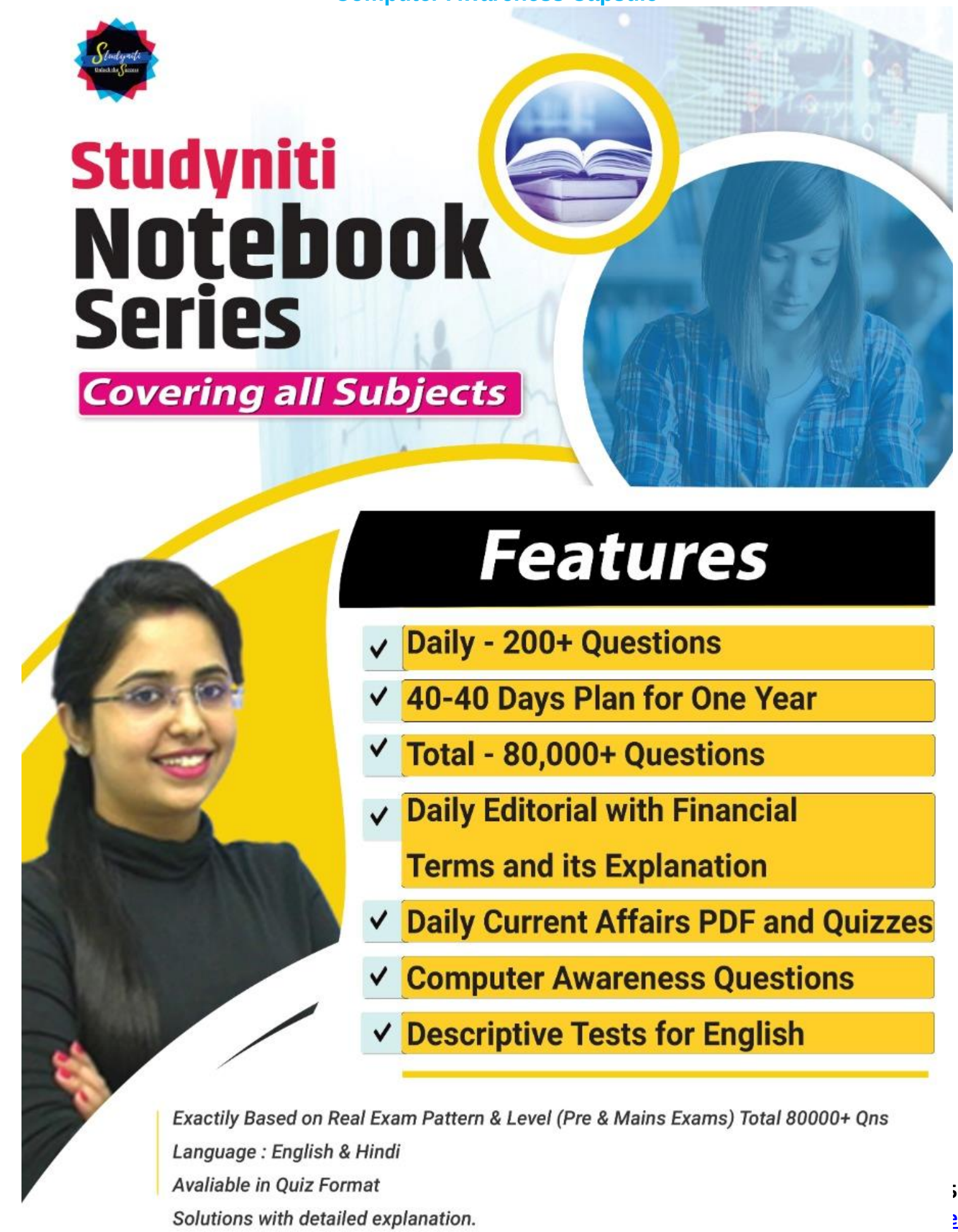
Computer Awareness Capsule



History and Generations of Computers

1. 2600 B.C.-Abacus in China
2. (1614-1617)-John Napier (Napier Bones)
3. 1500-Leonardo Da Vinci is now given credit for building the first mechanical calculator around.
4. 1642-Blaise Pascal (Pascal Calculator with 8-digit capacity)
5. 1800-Joseph Marie Jacquard (automatic Jacquard Looms)
6. 1822-Charles Babbage (Difference Engine). Augusta Ada Byron (1st computer programmer), worked with Babbage and created a first program for the Analytical Engine.
7. 1834-Charles Babbage (Analytical engine).
8. 1836-Morse Code by Samuel Morse (US) - Morse developed a system of dots and dashes to help send telegraphs over long distance wire.
9. 1840-George Boole invented Boolean algebra. Claude E. Shannon recognized its relevance to electronics design.
10. 1857-Sir Charles Wheatstone (the inventor of the accordion) introduced the first application of paper tapes as a medium for the preparation, storage, and transmission of data.
11. 1868-The first practical typewriting machine was commercially successful, invented by three American Christopher Latham Sholes (also the father of modern Keyboard), Carlos Glidden, and Samuel W. Soule.
12. 1890-Herman Hollerith (Tabulating Machine).Data was entered on punched cards and could be sorted according to the census requirements.
13. 1911- Charles Ranlett Flint founded" Computing-Tabulating-Recording company (CTR)" and was renamed "International Business Machines" in 1924.
14. 1926- Dr. Julius Edgar Lilienfeld from New York filed for a patent on a transistor.
15. (1936-1938)-Konrad Zuse, completes the 1st general purpose programmable Computer (Z1).
16. 1942-Atanasoff-Berry Computer (First electronic digital computer)
17. 1944-Concived by Howard Aiken (Harvard Mark 1) designed by IBM.
18. (1943-1946)-E NIAC (Electronic Numerical Integrator and Computer) is developed by J. Presper Eckert and John Mauchly. It was the first general purpose Electronic computer (Based on Decimal numbers).
19. 1947-The transistor is developed by Bell Telephone Laboratories.
20. (1946-1949)-EMCC (Eckert-Mauchly Computer Company) the First computer company.
21. 1949-EDVAC (Electronic discrete variable automatic computer) unlike the predecessor, it was binary rather than decimal and was a stored program computer. Idea of stored program was given by Jon Von Neumann.
22. 1949-EDSAC(Electronic Delay Storage Automatic Calculator)-Maurice Wilkes(first fully stored computer based on binary)
23. 1951-UNIVAC (Universal Automatic Computer) was release which was the world's first commercial computer.
24. 1959-Texas Instruments and Fairchild Semiconductor both announce the integrated circuit (Jack Kilby & Robert Noyce).
25. 1962-Ivan Sutherland demonstrates a program called Sketchpad (makes engineering drawings with a light pen) on a TX-2 mainframe at MIT's Lincoln Labs
26. 1964-The IBM 360 is introduced and quickly becomes the standard institutional mainframe computer.

27. 1964-Douglas Engelbart invented first mouse.
28. 1968-Gordon Moore and Robert Noyce founded a company called Intel.
29. 1971-Intel introduces a 1K RAM chip and the 4004 (first processor), a 4-bit microprocessor.
30. 1972-Intel introduced 8008, an 8-bit processor.
31. 1972-Gary Kildall writes PL/M (Programming Language for Microcomputers), the first high-level programming language for the Intel Microprocessor.
32. 1975-Paul Allen and Bill Gates develop BASIC for the Altair 8800. Microsoft is born!!!
33. 1976-Apple was founded by Steve Jobs and Steve Wozniak found in Southern California.
34. 1980-Microsoft is approached by IBM to develop BASIC for its personal computer project. The IBM PC is released in August, 1981.
35. 1981-First Laptop was introduced by Adam Osborne and the company EPSON manufactured first laptop.
36. 1984-The First Apple Macintosh, featuring a simple graphical interface using the 8-MHz, 32-bit Motorola 68000 CPU and a built-in 9-inch B/W screen.

Generations of Computers

First Generation (1945-1955)

1. Vacuum Tubes invented
2. Magnetic Drum for memory
3. Works on 4000 bits
4. ENIAC, EDVAC, EDSAC, UNIVAC-I

Second Generation (1955-1965)

1. Transistors invented by J. Bardeen, H.W. Brattain and W. Shockley
2. Magnetic Core was used for primary storage
3. 32,000 bits
4. IBM 700/7000, 7094, 1401, IBM 650, ATLAS, CDC (Control data Corporation) 1604, 3600, NCR (National cash register)304

Third Generation (1965-1971)

1. IC (Integrated circuits) invented by Jack Kilby and Robert Noyce
2. 128,000 bits
3. Multiprogramming
4. Keyboard, Monitor
5. IBM 360, 370, PDP (Programmed Data Processor) 8, 11, UNIVAC AC9000

Fourth Generation (1971-1990)

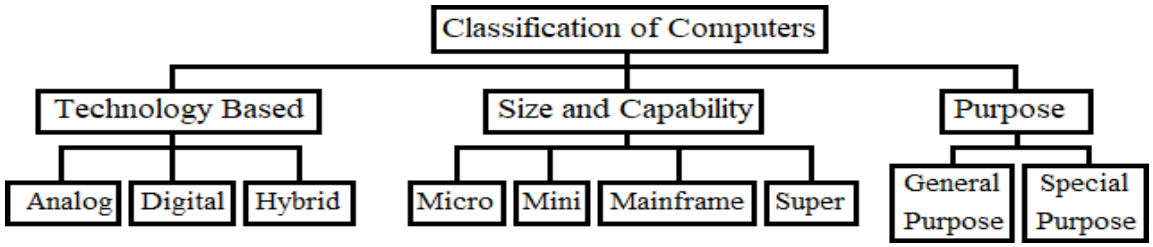
1. LSI, VLSI
2. 100 Million bits
3. Microprocessor (4004)

4. Time sharing, Real time, Distributed and Networks OS were introduced
5. Apple Macintosh, IBM PC, SUN SPARC, STAR 1000

Fifth Generation (1990-Till Date)

1. ULSI, SLSI, AI
2. Robotics, Neural Networks, Expert System
3. Parallel Processing
4. HVD Technique
5. Advancement of Supercomputing
6. Laptop, Desktop, Notebook, Ultrabook, Chromebook

Types of computers



Analog computer introduced by Lord Kelvin. Numerical data are represented by measurable physical variables such as electrical voltage (Analog format). A thermometer is a simple analog computer.

