 ZB = 1024 Exa Bytes)

## **YOTTA BYTES (YB):**

This unit of memory contain 1024 ZB or 1024 x 1024 EB. It is represented as "ZB". (1 YB = 1024 Zetta Bytes)

## **BRONTO BYTES (BB):**

This unit of memory contain 1024 YB or 1024 x 1024 ZB. It is represented as "YB". (1 Bronto B = 1024 Yotta Bytes)

## **GEOP BYTES :**

This unit of memory contain 1024 BB or 1024 x 1024 YB. It is represented as "BB". (1 GeopByte = 1024 Bronto Bytes)

## **TYPES OF MEMORY UNIT:**

There are two types of memory

- i. Primary memory
- ii. Secondary memory

## **Primary Storage:**

The main memory of the computer is also called Primary Memory, Primary storage. It stores instructions and data given to the computer for doing a specific job. It also holds the final results produced by the computer. The data or instructions when needs to be processed it is brought in to the Ram that is main memory of computer. ROM stores those instructions which are needed to run the computer efficiently.

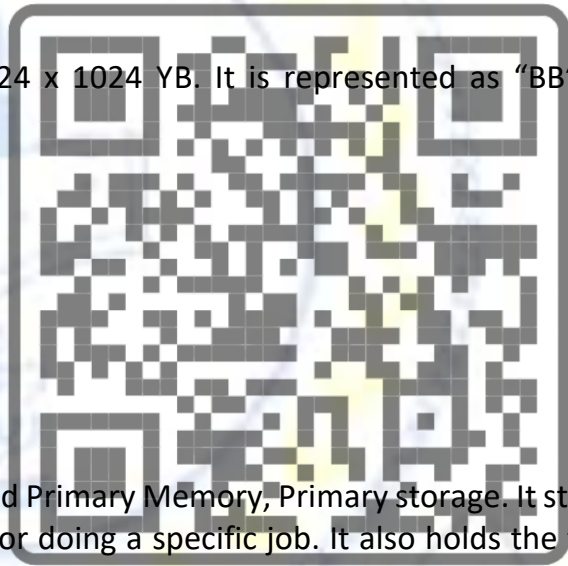
## **TYPES OF PRIMARY MEMORY:**

It is divided into two parts:

1. Read Only Memory (ROM)
2. Random Access Memory (RAM)

## **Read Only Memory (ROM):**

This part of memory contains permanently stored information. When the power is switched off. ROM does not wash away. This information is available to a computer to read and process but not to be changed is kept on ROM. This information is stored on small pieces of memory chips, before the computer is assembled.



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## **Random Access Memory (RAM):**

This part of memory consists of blank chips and hence the computer can use it to store and retrieve (write and read) information during its processing. The information stored in RAM is volatile, that is, when the computer is shut down the stored information is lost.

**OR**

- RAM stands for Random Access Memory
- It is volatile or temporary memory
- It contains all the running program of CPU
- When system turns off RAM loses all data
- It is alterable, erasable and programmable

## **Q. Differentiate between RAM and ROM.**

<b><u>RAM</u></b>	<b><u>ROM</u></b>
1. RAM is temporary memory.	1. ROM is permanent memory.
2. The data in RAM can be changed or deleted.	2. The instructions written in ROM cannot be changed or deleted.
3. Instructions in RAM change continuously as different programs are executed and new data is processed.	3. It is not possible to write new information or instructions in ROM.
4. RAM is a volatile memory.	4. ROM is non-volatile memory.
5. The instruction is written into the RAM at the time of execution.	1. The instructions written into ROM at manufacturing time.

## **SECONDARY STORAGE DEVICES:**

Secondary storage or secondary memory also referred as backing storage is used to supplement the capacity of main storage; the memory stores a bulk of information. It is also called auxiliary storage or mass storage. The information stored in this memory is used by the CPU by first bringing it to main memory.

**OR**

Secondary Storage is the auxiliary storage of computer system in which large amount of data can be stored permanently. Sometimes this memory also supplements the main memory during the processing of a data or program. Secondary storage is also called mass storage.

Usually, secondary storage devices can be categorized as;

1. Magnetic Storage Devices
  - i. Magnetic Tape
  - ii. Hard Disk
  - iii. Floppy Disk
2. Optical Storage Devices
  - i. CD-ROM
  - ii. DVD-ROM





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## 3. Solid State Storage Devices

- i. Flash Memory
- ii. Smart card

## MAGNETIC STORAGE DEVICES

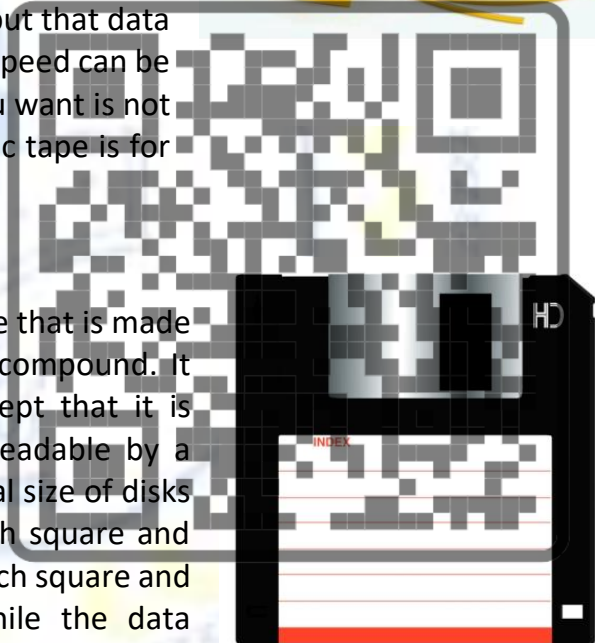
### MAGNETIC TAPE:

A magnetic tape is also a storage device from which you can access data serially like an audio cassette from which you can hear the songs in the order in which they are stored. Serial access is slower than the direct access provided by media such as diskettes. When you want to access some particular data from the tape, the device has to scan through all the data you do not need but that data is stored before the required one. The access speed can be quite slow when the tape is long and what you want is not near the start. So the best use of the magnetic tape is for the data that you do not use very often.



### FLOPPY DISKETTE:

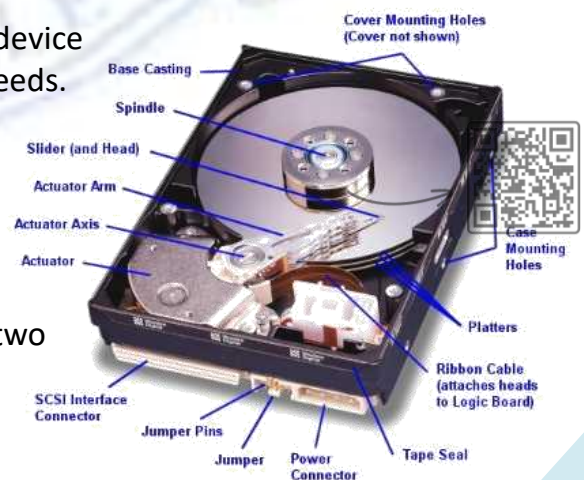
It is a small removable, portable storage device that is made of polyester film coated with a metal oxide compound. It looks like a 45-rpm phonograph record except that it is enclosed in a jacket square in shape. It is readable by a computer with a floppy disk drive. The physical size of disks has shrunk from the early 8 inch to 5.25 inch square and about 1 millimeter thick (mini-floppy) to 3.5 inch square and about 2 millimeters thick (microfloppy) while the data capacity has risen.



### HARD DISK:

A hard disk drive is a non-volatile computer storage device containing magnetic disks or platters rotating at high speeds. Hard disk/drive unit comes with a set rotation speed varying from 4500 to 10000 rpm. Disk contains concentric **tracks**. Tracks are divided into **sectors**. A **sector** is the smallest addressable unit in a disk. Data are recoded on the tracks of a spinning disk surface and read from the surface by one or more read / write heads. There are two basic types of disk system.

- ☒ Moving head
- ☒ Fixed head





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## **MOVING HEAD:**

The moving head consist of one read / write head for each disk surface mounted on an axis and which can be moved in and out. In this system each read / write head moves horizontally across the surface of the disk. So that it is able to access each track individually. Information stored on the tracks which constitute a cylindrical shape through the disk pack are therefore accessed simultaneously.

## **FIXED HEAD:**

In the fixed head system the axis are non-movable. A large number of read / write heads are distributed over the disk surfaces. One head for each track as a result no head movement is required and therefore information is accessed more quickly.

## **OPTICAL STORAGE DEVICES**

### **CD-ROM:**

CD-ROM (Compact Disc, Read Only Memory) is an adaption of the CD that is designed to store computer data in the form of text and graphics, as well as hi-fi stereo sound. It is a non-volatile optical data storage medium that is physically the same as an audio CD and is capable of storing large amounts of data up to 1 GB, although the most common size is 650 MB about 12 million bytes per pound weight. All CD-ROMs confirm to a standard size and format, so you can load any type of CD-ROM into any CD-ROM player. In addition, CD-ROM players are also capable of playing audio CDs. A standard CD is 120mm (4.75 inches) in diameter and 1.2 mm (0.05 inches) thick.



### **DVD-ROM:**

A read-only DVD disc used to permanently store data files. It is a high-density medium capable of storing a full-length movie on a single disk. DVD ROM achieve such high storage capacity using both sides of the disc and special data compression technologies and by using extremely tracks for using data. Since each size of a standard DVD-ROM disc can hold 4.7GB these disc can contain as much as 9.4GB of data.



## **SOLID STATE STORAGE DEVICES**

Solid state storage devices are unique storage device because they do not use disk or tapes and have no moving parts. It relies on integrated circuit to hold data. Some solid

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state devices are nonvolatile because they can retain their data even when the system's power is turned off.

## **Flash Memory:**

Flash memory is a special type of memory chip that combines the best features of RAM and ROM, flash memory lets a user or program access data randomly. Like RAM, flash memory lets you overwrite any or all of its content at any time. It is a non-volatile memory, so data is retained even when power is off.

## **Smart Card:**

Smart card is a device with extra ordinary potential. Smart card contains a small chip that stores data. User can read or write data form card by using card reader. Some smart cards called intelligent smart cards also contain their own microprocessors, and they function like a computer.

**Q: Define Bus and its types?**

## **COMPUTER BUS:**

A bus is a path between the components of a computer. The bus is a group of parallel wires. Like the processor, the bus's speed is measured in megahertz (MHz) because it has its own clock speed. There are two main buses in a computer; the Internal (or System) Bus and the External (or Expansion) Bus. The System Bus resides on the motherboard and connects the CPU to other devices that reside on the motherboard. An Expansion Bus connects external devices, such as Keyboard, mouse, printer and so on to the CPU. Cables from disk drives and other internal devices are plugged into the bus.

**OR**

The bus is set wires that connect the different components together which transmit the data and signal between them.

The System bus consists of three main parts:

## **TYPES OF COMPUTER BUS:**

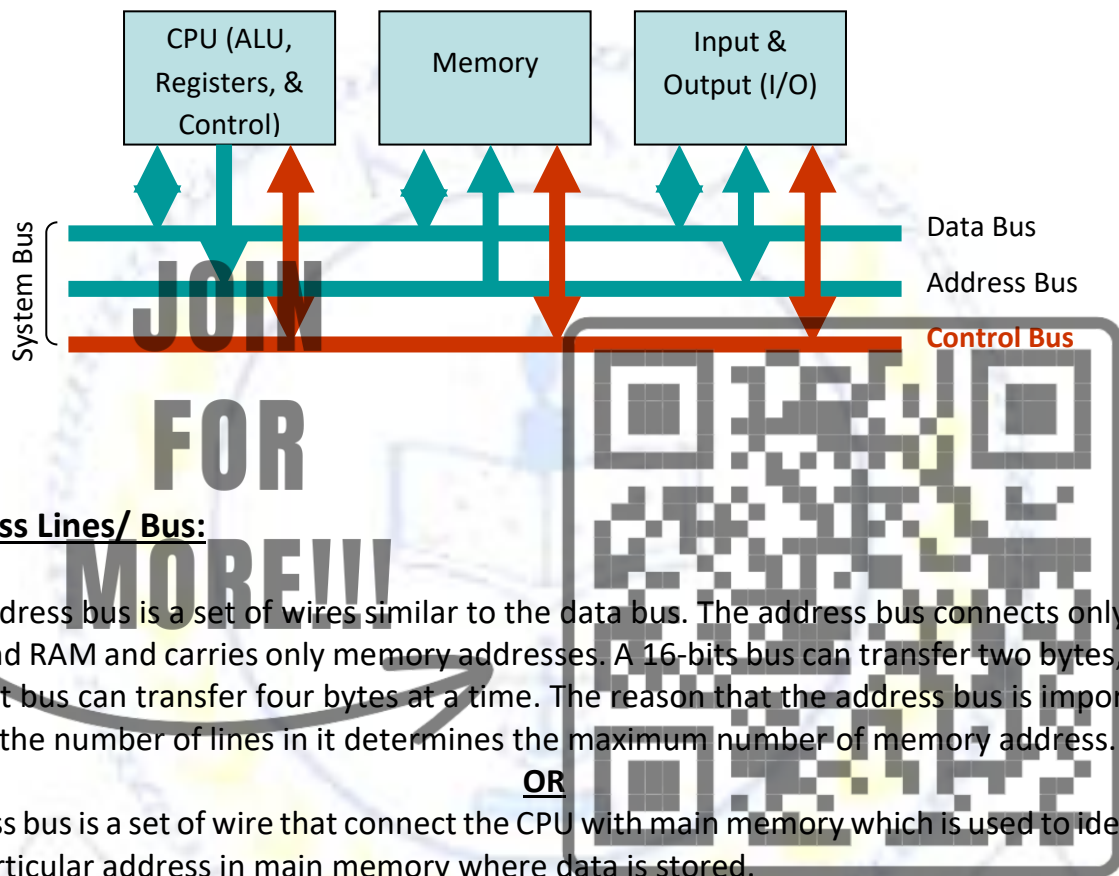
There are two main buses in a computer:

- **Control lines/ Bus**
- **Address lines / Bus**
- **Data lines / Bus**

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## Control lines / Bus:

Control Unit controls the activities of all other components by sending control commands on the control bus. Control bus provides the two way transfer of data and instructions between main memory and CPU.

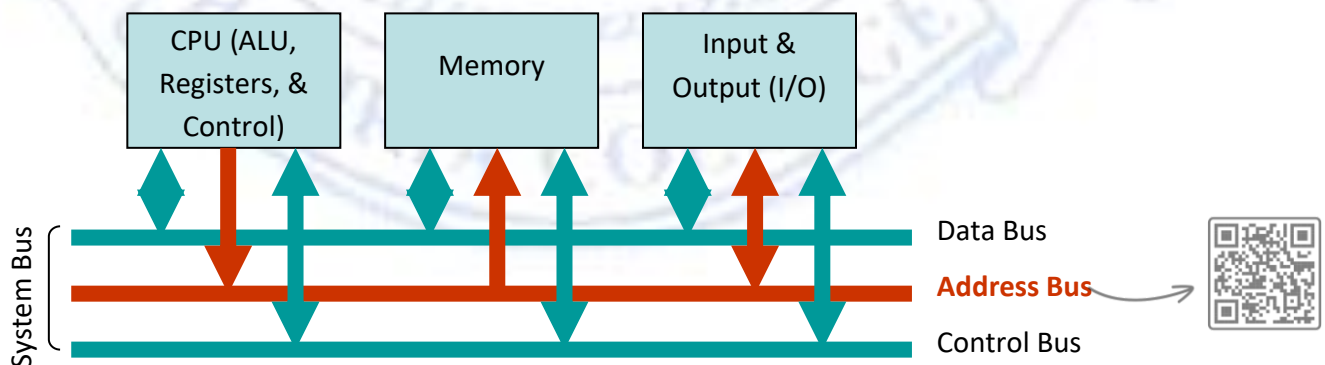


## Address Lines/ Bus:

The address bus is a set of wires similar to the data bus. The address bus connects only the CPU and RAM and carries only memory addresses. A 16-bits bus can transfer two bytes, and a 32-bit bus can transfer four bytes at a time. The reason that the address bus is important is that the number of lines in it determines the maximum number of memory address.

OR

Address bus is a set of wire that connect the CPU with main memory which is used to identify the particular address in main memory where data is stored.



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## Data lines / Bus:

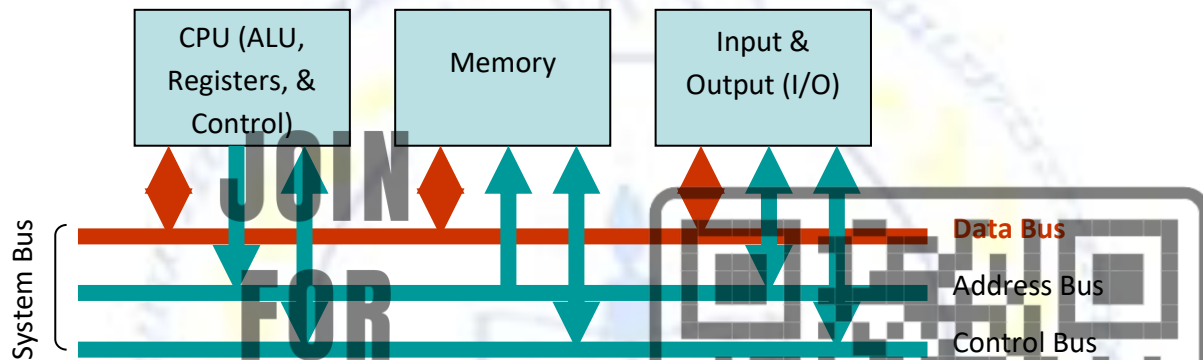
The data bus is an electronic path that connects the CPU, memory, and the other hardware devices on the motherboard. Actually, the bus is a group of parallel wires. A 16-bit bus can transfer two bytes and a 32-bit bus can transfer four bytes at a time.

The meaningful data which is to be sent or retrieved from a device is placed on to these lines.

OR

The Bus is set to run at a specified speed which is measured in MHz.

Data bus is a communication path between memory and different parts of CPU.



**Q: Define ports and its types ?**

## COMPUTER PORTS

A system board with its processor and memory unit can work only when linked to input/output storage and communication devices to receive data and communicate results of processing. Peripheral devices such as a keyboard, mouse, monitor and a printer come with a cable and a multiple connector. To link a device to the PC, you plug its connector into a receptacle called a port in much the same way you plug a lamp cord into electrical outlet. A port is one of the entry lines coming into the computer. A port provides a direct link to the microcomputer's common electrical bus.