Digital computer that accepts and process data in the form of numbers and all the character are converted into binary code 0, 1 (Discrete Value). Example Digital Watch.

Hybrid computer used the combined feature of analog and digital machine. you can see hybrid computer in geological departments.

Microcomputer these are small relatively inexpensive computer designed for personal and office use. It has lowest storing and processing speed. These can be laptop or desktop.

Minicomputer powerful as compare to microcomputer it has higher memory provide faster operating speeds and large storage capacities than microcomputers. It can be used as a server and capable of supporting from 2 to 200 users.

Mainframe computer it has very memory and processing speed and used as a server (can support thousands of users).

Super computer can be used for complex type of application i.e. specific research, weather forecasting, Weapon designing etc

Servers are dedicated computers that serve the needs or request of other programs or computer.

Workstations serve usually one user only.

Information appliances are computers specially designed to perform a specific "user-friendly" function—such as playing music, photography.

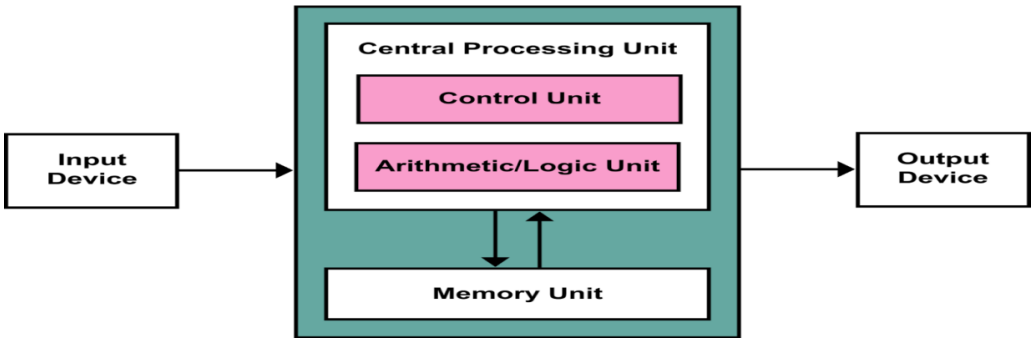
An embedded system is a computer system with a dedicated function within a larger system

Computer Hardware

All the physical componen0ts that grouped and form a complete system are known as hardware. Example: - Motherboard, RAM, ROM, Hard disk, monitor, keyboard, mouse etc. **IPOS Cycle: -** Input Process Output Storage

System Unit: The system unit is the case that contains all the electronic components related to processing of any computer system. A system unit includes the following parts:

1. **Motherboard:** The circuit board that holds the main internal components of the computer together.
2. **Microprocessor:** Microprocessor or brain of the computer is also known as CPU. The CPU controls information and tells the other components inside the computer what to do. CU and ALU along with registers form a complete CPU.



3. **Buses:** A bus is a subsystem that is used to connect computer components and transfer data between them. There are three types of buses – Address bus, Data bus and control bus.
4. **Ports**: Ports are connecting socket outside the system into which different types of cables are plugged.
5. **Memory**: RAM, ROM
6. **Cards**: Sound card, Video card, NIC card

Input Devices: In computing, Input device is a peripheral used to provide data or control signal to system for processing. Examples: - Keyboard, Mouse, Trackball, Light pen, Stylus, Scanner, Joystick, OMR, OCR, MICR, BCR, QR, WEBCAM, Biometric, Touch pad, Microphone, Pen tab.

Keyboard One of the primary input devices used to input data and commands. Alphabet (A – Z, a - z), Number keys(0-9), Function key (F1 to F12), Modifier keys (Ctrl, ALT, Shift), Toggle keys (Caps lock, num-lock, Scroll lock), Navigation keys (Arrow keys, Home, End, Page Up, Page Down), Indentation key (Tab key), Special symbols (!, @ # $ % ^ & * ( ) _ + - = [ ] \ { } | ; ’ : ” , . / <> ?)

Keyboards are connected to the computer through USB or Bluetooth. Keyboard can be use in GUI and CUI. 104 Key in Standard keyboards. 17 keys in Number pad.

Mouse It is a pointing device to point out any object on screen. It can be used only in CUI, not in GUI.

Types of mouse - 1. Mechanical Mouse 2. Optical mouse (Wired and Wireless)

Track ball It is also a pointing device that can be used instead of mouse. Now as days it is used in mobiles to control the pointer.

Light Pen It is also a pointing device. It can be used for digital signature. It can work with any CRT based monitors.

Stylus It is a pen-shaped input device used to write or draw on the screen of a graphic tablet or device.

Scanner: - Scanner is an input device that reads an image and converts it into a digital file. A scanner is connected to a computer through USB. There are different types of scanners:

Flatbed scanner – uses a flat surface to scan documents.

Sheet fed scanner – like a laser printer where paper is fed into the scanner.

Handheld scanner – the scanner is dragged over the page to be scanned

Joystick A joystick is an input device commonly used to control video games. Joysticks consist of a base and a stick that can be moved in any direction. The stick can be moved slowly or quickly and in diff erent amounts.

OMR Optical mark recognition (also called optical mark reading and **OMR**) is the process of capturing human-marked data from document forms such as surveys and tests. They are used to read questionnaires, multiple choice examination paper in the form of lines or shaded areas.

MICR Magnetic ink character recognition code, known in short as **MICR code**, is a character recognition technology used mainly by the banking industry to streamline the processing and clearance of cheques and other documents.

OCR Optical character recognition (OCR) software works with your scanner to convert printed characters into digital text.

BCR A Barcode reader or Barcode scanner is an electronic device which is able to scan and decode barcodes. These devices use optical technology such as infrared light.

QR A QR code (short for "quick response" code) is a type of barcode that contains a matrix of dots. It can be scanned using a QR scanner or a smartphone with built-in camera. Once scanned, software on the device converts the dots within the code into numbers or a string of characters.

Touch pad A touchpad or trackpad is a pointing device featuring a tactile sensor, a specialized surface that can translate the motion and position of a user's fingers to a relative position on the operating system that is made output to the screen.

Microphone It is used to convert sound waves into electric waves or input the audio into computers. It captures audio by converting sound waves into an electrical signal, which may be a digital or analog signal.

Pen tab A graphics tablet (also known as a digitizer, drawing tablet, drawing pad, digital drawing tablet, pen tablet, or digital art board) enables a user to hand draw images, animations and graphics, with a special pen-like stylus, similar to the way a person draws images with a pencil and paper.

Output Devices

An output device is any piece of computer hardware equipment which converts information into human-readable form. It can be text, graphics, tactile, audio, and video. Some of the output devices are Visual Display Units i.e. a Monitor, Printer, projector, Plotters, Speakers etc.

Monitor

It is known as standard output device. The monitor displays video and graphics information, user interface and other programs, allowing the user to interact with the computer.

Types of monitors:

CRT (cathode ray tube), TFT (thin film transistor), LCD (Liquid crystal display), LED (Light emitting display)

Types of monitor based on colours

1. Monochrome (black and white)
2. Colour

CGA (Colour Graphics Adapter): 4color/resolution 320*320

EGA (Enhanced Graphics Adapter): 16 colour/resolution 640*350

VGA (Video Graphics Array): 256 colour/resolution 640*480

XGA (Extended Graphics Array): 65536 colour/resolution 800*600 and 1024*768

SVGA (Super Video Graphics Array): 16,777,216 colour/resolution 1280*1024

Printer

It is an output device and used to convert the soft copy to hard copy.

Types of Printers

1. Impact printer

Use hammer and ribbon, strikes the paper directly.

Daisy wheel, Dot matrix, and Line printers are the examples of impact printer.

2. Non-Impact printer

Does not use hammer and ribbon for printing, also does not strikes the directly.

Inkjet, laser and thermal printers are he examples of impact printer.

Types of printers based on colours:

Monochrome (black and white)

Colour

COLOURS [C-Cyan M-Magenta Y-Yellow K-Key (Black)]

Plotter

A plotter can be used to produce high quality, accurate and bigger drawings.