OR

Port is a socket which is present at the back of the computer to connect the different peripheral devices with CPU.

## TYPES OF COMPUTER PORTS

There are two types of ports used in computer:

- Serial Ports
- Parallel Ports





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## **Serial Ports:**

A serial port provides a connection for transmitting data one bit at a time. A serial port connects your computer to a device such as modem, which requires two-way data transmission, or to a device such as a mouse, which requires only one-way data transmission. IBM-compatible computers use either 9-pin or 25-pin connectors for their serial ports COM1, COM2 etc.

## **Parallel Ports:**

A parallel port provides a connection for transmitting data eight bits at a time over a cable with eight separate data lines. Parallel transmission is fast because eight bits travel simultaneously. Parallel transmission is typically used to send data to the printer. The cable that connects two parallel ports contains 25 wires, eight wires carry data and the remaining wires carry control signals that help to maintain orderly transmission and reception. IBM-compatible computers generally allow you to use up to three ports which are designated as LPT1, LPT2 etc.

## **OUTPUT DEVICES:**

An output device is any peripheral device that converts machine-readable information into people-readable form such as a monitor, printer, plotter and voice output device.

### **Type of Output Devices:**

- Monitors
- Printers
- Plotters
- Voice Output Devices
- Modems



## **MONITORS:**

A monitor is a screen used to display the output. Images are represented on monitors by individual dots called *pixels*. A pixel is the smallest unit on the screen that can be turned on and off or made different shades. The density of the dots determines the clarity of the images, the resolution.

- **Screen resolution:** This is the degree of sharpness of a displayed character or image. The screen resolution is usually expressed as the number of columns by the number rows. A 1024 x 768 resolution means that it has 1024 dots in a line and 768 lines. Another measure of display resolution is a dot pitch.



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There are two forms of display: *cathode-ray tubes* (CRTs) and *flat-panel display*.

## CATHODE RAY TUBES (CRT):

A CRT is a vacuum tube used as a display screen for a computer output device. Although the CRT means only a tube, it usually refers to all monitors. IBM and IBM compatible microcomputers operate two modes unlike Macintosh based entirely on graphics mode. They are a text mode and a graphics mode. Application programs switch computers into appropriate display mode.

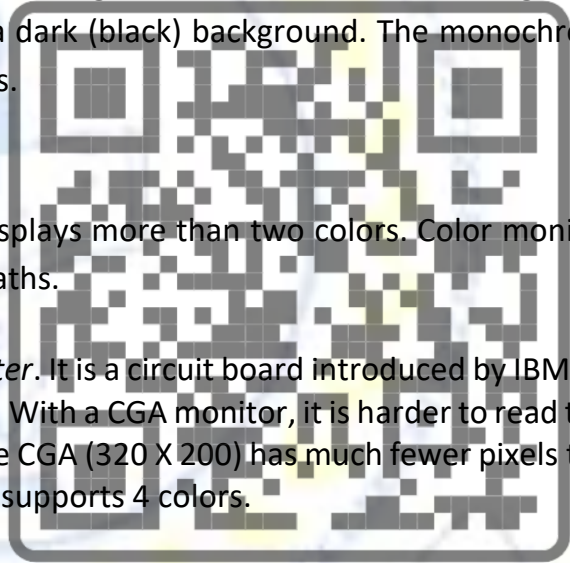
## Monochrome Monitors:

A monochrome monitor has two colors, one for foreground and the other for background. The colors can be white, amber or green on a dark (black) background. The monochrome monitors display both text and graphics modes.

## Color Monitors:

A color monitor is a display peripheral that displays more than two colors. Color monitors have been developed through the following paths.

- **CGA:** This stands for *Color Graphics Adapter*. It is a circuit board introduced by IBM and the first graphics standard for the IBM PC. With a CGA monitor, it is harder to read than with a monochrome monitor, because the CGA (320 X 200) has much fewer pixels than the monochrome monitor (640 X 350). It supports 4 colors.
- **EGA:** It stands for *Enhanced Graphics Adapter*. EGA is a video display standard that has a resolution of 640 by 350 pixels and supports 16 colors. EGA supports previous display modes and requires a new monitor.
- **VGA:** VGA stands for *Video Graphics Array*. This is a video display standard that provides medium to high resolution. In a text mode, the resolution of this board is 720 by 400 pixels. It supports 16 colors with a higher resolution of 640 by 480 pixels and 256 colors with 320 X 200 pixels.
- **Super VGA:** This is a very high resolution standard that displays up to 65,536 colors. Super VGA can support a 16.8 million colors at 800 by 600 pixels and 256 colors at 1024 by 768 pixels. A high-priced super VGA allows 1280 by 1024 pixels. Larger monitors (17" or 21" and larger) with a high resolution of 1600 by 1280 pixels are available. VESA (*Video Electronics Standards Association*) has set a standard for super VGA.



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## **FLAT PANEL DISPLAYS:**

Portable computers such as a lap top use flat panel displays, because they are more compact and consume less power than CRTs. Portable computers use several kinds of flat panel screens:

### **Liquid-Crystal Displays (LCDs):**

- A display technology that creates characters by means of reflected light and is commonly used in digital watches and laptop computers. LCDs replaced *LEDs* (light emitting diodes) because LCDs use less power. LCDs are difficult to read in a strong light, because they do not emit their own light. Portable computers wanted to have brighter and easier to read displays.



## **FACTOR DETERMINING A MONITOR'S QUALITY**

### **Resolution:**

The resolution of monitor is indicate how to densely packed the pixel are. In general resolution provides a sharper image.

**OR**

Resolution is the term used to describe the number of dots, or pixels, used to display an image.

### **Bandwidth:**

Bandwidth is a range of signal frequencies the monitor can handle.

### **Dot Pitch:**

The distance between pixels called Dot pitch. The smaller the dot pitch, the sharper the image.

### **Convergence:**

Convergence is the clarity and sharpness of each pixel.





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## **PRINTERS:**

A printer is an output device that produces a *hard copy* of data. The resolution of printer output is expressed as DPI. Printers can be classified into different types in several ways. First, the printers can be divided into three categories by the way they print.

- **Serial Printers:** Also called a character printer. Print a single character at a time. They are usually inexpensive and slow.
- **Line Printers:** Print a line at a time. They are expensive and very fast. Line printers use a band, a chain, etc.

## **IMPACT PRINTERS:**

### **Daisy-Wheel Printer:**

*Daisy-Wheel* is a printer mechanism that uses any kind of hub (wheel) having a set of spokes at the margin of the hub. The wheel can be removed to use a different character set. When the wheel is turned and the required character is aligned to the print hammer, the character is then struck into a ribbon and onto a paper with the hammer.

*Daisy-Wheel Printer* prints typewriter-like very high quality characters. However, they are slower and less reliable than dot-matrix printers.

### **Chain Printer:**

A *chain printer* uses a printing mechanism that uses character typefaces linked together in a chain. The chain spins horizontally around a set of hammers aligned with each position. When the required character is in front of the selected print position, hammer in that position hits the paper into the ribbon against the character in the chain.

This printer is not commonly found around microcomputers, because it is a very expensive, high-speed machine designed originally for mainframes and minicomputers. Chain printers are very reliable and can speed up to 3000 lines per minute.

### **Dot-Matrix Printer:**

*Dot-matrix printers* are printers that write characters and form graphic images using one or two columns of tiny dots on a print head. The dot hammer moving serially across the paper strikes an inked-ribbon and creates images on paper.

Dot matrix printers are popular printers used with microcomputers, because the printers are highly reliable and inexpensive. They are used for tasks where a high-quality image is not essential. Several kinds of dot matrix printers are available with print heads that have 7, 9, 18, or 24 pins.





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## NON-IMPACT PRINTER:

### Ink-Jet Printer:

*Ink-jet* is a printer mechanism that sprays one or more color of ink at high speed onto the paper and produces high-quality printing. This printer also produces color printing as well as high-quality image. That is, ink-jet printers can be used for variety of color printing at a relatively low cost. Ink-jet printing has two methods: Continuous stream method and drop-on-demand method.

### Laser Printer:

A *laser printer* is a printer that uses the electrophotographic method used in a copy machine. The printer uses a laser beam light source to create images on a photographic drum. Then the images on the drum are treated with a magnetically charged toner and then are transferred onto a paper. A heat source is usually applied to make the images adhere.



### **Q. What is Difference Between Impact and Non-Impact Printer?**

The difference between impact and non-impact printer is as follows:

<u>Impact printer / Dot-matrix Printer</u>	<u>Non impact Printer / Laser Printer</u>
1. It prints characters or images by striking print hammer or wheel against an inked ribbon.	1. It prints characters and images without striking the papers.
2. Its speed is slower.	2. Its speed is faster.
3. Its printing quality is lower.	3. Its printing quality is higher.
4. It normally uses continuous paper sheet.	4. Its normally uses individual paper sheet.
5. It generates noise during printing.	5. It does not generate noise during printing.
6. It uses inked ribbon for printing.	6. It uses toner or cartridge for painting.
7. It is less expensive.	7. It is more expensive.
8. Dot matrix is an impact printer.	8. Laser printer is a non-impact printer.



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**Q. What is the usage of plotters? Explain different types of plotters.**

A **plotter** is an output device that is used to produce high quality graphics in a variety of colors. Plotters are used to create maps, architectural drawings, graphs and charts.

## **Types of Plotters:**

Different types of plotters are as follows:

1. Pen plotter
2. Electrostatic plotter

### **Pen plotter**

Pen plotters have an ink pen attached to draw the image.

- Flatbed plotter
- Drum Plotter

### **Flatbed Plotter:**

**Flatbed plotter** is used to plot or draw images. It contains pens for drawing images. The paper is placed on a table-like surface. Software instructs the pens to move down on the paper. The pen then moves on the paper for creating images. Most flatbed plotters have one or more pens of different colors and widths.

### **Drum plotter:**

**Drum plotter** uses a rotating drum or cylinder. The drawing pens are mounted on the drum. The pens move to the left and right as the drum rotates. This movement creates the desired image. The advantage of a drum plotter is that the length of the plot is almost unlimited. The roll paper can be used to draw very lengthy images. The width of the image depends on the width of the drum.

### **Electrostatic Plotter:**

An electrostatic plotter produces a faster image by charging the paper with high voltage. This voltage attracts toner, which is then melted on the paper with heat. This type of plotter is fast, but the quality is generally considered to be poor when compared to a pen plotter.

### **VOICE-OUTPUT DEVICES:**



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This device produces a human speech like sound, but actually is prerecorded vocalized sounds. Voice output is used in the telephone information system, where the requested number is reported using a voice output system.

For example, when a student enrolls courses using a telephone registration system, he or she hears voice output upon your request. Voice output is becoming common in voice messaging systems.

## **Q. Define Dual Purpose device.**

### **Dual Purpose device:**

Dual Purpose devices are that perform input and output task at time. E.g. disk drive and CD writer.

### **DISK DRIVE:**

Disk drive is a peripheral device that reads or write the disks (hard disks, floppy disks, etc) that store information. Disk drives are called "Storage Device" because they store information on portable or permanent disks. The drive contains a motor to rotate the disk at a constant rate and one or more read/write heads, which are positioned over the desired track.

### **CD-WRITER:**

A CD writer is a device connected to your computer which can write on CD-WR and CD-R discs. CD-WR discs may be written, erased and rewritten, while CD-R discs may be written only once. CD writer performances is measured in X unit, where IX =150 kilobytes/sec. This allows user to master a CD-ROM or audio CD for publishing CD-R devices can also read CD-ROMs and play audio CDs. The CD writer is also called a CD-R drive (short for Compact Disc - Recordable Drive)



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**Q. Define softcopy and hard copy.**

## **SOFT COPY:**

A process information which displayed on monitor screen called softcopy. It is intangible and temporary. It is machine readable form.

## **HARD COPY:**

A computer output which taken on paper called hard copy. It is tangible and permanent. It is come from printer and plotter.

**Q. Differentiate between SOFT COPY and HARD COPY.**

<b><u>SOFT COPY</u></b>	<b><u>HARD COPY</u></b>
1. A process information which displayed on monitor screen called softcopy.	1. A computer output which taken on paper called hard copy.
2. It is intangible and temporary.	2. It is tangible and permanent.
3. It is machine readable form.	3. It is come from printer and plotter.

**Q. What is software?**

## **SOFTWARE:**

The instruction that tells a computer what to do is called a software. Software comprises the entire set of programs, procedures, and associated with the operation of a computer system.

**OR**

Set of instruction stored as interconnected program to perform a specific task is called software.

**OR**

Software is a set of programs, which is designed to perform a well defined function. A program is a sequence of instruction written to solve a particular problem.

## **TYPES OF SOFTWARE:**

1. System software
2. Application software



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## **System Software**

The system software is collection of programs designed to operate , control and extend the processing capabilities of the computer itself. System software are generally prepared by computer manufactures.

## **Application Software**

Application software are the software that are designed to satisfy a particular need of a particular environment. All software prepared by us in the computer lab. Examples of application software are-student record software, railway reservation software, income tax software, word processors etc.

### **Q. Difference between system software and application software?**

<b><u>S #</u></b>	<b><u>Application Software</u></b>	<b><u>System Software</u></b>
1.	Application software is computer software designed to help the user to perform specific tasks.	System software is computer software designed to operate the computer hardware and to provide a platform for running application software.
2.	Application Software performs in a environment which created by System/Operating System	System Software Create his own environment to run itself and run other application.
3.	It executes as and when required.	It executes all the time in computer.
4.	Application is not essential for a computer.	System software is essential for a computer

### **Q. What is an operating system? And write its function & features?**

#### **OPERATING SYSTEM:**

Operating system is a set of program that control and supervise the hardware computer and provides services to application software, programmer and user of computer. The operating system is a vital component of the system software in a computer system. Application programs usually require an operating system to function.

**OR**

An operating system is the most important software that runs on a computer. It manages the computer's memory, processes, and all of its software and hardware. It also allows you to communicate with the computer without knowing how to speak the computer's "language." Without an operating system, a computer is useless.

**OR**

An operating system (sometimes abbreviated as "OS") is the program that, after being initially loaded into the computer by a boot program, manages all the other programs in a computer. The other programs are called applications or application programs. The

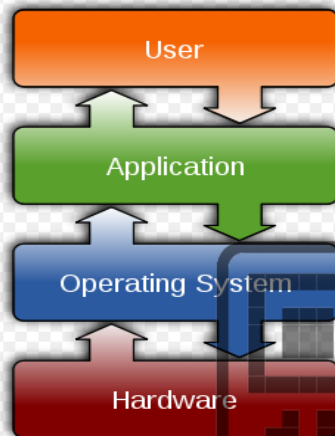


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application programs make use of the operating system by making requests for services through a defined application program interface (API). In addition, users can interact directly with the operating system through a user interface such as a command language or a graphical user interface (GUI).

OR

An operating system is a system software. It contains a number of programs to manages system resources. A user cannot communicate to the microprocessor of computer system until an operating system is not installed.



Example:

- Windows
- DOS
- Linux
- Unix

## FUNCTION OF (OS)

- **Resource Management:** Operating System will Manages all the Resources those are Attached to the System like Memory and Processor and all the Input output Devices.
- **Storage Management:** Operating System also Controls all the Storage Operations means how the data or files will be Stored into the computers
- **Process Management:** All the Processes those are given by the user or the Process those are System 's own Process are manage by the Operating System .
- **Memory Management :** Operating System also Manages the Memory of the Computer System means Provide the Memory to the Process
- **File management:** An operating system provides command to create and manage files on disk. The file operations like COPY, PASTE, DELETE, BACKUP, RENAME and etc.



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**Operating systems can be classified as follows:**

- **Multi-user**: Allows two or more users to run programs at the same time. Some operating systems permit hundreds or even thousands of concurrent users.
- **Multiprocessing** : Supports running a program on more than one CPU.
- **Multitasking** : Allows more than one program to run concurrently.
- **Multithreading** : Allows different parts of a single program to run concurrently.
- **Real time**: Responds to input instantly. General-purpose operating systems, such as DOS and UNIX, are not real-time.

## **FEATURES OF OPERATING SYSTEM:**

Operating system should have the following features:

- Efficiency, in terms of processor and resource utilization.
- Reliability, in terms of being error free and handling all possibilities in the execution of jobs.
- Maintainability, in term of enhancing facilities, correction of bugs etc.
- Small size, in term of the amount of memory and backing store required.

**Q: Define Language translator and its type?**

### **Language Translator:**

Language translator is a software which translate a programming language into machine language or binary language, because computer can only understand machine language.

### **Types of Language Translator**

The language translator associated with programming languages as Assembler, Compiler and Interpreter.

#### **Interpreter:**

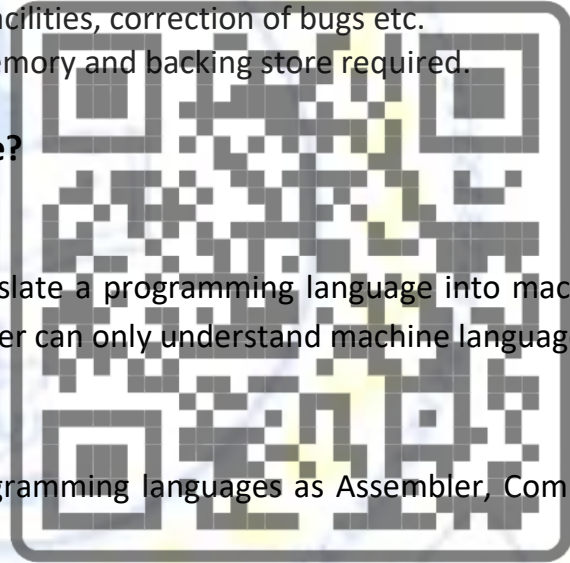
Interpreter is a language translator that translate and executes each program statement or instruction at a time. After execution the translation of a statement is removed from memory and next statement is loaded for translation. Translation is required if program is executed again.

#### **Compiler:**

Compiler translates the whole program at a time and stores the translated program on disk. The original program is called Source Program while it translation is called Object Program.

#### **Assembler:**

Assembler translates low level assembly language into machine language. Assembly language is a symbolic language. Every low level symbolic language ha its own assembler to translates.