Generally plotters are used in CAD, CAM applications such as house maps

banners, hoardings and car parts etc.

Projector and speakers are also examples of output devices. Projectors gives us an output in the form of light and speakers give us sound format.

Memory Unit and Management

0 or 1	1 Bits
4 Bits	1 Nibble
8 bits	1 byte
1024 Byte	1 KB (Kilo Byte)
1024 KB	1 MB (Mega Byte)
1024 MB	1 GB (Giga Byte)
1024 GB	1 TB (Tera Byte)
1024 TB	1 PB (Peta Byte)
1024 PB	1 EB (Exa Byte)
1024 XB	1 ZB (Zeta Byte)
1024 ZB	1 YB (Yota Byte)
1024 YB	1 BB (Bronto Byte)
1024 BB	1 Geop Byte

Primary Memory	**Secondary Memory**
• Primary storage is also known as Memory or Main Memory or internal memory. • From here data is directly accessed by CPU. • Very Fast in the comparison of secondary storage. • Holds the data and the instructions that the computer is working on right now • Holds the data and the instructions that the computer is working on rightnow	• Secondary storage is also known as Secondary memory or auxiliary memory or external memory. • From CPU cannot access the data from here. • Very slow in the comparison of primary storage. • Holds the data and instructions that the computer has access to when it need them • It determines that how many programs and data can be stored permanently.

Primary Memory

Random Access Memory (RAM), allows the computer to store data for immediate manipulation and to keep track of what is currently being processed. **RAM** is referred to as **volatile memory** and is lost when the power is turned off. It also known as read/write memory as information can be read from and written onto it. The two main types of RAM are Static RAM and Dynamic RAM.

SRAM stands for Static Random-Access Memory. SRAM is Fast and flip-flop is used to store data. In SRAM retains data as long as power is provided to the memory chip and need not be refreshed periodically.

The data on **DRAM** stands for Dynamic Random-Access Memory. DRAM is Slow and use transistor for controlling and capacitors for storage. DRAM continually refreshed to maintain the data.

Read-only memory (ROM)is non-volatile and the permanent memory. BIOS (Basic input/Output system) stored in ROM. The types of ROM include PROM, EPROM and EEPROM. **PROM** - (programmable read-only memory) is a memory chip on which data can be written only once.

The difference between a PROM and a ROM is that a PROM is manufactured as blank memory, whereas a ROM is programmed during the manufacturing process.

EPROM - (erasable programmable read-only memory)is a special type of PROM that can be erased by exposing it to ultraviolet light. That's why it is also known as UVEPROM.

EEPROM - (electrically erasable programmable read only memory). EEPROM can be erased by exposing it to an electrical charge.

Secondary Memory SASD - Sequential Access storage device – Data can be accessed in sequential manner (Magnetic Tape)DASD/RASD - Direct/Random Access storage device – Data can be access directly or randomly manner. **Magnetic Disk** – Floppy (1.44 MB), Hard disk **Optical Memory** – CD (ROM, Recordable, Rewritable) – 700 MB approximate.DVD (Digital Versatile/Video disc) – 4.7 GB Approximate.

BRD (Blu-Ray Disc) – 25GB in Single layered, 50GB in double layered.

HVD (Holographic Disc) – 3.9 TB for users and 6TB for scientists.

Flash memory (Electronic Non-Volatile memory) – Pen drive and memory card.

There are two types of memory cards MMC card and SD card. MMC for Multimedia card and SD stands for Secure digital card used now a days.

SD cards are of four types: SDSC(secure digital standard capacity), SDHC (secure digital high capacity), SDXC (secure digital extended capacity), SDUC (secure digital ultra-capacity).

Virtual Memory - To load an application or to perform some task the extra memory (apart from RAM)that is borrow from Hard disk, is known as virtual memory or extended RAM.

Cache Memory - Cache is a very high speed, expensive memory. Cache is used to speed up the memory retrieval process. The idea of introducing cache is that this extremely fast memory would store data that is frequently accessed. It works between Main memory and CPU.

Computer Software

Data – Data is a raw information or unprocessed information. **Information** – Information is a meaningful data or a processed data, or we can say that after processing data is converted into information. **Programs** – Collection of instruction or

commands. **Software** – Collection of programs to performs some specific task. There are two types of softwares: System softwares and Application Softwares

System software provides a base platform to execute and development different types of other programs. It is designed to control the operations and resources of computer and co-ordinate all hardware. Examples:- Operating system, BIOS, Linker and Loader, Language translators, Utility software. **Language t ranslators** - Assembler, compiler, Interpreter. **Utility Software** - Utility Softwares are used to enhance the performance of a system and devices. Examples: - Antivirus, Data backup software, Desktop cleaner, Disk cleanup, Firewall, File management tools, Compression software, Disk Defragmenter, Device Driver, etc.

An application software is designed and developed for the users to perform some specific tasks like writing a letter, listening to music or seeing any video. For all these requirements there required a specific software for each type and that specific software that is designed for some specific purpose.

Word Processors–MS Word, Word pad, Word star, Corel WordPerfect, Google Docs.

Database Software –MS Access, FileMaker, dBase, Clipper, MySQL, FoxPro.

Web Browsers – Google Chrome, Mozilla Firefox, Internet Explorer, Opera.

Multimedia Software – Adobe Photoshop, Picasa, VLC Media Player, Windows Media Player.

Mailing Software – MS Outlook.

Presentation Software –MS Power point.

Spreadsheet Software – MS Excel, Lotus 123.

Firmware - It is actually a permanent software which is embedded in the system's read-only memory. It is essentially a set of instructions which are permanently stored onto to the hardware device. Some of the examples of firmware are: BIOS etc.

Freeware - These softwares are available free of cost. A user can easily download them from the internet and can easily use them without paying any charges or fees. However, they don't provide any type of liberty to modify the entire software or charging a fixed fee for its distribution.

Shareware - This software is distributed freely to users on a fixed trial basis. It generally comes with a set time limit, and on the expiration of the time limit, the user is finally asked to pay a fixed fee for the continued services.

Open Source softwares - Such types of software are usually available to users along with their source code which means that the user can easily modify and distribute the software as well as add additional features to them. They can either be chargeable or free.

Tailor made/ Bespoke/ custom softwares - Tailor Made Software also known as custom software is software that is specially developed for some specific organization or other user.

Operating System

Operating system is an example of **System software**. It is a collection of integrated programs that is used to control the resources of computer system, this is why it is also known as the **resource controller** of our system. It works as an interface between user and hardware.

Function of OS:

- Process Management
- Device management
- Memory management
- File management
- Messaging service
- Error detection
- Security
- Command interpretation

WIN (In short)means Windows. **WINDOWS** – Wide Interactive Network Development for Office Work Solution. Inbuilt web browser is Internet Explorer. Microsoft Edge is browser for Windows 10.**List of Windows Operating System** Windows 1.0, Windows 2.0, Windows 3.0, Windows 3.1, Windows NT 3.1 – 3.5, Windows 95, Windows NT 4.0, Windows 98,Windows 2000, Windows ME, Windows XP, Windows Vista, Windows 7, Windows 8, Windows 8.1, Windows 10.

Macintosh OS - The full form of Mac is Macintosh Operating system. First version of macOS was known as **Classical Mac OS** .It was designed by product of **Apple in 1984.**Inbuilt web browser is **Safari**. Some examples of Mac OS are Cheetah, puma, jaguar, panther, tiger, leopard, snow leopard, lion, mountain lion, mavericks, Yosemite, El -Capitan, sierra, high sierra, Mojave, **Catalina (latest),** Big Sur (To be announced).

Android It is associated with **Google**. It is an **open source operating system.** First version was released on Sept 2008.Name of android OS are cupcake, Donut, Éclair, Froyo, Gingerbread, Honeycomb, Ice cream sandwich, Jelly bean, KitKat, Lollipop, Marshmallow, Nougat, Oreo, Pie, Android 10 Q.

LINUX It was developed by **Linus Torvalds** in 1991.It is not associated with any company. It is an open source operating system. It is highly secured operating system. Some Linux based operating systems are – Ubuntu. Mint, fedora, redhat, CentOS, OPENSUSE, gentoo, Debian, Mandriva, Slackware etc.

UNIX - Old name of UNIX is **UNICS**. Full form of UNIX or UNICS is "**Unilpexed information and computing system**". Unix is a family of multitasking, multiuser computer operating systems. Unix was developed in the 1971 at the Bell Labs research center by **Ken Thompson, Dennis Ritchie**, and other. Some examples of Unix based OS are - Microsoft/SCO Xenix, HP-UX, IBM AIX, SGI IRIX, Oracle Solaris, Tru64 UNIX, Apple Darwin, FreeBSD(Berkeley Software Distribution),NetBSD etc.

MS – DOS – **Microsoft disk operating system by (Microsoft).** It is **command line** operating system. It is **Single user and s ingle tasking** Operating system.Microsoft renamed it PC-DOS (the IBM version) and MS-DOS (the Microsoft version).

Types of Operating systems

Batch Operating system - These are oldest system. To speed up the processing, operator batches together jobs with similar needs and ran them through the computer as a group. If one job is fully executed, then only another job will be executed. In batch processing no any prioritization of job is used. Example – Payroll system, Banking system etc.

Multiprogramming Operating system There are one or more jobs loaded into memory which are ready to executed. In multiprogramming CPU never sits idle. Multiprogramming increase CPU utilization.

Time sharing / multitasking operating system It is a logical extension of multiprogramming. Main objective to use multitasking is to minimize response time. Time is shared to execute a particular job. Examples; Unix, windows, Linux etc.

Multiprocessing operating system Multiprocessor Operating System refers to the use of two or more central processing units (CPU) within a single computer system. These multiple CPUs are in a close communication sharing the comput er bus, memory and other peripheral devices. It is used to increase throughput of system. Economical of scale.

Real t ime operating system The real-time operating system used for a real-time application means for those applications where data processing should be done in the fixed and small quantum of time.

Types of Real-Time Operating System

1) **Soft Real-Time System**: Example are a digital camera, mobile phones, etc.

2) **Hard Real-Time System**: Examples are Airbag control in cars, anti-lock brake, engine control system, etc.**Network Operating system**Network Operating System is an operating system that includes special functions for connecting computers and devices into a local-area network (LAN) or Inter-network. Short form of Network Operating system is NOS. Novell Netware, Windows NT/2000, Linux, Sun Solaris, UNIX, and IBM OS/2.

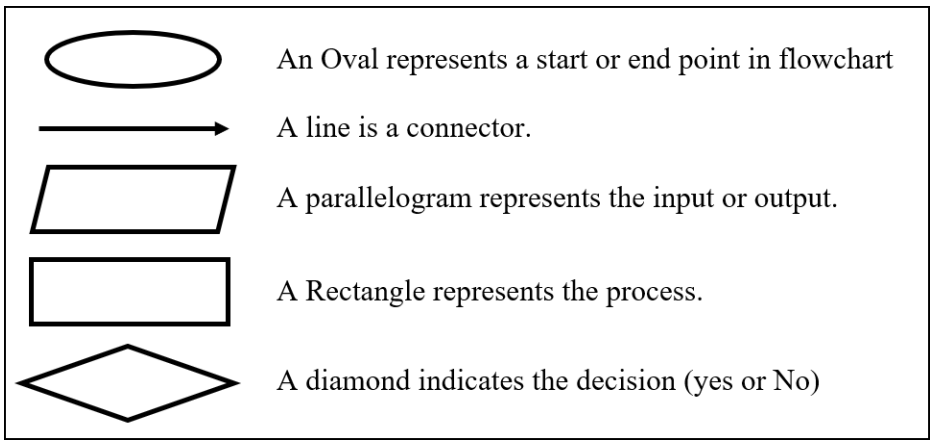
Computer Programming Languages

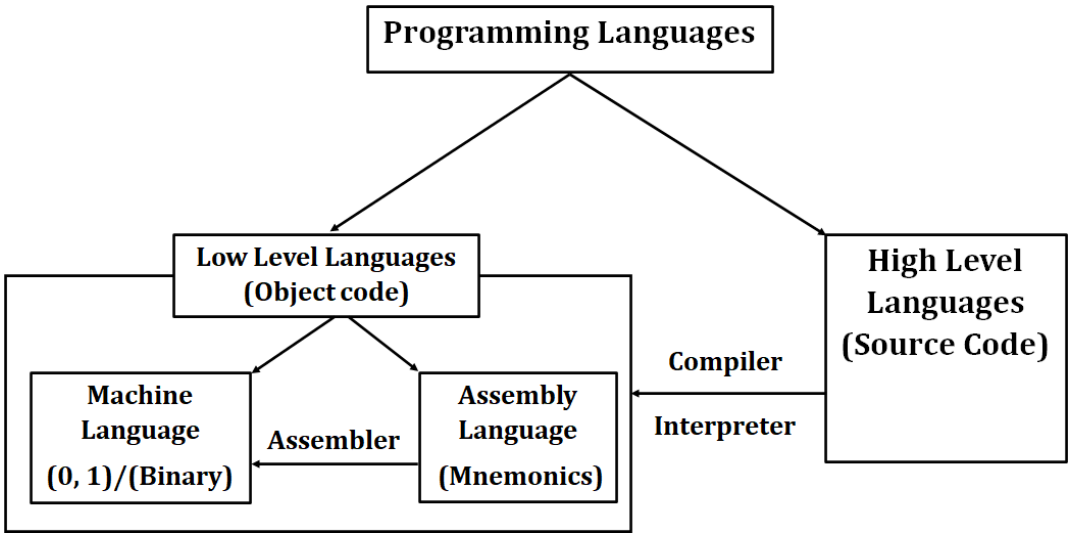
What is a Programming Language?

A set of words, symbols and codes used to write programs is called programming language. A programming language is a language that is designed to be used (read and written) by humans to create programs that can be executed by computers. In other words, we can say that programming languages provides the way so that the users may interact with the computer to give it commands and instructions to perform certain tasks.

Algorithm - Algorithm is step by step description that the program must perform to arrive the solution.

Flowchart - A graphical representation of an algorithm is known as a flowchart. Some symbols are used to design a flowchart





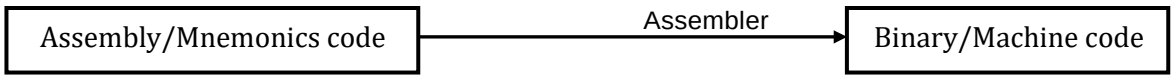
Machine Language

- A language in which instructions are written in binary form (0& 1) is called machine language.
- It is the only language that is directly understood by the computer.
- Machine language is also known as first generation language.
- It is a machine dependent language.
- Very fast program execution.
- Machine Language is difficult to understand.
- Machine Language requires deep knowledge of hardware.

Assembly Language

- Assembly language is computer language in which the instructions are created using symbols such as letters, digits and special characters.
- In assembly language, we use predefined words called **mnemonics Code**. Binary code instructions in low level language are replaced with mnemonics and operands in middle level language.
- Assembly language is known as second generation language.

- But computer cannot understand mnemonics. So, we use a translator to convert the assembly code (Mnemonics code) into machine understandable code. Converter is known as assembler.
- Assembly language is easier to learn, understand and modify than machine language.
- Assembly language programs are machine dependent. Assembly language programming requires deep knowledge of hardware. Execution of this is very slow than machine language.



High level language

- High level language is a computer language which can be understood by the users but the computer cannot understand it. High level language is very similar to the human languages and have a set of grammar rules that are used to make instructions more easily.
- Every high-level language has a set of predefined words known as reserved Keywords and a set of rules known as **Syntax** to create instructions.
- High level language needs to be converted into low level language to make it understandable by the computer. We use **Compiler** or **interpreter** to convert high level language to low level language.
- It is Easy to remove errors in the Programs written in High Level Programming Languages.
- Programs written in High Level Programming Languages are Machine independent.
- High Level Programming Languages have Better documentation. Less time to write a program.
- High level language needs to be translated to low level language.
- High level language executes slower compared to low level languages.

Difference between Interpreter and compiler

Interpreter	Compiler
1. Read a program line by line.	1. Read a whole program at a time.
2. No intermediate object code is Generated.	2. Intermediate object code is Generated.
3. Less Memory required.	3. More memory required.
1. Errors are displayed for every instruction interpreted (if any)	4. Errors are displayed after entire program is checked.

Loader: It loads the code which is translated by translator into the main memory and makes it ready to execute.

Linker is used to combine all the object files and convert them into a final executable program

Some Important High-level Languages

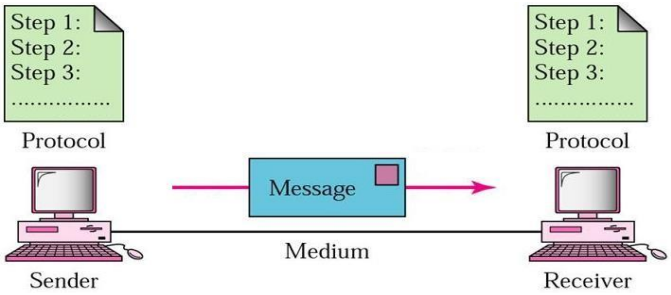
- **Fortran**- 1957, FORmula TRANSlation, by John Backus, Language for scientific computations. That's why it is known as scientific language.
- **ALGOL -** ALGOL is short for algorithmic language. It is an early high-level computer programming language devised to carry out scientific calculations. ALGOL was used as the standard method for creating algorithms. First appeared in 1958.
- **Lisp**- 1958, LISt Processing, by John McCarthy.
- **Cobol** - 1959, COmmon Business Oriented Language, by a group of computer professionals called the Conference on Data Systems Languages (CODASYL) by Grace Hopper.
- **BASIC** - 1964, Beginner's All-purpose Symbolic Instruction Code, by John G. Kemeny and Thomas E. Kurtz.
- **Pascal**- 1970, after the name of a French mathematician, by Nicklaus Wirth.
- **SQL**- 1970, Donald D. Chamberlin and Raymond F. Boyce, Language for Database, SQL was one of the first commercial languages to utilize Edgar F. Codd's relational model.
- **PL/ M**- 1972, Programming Language for Microcomputers, by Gary Kildall. High-level language for Intel's microprocessors.
- **Prolog**- 1972 by Alain Colmerauer. Logic programming. A language of Artificial intelligence.
- **C**- 1972, Designed by Dennis Ritchie to write the code of the UNIX operating system, Structured and procedural language.
- **MATLAB**- 1975-1978, by Cleve Moler. The scientific and mathematical language evolved to more diverse applications.
- **C++** - 1979 -1983, by Bjarne Stroustrup. It is an Object-oriented language. C++ was initially known as "C with classes," and was renamed C++ in 1983. ++ is shorthand for adding one to variety in programming, therefore C++ roughly means that "one higher than C."
- **PERL (Practical Extraction and Reporting Language)** Perl is a general-purpose programming language originally developed for text manipulation and now used for a wide range of tasks including system administration, web development, network programming, GUI development, and more. Perl was originally developed by Larry Wall in 1987.
- **HTML**- 1990-91, Hypertext Mark-up Language. 1991 by Tim Berners-Lee.
- **Visual Basic** - 1991, VB is a programming language from Microsoft first released. It is a user-friendly programming language designed for beginners, and it is a first graphical language.
- **Python**- 1991 by Guido van Rossum. Based on OOPs.
- **Java**- 1995, by James Gosling. it is an object-oriented Programming language, an internet language and a platform independent language.
- **PHP** -1995, Personal Home Page/Hypertext Processor, by Rasmus Lerdorf.
- **ASP** - 1996, by Microsoft, For web designing.
- **C#**- 2000, By Microsoft as an alternative to Java and derived from C++ too. It is an OOP based language.