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# 01

## **PAST PAPERS**

### **2017:**

Enlist any six features of an Operating System.  
What will happen, if RAM is not available in a Computer System?  
What is Application Software? Name at least five Application Software.  
What is port? Enlist its types.  
How is secondary storage different from primary storage?  
Define Bit, byte and word.  
Why is ROM called non-volatile memory?  
Explain different types of Impact printers.  
What is System Software? Discuss its types.  
Discuss the major components of Computer System.  
Discuss the characteristics of Computer.

### **2016:**

Define the following terms related to screen display: CRT, Pixel, Resolution  
List the various function normally performed by the operating system.  
Define the main components of CPU.  
What is System Software? Define its different types.  
What is Secondary memory? Define its types.  
Define different types of Scanning devices.

### **2015:**

Differentiate between volatile and non volatile memory?  
What is an operating system? Why is it necessary for a computer system?  
Explain different types of impact printers?

### **2014:**

Differentiate between Application software v/s System software?  
Define Impact & Non-Impact Printers?  
Discuss the role of CPU. Also describe its components.





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## **2013:**

Define the term Bus. Describe the functions of any two buses.  
What is Software? Explain its different types.

## **2012:**

Define ROM & its type?  
What is secondary memory? Discuss its three types.  
What are I/O devices? Describe any three output devices.  
What is an impact printer? Describe any two types.  
What is CPU? Define its various components with diagram.

## **2011:**

Define the term Bus. Describe any two buses.  
Differentiate between Softcopy and Hardcopy.

## **2010:**

Explain the basic unit of primary storage secondary storage.  
Define Information technology. Write its advantage.  
What are the function of Data bus & Address bus.  
Explain any three scanning devices with example.  
What is a CPU. State its various components.

## **2009:**

What is a CPU. Define with a diagram.  
What do the term bit, byte and word stand for?  
What are difference between volatile storage & non-volatile storage.  
What are peripheral devices? Mention some examples of peripheral devices.

## **2008:**

Discuss different scanning devices used to input data into a computer.  
Describe the mechanism of Hard disk.  
Describe the units of CPU with the help of a diagram.  
What is main memory. Discuss the function of the main memory.



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## 2

## INFORMATION NETWORKS

### NETWORK:

A network is a group of two or more computer systems linked together.

OR

When you have two or more computers connected to each other, you have a network. The purpose of a network is to enable the sharing of files and information between multiple systems. The Internet could be described as a global network of networks. Computer networks can be connected through cables, such as Ethernet cables or phone lines, or wirelessly, using wireless networking cards that send and receive data through the air.

OR

In information technology, a network is a series of points or nodes interconnected by communication paths. Networks can interconnect with other networks and contain sub-networks.

OR

A group of interconnected (via cable and/or wireless) computers and peripherals that is capable of sharing software and hardware resources between many users.

OR

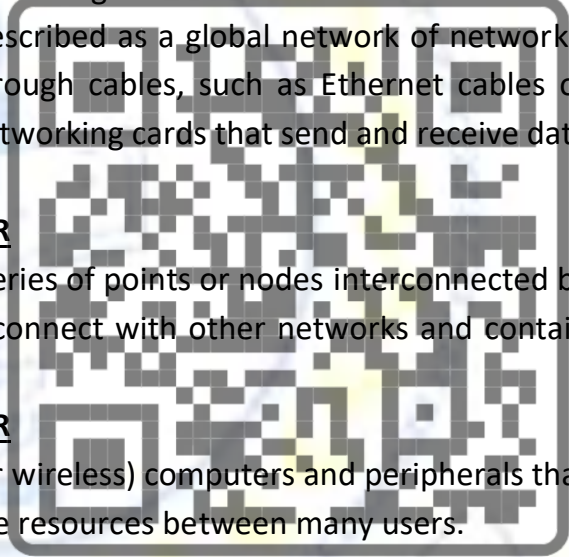
A computer network, also referred to as just a network, consists of two or more computers, and typically other devices as well (such as printers, external hard drives, modems and routers), that are linked together so that they can communicate with each other and thereby exchange commands and share data, hardware and other resources.

OR

A network is a collection of data communication hardware, computer, communications software and communication media connecting in a meaningful way to allow users to share information and networks.

### **Example:**

A chain of radio or television broadcasting stations linked by wire or microwave relay.



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## **ADVANTAGES OF NETWORKING:**

- Enable users to share files with others. Thus different distant departments of an organization can easily access data.
- Enable users to share equipments.
- Different types of computers with different O/S can communicate with each other.
- Enhanced communication speed and accuracy.
- Speedy data transfer as compared to fax.
- Cost of transfer is considerably lowered.

## **Q: What is the main reason to develop a computer network?**

The main reason to develop a computer network is that the Networks are collections of computers, software, and hardware that are all connected to help their users work together. A network connects computers by means of cabling systems, specialized software, and devices that manage data traffic. A network enables users to share files and resources, such as printers, as well as send messages electronically (e-mail) to each other.

## **TYPES OF NETWORK:**

Networking is the construction, design, and use of a network, including the physical (cabling, hub, bridge, switch, router, and so forth), the selection and use of telecommunication protocol and computer software for using and managing the network, and the establishment of operation policies and procedures related to the network.

The types of network common to all organization are defined as follows:

- i- **PAN (Personal Area Network)**
- ii- **LAN (Local Area Network)**
- iii- **WAN (Wide Area Network)**
- iv- **GAN (Global Area Network)**
- v- **SAN (Storage Area Network)**

## **PAN (Personal Area Network)**

Generally this is a microcomputer network used for communication among computer devices (including telephones, PDAs, printers, cameras, scanners, etc.) being used by an individual person. The extent of a PAN typically within a range of 33 feet (about 10 meters). PANs can be used for communication among the personal devices themselves or to connect to a higher-level network and the Internet. PANs may be wired with computer buses, such as USB and other standards. If PANs are



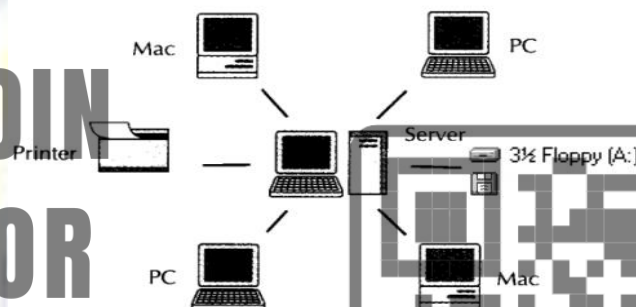
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implemented without wires, they are called wireless PANs (WPANs), which can also be made possible with network technologies such as IrDA and Bluetooth.

## LAN (Local Area Network)

**LANs** are computer networks that cover a limited area such as a home, office or campus. Characteristics of LANs, in contrast to WANs, are higher data transfer rates and smaller geographic range. Ethernet and Wi-Fi are the two most common technologies currently used.

**Local Area Network (LAN)**



**Q: Define Topology? Also describe its type?**

### TOPOLOGY:

The physical architecture of a network is called topology. In a network topology a component is called a node. LAN topologies define how networks are organized from a physical standpoint.

### TOPOLOGIES OF LAN:

There are four basic topology of LAN

- i. **STAR Topology**
- ii. **RING Topology**
- iii. **BUS Topology**
- iv. **HYBRID Topology**

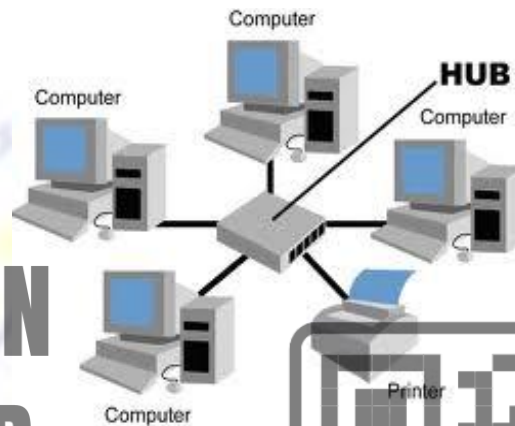




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## **STAR TOPOLOGY**

A star network is a local area network (LAN) in which all nodes (workstations or other devices) are directly connected to a common central computer. Every workstation is indirectly connected to every other through the central computer. In some star networks, the central computer can also operate as a workstation goes through the central unit.



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## **ADVANTAGES OF STAR NETWORK**

- Easy to connect new nodes or devices. In star topology new nodes can be added easily without affecting rest of the network.
- It is easy to troubleshoot this network type as all computers are dependent on the central hub.
- Failure of one node or link doesn't affect the rest of network.
- Centralized management. It helps in monitoring the network.
- No chance of data collision because of central **HUB**.
- Transmission delay between two terminals or between server and terminal do not increase by adding new nodes.

## **DISADVANTAGES OF STAR NETWORK**

- Too much dependency on central device has its own drawbacks. If it fails whole network goes down.
- The performance of the entire network is directly dependent on the performance of the hub.
- The size of the network is dependent on how many connections can be made to the hub.



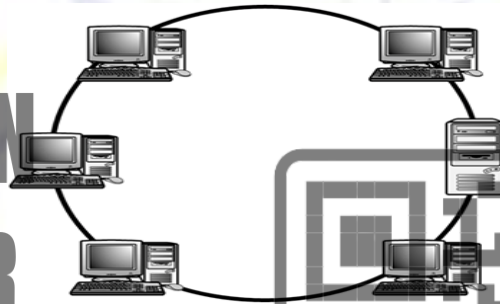
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## RING NETWORK

Each node is connected to exactly two other nodes, forming a ring can be visualized as a circular configuration. Requires at least three nodes. All communication between terminals follows a clockwise and anticlockwise pattern. The message goes terminal to terminal until the designated device is reached. There is no central server.

OR

In Ring Topology, all the nodes are connected to each-other in such a way that they make a closed loop. Each workstation is connected to two other components on either side, and it communicates with these two adjacent neighbors. Data travels around the network, in one direction.



## ADVANTAGES OF RING NETWORK

- Additional components do not affect the performance of network.
- This type of network topology is very organized. Each node gets to send the data when it receives an empty token. This helps to reduce chances of collision. Also in ring topology all the traffic flows in only one direction at very high speed.
- Each computer has equal access to resources.

## DISADVANTAGES OF RING NETWORK

- Each packet of data must pass through all the computers between source and destination. This makes it slower than [Star topology](#).
- If one workstation or port goes down, the entire network gets affected.
- Network is highly dependent on the wire which connects different components.
- It is difficult to troubleshoot the ring network
- Communication is directly proportional to the number of computer in the network.

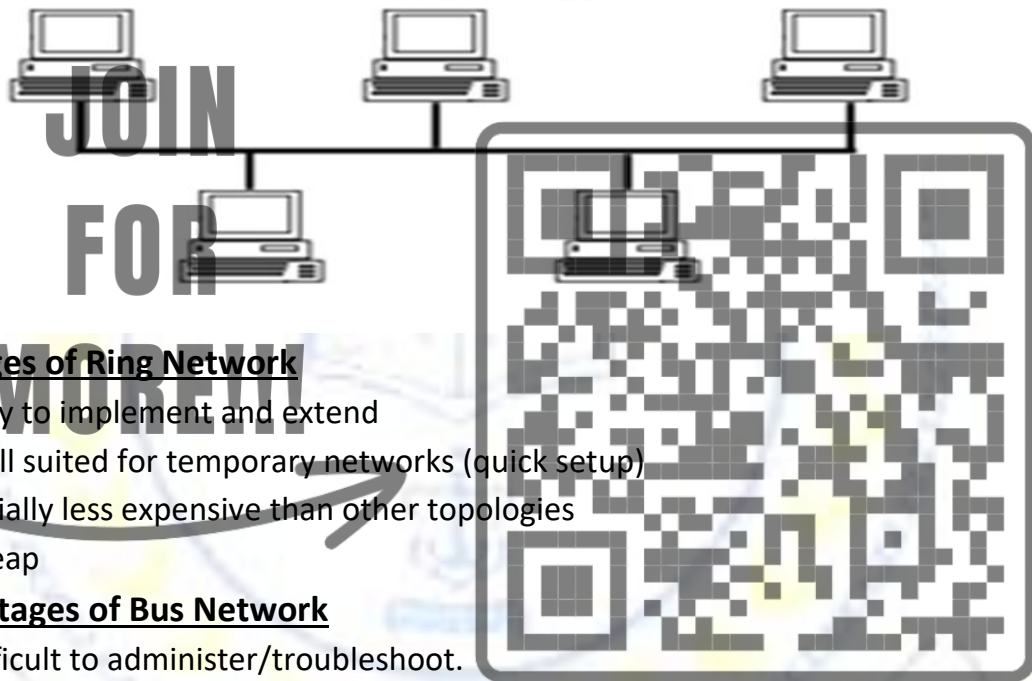


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## **BUS NETWORK:**

In local area networks where bus topology is used, each node is connected to a single cable. Each computer or server is connected to the single bus cable. A signal from the source travels in both directions to all machines connected on the bus cable until it finds the intended recipient. If the machine address does not match the intended address for the data, the machine ignores the data. Alternatively, if the data matches the machine address, the data is accepted. Since the bus topology consists of only one wire, it is rather inexpensive to implement when compared to other topologies.

**Bus Topology**



### **Advantages of Ring Network**

- Easy to implement and extend
- Well suited for temporary networks (quick setup)
- Initially less expensive than other topologies
- Cheap

### **Disadvantages of Bus Network**

- Difficult to administer/troubleshoot.
- Limited cable length and number of stations.
- If there is a problem with the cable, the entire network goes down.
- Maintenance costs may be higher in the long run.

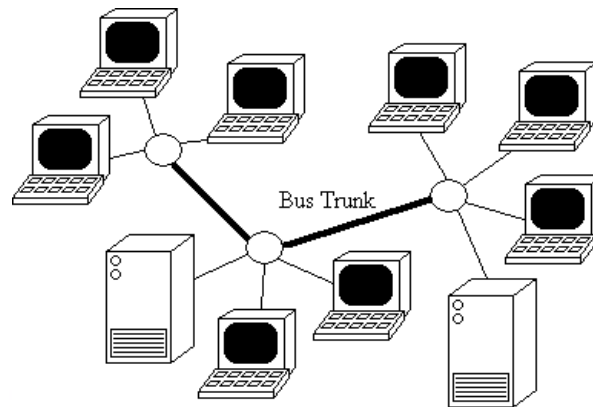
## **HYBRID NETWORK**

In networking terminology, a hybrid network--also called a hybrid network topology--combines the best features of two or more different networks. According to "Information Technology Control and Audit," hybrid topologies are reliable and versatile. They provide a large number of connections and data transmission paths to users.

- i- Reliability of the entire system
- ii- Expandability of the system
- iii- Cost involved
- iv- Availability of communication line



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## **LAN Models**

LAN follows one of the two models.

1. Client/Server Model
2. Peer to Peer Model

### **Client/Server Model**

A network architecture in which each computer or process on the network is either a client or a server. Servers are powerful computers or processes dedicated to managing disk drives (file servers), printers (print servers), or network traffic (network servers). Clients are PCs or workstations on which users run applications. Clients rely on servers for resources, such as files, devices, and even processing power.

### **Peer to Peer Model**

Peer-to-peer (abbreviated to P2P) refers to a computer network in which each computer in the network can act as a client or server for the other computers in the network, allowing shared access to files and peripherals without the need for a central server. P2P networks can be set up in the home, a business or over the Internet.

### **Components of LAN**

- Connection or Cabling System
- Micro computer with network card
- Network operating system
- Other shared device
- Router, Bridge & Gateway





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## **1- Connection or Cabling System**

LAN don't use telephone network. It uses Coaxial cable, Twisted-pair wire & Fiber optic cable. Wireless connection may be infrared, radio-wave transmission, Bluetooth, or WiFi.

## **2- Microcomputer with Network Interface Cards:**

Two or more microcomputer are required, along with network interface card.

A network interface card (NIC) is a computer circuit board or card that is installed in a computer so that it can be connected to a network.

## **3- Network Operating System**

NOS, an [operating system](#) that includes special functions for connecting computers and devices into a local-area network (LAN). Some operating systems, such as UNIX and the Mac OS, have networking functions built in. The term *network operating system*, however, is generally reserved for software that enhances a basic operating system by adding networking features.

**OR**

A network operating system (NOS) manages concurrent requests from clients and provides the security necessary in a multiuser environment. A file sharing component is installed in each client machine that interacts with the server to share files and applications as well as devices on the network such as printers, faxes and modems.

## **4- Other shared device**

Printer, Fax machine, scanners, storage devices, and other peripheral devices may be added to the network as necessary and shared by all users.

## **5- Router, Bridge & Gateways**

### **Router:**

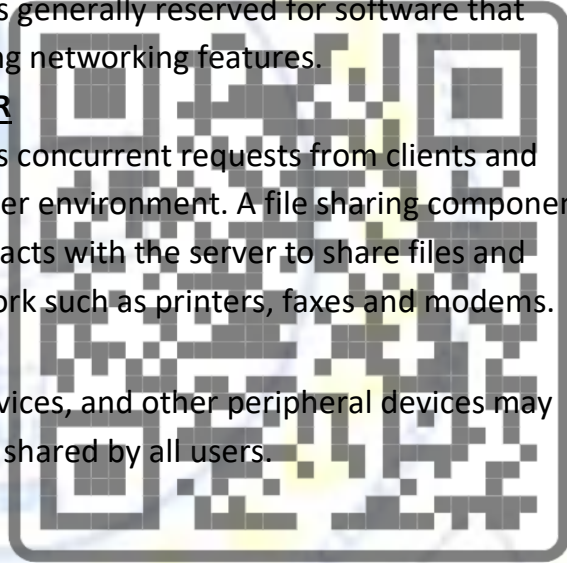
A Router is a device that connects two networks - frequently over large distances. It understands one or more network protocols, such as IP or IPX. A Router accepts packets on at least two network interfaces, and forwards packets from one interface to another.

**OR**

A Router is a device that forwards data packets between computer networks. A router is connected to at least two networks, commonly two [LANs](#) or [WANs](#) or a LAN and its [ISPs](#) network.

### **Bridges:**

A **bridge** device filters data traffic at a network boundary. Bridges reduce the amount of traffic on a LAN by dividing it into two segments.