- **Scripting Language -** Scripting languages are server-side scripting languages that manipulate the data, usually in a database, on the server. Scripting languages are used to create and manage Internet as a communications tool. Html, Xml, JavaScript, ASP, JSP, PHP, Perl are examples of scripting languages.

Computer Network

Data Communication - Exchange of data between two or more devices via some of the transmission medium such as wire/wireless.The effectiveness of a data communications system depends on four fundamental characteristics:

- Delivery - The system must deliver data to the correct destination.
- Accuracy - The system must deliver the data accurately.
- Timeliness - The system must deliver data in a timely manner.
- Jitter - Jitter refers to the variation in the packet arrival time.



Component used in data communication

- Sender, Receiver,
- Transmission medium,
- Message and Protocol

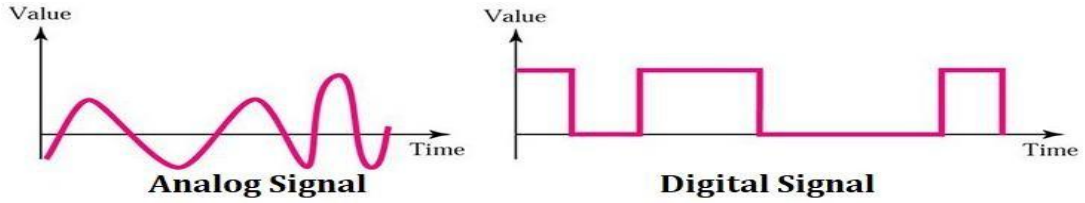
Data representation

- Text – (0 – 9), (A - Z), (a - z) and special symbols.
- ASCII– 7-bit code (American standard code or information interchange)
- BCD– 4-bit code (Binary coded decimal)
- EBCDIC– 8-bit code (Extended binary coded decimal interchange code)
- UNICODE– 16, 32-bit code (Universal code)
- Numbers– Numbers are directly converted into Binary.
- Images– Images are also represented by bit patterns. An Images is a composed of a matrix of Pixels.
- Audio– In the form of continuous signals.
- Video– It is a collection of images.

Signals

- To be transmitted, data must be transformed to electromagnetic signals.
- Data can be analog or digital.
- Analog data refers to information that is continuous. Ex: Human Voice, Analog clock.
- Digital data refers to information that has discrete state. Ex: Digital clock, Computer.

Analog signal	Digital signal
• An analog signal is a continuous wave.	• A digital signal is a discrete wave.
• Analog signal can have infinite number of values in a range.	• Digital signal can have a limited number of values.
• An analog signal transmit data in the form of a wave.	• A digital signal carries data in the binary form i.e. 0 and 1.
• Slow transmission.	• Fast transmission.



Data t ransmission modes

- **Simplex –** Unidirectional or one-way transmission one of the two devices can transmit the data and the other can only receive the data. for example: Remote, Radio, Keyboard, mouse etc.
- **Half Duplex –** Both sender and receiver can both transmit and receive, but not at the same time. For example: Walkie-talkie etc.
- **Full duplex –** Both sender and receiver can simultaneously transmit the data. For example: telephone.

Network – Computer network is a collection of two or more nodes and devices linked together for exchanging information, data or resources.

Types of Networks: Mainly there three networks in networking (LAN, MAN, WAN)

- **LAN (Local area network)** - A LAN is a group of computer and devices which are connected in a limited area such as school, home, and office building. Ethernet, bus network are the most common examples of LAN. It is a widely useful network for sharing resources like files, printers, games, and other application.
- **MAN (Metropolitan area network) -** MAN is consisting of a computer network across an entire city. The s ize of the Metropolitan area network is larger than LANs and smaller than WANs, but covers the larger area of a city or town. Cable TV is an example of MAN.
- **WAN (Wide Area Network)** - A WAN can cover large geographical area such as country, continent or even a whole world. Internet connection is an example of WAN. It is difficult to maintain the WAN network.

- **PAN (Personal Area Network)** - PAN offers to make connections of multiple devices or other equipment under the single user's environment within 10 meters to 30 feet. PAN network enables with few computer devices, telephones, electronic devices, laptop, PDAs, printers, smart phone, and other wearable computer devices.
  Wired PAN - physical wires can be used like as USB.
  Wireless PAN – In this network, wireless connections are established like as infrared, Bluetooth, NFC.
- **CAN (Campus Area Network)** - CAN network helps to link couples of LANs with small geographical space such as schools, university campuses, and corporate buildings. A CAN has main objective is that offer to best accessibility of campus residential regions such as schools, colleges, university, small institutes and corporate area.
- **SAN (Storage Area Network)** is a specialized, high-speed network that provides block-level network access to storage.
- **VPN (virtual private network)** extends a private network across a public network, such as the Internet. It enables users to send and receive data across shared or public networks as if their computing devices were directly connected to the private network.

Types of connection

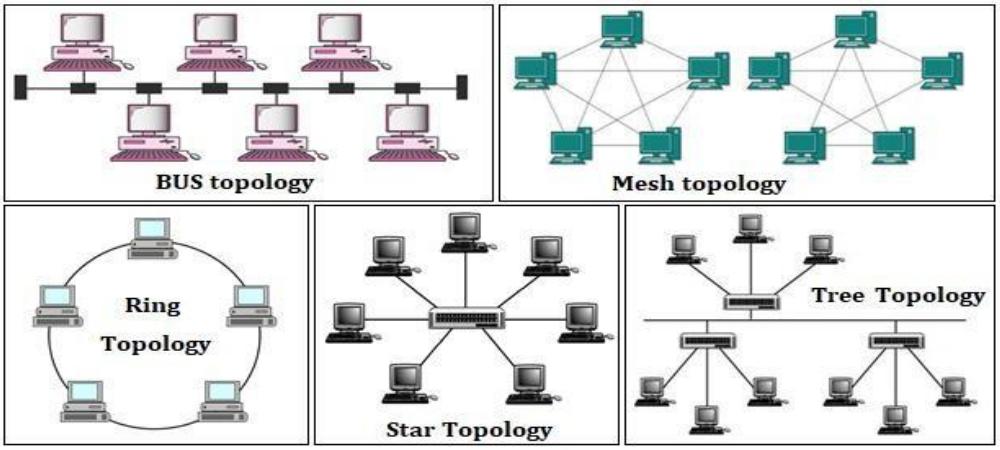
- **Point-to-point connection** – In which provides a dedicated link between two devices.
- **Multipoint connection** – In which more than two devices share a single link.

Network topology is the arrangement of the various elements (links, nodes, etc.) of a computer network. There are two basic categories of network topologies: Physical topologies and Logical topologies.

Various types of topologies are: Bus, ring, star, mesh and tree.

1. **Bus topology -** Bus topology is also called as a linear bus topology. All computers are connected to a central cable with Multipoint connection. Break in the cable cause whole network failure. Transmission speed is slow in bus topology. It provides unsecured medium. Terminators are used at the end of the central cable.
2. **Ring topology -** In ring topology, the structure of the network is formed similar to as of a "Ring". Nodes are connected in a circular manner to each other. It is an example of Point to point structure. Transmission speed is slow. Failure in any cable or device cause whole network failure. Ring topology provides unsecured medium security of data. In order for all computers to communicate with each other, all computers must be turned on.
3. **Star topology -** In this, all the nodes/devices are connected to a centralized device known as HUB in the structure similar to that of a "STAR". It is Point to point structure. Easily add and/or remove devices. It provides secured transmission. Problem identification is easy in star topology. Data communication is fast due to the HUB/Switch connectivity. Expensive due to the cost of cables and HUB/Switch. If central device fails, entire network will shut down.
4. **Mesh Topology -** In Mesh Topology, each node provides an individual link to another node. It means, every node in the entire network is directly connected to every other node in the network making it the most complex topology among all the other topologies. It is a Point to point Structure. Data communication speed is fast in mesh topology. Security and privacy of data is provided. Any fault in the network doesn't affect the entire network. Most expensive topology due to the amount of cables. Highly complex structure.
5. **Tree topology -** Tree topology is a combination of bus and star topology. Tree topology is made by connecting various star topologies via central bus backbone cable. It is also known a expended star topology. It is used for expansion of the

network. If central backbone cable or root device gets a problem then the whole network stops functioning. There are a lot of cables needed, so it is highly expensive. Expansion of Network is possible and easy.