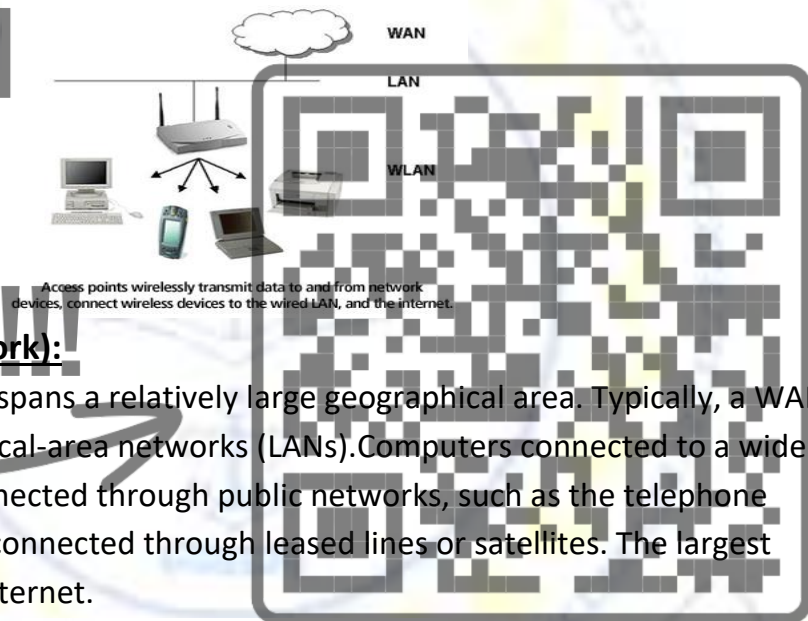
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## Gateways:

A **network gateway** is an *internetworking* system capable of joining together two networks that use different base protocols. A network gateway can be implemented completely in software, completely in hardware, or as a combination of both. Depending on the types of protocols they support, network gateways can operate at any level of the [OSI model](#).

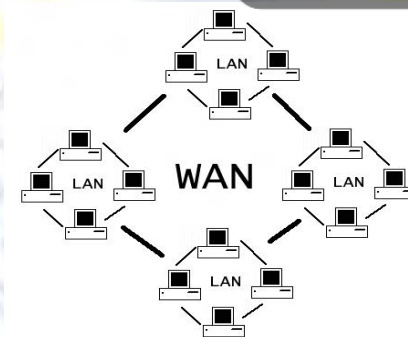
## WLAN (Wireless Local Area Network)

A WLAN provides wireless network communication over short distances using radio or infrared signals instead of traditional network cabling.



## WAN (Wide Area Network):

A computer network that spans a relatively large geographical area. Typically, a WAN consists of two or more local-area networks (LANs). Computers connected to a wide-area network is often connected through public networks, such as the telephone system. They can also be connected through leased lines or satellites. The largest WAN in existence is the Internet.



## Characteristic of WAN

- The network operates beyond the local LAN.
- Transmission medium used public system such as telephone lines, microwaves & satellite links.
- WAN has higher speed.



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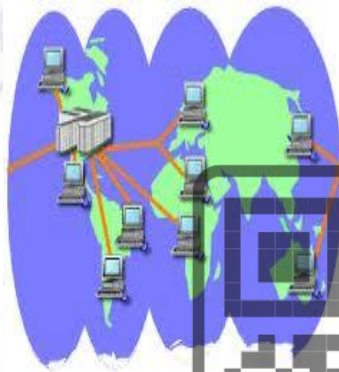
## **SAN (Storage Area Network)**

SANs are variation of LANs and are dedicated to connecting storage device to servers and other computing device. SANs centralize the process for the storage and administration of data.

## **GAN (Global Area Network)**

Global area network (GAN) refers to any network that is composed of different interconnected computer networks (WANs) and also covers an unlimited geographical area.

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## **The Global Village**

Global village, is the term used to describe the world shrunk into a village by the means of the different media types, most especially the World Wide Web, making it easy to pass across messages (like the news), thereby making the world become like a single village where people can easily contact each other quicker.

## **ARPANET**

The **Advanced Research Projects Agency Network (ARPANET)** was the world's first operational packet switching network and the core network of a set that came to compose the global Internet. The network was funded by the Defense Advanced Research Projects Agency

**Q. What is internet naming its components?**

## **INTERNET:**

A global computer network providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols.



**OR**

The Internet is the world-wide network of interconnected computer networks (e.g., commercial, academic and government) that operates using a standardized set of

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communications protocols called TCP/IP (transmission control protocol/Internet protocol) or the Internet protocol suite.

## **COMPONENTS OF INTERNET:**

### **Hardware:**

It is any part of your computer that has a physical structure, such as the computer monitor, internet modem.

### **Software:**

Software is any set of instructions that tells the hardware what to do. It is what guides the hardware and tells it how to accomplish each task.

### **Chat:**

IRC (Internet Relay Chat) is used for live discussions on the Internet.

### **Ecommerce:**

Taking orders for products and services on the Internet.

### **E-mail:**

Exchanging electronic letters, messages, and small files.

### **FTP:**

File Transfer Protocol is the most common method of transferring files between computers via the Internet.

### **Hosting:**

Making information available to others on the Internet.

### **Mailing Lists:**

E-mail messages forwarded to everyone on a special interest list.

### **Search Engines:**

These tools are really a part of the World Wide Web and are often used when looking for information because the Web has grown so large and is without any inherent organizational structure.





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## **Major Feature of Internet**

- E-Mail (electronic mail)
- Bulk of File
- Chats & Forums
- Social Video Game
- Customer Supports
- E-shopping
- News & weather
- Remote computing

## **Q: Define FTP & HTTP?**

### **FTP (File Transfer Protocol)**

- FTP stands for file transfer protocol.
- The protocol by which files may be transferred across the internet between two sides.
- It requires account on the FTP server.
- It is used to transfer file from FTP server i.e. download files on request to client.
- It requires a valid password.

### **HTTP (Hyper Text Transfer Protocol)**

- HTTP stands for Hyper Text transfer protocol.
- A standard that tell computer how to communicate with each other.
- It requires HTTP server on one end & HTTP client on the other end.
- It is used for moving hyper text file around the client.
- It does not require a password.



## **Q: Define router & switch?**

### **SWITCH:**

- The switch cannot send data out to internet, or across WAN.
- Switch can handle only similar type of network or topology.
- Switch has simple software to handle network activity.
- The switch learns the MAC address of each computer.
- Switch just used in LAN.

### **ROUTER:**

- The router is a device which is smart enough to route data from the LAN to the internet, or to your ISP, or to your WAN or even another LAN.
- Router can manage several network or topologies.
- A router has additional smart software with security features.
- Router concerned with IP address instead of MAC address.
- High speed router can serve as a part of internet back bone.



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## **USENET:**

- Usenet is a collection of more than 30,000 newsgroups, or discussion groups, on every conceivable subject.
- For example, some newsgroups are self-help groups for the victims of cancer, and others give the latest in gossips about show business personalities.
- Anyone can contribute a message, called an article, to a Usenet newsgroup or post a reply, known as a follow-up post, to an existing article.
- You can access and join a number of groups on google, yahoo and MSN websites.
- The examples of Usenet newsgroup are: soc.culture.african.american and misc.jobs.offered.

## **TELENET:**

- Telnet is the service of the internet that allows you to access remote computers outside your area.
- Through Telnet, you may access libraries, databases, and other public services all over the world.
- Hytelnet is a tool that helps you access the various sites through Telnet.

## **INTERNET RELAY CHAT:**

The oldest but still the most common type of chat. It allows people to type messages to others and to get responses in real time.

## **3-D Virtual Chat:**

This type of chat is a graphical extension of IRC. It enables you to take on the persona of a 3-D character who appears on the screen.

To use this feature, you need 3-D chat software, a speedy computer, and a fast internet connection.

## **WWW (World Wide Web)**

WWW Stands for "World Wide Web." It is important to know that this is not a synonym for the Internet. The World Wide Web, or just "the Web," as ordinary people call it, is a subset of the Internet. The Web consists of pages that can be accessed using a Web browser. The Internet is the actual network of networks where all the information resides.



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## 02

## PAST PAPERS

### 2017:

What is network topology? Name any three.  
List the benefits of LAN.

### 2016:

Define Ring topology and give advantages and disadvantages  
What are the benefits of developing a computer network?

### 2015:

What is the function of router and gateway in data communication?  
Explain any four LAN technologies?

### 2014:

Define BUS topology with diagram?

### 2013:

Define Star Topology with diagram.

### 2012:

What are the main components of LAN?  
Define WAN. Discuss its main objectives.  
What is meant by topology? Describe any three network topology with diagram?

### 2011:

What are the main reason to develop a computer network?  
Define topology, Describe the working of LAN topologies with diagrams.

### 2010:

Define any three topologies?  
What is network and what are the main advantages and disadvantages of network?

### 2009:

Describe briefly three common LAN topologies?  
Distinguish between LAN and WAN?  
What is network and what are the main advantages of network?



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## 3

## DATA COMMUNICATION

### **Q: What is communication?**

Communication is derived from the Latin word "communis", which means to share. It is the activity of conveying information through the exchange of thoughts, messages, or information, as by speech, visuals, signals, writing, or behavior.

### **Q: What is data communication?**

Data communication is used to transmit messages or data from one point to another point which may be local or remote.

OR

Data communication is the process of sending and receiving data from two computers connected in a network, either local networks (LAN) as well as a wider network.

### **Element of Data Communication:**

A typically simple data communication system has three components:

1. The transmitter (source)
2. The transmission path (channel or medium)
3. The receiver (destination)

### **Sender:**

The sender in a data communication sequence is the device that generates the messages. Sometimes these devices are called sources or transmitters instead of senders.

### **Receiver:**

The receiver is the device on the other end of the data communication transmission that gets the message and reassembles it. Many of the same devices that function as receivers also function as senders, such as computers, smart phones and telephone handsets.

### **Medium:**

The medium is the means by which the message travels from the sender to the receiver. In a data communication system this includes the wire, twisted wire, local area network (LAN) cable, fiber optic cable, microwave signal, satellite signal or any other transmission medium used in a network.





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## **DATA:**

The collection of fact and figure is called data.

**OR**

The collection of raw material.

Data can exist in many forms, text data, graphics data and audio data.

## **Q: Define characteristic of data transmission?**

All form of data communication have several characteristics:

- 1- Signal Type
- 2- Transmission mode
- 3- Direction of transmission

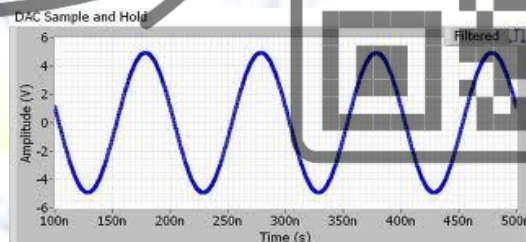
## **Signal Type:**

Data is transmitted in two type of signal, each requiring different kind of communication technology.

- 1- Analogue Signals
- 2- Digital Signals

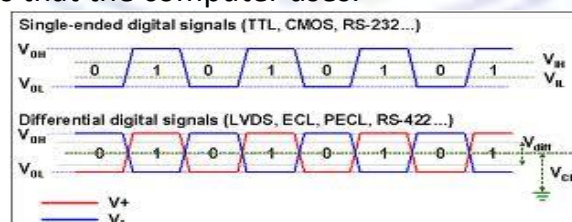
## **Analogue Signal:**

A transmission signal that varies continuously in amplitude and time, and is generated in wave formation. Analog signals are used in telecommunications.



## **Digital Signal:**

A digital signal uses ON/OFF electrical pulses in discrete rather than a continuous waveform. This two state kind of signal work perfectly ion representing binary language of 0's and 1's that the computer uses.



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**Q. Explain various transmission modes?**

**Q. Discuss various transmission mode used in data communication?**

## **Transmission mode**

Data may be sent by synchronous and asynchronous transmission.

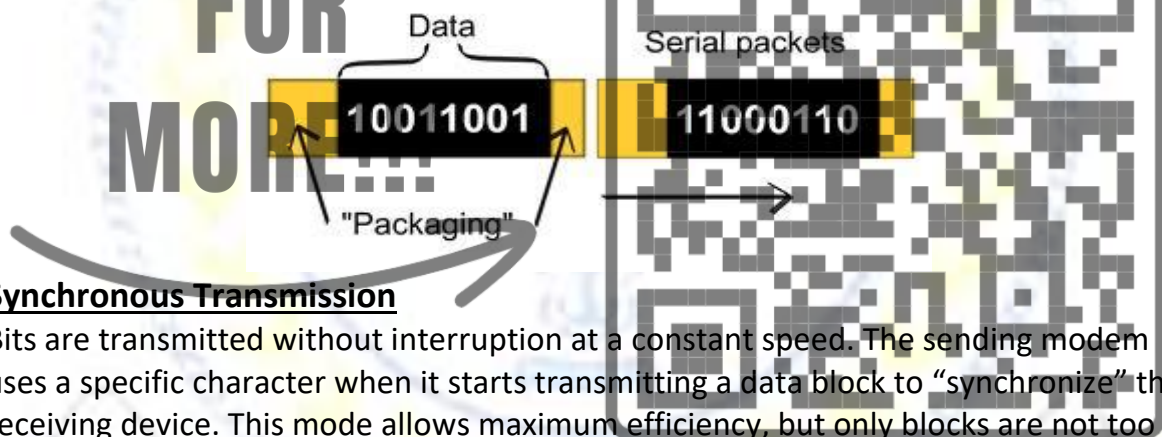
- I. Synchronous Transmission
- II. Asynchronous Transmission

## **Asynchronous Transmission**

The transmitting device marks the beginning and end of a byte by sending a “start” and a “stop” bit before and after each data byte. This transmission is used in microcomputers.

**OR**

In Asynchronous Transmission, data is sent one byte at a time. Each byte is preceded by a “Start” bit and a “Stop” bit. Each byte is wrapped in its own “electronic envelop”. This transmission is used in microcomputers.



## **Synchronous Transmission**

Bits are transmitted without interruption at a constant speed. The sending modem uses a specific character when it starts transmitting a data block to “synchronize” the receiving device. This mode allows maximum efficiency, but only blocks are not too short.

**OR**

In synchronous transmission, blocks (several byte) are transmitted without “start” or “stop” bit. Header and trailer are inserted at the beginning and ends of blocks. This transmission is used in large computer.

**Q. Explain Direction of transmission?**

## **Direction of Transmission:**

Direction is another characteristic of data transmission. These are three type of data transmission are called Simplex, Half duplex and Full duplex.

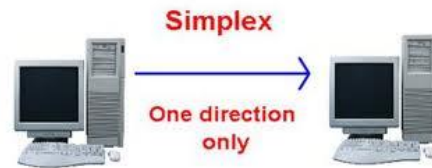
## **Simplex Transmission:**

Simplex is a communications mode in which only one signal is transmitted, and it always goes in the same direction. The transmitter and the receiver operate on the same frequency.



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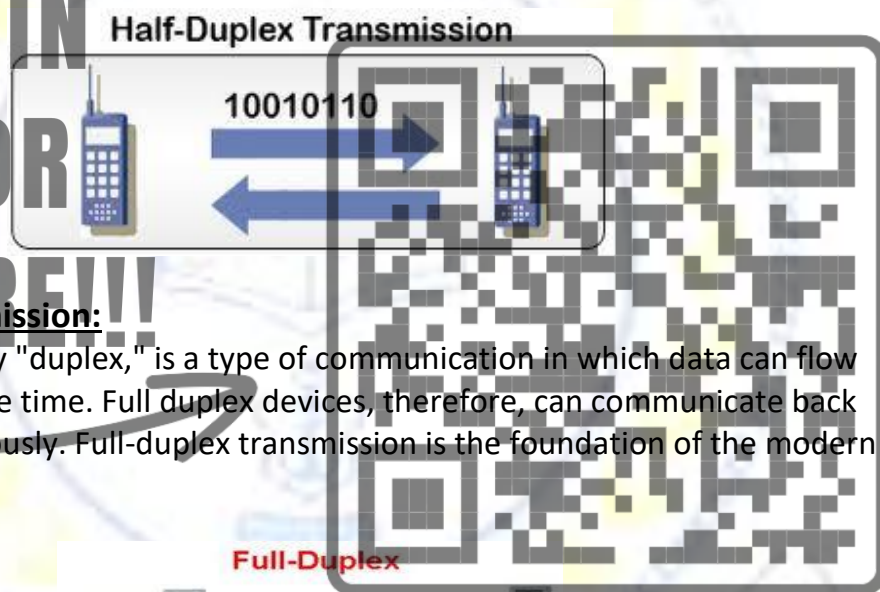
Example: Radio transmission.



## **Half Duplex Transmission:**

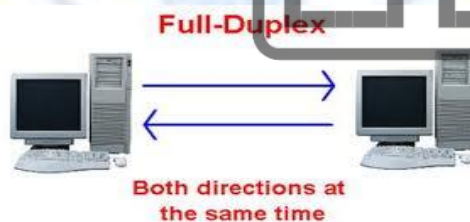
Half-duplex transmission, also known as "HDX", is the ability of a transmission facility to transport data in both direction, but not simultaneously. Half-duplex facilities use some form of Request-to-Send (RTS) and Clear-to-Send (CTS) to manage the transmission direction. A half-duplex 100-megabyte connection has 100 MB of bandwidth.

Example: A walkie-talkie is a half-duplex device



## **Full Duplex Transmission:**

Full-duplex, or simply "duplex," is a type of communication in which data can flow two ways at the same time. Full duplex devices, therefore, can communicate back and forth simultaneously. Full-duplex transmission is the foundation of the modern Internet.



## **Data Communication Media:**

Communication Media refer to medium through which data transmission from sender to receiver take place. There are two types of communication media:

- i- Guided Media
- ii- Unguided Media



## **Coaxial Cable:**

Coaxial cable composed of an insulated wire that runs through the middle of each cable, a second wire that surrounds the insulation of the inner wire like a sheath, and the outer insulation which wrap the second wire. Coaxial cable has a greater transmission capacity than standard twisted-pair cables but has a limited range of effective distance.



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**Q. What do you know about fiber optics cable?**

## **Fiber-Optic Cable:**

Glass fiber that transmit binary signal over a telecommunication network. A technology that uses glass (or plastic) threads (fibers) to transmit data. A fiber optic cable consists of a bundle of glass threads, each of which is capable of transmitting messages modulated onto light waves. Fiber optic system has low transmission losses as compared to twisted-pair cables, they do not radiate energy or conduct electricity. Fiber is more prefer for high-volume longer distance runs. They are free from corruption and lighting induced interference and they reduce the risk of wiretaps. In addition fiber-optic cable is often used to connect server to SANs..