Hybrid topology uses a combination of any two or more topologies in such a way that the resulting network does not exhibit one of the standard topologies.

Cloud computing is a type of Internet-based computing that provides shared computer processing resources and data to computers and other devices on demand.

Public c louds are owned and operated by companies that offer rapid access over a public network to affordable computing resources. A **private cloud** is infrastructure operated solely for a single organization, whether managed internally or by a third party, and hosted either internally or externally. A **hybrid cloud** uses a private cloud foundation combined with the strategic integration and use of public cloud services. Google Drive is a personal cloud storage service from Google which gives every user 15 GB of Drive storage space. One Drive is Microsoft's service for hosting files in the "cloud computing". One Drive offers 5GB of storage space for free.

Transmission media

Transmission media can be defined as something that can carry information from a source to a destination. Transmission media can be divided into two categories. Guided and Unguided media.

Guided Media

- **Twisted-Pair cables** - A twisted-pair cable consists of two conductors, each with its own plastic insulators, twisted together.
  - Unshielded Twisted Pair (UTP)
  - Shielded Twisted Pair (STP)
  - RJ-45 Connector is used to connect it.
- **Coaxial cables -** A coaxial cable is used in video, communications, and audio. Most users relate to a coaxial or coax cable as a cable used to connect their TVs to a cable TV service. However, these cables are also used in networks that allow a broadband cable Internet connection using a cable modem. BNC (Bayone-Niell-Concelman) connector is used to connect Coaxial cable.

- **Fibre optic cable -** A fiber optic cable contains optical fibers (usually glass) coated in plastic which are used to send data by pulses of light. Fiber optic cables allow for a much faster data transmission than standard copper wires, due to the fact that they have a much higher bandwidth. Connectors are used for connections are as follows:
  - SC (subscriber channel) – for cable TV
  - ST (Straight Tip) – for networking device
  - MT-RJ (mechanical transfer) like RJ-45

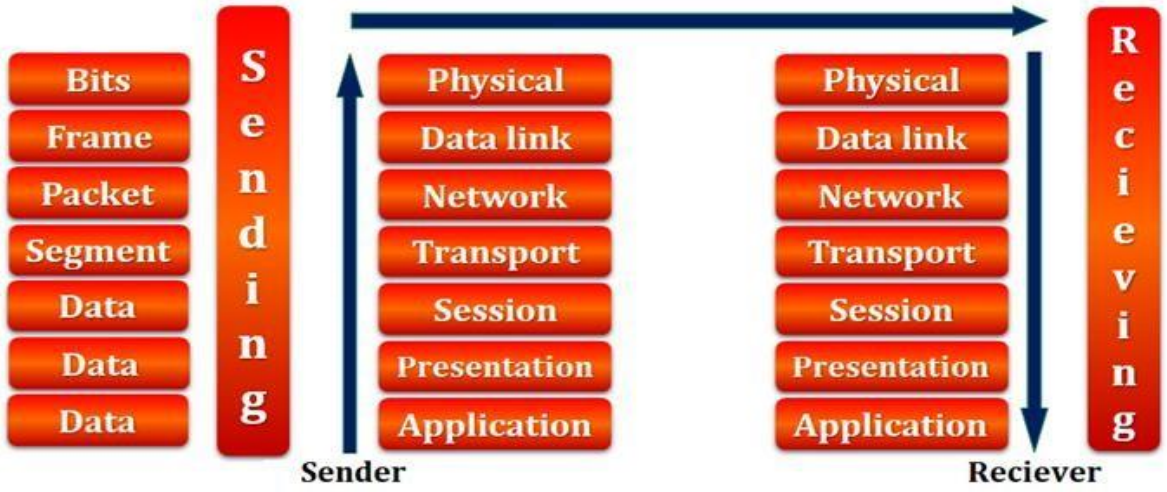
Unguided Media

Unguided medium transport electromagnetic waves without using a physical conductor. This type of communication is often referred to as wireless communication. **Radio waves f requency range** (3KHz – 1 GHz). Radio waves are used for multicast communications such as AM/FM Radio, TV, Cordless phones etc.

Microwaves f requency range (1 GHz – 300 GHz). Microwaves are used in unicast communications such as cellular phones, satellite networks and wireless LANs.

Infrared frequency range (300 GHz – 400 THz). Infrared signals are used in short range communication in closed area using line of sight. such as TV remote.

OSI MODEL OSI (Open system interconnection) model is an architecture or model, not a protocol. It describes "How to transfer the data from sender to receiver". In 1984, the OSI model was approved as international standard by ISO. It is a seven layered Model.



Functions of Layers

Physical layer – To define the specifications of medium. To convert the data in the form of bits and transmit it over medium. To define topologies, medium, speed, transmission modes.

Data Link Layer–Construction of data frame. Error detection and controlling. Data flow controlling. Physical addressing (Mac Addressing).

Network layer –Logical addressing (IP addressing), Routing and Packet delivery.

Transport layer –It provides a reliability of error free, end to end data delivery and correct destination. Segmentation and reassembly.

Session layer – Time management, communication controlling, Synchronization.

Presentation layer –Data is presented in the form size, type, encryption-decryption and compression.

Application layer –It provides a user interface or platform to transmit or receive the data. Example web browser.

Protocols and standards work on OSI Layers

Physical	Ethernet and WIFI standards
Data link	PPP, SLIP
Network	IP (IPV4, IPV6), ICMP, IGMP, OSPF, ARP, RARP
Transport	TCP, UDP
Session	SAP, SQL
Presentation	JPEG, MIDI, MIME
Application	HTTP, HTTPS, WWW, TELNET, SNMP, SMTP, POP, DNS, DHCP, FTP, WAP

HTTP	- Hypertext transfer Protocol	MIME	- Multipurpose Internet Mail Extension
HTTPS	- Hypertext transfer Protocol Secured	SAP	- Session Announcement Protocol
WWW	- World Wide Web	SQL	- Structured Query Language
Telnet	- Terminal Network	TCP	- Transmission Control Protocol
SNMP	- Simple Network Management Protocol	UDP	- User Datagram Protocol
SMTP	- Simple Mail Transfer Protocol	ICMP	- Internet control Message Protocol
POP	- Post Office Protocol	IGMP	- Internet Group Management Protocol
DNS	- Domain Name System/Server	OSPF	- Open Shortest Path First
DHCP	- Dynamic Host Configuration Protocol	ARP	- Address Resolution Protocol
FTP	- File Transfer Protocol	RARP	- Reverse ARP
WAP	- Wireless Application Protocol	PPP	- Point to Point Protocol
JPEG	- Joint Photographic Experts Group	SLIP	- Serial Line Internet Protocol
MIDI	- Musical Instrument Digital Interface		

Connecting Devices

Gateway – It works on all the layers of OSI model. Gateway is a combination of Software and hardware. It is used to connect different types of two or more networks having different protocols, services and environments.

Bridge - It works on data link layer of OSI Model. It is used to connect same or similar types of two or more networks. It is also used to divide a big network into two or more small networks.

Router It works at the Network Layer. It sends the data packets to desired destination by choosing the best path available thus reducing network traffic Router works as a data traffic controller in a network. Addressing and routing are the functions of Router.

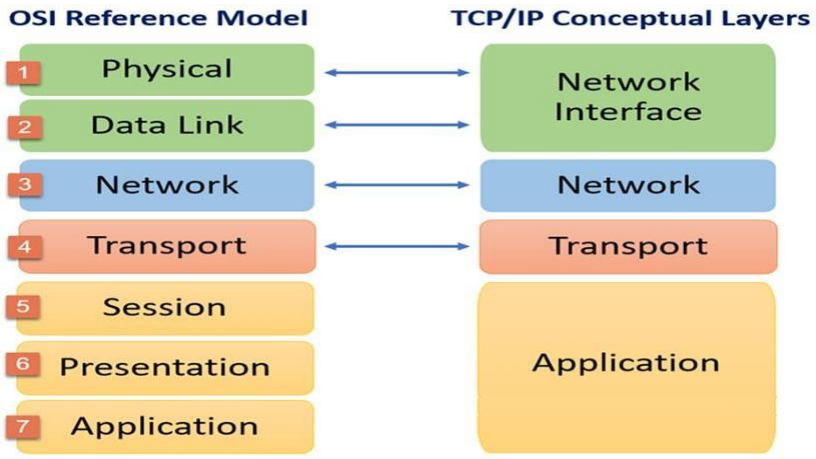
MODEM - Modulator and demodulator is the full-form of MODEM. It works on Physical layer. The function of MODEM is Modulation and demodulation. Modulation means Digital to analog or Demodulation means analog to digital. It is used to connect computers for communication via telephone lines.