## **Advantages of Fiber-Optics:**

Fiber optics has several advantages over traditional metal communications lines:

- Fiber optic cables have a much greater bandwidth than copper cables. This means that they can carry more data.
- Fiber optic cables are less susceptible than metal cables to interference.
- Fiber optic cables are much thinner and lighter than metal wires.

## **Twisted Pair:**

A pair of small insulated wire that are twisted around each other to minimize interference from other wires in the cable. This is a low-capacity transmission medium. A digital signal can be refresh every couple of kilometers by use of device called repeater.





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## Data Communication Hardware:

Each computer on the network needs hardware to control flow of data.

1. Modem
2. Ethernet
3. Fast Ethernet
4. Token Ring

**Q. What is a Modem? Define its types of commonly used in computer technology?**

**Q. What do you understand by Modulation and Demodulation?**

### Modem:

A computer's voice is digital that consists of on/off pulses representing 1s and 0s. A device called modem (modulator-demodulator) is translate digital signal into analog signal that are travel over standard telephone lines. In its modulation phase, the modem turns the computer's digital signal into analog signal, which are transmitted across the phone line. In demodulation phase the modem covert the analog signal into digital signal for the computer.

### Types of Modem:

There are two types of Modem:

- i- Internal Modem
- ii- External Modem

### Internal Modem:

An internal modem is a circuit board which is plugged into of the slots provided in the computers mother board.

### External Modem:

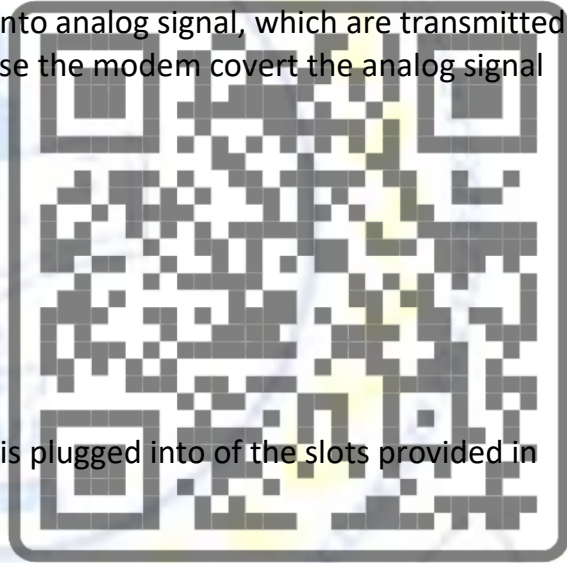
An external modem is a separate box and it is externally connected to the computer. It is usually have a separate power supply. It is sometimes refers intelligent modem because of its ability to automatically dial, redial and disconnect.

**Q. Why Modem is necessary for internet?**

A modem is a communication device used to convert analog data on telephone lines to digital data. They are used on computers so that one computer can communicate with another computer. There are two types of internet connections through a modem – always-on and dial-up.

**OR**

We need a modem to connect to the internet since it performs modulation and demodulation. Modulation is the process of turning a digital signal into an analog signal which is transmitted as electrical pulses.



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## **Ethernet:**

Ethernet is the standard way to connect computers on a network over a wired connection. It provides a simple interface and for connecting multiple devices, such as computers, routers, and switches. With a single router and a few Ethernet cables, you can create a LAN, which allows all connected devices to communicate with each other.

## **Fast Ethernet:**

Fast Ethernet is one of the versions of the Ethernet standard that enables the transmission of data over 100 megabits per second on local area networks (LAN). It was launched in 1995 and was the fastest network connection of its time. Fast Ethernet is also known as 100 Base X or 100 Mbps Ethernet.

## **Token Ring:**

A token ring network is a local area network (LAN) topology where nodes/stations are arranged in a ring topology. Data passes sequentially between nodes on the network until it returns to the source station to prevent data collision, a token ring topology uses a token to ensure that only one node/station on the line is used at a time.

## **Communication Protocol:**

### **Protocol:**

A protocol is the special set of rules that end points in a telecommunication connection use when they communicate. Protocols specify interactions between the communicating entities. There are thousands of protocols that exist. Some important ones are the following:

### **SNA:**

IBM has established SNA (System Network Architecture) for its own machines. Other equipment won't necessarily communicate with them.

### **ISDN:**

ISDN (Integrated Services Digital Network) is a set of standards designed to set rules for a worldwide digital communication network. It simultaneously supports voice, data, and video communication over telephone lines.

### **ATM**

Asynchronous Transfer Mode (ATM) is a network protocol that transmits data at a speed of 155 Mbps and higher.



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## **OSI Model:**

The OSI (Open Systems Interconnection) model was created by the ISO to help standardize communication between computer systems. It divides communications into seven different layers, which each include multiple hardware standards, protocols, or other types of services.

The seven layers of the OSI model include:

1. The Physical layer
2. The Data Link layer
3. The Network layer
4. The Transport layer
5. The Session layer
6. The Presentation layer
7. The Application layer

## **Physical Layer:**

The physical layer is first layer of OSI model. It defines all physical and electrical specifications for devices used to interface to the network, including the shape and layout of pins in connectors, voltages, cable specifications and broadcast frequencies. It provides the means for transmitting raw bits, but it is not concerned with MAC addresses, IP addresses and packets; rather, these are dealt with by layers higher in the hierarchy.

## **Data Link layer:**

The data link layer is the second layer of OSI model. It is used for the encoding, decoding and logical organization of data bits. Data packets are framed and addressed by this layer, which has two sub layers, MAC & logic link control.

## **Network layer:**

The network layer is the third level of the Open Systems Interconnection Model (OSI Model) and the layer that provides data routing paths for network communication. Data is transferred in the form of packets via logical network paths in an ordered format controlled by the network layer.

## **Transport layer:**

The transport layer is the forth layer in the open system interconnection (OSI) model responsible for end-to-end communication over a network. It provides error checking mechanisms and data flow controls. The Transport layer provides services for both "connection-mode" transmissions and for "connectionless-mode" transmissions.

## **Session Layer:**

The session layer, the fifth layer in the seven-layer OSI (open systems interconnect) model, establishes, manages (including providing security) and terminates connections between applications at each end. The session layer tracks the dialogs between computers, which are also called sessions.



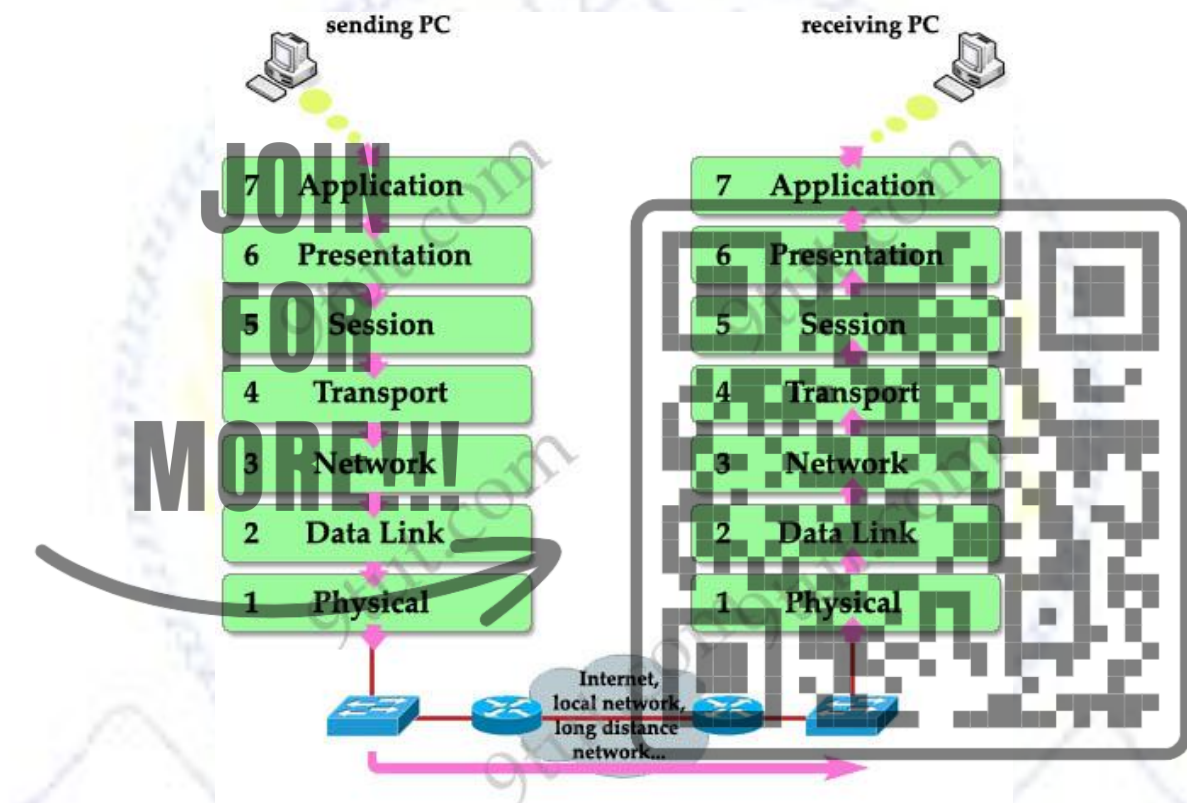
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## Presentation Layer:

The presentation layer is 6th layer in Open Systems Interconnection (OSI) model. It is used to present data to the application layer (layer 7) in an accurate, well-defined and standardized format.

## Application Layer:

The application layer is the 7th layer of OSI (open systems interconnection) model. It provides services to connect application programs to communications protocols and to ensure effective communication with other application programs over a network.





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## 03

## PAST PAPERS

### 2017:

Which layer of OSI model is responsible for routing information between computers?  
Discuss the modes of transmission with examples.  
Differentiate between Asynchronous and Synchronous transmission methods.

### 2016:

Describe the OSI model with diagram.  
Define microwave system. How can be its useful in communication system?

### 2015:

What is the function of modem? Define different types of modem?  
Define simplex, half duplex and full duplex mode in data communication?  
What do you mean by protocol? Define any two types of protocol?  
Explain Synchronous and Asynchronous transmission?  
Explain advantages and disadvantages of fiber optics cable?

### 2014:

What do you know about modulation and demodulation?  
Describe OSI reference model with diagram.  
What is data communication? Define any three data communication media?

### 2013:

What does Network Protocol mean? Name any three protocol with their abbreviation  
What is Modem? Why is it necessary for internet?  
What is data communication? Define various data communication media?  
What is an OSI model? Write the function of each layer of OSI model?

### 2012:

Differentiate between Synchronous and Asynchronous transmission?  
Draw the layer cake of an OSI model. Define any two of its layers.

### 2011:

Discuss various transmission mode used in data communication?  
Define network protocols. Explain any three network protocols.  
What is an OSI model? Explain each layer with a diagram?



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## **2010:**

Draw the layer cake of an OSI model.

Differentiate between analog and digital signal?

Explain various type of communication media used for data communication?

What is a Modem? Define its types of commonly used in computer technology?

## **2009:**

Explain various transmission mode?

Explain various type of communication media used for data communication?

## **2008:**

Differentiate between Synchronous and Asynchronous transmission?

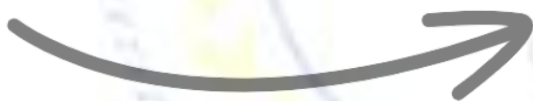
What do you know about fiber optics cable?

Define basic element of data communication?

What is an OSI model? Write the function of each layer of OSI model?

Discuss various transmission mode used in data communication?

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## 4

## Application & Uses Of Computer

### Q. What is e-commerce?

Electronic commerce or e-commerce refers to a wide range of online business activities for products and services. It also pertains to “any form of business transaction in which the parties interact electronically rather than by physical exchanges or direct physical contact.”

OR

E-commerce is usually associated with buying and selling over the Internet, or conducting any transaction involving the transfer of ownership or rights to use goods or services through a computer-mediated network.

The various fields of computer applications are as follows:

### Scientific Applications

Computer is widely used in many scientific areas, in order to increase reliability and accuracy of results. Some of these scientific applications are listed below. Special-purpose computers are generally used for all such applications.

- 1) Weather forecast
- 2) Atomic reactor control
- 3) Control of satellite



### Engineering Applications

Computer is widely used in Engineering Applications, in order to reduce man power need and get quality products. Some of these engineering applications are listed below. Various types of computers and software are used for these applications. An example of such software is AutoCAD. It is used for engineering drawings and design.

- 1) Automobile design
- 2) Architect design
- 3) Design of new engineering tools
- 4) Computerized Maintenance Management



### Business Applications

Businesses use various software and hardware for their needs. Following are the common business applications and software commonly used for them:

- 1) Word processing (e.g. MS WORD)
- 2) Record Keeping (e.g. TrackIT software)

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- 3) Payroll processing (e.g. QUICK BOOKS)
- 4) Inventory control (e.g. TrackIT)
- 5) Accounting (e.g. Peachtree)
- 6) Auditing (e.g. Peachtree)
- 7) Stock marketing (it requires a Mainframe computer and special software)
- 8) Ticket Reservation systems (it requires a Mainframe computer and special software)

## **Educational Application**

Computer is also used in enhancement of education's quality and opportunities. Some of Educational applications are listed below.

- 1) Computer based training (e.g. computer based simulations, lectures, instructions)
- 2) Computer-based testing (e.g. online testing of various computer certifications like MCSE)

## **Home Computing Applications**

An ordinary home user can also use computer for better planning. Some of applications for home users are:

- 1) Bank account management (e.g. QUICKBOOKS)
- 2) Personal business management

## **Graphics and Multimedia Applications**

Computer is also used widely in creative works of desktop designing/ publishing and by show business persons for making especial effects. Some of these applications are:

- 1) Preparation of videos and dramas
- 2) Preparation of magazines and newspapers

## **Banking Applications**

Banks use specialized software and hardware for their needs. IBM is the world leader in the field of computerized banking applications. IBM manufactures both the software and hardware specifically for banking industry.

- 1) Processing and maintenance of customers accounts
- 2) Record keeping of loans
- 3) ATMs

## **Medical Field Applications**

Medical field has a wide verity of computer applications.

- 1) Inventory control of hospitals (e.g. medicines and other hospital supplies)
- 2) Disease diagnosis and treatment
- 3) Patient monitoring
- 4) Medical history keeping
- 5) Life Support systems





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## **THE IMPACT OF COMPUTERS ON OUR SOCIAL LIFE**

The technological Advantages in the field of computer have made it one of the most powerful forces in society today they have made it possible for computer usage to spread into homes and organization of all sizes.

### **Positive Implication (Advantages)**

People may benefit from computers in many ways. Among the benefits are the following:

#### **1. New job opportunities**

Hundreds of thousands of new jobs have been created in such areas as programming, computer operation, and information systems management. Current demand for persons qualified for these jobs exceeds the current supply.

#### **2. Greater job satisfaction**

Scientist and engineer can tackle interesting problems that they could not have considered without computer help and lawyers, teachers, clerical workers and other can turn over repetitive and boring task to computer processing and then concentrate on the more challenging aspects of their work.

#### **3. Used by businesses**

The use of computers by businesses to avoid waste and improve efficiency may results in lower product prices and/ or better services to individuals. In addition the computer controlled robots along with other automated tools can precisely carryout the dreary, dirty and dangerous task that cause worker discontent. The net result of using these machines may be to improve the quality of the products assembled and sold to customers.

#### **4. Use by public organizations**

Avoiding waste and improving efficiency in government agencies, colleges, and hospital units can also result in better services. Without computers, for example, the A.G. Sindh could not keep up with the payment of benefits to widows, orphans, and retired persons.

#### **5. Use in the home**

Millions of microcomputers have been acquired for home use. Such personal systems are used for entertainment and hobby purposes, for educational uses, for family financial applications, and for countless other tasks.



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## **6. Better planning and decision making:**

Computer-based information system that are quicker- responding and broader in scope than those previously available can have a positive impact on the planning and decision making that occurs in a business or non-profit organization. Planning can be improved with the help of information systems that quickly notify managers of problem and opportunities.

## **POTENTIAL PROBLEMS (DISADVANTAGE)**

In spite of the countless benefits; that people receive from computer usage, such usage can also lead to potential dangers and problem. Some of these problem areas are.

### **1. The threat of unemployment:**

The greater efficiency made possible by computer usage can result in job obsolescence and displacement some workers. For example, the computer-controlled robots can sense the need for a specified task, and can then task the action necessary to perform the task. In the auto manufacturing and supply industries alone, it is expected that tens of thousands of jobs will be eliminated by robots during the years 2000-2010.

### **2. The use of questionable data processing practices**

Input data about individual are routinely captured by many organizations and entered into computer-processed files. In some cases, these facts have been compiled by those who have no valid reason to gather them. In other cases, inaccurate and incomplete data about people have been placed in computer system files. Finally human errors in preparing input data and in designing and preparing programming have resulted in system miscalculation that has harmed people.

### **3. The system security issue**

The lack of control over data security in a computer system has resulted in the destruction of an individual, s records in some cases. The lock of control has also led to the accidental or intentional disclosure to unauthorized persons of confidential information of a very personal nature.

### **4. The privacy issue**

Lack of control over data storage, retrieval and communication has led to abuses of a person's legal right to privacy i.e. to keep private (or have on a confidential basis) those facts, beliefs, and feelings which one does not wish to publicly reveal. For example the records of patients hospitalized for psychiatric treatment may be made available to insurance companies, police department, the motor vehicle department, and all other licensing agencies.