Hub: It works at the Physical layer. It just acts like a connector of several computers i.e. simply connects all the devices on its ports together. It broadcasts all the data packets arriving at it with no filtering capacity.

Switch: It works at the Data Link Layer. It is used for dividing a network into segments called subnets. It provides filtering of data packets and prevents network traffic also. A switch is also known as an intelligent hub.

Repeater – It works in physical layer. Repeaters are used to recharge or regenerate or re-boost the week signals to transmits the signals for long distance.

TCP/IP Model



MAC address - It is also known as Physical address of our system. The size of MAC address is 48 Bits/6 Bytes.MAC address works on Data link layer of OSI model.MAC address is of Hexadecimal format. Format of MAC address is

07 : 01 : 02 : 22 : 3C : 4D

Manufacturer ID Ethernet Card Serial Number

IP address - IP address is used to uniquely identify a system in a network. It is also known as Logical address of our system. It is of two type as followsIPV4 (32bits/4Bytes) and IPV6 (128bits/16Bytes). Format of IPV4 Address is 252.50.100.10

Format of IPV6 Address is FDEC: 790B:45DE:0000:0001:1239: CDFA:AD38

Class	Starts with	Binary range	Decimal Value range	Maximum subnets	Maximum hosts	Routing mask
A	0	00000000-01111111	0-127*	127	16,777,214	255.0.0.0
B	10	10000000-10111111	128-191	16,384	65,534	255.255.0.0
C	110	11000000-11011111	192-223	2,097,152	254	255.255.255.0
D	1110	11100000-11101111	224-239			
E	1111	11110000-11111111	240-255			

* The 0 octet is forbidden in the RFC, and 127 is reserved for loopback testing.

Loopback addresses are used to find out the current status of hardware (related to networking), whether these are working properly or not. Range of loopback address is (127.0.0.1 – 127.255.255.255).

Public IP address: A public IP address is the address that is assigned to a computing device to allow direct access to internet. IT can be found at **www. whatismyipaddress.com.** Some authorities are responsible to manage these public addresses.

- ICANN : Internet Corporation Authority Name and Numbers
- IANA : Internet Assigned Name and Numbers
- RIR : Regional Internet Registry
- ISP : Internet Service provider

Private IP address: Private IP addresses are locally unique. It is used in private networks. These addresses are commonly used for local area networks in residential, office, and enterprise. There are three classes - A Class:(10.0.0.0 to10.255.255.255), B Class :(172.16.0.0to172.31.255.255), C Class:(192.168.0.0to192.168.255.255)

Static IP address: A permanent address that is assigned to a host by network administrator. It means for manual configuration. Less secure. Does not changes automatically after it is assigned to a computer.

Dynamic IP address: A Temporary address that is assigned to a host by automatically by DHCP Sever. It means for Automatic configuration More secure as compared to Static IP. Changes automatically if connection is reset or DHCP Lease expires.

APIPA – (Automatic Private IP addressing) APIPA is a special feature of windows operating system that enables computer to automatically self-configure an IP address and subnet mask when DHCP server is not reachable.

Internet

The **Internet** is a global system of interconnected computer networks that use the standard Internet protocol suite(TCP/IP) to link several billion devices worldwide.

It is a **network of networks** that consists of millions of private, public, academic, business, and government networks, of local to global scope, that are linked by a broad array of electronic, wireless, and optical networking technologies

History of internet

1962 –The concept of the Galactic Network was created by J.C.R. Licklider.

1969 – ARPANET (Advance research project agency) First network of world.

1971 – Email (@) by Ray Tomlinson.

1973 – Vinton "Vint" Cerf and Robert E. "Bob" Kahn start a project to develop Transmission-Control Protocol (TCP).

1973-74 – Ethernet by Robert Metcalfe.

1974 – Bob Kahn and Vint Cerf refer to the term "Internet" for the first time in their notes regarding Transmission Control Protocol.

1977 – First modem by Dennis Hayes.1983 – TCP/IP became the standard communication method for ARPANET.1983-84 – The Domain Name System (DNS) establishes the familiar .edu, .gov, .com, .mil, .org, .net, and .int system for naming websites. This is easier to remember than the previous designation for websites.

1989 – WWWC (World Wide Web Consortium).

1990-91 – The first web browser, called World Wide Web, was created by Sir Tim Berners-Lee.

1990 – Archie search engine (first search engine) by Alen Emtage.

1993 – First Graphical browser MOSAIC, by Marc Andreessen, at NCSA.

1995 – Internet launched in India by VSNL.

What are Domain Names.

Domain names are enabled computers to find the server where your website is hosted.

Types of Domain:1. Top level Domain.2. Sub domain.

List of Domains

.com – Commercial Organizations

.org – non-profit organizations

.info - Information service providers

.edu - Educational institutions

.ac.in - Academics in India

.gov - Govt. websites

.Int - International Organizations

.mil - Military groups

.def - Defense sites

.co.in - commercial in India

.net - network centers

.aero - Airlines and aerospace sites

.biz - Businesses or firms

URL Address

URL stands for Uniform Resource Locator, or in other words, the web address of an online resource, i.e. a web site or document. Sometimes people understand (www.abc.com) a URL, but it is not URL. It is a part of URL. Example -

HTTPS://www.xyz.com/asdef/jopl?color=bk&Positivity=False

Web browsers – It is an example of application software. It provides a platform to access the services of internet or a network. Examples – WWW (World Wide Web) – first web browser of world. It renamed as NEXUS.

Mosaic – it was the first graphical web browser.

Some other examples of browsers are LYNX, Arena, Netscape Navigator, opera, Internet explorer, Amaya, Mozilla Firefox, phoenix, safari, google chrome, Epic (Indian), Microsoft Edge etc.

Search engine - A search engine is an online tool that searches for results in its database based on the s earch query (keyword) submitted by the internet user. Search engines find the results in their database, sort them and make an ordered list of these results based on the search algorithm. This list is generally called the search engine results page (SERP). There are many search engines on the market, while the most widely used is Google. Some other examples are Archie (First search engine in the world developed by Alan Emtage), Veronica, Gopher, Excite, Aliweb, Altavista, Lycos, Yahoo, Looksmart, Hotbot, Ask.com, Bing, google, all the web, Baidu, Cuil etc.

A **Hyperlink** is a reference to data that the reader can directly follow either by clicking or by hovering or that is followed automatically.

A **Website** is a set of related web pages served from a single web domain.

A **Home page, index page,** or **main page** is a page on a website.

Computer malware and security

Malware - Malware is stands for malicious software. It is small program that can come in our system form anywhere and then infects or harms our system. Virus, Worm, Trojan horse, Spyware, Adware, Rootkit, Key loggers, Logic bomb, Ransomware.

VIRUS (Vital Information resource under siege)A **virus** is a program that replicates its own code by attaching itself to other executable files in such a way that the virus code is executed when the infected executable file is executed. Almost all viruses are attached to an executable file, which means the virus may exist on a system but will not be active or able to spread until a user runs or opens the malicious host file or program. Types of viruses are File Virus, Macro Virus, Multipart ite Virus, Boot sector Virus/Master Boot Record Virus, Stealth Virus, Cavity (Space Filler) Virus, Tunneling Virus, Polymorphic Virus, Cluster Virus.

WORM (Write once read many) -A computer worm is a program that replicates itself and makes use of a PC's network connectivity to transfer a copy of itself to other computers within that network. Worms are distinct from viruses in that they do not require a host program to run.

Trojan Horse - In computing, Trojan horse, or Trojan, is any malicious computer program which is used to hack into a computer by misleading users of its true intent. By definition a Trojan does not self-replicate. Like the horse, a Trojan program is a delivery vehicle; the Trojan horse appears to be a very useful program of some type but when a certain event occurs, it does something nasty and often destructive to the system.

Spyware is a type of malware that is installed on a user's computer to collect personal information or monitor internet browsing activities.

Rootkit is an application that hides its own presence or presence of other malwares on the computer, using some of the lower layers of the operating system (API function redirection, using of undocumented OS functions, etc.), which makes them almost undetectable by common anti-malware software.

Adware is software that contains advertisements embedded in the application. Adware is considered a legitimate alternative offered to consumers who do not wish to pay for software.

Keylogger - A keylogger is a type of surveillance software that has the capability to record every keystroke you make to a log file, usually encrypted. A key logger recorder can record instant messages, e-mail, and any information you type at any time using your keyboard.

Logic Bomb - A **logic bomb** is a piece of code inserted into an operating system or software application that implements a malicious function after a certain amount of time, or specific conditions are met.

Ransomware- It is a type of malicious software designed to block access to a computer system until a sum of money is paid.

Bot, Zombie and Botnet - A bot is an abbreviation for "robot" and denotes a type of software, application, or code script that can be commanded remotely by the attacker. After a device has been infected by a bot, the infected computer is now referred to as a **zombie**, because it is being remotely animated by the attacker. One zombie under the control of a bot is a useful thing to an attacker, but their usefulness increases in groups. Attackers will attempt to infect dozens, hundreds, or thousands of computers with the same bot and unify to perform coordinated malicious activities.