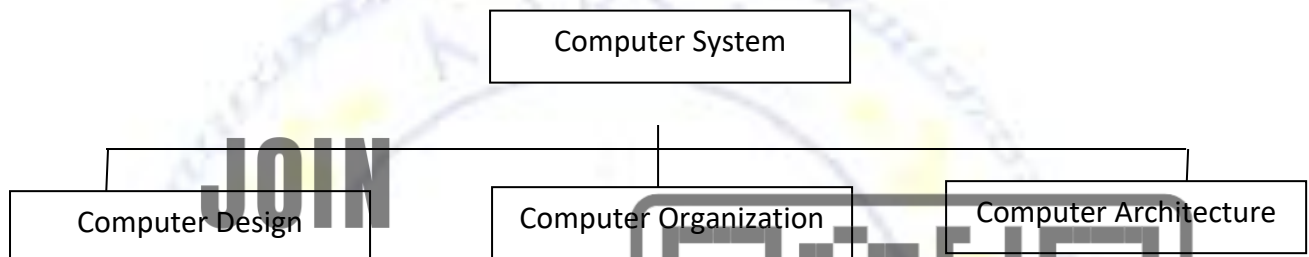


## 5

## Computer Architecture and Registers

### Computer Architecture:

There are three terms associated with computer hardware or computer system:



### Computer Design

Computer Design is concerned with the hardware design of the computer. Once the computer specifications are formulated, it is the task of the designer to develop hardware for the system. Computer design is concerned with the determination of what hardware should be used and how the parts should be connected. This aspect of computer hardware is sometimes referred to as computer implementation.

### Computer Organization

Computer Organization is concerned with the way the hardware components operate within themselves and the way they are connected together to form the computer system.

### Computer Architecture

Computer architecture is concerned with the structure and behavior of the computer seen by the user (programmer not the end user). It includes the information formats, the instruction set, and techniques for addressing memory. It is concerned with the specifications of the functional modules of a computer system.

### Microprocessor and its units /Components of a Digital Computer:

Large scale integration (LSI) and very large scale integration (VLSI) technologies can put tens of thousands of transistors (the basic device that detects the presence or absence of electric current) on a single chip. This has made it possible to fabricate the entire brain of computer as a single integrated circuit called a microprocessor.

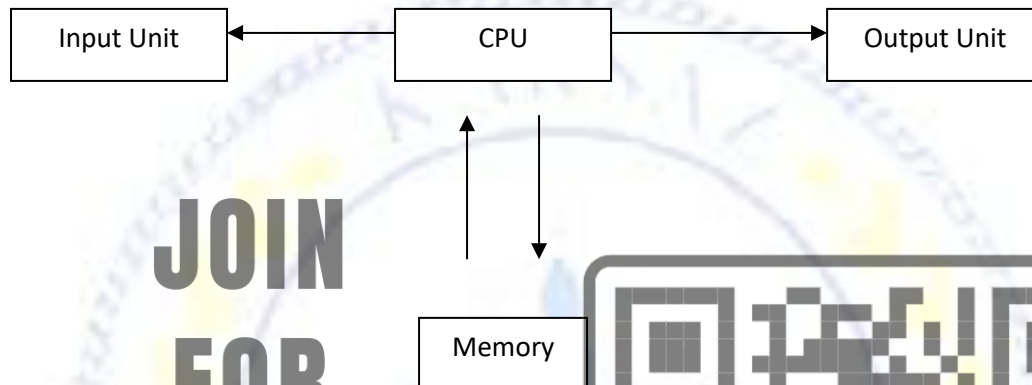


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A digital computer can be broadly classified as a collection of four basic units. These are:

1. Input Unit
2. Output Unit
3. Central Processing Unit (CPU)
4. Memory Unit

A block diagram representation of basic components of a computer system is shown below:



## Input Unit

The input unit provides an interface between the users and machine for inputting data and instructions etc. The data in any form is first digitized, i.e. converted into binary form, by the input device before being fed to the central processing unit.

## Output Unit

The output unit receives the data from the central processing unit in the form of binary bits. This is then converted into a desired form (graphical, audio, visual) understandable by the user.

## Central Processing Unit (CPU)

The central processing unit is the brain of the computer system. It has two principal sections:

### ✓ Arithmetic Logic Unit

Arithmetic Logic Unit is the part of the computer where the actual processing takes place. ALU is capable of performing arithmetic, logical, and data manipulation operations on binary numbers. The circuitry that performs these operations consists of logic circuits such as adders, substrates, comparators etc. The ALU consists of logic circuitry that will perform operations such as addition, subtraction, multiplication, division, square root, exponential data manipulations, comparisons and logical operations such as AND, OR etc.





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## ✓ Control Unit

The control unit fetches an instruction from main memory by sending an address and a READ command to the main memory. The instruction word comes from memory in the control unit. The instruction which is in binary code is then decoded by logic circuits in the control unit to determine which operation is to be performed. Once this is determined the control unit generates the signals needed to actually execute the operations.

We can say that the control unit function is to fetch, decode and execute the instructions that are in memory.

It also contains several registers and a network of buses connecting various components.

## Memory Unit:

Memory also called main memory, RAM, primary or internal storage. The Main Memory holds:

- Programs and data passed to the computer system for processing.
- Intermediate processing results. <for example the intermediate result of  $a + b$  in  $s = a + b / c$ >.
- Output ready for transmission to a secondary-storage or output device.

## Addressing in Memory Locations:

A computer has not only to store a large amount of information in the form of data and instructions but also has to retrieve it for processing and it has to keep track of all the information stored in its memory. For this purpose, the computer memory can be considered as made of small compartments, usually called cells or memory locations. In each of these locations, a computer word (representing a data or an instruction) can be stored. Each of these locations is assigned a particular number called its address with the start address of 0.

If a computer has a memory of 64 K words then this memory unit has  $64 * 1024 = 65536$  memory locations.

## Registers

A register is a location inside the CPU where it can hold data temporarily while it carries out arithmetic and logic operations in it.

Registers are special work areas inside the CPU designed to be accessed at high speed.



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## **Difference between Register and Memory:**

1. Unlike memory, where every address is just every other address, each register serves a particular purpose.
2. Registers are not addressed as a memory location, but instead are manipulated directly by the control unit.

## **Q. Enlist the Registers of 80x86 Intel microprocessor and also define the General Data Registers.**

There are two major categories of registers in Intel 80x86 microprocessor.

### **General Purpose Registers**

- General Data register (AX, BX, CX, DX)
- Index registers (SI, DI, BP)

### **Special Purpose Registers**

- Segment register (CS, DS, SS, ES)
- Special register (IP, SP)
- Flag registers (Zero flag, sign flag, carry flag, auxiliary carry flag, overflow flag)

### **Data Register**

Four registers named data registers or general purpose registers are used for arithmetic and data movement.

#### **AX.(Accumulator)**

AX is called accumulator register. It is used in arithmetic, logic and data transfer. One number must be stored in AX in Multiplication & Division, also used to store data during Input & Output.

#### **BX (Base)**

BX stands for BASE. This register is used for addressing the data.

#### **CX (Counter)**

The CX register acts as a counter for repeating or looping instructions.

#### **DX (Data)**

The DX register has a special role in multiply and divide operations. DX and AX concatenated into 32-bit register for some Multiplication and Division operations.



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**Q. Define the role of Program Counter Register.**

## **The Program Counter (PC) or Instruction Pointer (IP)**

This register normally functions as a counter that control the sequence in which the instruction are fetch from memory at any given instant, the content of the PC indicates the address in memory from which the next byte of the instruction code is to be fetch.

A program is defined to be “an ordered set of instructions.” Order in this definition is a key part. Instructions run one after another, first, second, third and so on. Instructions have a positional relationship. The whole logic depends on this positioning. If the computer executes the fifth instructions after the first and not the second, all our logic is gone. The processor should ensure this ordering of instructions. A special register exists in every processor called the program counter or the instruction pointer that ensures this ordering. “The program counter holds the address of the next instruction to be executed.” A number is placed in the memory cell pointed to by this register and that number tells the processor which instruction to execute

**Q. Briefly discuss MAR, IR and MBR and ACCUMLATOR.**

## **Memory Address Register**

The MAR provides an operand Address to the memory unit when the microprocessor has to access memory during the execution phase of an instruction. For example during the execution of a store the accumulator instruction, the MAR will hold the operand address corresponding to the memory location where the content of the accumulator is to be stored.

## **The Instruction Register (IR)**

Instruction Register holds an instruction temporarily only for the time when the instruction and data are being interpreted or decoded.



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## **Memory Buffer Register: (MBR) (Memory Data Register)**

MBR holds the operands temporarily that the ALU need to operate on during the execution phase of an instruction these operands are loaded in to these register from memory. Under the instructions from the control unit the operand stored in the particular memory location is transferred to Memory Buffer Register.

## **Accumulator**

There is a central register in every processor called the accumulator. Traditionally all mathematical and logical operations are performed on the accumulator. The word size of a processor is defined by the width of its accumulator. A 32bit processor has an accumulator of 32 bits. Accumulator is located inside the ALU unit.

## **Sizes of CPU Registers:**

See in book on page 163.

## **Buses:**

A bus is a communication pathway connecting two or more devices.

A bus is a electrical wire through which electrical signals can be transmitted.

<already done in chapter one>

## **COMPUTER INSTRUCTIONS**

**Q. Define Instruction and types of instruction.**

## **Instructions**

An instruction is an order for the computer to perform a certain specified operation. It may be an order for computer to read a data item from an input unit or write a data item through an output unit. On the other hand an instruction may specify an arithmetic operation such as addition, subtraction, multiplication or division of two numbers.

## **Components of a Computer Instruction**

A computer instruction in machine language consists of a fixed number of bits stored as computer words. If an instruction has n-bits then these bit positions are divided into two or more sections called *fields*.

An instruction in machine language consists of two parts, namely:





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1. *Operation Code*, abbreviated to Opcode.
2. *Address or Addresses* of one or more memory locations.

## **1. Operation Code**

Opcode is something that specifies the operation to be performed. This field is essential because in its absence the instruction becomes meaningless. The Opcode may instruct the computer to:

- add two numbers or
- compare two numbers or
- it may direct the computer to stop the execution of the program.

The operational code of an instruction consists of a group of bits that define certain arithmetic or some other operations, such as addition, subtraction, multiplication, division, shifting or complementation.

## **2. Address**

The data on which the operation to be performed is called an *operand*. Thus an instruction must specify the operation to be performed along with the address or addresses of the operands or registers where the result of an operation is to be stored. Thus, a computer instruction contains the following information.

1. Operation to be performed.
2. Address or addresses of memory locations containing the operand or operands.
3. Address of the register or memory location which is to store the result.

## **Instruction Formats**

An instruction format defines the layout of bits of an instruction in terms of its constituent parts. There are various instruction formats depending upon the architecture of the computer. The types of commonly used instructions are:

1. Three-Address Instruction.
2. Two-Address Instruction.
3. One-Address Instruction.
4. Zero-Address Instruction.

## **Three-Address Instruction**

A three-address instruction consists of the following parts:

- (a) Operation Code.
- (b) Addresses of two operands, called Address 1 and Address 2.
- (c) Address of the memory location where the result of the operation is to be stored *i.e.* address of the destination.

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A three-address instruction to add two numbers, specifies the operation code for addition, addresses of two numbers (operands) to be added, address of the memory location where the result of addition of two numbers is to be stored, usually called address of the destination.

## Instruction

ADD A, B, C

In other words:

## Meaning

Add the numbers stored at the memory locations A and B. Store the result in memory location C.

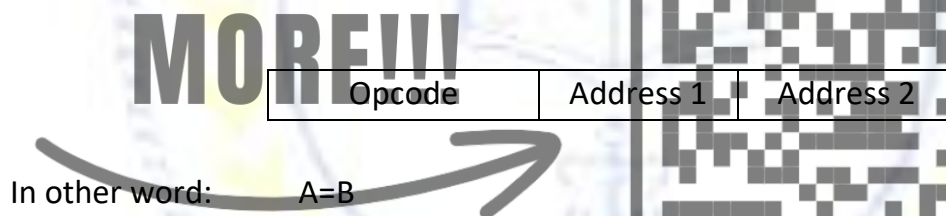
$C = A + B$ .

## Two-Address Instruction

In this type of instruction, one operand is placed in a specified register such as an Accumulator and the address of the next instruction is obtained from another register called Program Counter (PC). This implies that such an instruction should have the following parts:

- (a) Operation Code
- (b) Address of one of the operands, say Address 1
- (c) Address of the storage location where the result is to be stored. This address is denoted by Address 2.

The general form of a two-address instruction is:



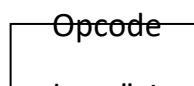
## One-Address Instruction

This instruction has address of one operand only, the other operand is stored in Accumulator. The results of operation are left in the Accumulator itself, from where these can be moved to main memory by another instruction. The address of the next instruction is obtained from the Program Counter as is the case with the three- or two-address instructions. The general form of a one-address instruction is



## Zero-Address Instruction

Finally zero-address instructions were developed. These zero-address instructions are also called *Stack Instructions* and consist of Opcode only. The addresses of operand and destination are implied. The general form of a zero-address instruction is



For example instruction "clear accumulator" is a 0-address instruction. Here the instruction itself specifies that the operation "clear" is to be performed on Accumulator.

**Q. Define the Execution of instruction in CPU.**



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## **Execution Life Cycle**

The control unit within the CPU is responsible for maintaining the correct sequence of instruction to be obeyed, while the arithmetic unit provides the facilities to actually execute an instruction.

Following four events happen on a CPU while executing an instruction:

### **1. Instruction fetch**

- From control unit address is passed to Memory Address Register (MAR) and PC (Program Counter) itself gets incremented by 1 and now it holds the address of next instruction.
- The control unit issues commands to MAR (Memory Address Register) to pass on this Main memory address to the main memory and under the directions of the control unit, The instruction stored at this particular address in the memory is passed to the Memory Buffer Register (MBR).
- This instruction is held in MBR temporarily and is passed to current Instruction Register under the commands from control unit.

### **2. Decoding of Instruction**

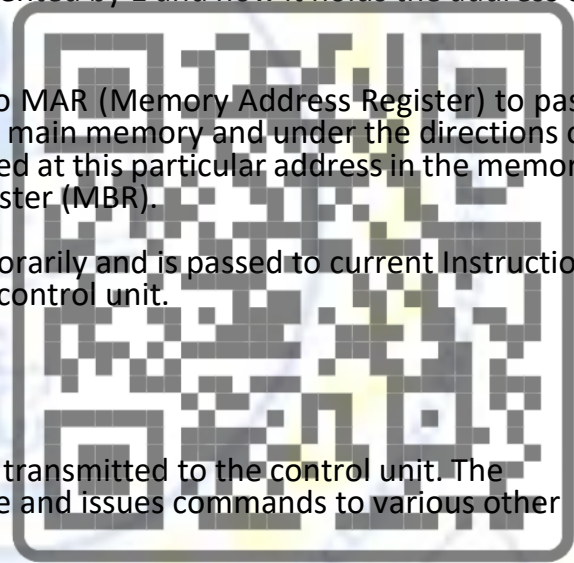
The operation code of the instruction is transmitted to the control unit. The control unit decodes this operation code and issues commands to various other hardware units.

### **3. Data Fetch**

In case of certain type of instruction certain data is required to be fetch from computer memory and loaded in to a CPU register before the instruction can be executed.

The address part of the instruction is transferred to a decoder. The decoder interprets it and communicates this address to the Memory Address Register, which transmits this address to the main memory. In fact, this is the memory address of the operand.

Under the instructions from the control unit the operand stored in this memory location is transferred to Memory Buffer Register.



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## 4. Execute Instruction

Once an instruction has been interpreted, and data fetch whenever required, the CPU executes the instruction. The arithmetic and logical unit of the CPU provides this part of the functionality for most instruction.

Memory Buffer Register transfers the operand to the arithmetic/logic unit, where the necessary operation is performed on the operands in the Accumulator, one operand already being stored in the accumulator. The result of the operand remains in the accumulator.

### Fetch Cycle

The fetch cycle is that duration of time in which an instruction stored in the memory is brought to an appropriate register.

### Execute Cycle

The process of execution of an instruction by the CPU in a specified interval of time is called *execute cycle*. The instruction fetched from memory is placed in a register where it is decoded and executed by ALU (Arithmetic/Logic Unit) in this execute cycle.

### Fetch Stage

The CPU when fetching an instruction is said to be in *fetch stage*.

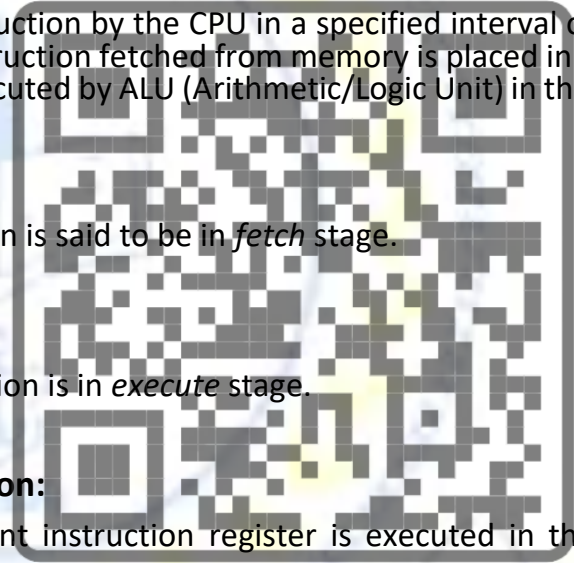
### Execute Stage

The CPU when executing an instruction is in *execute stage*.

### Steps in Execution of an Instruction:

The instruction stored in the current instruction register is executed in the following steps:

1. The operation code of the instruction is transmitted to the control unit. The CU decodes this operation code and issues commands to various other hardware units.
2. the address part of the instruction is transferred to a decoder. The decoder interprets it and communicates this address to the Memory Address Register, which transmits this address to the main memory.
3. under the instructions from the control unit the operand stored in this memory location is transferred to Memory Buffer Register.
4. MBR transfers the operand to the ALU, where the necessary operation is performed on the operands in the accumulator, one operand already being stored in the accumulator. The result of the operand remains in the accumulator.
5. this completes the execution cycle.





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## Q. Briefly define the type of Instructions.

At this stage we should also begin to distinguish between at least four different types of instructions:

### Arithmetic Instruction:

The first type is those that cause an arithmetic operation to be performed i.e. addition, subtraction, multiplication, or division. These type of instruction are called arithmetic instruction and are executed by arithmetic and logic unit of CPU.

### Logical Instruction:

The second type of instruction is that, which requires two data values to be compared with each other. Possible results of such an operation are (a) greater than (b) less than or (c) equal to these types of instruction are called logical instruction and are also executed by arithmetic and logical unit of CPU

### Data transfer instruction:

The third type of instruction is called 'data transfer instruction. These instruction cause transfer of data either from CPU register to a memory location or an output device, or from RAM or input device to a CPU register.

### Control Transfer instruction:

These instruction cause a deviation from the normal course of action i.e. execution of the next instruction. Instead instruction forces the CPU to transfer control (JUMP) to a new location (Instruction), which is not the 'next' instruction.

## Q. Define Stack Organization.

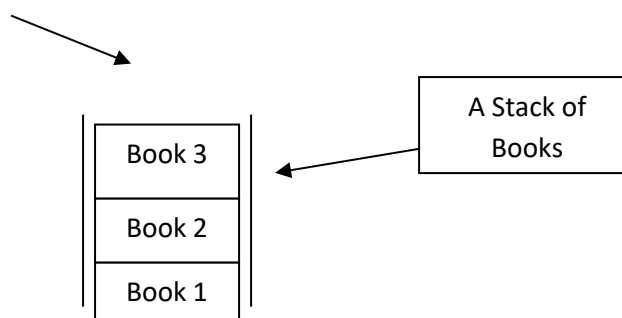
### Stack

A *stack* can be considered as a data storage method in which the items are stored in consecutive memory locations and the last element stored is the first element retrieved. Also called LIFO (*last in first out*) list.

Stack may be a finite number of registers bundled together or stack can also be a part of memory unit. An address register is associated with stacks. This address register called *Stack Pointer* contains the address of the recently stored element. Remember that this is the element which will be first retrieved. Stack Pointer always points to the topmost element in the stack.

1. 'Push' is the term used for inserting an element into a stack and is done by incrementing the Stack Pointer.
2. 'Pop' is the term used for removing an element from a stack and is done by decrementing the Stack Pointer.

Place of Insertion and Deletion



## **6**

## **Security, Copyright And The Law**

**Q. What do you mean by computer crime? Mention preventive measure?**

**COMPUTER CRIME:**

Computer crime refers to any crime that involves a computer and a network. The computer may have been used in the commission of a crime, or it may be the target.

**PREVENTIVE MEASURE:**

- Anti-virus
- Firewall
- Encryption
- Copyright

**Q. What is hacking?**

**HACKING:**

In computer networking, hacking is any technical effort to manipulate the normal behavior of network connections and connected systems.

**OR**

Hacking is the practice of modifying the features of a system, in order to accomplish a goal outside of the creator's original purpose.

**Q. Define Computer Virus & how many type of virus are there? Describe a virus can effect a computer system.**

**COMPUTER VIRUS:**

A computer virus is a program or piece of code designed to distribute, alter or destroy data store on your computer. Viruses can also replicate themselves.

All computer viruses are man-made. It can be passed from one computer to another disk, over the local area network, over remote modem connection and over the internet connection.

A computer virus may be benign or have a negative effect, such as causing a program to operate incorrectly or corrupting a computer's memory.



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## **TYPES OF VIRUSES:**

The following are the major type of viruses.

- Worm
- Trojan horse
- Time Bomb
- File Infector
- Boot Sector Virus

### **Worm:**

A worm is a program that makes and facilitates the distribution of copies of itself; for example, from one disk drive to another, or by copying itself using email or another transport mechanism. The worm may do damage and compromise the security of the computer.

### **Trojan Horse:**

A Trojan horse refers to illegal instruction placed in the middle of a useful program. The program does something useful but also, via Trojan horse instruction, does something destructive. Sometimes Trojan horse disguised as a game or utility program.

### **Time bombs:**

A time bomb virus is commonly referred to as a logic bomb. This type of virus is found in code that is intentionally inserted into a software system. A logic bomb is a piece of software that sits dormant for a period of time until some event causes its malicious payload to be implemented.

### **File Infectors:**

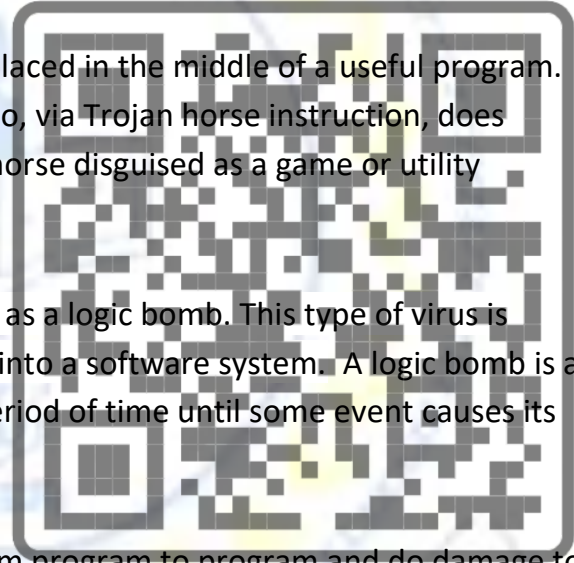
Most virus are file infectors that spread from program to program and do damage to file, data and directories. A file infector virus hidden on a floppy disk will transfer itself to any hard disk that the floppy comes into contact with.

### **Macro virus:**

A macro virus is designed to infect a specific type of file or document such as MS WORD or MS EXCEL.

### **Boot sector:**

The virus move the Boot sector data to a different part of the disk or can make the data stored on the disk inaccessible.



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**Q. How a computer system can be prevent from a virus infection?**

**Q. How we can save our computer from threats, viruses, hackers etc?**

A virus can cause a serious cause with computer system. Different viruses produce different type of threads. Thousands of viruses are existence, and more are being written each day. Through antivirus our computer can prevent from virus infection.

## **ANTIVIRUS:**

Antivirus software is a computer program that detects, prevents, and takes action to disarm or remove malicious software programs, such as viruses and worms. You can help protect your computer against viruses by using antivirus software

## **FUNCTION OF ANTI—VIRUS:**

- An anti-virus search for the virus in the storage media which exist in the form of file.
- It delete or destroys the virus form the computer system.
- It repair and manage the infected data.
- It is an automatic program which an eyes over every device attachment.

Following are some popular anti-viruses:

- **Microsoft Security Essential**
- **McAfee virus scan**
- **IBM anti-virus**
- **Norton anti-virus**
- **Symantec anti-virus for the Macintos**



## **COMPUTER SECURITY**

### **Firewall:**

Firewall means of perimeter security for their network. Firewall as defined a device is installed at the point where network connection enter site, they apply rules to control the type of networking traffic flowing in and out.

### **Password**

A password is secret word or string of characters that is used for user authentication to prove identity, or for access approval to gain access to a resource (example: an access code is a type of password).



### **Encryption**

Encryption is a process of converting a plaintext message into a secure-coded form to text called CIPHERTEXT, which cannot be understood without converting back, via decryption.



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## Digital Signatures:

A *digital signature* is a string of characters and numbers that a user signs to an electronic document being sent by his or her computer. The receiving computer performs mathematical operations on the alphanumeric string to verify its validity. The system works by using a *public-private key system*. That is, the system involves a pair of numbers called a private key and a public key. One person creates the signature with a secret private key, and the recipient reads it with a second, public key. This process in effect ensures integrity of the document.

## **Q. Define software piracy?**

### **SOFTWARE PIRACY:**

Software piracy is the illegal copying, distribution, or use of software. The illegal copying of software for distribution within the organization, or to friends, clubs and other groups, or for duplication and resale. The software industry loses billions of dollars each year to piracy, and although it may seem innocent enough to install an application on a couple of additional machines.

## **Q. What do you know about copyright?**

### **COPYRIGHT:**

Copyright protects the physical expression of ideas. As soon as an idea is given physical form, e.g. a piece of writing, a photograph, music, a film, a web page, it is protected by copyright. There is no need for registration or to claim copyright in some way, protection is automatic at the point of creation. Both published and unpublished works are protected by copyright.

### **ADVANTAGES & DISADVANTAGES OF COPYRIGHT:**

**Right to Produce/Reproduce** - Copyright gives the creator of a piece of intellectual property the sole right to produce and reproduce their work.

**Right to Authorize** - These rights include the right to authorize others to produce or reproduce your work as well as the right broadcast your work.

**Protection** - Copyright prevents your work from being stolen or misused by others.

**Moral Rights** - Copyright allows the holder of the copyright to object to uses of their work that they find morally objectionable.

**These are several key disadvantages to Copyright holders:**

**Inability to Share Work** - Copyrights key advantage is also its primary disadvantage. Copyright does not allow you to openly permit others to use your work or to distribute it, even if they are not doing it for profit. This can mean that your work is disseminated slowly or not at all.

**Authorship is not Ownership** - You must own the copyright to be able to exercise the rights that it grants, and just being the creator of the work does not always



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guarantee ownership. In some cases the owner is actually the person who commissioned the work, or the company for whom the work was produced.

**Q. Define LAW?**

## **LAW**

The system of rules which a particular country or community recognizes as regulating the actions of its members and which it may enforce by the imposition of penalties

**Q. What is backup?**

## **Backup:**

Backup is the activity of copying files or databases so that they will be preserved in case of equipment failure or other catastrophe. Backup is usually a routine part of the operation of large businesses with mainframes as well as the administrators of smaller business computers.

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## 06

## PAST PAPERS

**2017:**

What measure can be taken to save our computer from virus attacks?

What is computer crime? How is the computer being used as tool of crime?

**2016:**

Define antivirus and its different types?

**2015:**

What is computer virus? Define different type of computer virus?

**2014:**

What is computer security? What security techniques are used to reduce risk?

**2013:**

State Copyright Law. Gives its advantages?

What is computer virus? How can we protect our computer from it?

**2012:**

**NIL**

**2011:**

What do you mean by computer crime? Mention preventive measure?

**2010:**

How we can save our computer from threats, viruses, hackers etc?

**2009:**

What is computer virus? Explain.

**2008 & 2007:**

What do you know about copyright?



## 7

# Operating System (Windows)

### Operating System:

Operating system is a set of program that control and supervise the hardware computer and provides services to application software, programmer and user of computer. The operating system is a vital component of the system software in a computer system. Application programs usually require an operating system to function.

OR

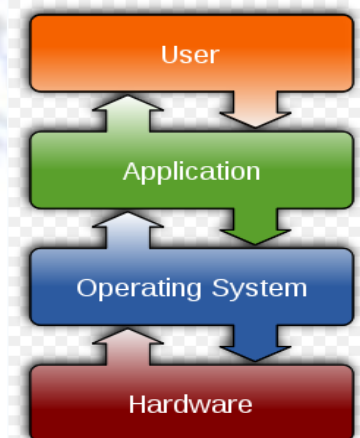
An operating system is the most important software that runs on a computer. It manages the computer's memory, processes, and all of its software and hardware. It also allows you to communicate with the computer without knowing how to speak the computer's "language." Without an operating system, a computer is useless.

OR

An operating system (sometimes abbreviated as "OS") is the program that, after being initially loaded into the computer by a boot program, manages all the other programs in a computer. The other programs are called applications or application programs. The application programs make use of the operating system by making requests for services through a defined application program interface (API). In addition, users can interact directly with the operating system through a user interface such as a command language or a graphical user interface (GUI).

OR

An operating system is a system software. It contains a number of programs to manages system resources. A user cannot communicate to the microprocessor of computer system until an operating system is not installed.





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## Example:

- Windows
- DOS
- Linux
- Unix

## FUNCTION OF (OS)

- **Resource Management:** Operating System will Manages all the Resources those are Attached to the System like Memory and Processor and all the Input output Devices.
- **Storage Management:** Operating System also Controls all the Storage Operations means how the data or files will be Stored into the computers
- **Process Management :** All the Processes those are given by the user or the Process those are System 's own Process are manage by the Operating System .
- **Memory Management :** Operating System also Manages the Memory of the Computer System means Provide the Memory to the Process
- **File management:** An operating system provides command to create and manage files on disk. The file operations like COPY, PASTE, DELETE, BACKUP, RENAME and etc.

## Operating systems can be classified as follows:

- **Multi-user:** Allows two or more users to run programs at the same time. Some operating systems permit hundreds or even thousands of concurrent users.
- **Multiprocessing** : Supports running a program on more than one CPU.
- **Multitasking** : Allows more than one program to run concurrently.
- **Multithreading** : Allows different parts of a single program to run concurrently.
- **Real time:** Responds to input instantly. General-purpose operating systems, such as DOS and UNIX, are not real-time.

## Q. What is interface?

The junction between a user and a computer program. An interface is a set of commands or menus through which a user communicates with a program.

- Command-Line Interface (CLI)
- Graphical User Interface (GUI)



## Command-Line Interface (CLI)

A Command-Line Interface (CLI) is a text based interface. User has to type the commands on the command prompt. In this interface user has to memorize commands. DOS is an example of command line operating system.

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## **Graphical User Interface (GUI)**

Graphical User Interface (GUI) provide a window like and a menu like environment as user interface. Command can be given by the selecting different option from the GUI interface.

### **Q. What is windows?**

#### **Windows:**

Windows is an operating system developed by the Microsoft Corporation. It is a multitasking operating system with GUI interface usually displays each task in a separate window. Each window is a rectangular region of the screen through which we can view a running program, or a document or a dialogue box.

#### **Icon**

A small picture, pictorial symbol, sometimes with text, that represent a command, a file or a shortcut to a program, file or web resource.

#### **File Management:**

it is an important part of operating system. Each saved program or saved data, whether it is something that you have created or imported from the other source, is a file. The system that an operating system or program uses to organize and keep track of files is called file management system.

### **Q: Define My Computer.**

My computer allows access to computer resources from hardware devices to file folders. Such as floppy drive (A), Disk Drive (C), Disk Drive (D), Compact Disk (E), Control Panel etc. All these services can also be accessed through other means but using My Computer, it is easy to discover and manage these applications.

### **Q: Define Recycle Bin.**

Recycle Bin is an area of Windows that stores the deleted files. Deleted files can be restored from the Recycle Bin by using the Recycle Bin Icon located at desktop.

## **STEPS OF RESTORING THE FILE FROM RECYCLE BIN**

Step 1: Open Recycle Bin by double clicking on Recycle Bin Icon.

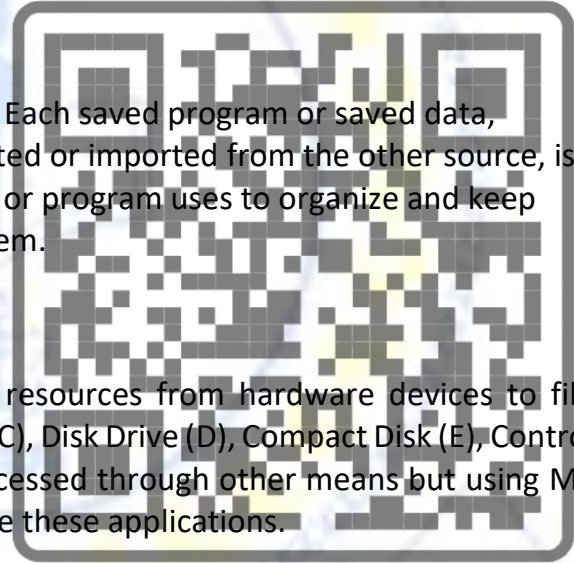
Step 2: Select the file or folder to be restored.

Step 3: Click Right Button of Mouse.

Step 4: Click on RESTORE Option.

### **Q: Briefly describe control panel.**

By using control panel a user can change the system defaults or properties of computer. For example, through control panel user can customize the way your mouse and keyboard work, choose display icon and customize the appearance of the desktop using color schemes, background patterns, settings, screen saver etc.



# **Word Processing & Spreadsheet**

**Q. What is word processor? And its feature?**

**Word Processor:**

A word processing program (also called a word processor) provides tool for creating all kind of text-based document. Word processor are not limited to working with text they enable you to add images to your documents and design documents that look like product of a professional print. Using a word processor you can create long document, a table of content, an index and other features.

A word processor can enhance document in other ways, you can add sound, video clips, and animation into them. You can link different documents together e.g. link a chart from a spreadsheet into a word processing report, to create complex document and update automatically.

**OR**

A word processing application program creates a document file representing a sequence or string of text character and formatting codes.

**Feature of Word Processor:**

- Creation of a sequence of content, with pages created automatically.
- Header and footer for each section that can hold standard text, graphics, automatic page number and watermark.
- Margins, borders, paper size and page orientation for each section.
- Formatting of text single or multiple columns.
- Tools for creating and editing tables.

**Q. Define function of word processor?**

**Function of Word Processor**

A word processor like MS WORD contain the following types of function:

- Creating Documents
- Editing Documents
- Viewing Document
- Insert & Coping Text
- Find & Replace Feature
- Formatting Documents
- Graphics



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- Insert Table, Text box, Images & Shapes

## Q. What is spreadsheet?

### Spreadsheet:

A spreadsheet program is a software tool for entering, calculating, manipulating, and analyzing sets of numbers. The rectangle at the intersection of a row and column is known as a “cell”. Spreadsheets have a wide range of uses from family budgets to corporate earnings statements. It shows information in different ways like rows and column format, report format with heading and charts. MS-EXCEL is a most common spreadsheet application.

### Function of Spreadsheet:

Functions are built-in formulae that are readily available in EXCEL. By using different functions, you can analyze and manipulate content. You can easily calculate percentage, maximum value, average etc.

- I. **Mathematical Function:** Simple calculation on numerical values.
- II. **Statistical Function:** Perform calculation on list of values.
- III. **Text Function:** Manipulates labels and parts of labels.
- IV. **Date and Time Function:** Set Date And Time in various formats.
- V. **Logical Function:** Allow you to compare values in cells.
- VI. **Trigonometric function:** function that deal with the angle and triangles.
- VII. **Logarithmic function:** function that deal with exponents and powers for scientific & engineering calculation.



08 & 09

PAST PAPERS

1. What main function of MS-EXCEL is not available in MS-WORD?
2. What are the main function of spread sheet and a word processor?
3. Differentiate between word processor and spread sheet





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## 10

## Internet Browsing & Using E-Mail

**Q. What is internet browser?**

**Internet Browser:**

*Internet browser*, a software application used to locate, retrieve and also display content on the World Wide Web, including Web pages, images, video and other files. As a client/server model, the browser is the client run on a computer that contacts the Web server and requests information. The Web server sends the information back to the Web browser which displays the results on the computer or other Internet-enabled device that supports a browser.

**OR**

“A browser is a software application that provides users with a way to view and interact with information on the Internet”.

**OR**

Browser, short for web browser, is a software application used to enable computers users to locate and access web pages. Browsers translates the basic HTML (Hypertext Mark Up Language) code that allows us to see images, text videos and listen to audios on websites, along with hyperlinks that let us travel to different web pages.

**OR**

A web browser is a program enables a user to interactively access information, in the form of text and other media from the remote web server.

**5 Browsers which is mostly used by the peoples are**

1. Google Chrome
2. Internet Explorer
3. Mozilla Firefox
4. Opera
5. Safari

**Firefox:**

Firefox is a free, open source Web browser for Windows, Linux and Mac OS X. It is based on the Mozilla code base and offers customization options and features such as its capability to block pop-up windows.



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## **Google Chrome:**

A very popular Web browser from Google that was introduced for Windows in 2008 and the Mac and Linux in 2009. Based on code from the open source Chromium project, Chrome made searching simpler by integrating the domain name address bar and Google search box into one input field.

## **Safari:**

Apple Safari is a Web browser available for the Macintosh and Windows operating systems as well as the iPhone, iPod Touch and iPad. Safari has been designed based on the premise that the most useful browser is one that "gets out of your way and lets you simply enjoy the Web."

## **Q. What is E-Mail?**

### **E-Mail:**

E-mail (electronic mail) is the exchange of computer-stored messages by telecommunication. E-mail messages are usually encoded in ASCII text. However, you can also send non-text files, such as graphic images and sound files, as attachments sent in binary streams. E-mail was one of the first uses of the Internet and is still the most popular use. A large percentage of the total traffic over the Internet is e-mail. E-mail can also be exchanged between online service provider users and in networks other than the Internet, both public and private.

**OR**

Email is the electronic version of the inter-office, inter-organizational paper-based mail system. Email is not simply the exchange of text messages. Email is really a system of interlocking parts, each of which is essential for ordinary people to communicate effectively with one or many others, in an environment where different kinds of information must be shared (memos, documents, files, etc.) i.e. the modern office environment.

### **Advantages of E-Mail:**

- **It's fast** - Messages can be sent anywhere in an instant
- **It's cheap** - Transmission can cost nothing or very little
- **It's simple** - Easy to use, after initial set-up
- **It's efficient** - Sending to a group can be done in one action.
- **It's versatile** - Pictures or other files can be sent too

### **Disadvantages of E-Mail:**

- If you don't know the email address of the other person then you can't send them a message
- Spam is a big problem, up to two-thirds of mails sent are spam
- Email attachments can contain viruses
- Some companies won't allow email attachments to be received



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## FIVE YEAR TOPICS

**Q. What is internet name its components?**

### INTERNET:

A global computer network providing a variety of information and communication facilities, consisting of interconnected networks using standardized communication protocols.

OR

The Internet is the world-wide network of interconnected computer networks (e.g., commercial, academic and government) that operates using a standardized set of communications protocols called TCP/IP (transmission control protocol/Internet protocol) or the Internet protocol suite.

### COMPONENTS OF INTERNET:

#### HARDWARE:

It is any part of your computer that has a physical structure, such as the computer monitor, internet modem.

#### SOFTWARE:

Software is any set of instructions that tells the hardware what to do. It is what guides the hardware and tells it how to accomplish each task.

Chat: IRC (Internet Relay Chat) is used for live discussions on the Internet.

Ecommerce: Taking orders for products and services on the Internet.

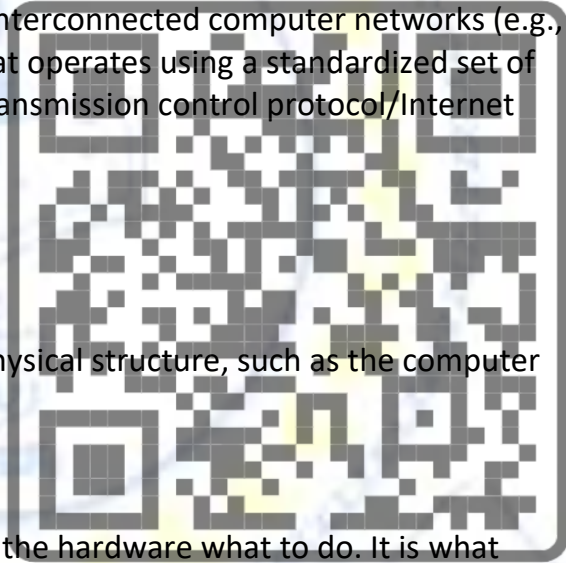
E-mail: - Exchanging electronic letters, messages, and small files.

FTP: File Transfer Protocol is the most common method of transferring files between computers via the Internet.

Hosting: Making information available to others on the Internet.

Mailing Lists: E-mail messages forwarded to everyone on a special interest list.

Search Engines: These tools are really a part of the World Wide Web and are often used when looking for information because the Web has grown so large and is without any inherent organizational structure.



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## **Q. Why Modem is necessary for internet?**

A modem is a communication device used to convert analog data on telephone lines to digital data. They are used on computers so that one computer can communicate with another computer. There are two types of internet connections through a modem – always-on and dial-up.

**OR**

We need a modem to connect to the internet since it performs modulation and demodulation. Modulation is the process of turning a digital signal into an analog signal which is transmitted as electrical pulses.

## **Q. Advantages & Disadvantages of copyright?**

**Right to Produce/Reproduce** - Copyright gives the creator of a piece of intellectual property the sole right to produce and reproduce their work.

**Right to Authorize** - These rights include the right to authorize others to produce or reproduce your work as well as the right broadcast your work.

**Protection** - Copyright prevents your work from being stolen or misused by others.

**Moral Rights** - Copyright allows the holder of the copyright to object to uses of their work that they find morally objectionable.

### **These are several key disadvantages to Copyright holders:**

**Inability to Share Work** - Copyrights key advantage is also it's primary disadvantage. Copyright does not allow you to openly permit others to use your work or to distribute it, even if they are not doing it for profit. This can mean that your work is disseminated slowly or not at all.

**Authorship is not Ownership** - You must own the copyright to be able to exercise the rights that it grants, and just being the creator of the work does not always guarantee ownership. In some cases the owner is actually the person who commissioned the work, or the company for whom the work was produced.

## **Q. What is e-commerce?**

Electronic commerce or e-commerce refers to a wide range of online business activities for products and services. It also pertains to “any form of business transaction in which the parties interact electronically rather than by physical exchanges or direct physical contact.”



**OR**

E-commerce is usually associated with buying and selling over the Internet, or conducting any transaction involving the transfer of ownership or rights to use goods or services through a computer-mediated network.



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**Q. What is software explain its types?**

**Software:**

Set of instruction stored as interconnected program to perform a specific task is called software.

**OR**

Software is a set of programs, which is designed to perform a well defined function. A program is a sequence of instruction written to solve a particular problem.

**Types of Software:**

1. System software
2. Application software

**System software**

The system software is collection of programs designed to operate, control and extend the processing capabilities of the computer itself. System software are generally prepared by computer manufactures.

**Application software**

Application software are the software that are designed to satisfy a particular need of a particular environment. All software prepared by us in the computer lab. Examples of application software are-student record software, railway reservation software, income tax software, word processors etc.

**Q. Difference between system software and application software?**

<b><u>S #</u></b>	<b><u>Application Software</u></b>	<b><u>System Software</u></b>
1.	Application software is computer software designed to help the user to perform specific tasks.	System software is computer software designed to operate the computer hardware and to provide a platform for running application software.
2.	Application Software performs in a environment which created by System/Operating System	System Software Create his own environment to run itself and run other application.
3.	It executes as and when required.	It executes all the time in computer.
4.	Application is not essential for a computer.	System software is essential for a computer

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## Q: What is the main reason to develop a computer network?

The main reason to develop a computer network is that the Networks are collections of computers, software, and hardware that are all connected to help their users work together. A network connects computers by means of cabling systems, specialized software, and devices that manage data traffic. A network enables users to share files and resources, such as printers, as well as send messages electronically (e-mail) to each other.

## Q: Differentiate between language and package?

S #	LANGUAGE	PACKAGE
1.	A programming language is a set of written symbols that instruct the computer hardware what to do .	A part of a usual program, application software are develop for different utility special purpose called software packages.
2.	Language are used to develop a new software.	Software packages are ready made software.
3.	Language have predefine rules for writing a software.	Software packages are easy to use and fairly quick.
4.	Language must be translate into machine language before execution.	Software packages are executable file.

## Q: What is network and define advantages and disadvantages of network?

A network is a collection of data communication hardware, computer, communications software and communication media connecting in a meaningful way to allow users to share information and networks.

### Advantages:

A user can logon to a computer anywhere on the network and access their work files from the file server
Computers can be managed centrally - with the same software installed on each one
Time - it is much faster to install an application once on a network - and copy it across the network to every workstation

### Disadvantages

If something goes wrong with the file server the whole network is unable to operate
The technical skills needed to manage a network are much higher than working on a stand-alone computer
It would take a long time to install software applications on each computer - one at a time!



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Sharing printers, plotters, modems etc saves money and time

It can be frustrating to print to a printer in another room - and then find after a long trek - that there is no paper in the printer!

## Q. What are the features of operating system?

### FEATURES OF OPERATING SYSTEM:

Operating system should have the following features:

**Efficiency:** in term of processor and resource utilization

**Reliability:** in term of being error free handling all possibilities in the execution of job.

**Versatility:** Computer can perform any task, provided it can be reduced to a series of logical steps.

**Maintainability:** in term of enhancing facilities, modularity, correction of bugs etc.

**Storage:** in term of amount of memory and backing storage required.

## Q. Define network protocol & types?

### **Protocol:**

A protocol is a set of rules that governs the communications between computers on a network.

In information technology, a protocol is the special set of rules that end points in a telecommunication connection use when they communicate. Protocols specify interactions between the communicating entities.

### **Types Of Protocols:**

There are thousands of protocols use. Some important ones are the following:

#### **Ethernet:**

The Ethernet protocol is by far the most widely used. Ethernet uses an access method called CSMA/CD (Carrier Sense Multiple Access/Collision Detection). This is a system where each computer listens to the cable before sending anything through the network.

#### **Token Ring**

The Token Ring protocol was developed by IBM in the mid-1980s. The access method used involves token-passing. In Token Ring, the computers are connected so that the signal travels around the network from one computer to another in a logical ring.

#### **ATM**



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Asynchronous Transfer Mode (ATM) is a network protocol that transmits data at a speed of 155 Mbps and higher.

**Q. Differentiate between volatile and non-volatile memory.**

<u>Volatile</u>	<u>Non-Volatile</u>
2. <b>Volatile</b> is temporary memory.	2. <b>Non-Volatile</b> is permanent memory.
3. The data in RAM can be changed or deleted.	3. The instructions written in ROM cannot be changed or deleted
4. RAM is a volatile memory.	4. ROM is non-volatile memory.
5. Instructions in RAM change continuously as different programs are executed and new data is processed.	5. It is not possible to write new information or instructions in ROM.
6. The instruction is written into the RAM at the time of execution.	5. The instructions written into ROM at manufacturing time.

**Q. Define Register?**

## REGISTER:

Register are high volatile memory blocks which are dynamically allocated in main memory.

OR

A, special, high-speed storage area within the CPU. All data must be represented in a register before it can be processed. For example, if two numbers are to be multiplied, both numbers must be in registers, and the result is also placed in a register. (The register can contain the address of a memory location where data is stored rather than the actual data itself.)

## TYPES OF REGISTER

- **MAR (Memory Address Register)**

This register holds the [memory](#) addresses of data and instructions. This register is used to access data and instructions from memory during the execution phase of an instruction.

- **Program Counter**

The program counter (PC), commonly called the instruction pointer (IP). it holds the address of the memory location of the next instruction when the current instruction is executed by the microprocessor.

- **Memory Data Register (MDR)**

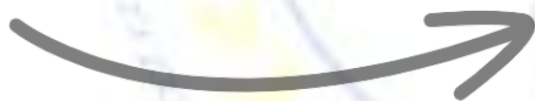
MDR is the register contains the data to be stored in the computer storage currently addressed by MAR.





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- **General Purpose registers:**  
General purpose registers are used to store data and intermediate results during program execution.
- **Instruction Register (IR):**  
Instructions are stored in instruction register. When one instruction is completed, next instruction is fetched in memory for processing.
- **Accumulator:**  
It is most frequently used register used to store data and for doing arithmetic and logic operation.

## Q. What is cache memory?

### **Cache:**

Cache memory is extremely fast memory that is built into a computer's central processing unit (CPU), or located next to it on a separate chip. The CPU uses cache memory to store instructions that are repeatedly required to run programs, improving overall system speed.

**OR**

Cache memory is random access memory (RAM) that a computer microprocessor can access more quickly than it can access regular RAM. As the microprocessor processes data, it looks first in the cache memory and if it finds the data there (from a previous reading of data), it does not have to do the more time-consuming reading of data from larger memory.

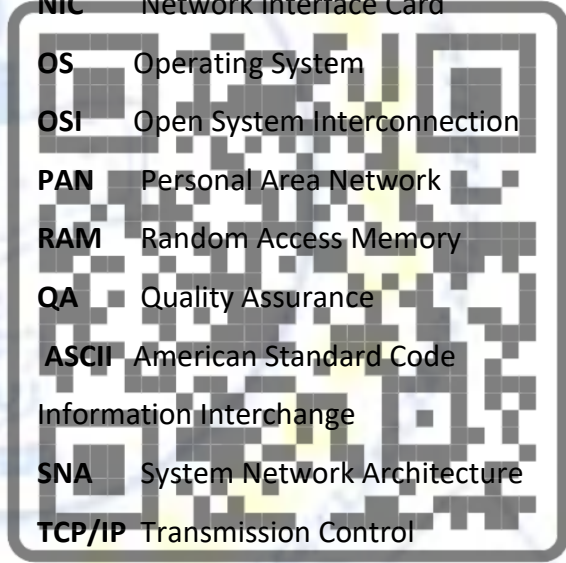
## Q. Differentiate between LAN and WAN.

LAN	WAN
Local Area Network	Wide Area Network
Local areas only (e.g., homes, offices, schools)	Large geographic areas (e.g., cities, states, nations)
LAN (Local Area Network) is a computer network covering a small geographic area, like a home, office, school, or group of buildings.	WAN (Wide Area Network) is a computer network that covers a broad area (e.g., any network whose communications links cross metropolitan, regional, or national boundaries over a long distance).
High speed (1000 mbps)	Less speed (150 mbps)
LANs have a high data transfer rate.	WANs have a lower data transfer rate compared to LANs.
High bandwidth is available for transmission.	Low bandwidth is available for transmission.

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## ABBREVIATIONS

<b>DBMS</b>	Database Management System	<b>Kb</b>	Kilobit
<b>FTP</b>	File Transfer Protocol	<b>KB</b>	Kilobyte
<b>HTTP</b>	Hyper Text Transfer Protocol	<b>HDLC</b>	High-Level Data Link Control
<b>ID</b>	Identification	<b>HTML</b>	Hyper Text Markup Language
<b>IP</b>	Internet Protocol	<b>ICMP</b>	Inter Control Message Protocol
<b>IS</b>	Information system	<b>MAN</b>	Metropolitan Area Network
<b>ISO</b>	International Standard Organization	<b>MAC</b>	Address Media Access Control Address
<b>IT</b>	Information Technology	<b>MODEM</b>	Modulator/demodulator
<b>LAN</b>	Local Area Network	<b>NIC</b>	Network Interface Card
<b>PBX</b>	Private Branch Exchange	<b>OS</b>	Operating System
<b>PIN</b>	Personal Identification Number	<b>OSI</b>	Open System Interconnection
<b>SDLC</b>	System Development Life Cycle	<b>PAN</b>	Personal Area Network
<b>SSL</b>	Secure Socket Layer	<b>RAM</b>	Random Access Memory
<b>TCP</b>	Transmission Control Protocol	<b>QA</b>	Quality Assurance
<b>WAN</b>	Wide Area Network	<b>ASCII</b>	American Standard Code Information Interchange
<b>AI</b>	Artificial Intelligence	<b>SNA</b>	System Network Architecture
<b>ANSI</b>	American National Standard Institute	<b>TCP/IP</b>	Transmission Control Protocol/Internet Protocol
<b>ARP</b>	Address Resolution Protocol	<b>URL</b>	Uniform Resource Locator
<b>ATM</b>	Asynchronous Transfer Mode	<b>USB</b>	Universal Serial Bus
<b>BIOS</b>	Basic Input Output System	<b>VLAN</b>	Virtual Local Area Network
<b>DDL</b>	Data Definition Language	<b>VPN</b>	Virtual Private Network
<b>ERP</b>	Enterprise Resource Planning	<b>WAP</b>	Wireless Application Protocol
<b>FAT</b>	File Allocate Table	<b>WLAN</b>	Wireless Local Area Network
<b>Gb</b>	Gigabit	<b>WPA</b>	Wi-Fi Protected Access
<b>GB</b>	Gigabyte	<b>WPAN</b>	Wireless Personal Area Network
<b>GPS</b>	Global Position System	<b>WWW</b>	World Wide Web
<b>IR</b>	Infrared	<b>OMR</b>	Optical mark recognition
<b>IRC</b>	Internet Chat Relay		



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**OCR** Optical character recognition

**MICR** Magnetic ink character recognition

**BIT** Binary digit

**BYTE** group of bits

**ROM** Read Only Memory

**PROM** Programmable Read Only Memory

**EPROM** Erasable Programmable Read  
Only Memory

**EEPROM** Electrically Erasable  
Programmable Read Only Memory

**CRT** Cathode Ray Tube

**RGB** Red Green Blue

**LCD** Liquid Crystal Display

**LED** Light Emitting Diode

**SVGA** Super video Graphics Array

**XGA** Extended Graphics Array

**SXGA** Super Extended Graphics Array

**DPI** Dots per Inch

**PCL** Printer Control Language

**CD** Compact Disk

**CD-R** Compact Disk-Recordable

**CD-RW** Compact Disk-rewriteable

**COBOL** Common business oriented  
language

**FORTRAN** Formula Translation

**ISP** Internet service Provider

**ISDN** Integrated Services Digital  
Network

**CSMA/CD** Carrier Sense Multiple  
Access/Collision Detection

**SNA** System Network Architecture

**MBR** Memory Buffer Register

**MAR** Memory Address Register

**IR** Instruction Register

**PC** Program Counter

**E-Mail** Electronic Mail

**Bps** Bits per Second

**CAD** Computer Aided Design

**GUI** Graphical User Interface

**CLI** Command Line Interface

**DVD** Digital Video Disk

**EDI** Electronic Data Interchange

**IBM** International Business Machine





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