Hacking, Hacker and Cracker - In computer networking, **hacking** is any technical effort to manipulate the normal behavior of network connections and connected systems. A **hacker** is any person engaged in hacking. Malicious attacks on computer networks are officially known as **cracking**.

Types of Hacking

1. Ethical hacking (Legal hacking)
2. Non-ethical hacking (Illegal)

Types of hackers

1. White hat hackers (Ethical hacking)
2. Black hat hackers (Non-Ethical hacking)
3. Gray Hat hackers (Combination of both black and white hat hackers)
4. Script Kiddie (not a professional, but use download software for hacking).

Phishing - Phishing is the attempt to acquire sensitive information such as usernames, passwords, and c redit card details (and sometimes, indirectly, money) by masquerading as a trustworthy entity in an electronic communication.

Packet Sniffing Packet sniffing is the act of capturing packets of data flowing across a computer network. The software or device used to do this is called a packet sniffer.

Spoofing– A spoofing attack is when an attacker or malicious program successfully acts on another person's (or program's) behalf by impersonating data.Some common types of spoofing attacks include ARP spoofing, DNS spoofing and IP address spoofing. These types of spoofing attacks are typically used to attack networks, spread malware and to access confidential information and data.

Snooping – Snooping refer to listening to a conversation. For example, if you login to a website that uses no encryption, your username and password can be sniffed off the network by someone who can capture the network traffic between you and the web site.

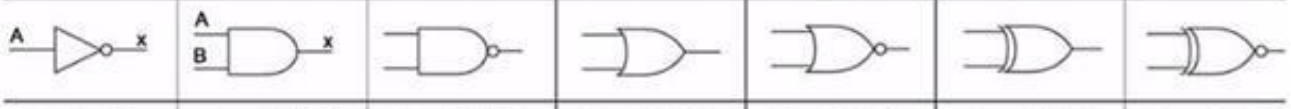
Firewall–A computer firewall is a software program that prevents unauthorized access to or from a private network. Firewalls are tools that can be used to enhance the security of computers connected to a network, such as LAN or the Internet.

Authentication–to verify the user id and password

Authorization– to verify permission, rights and authority assigned to a particular user to perform some task.

Logic Gates

NOT	AND	NAND	OR	NOR	XOR	XNOR
$\overline{A}$	AB	$\overline{AB}$	$A+B$	$\overline{A+B}$	$A \oplus B$	$\overline{A \oplus B}$



A	X
0	1
1	0

A	B	X
0	0	0
0	1	0
1	0	0
1	1	1

A	B	X
0	0	1
0	1	1
1	0	1
1	1	0

A	B	X
0	0	0
0	1	1
1	0	1
1	1	1

A	B	X
0	0	1
0	1	0
1	0	0
1	1	0

A	B	X
0	0	0
0	1	1
1	0	1
1	1	0

A	B	X
0	0	1
0	1	0
1	0	0
1	1	1

AND Gate - The AND gate is an electronic circuit which gives a high output only if all its inputs are high. The AND operation is represented by a dot (.) sign. AND gate is also known as conjunction gate.

OR Gate - The OR gate is an electronic circuit which gives a high output if one or more of its inputs are high. The operation performed by an OR gate is represented by a plus (+) sign. OR gate is also known as Disjunction gate.

NOT Gate - The NOT gate is an electronic circuit which produces an inverted version of the input at its output. It is also known as an Inverter. The operation of NOT gate is also known as Complement or 1's Complement.

NAND Gate - The NOT-AND (NAND) gate which is equal to an AND gate followed by a NOT gate. The NAND gate gives a low output only if all its inputs are high. The NAND gate is represented by a AND gate with a small circle on the output. The small circle represents inversion.

NOR Gate - The NOT-OR (NOR) gate which is equal to an OR gate followed by a NOT gate. The NOR gate gives a low output if any one of the inputs are high. The NOR gate is represented by an OR gate with a small circle on the output. The small circle represents inversion.

XOR Gate - The 'Exclusive-OR' gate is a circuit which will give a high output if only one of its inputs is high but not both of them. The XOR operation is represented by an encircled plus sign.

XNOR Gate - The 'Exclusive-NOR' gate is a circuit that does the inverse operation to the XOR gate. It will give a low output if only one of its inputs is high but not both of them. The small circle represents inversion.

Database management system

Database: It is a collection of interrelated data. These can be stored in the form of tables.

Database Management System: "DBMS is a collection of interrelated data and set of programs that enables user to create and maintain a database."

Examples of database softwares: Sybase, dbase, D2K, DB2, Oracle, My SQL, MS SQL Server, FileMaker, Informix, MS Access etc.

Sequence of data - Bit → Byte/character → Field → Record → File/Table → Database File Oriented approach: In this approach all data stored in various files of different formats, and it needs different applications to extract data from / add data to files, so it is very difficult to use in proper way. Disadvantages of file-oriented approach:

- Data redundancy – Repetition of data.
- Data inconsistency – No proper updation of data in all files.
- Difficulty in accessing data – Accessing of data is very difficult.
- Data isolation – Creating application of every file of different format and location is very difficult.
- Integrity Problems – No proper validation of data in file approach.
- Atomicity – Data is not saved during any type of failure.
- Concurrent access – Same data accessed, deleted, updated at same time, it will lead to inconsistent data.

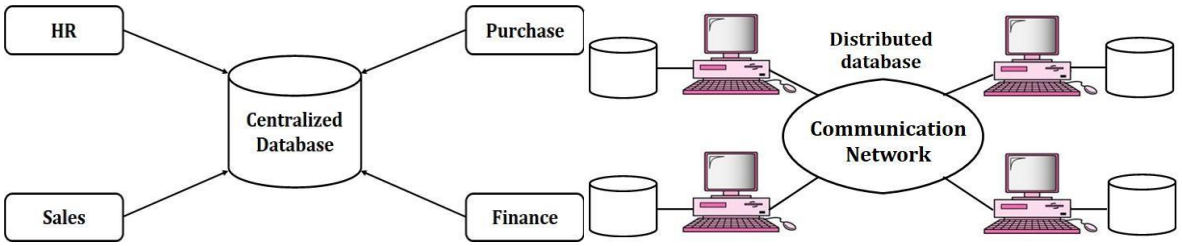
To get rid of these problem database management system presents.

Architecture of DBMS-The generalized architecture of DBMS is called ANSI/ SPARC model. The architecture is divided into three levels:

• **External v iew or user view/View Level-** It is the highest level of data abstraction. This includes only those portions of database of concern to a user or Application program. Each user has a different external view and it is described by means of a scheme called external schema.

• **Conceptual view/Logical Level-** All the database entities and the relationship among them are included. One conceptual view represents the entire database called conceptual schema.

• **Internal view/Physical Level-** It is the lowest level of abstraction, closest to the physical storage method. It describes how the data is stored, what is the structure of data storage and the method of accessing these data. It is represented by internal schema.**Centralized Database-** In a centralized database, all data is stored and maintained in one place. In a centralized database system one computer act as a server for storing whole data. In a centralized database system, client/server architecture is used it is the very simplest form of a database system in which one client sent a request to the server. The server will receive a request and will be the response.



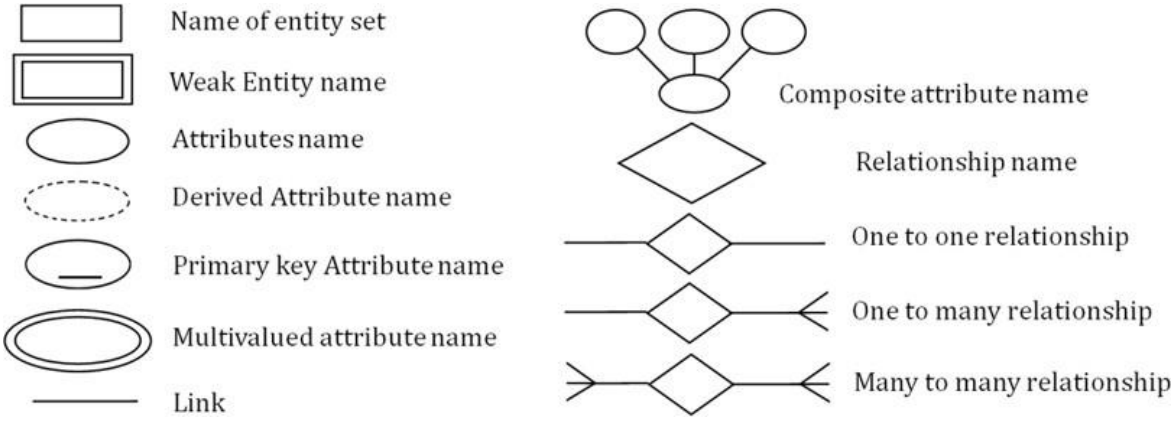
Distributed Database- A distributed database contains two or more database files located at different locations in the network. In other words, the database is split into multiple files. The users can access the nearest database file. This will increase the speed of retrieving data. This avoids users from interfering with each other. Another advantage is that if one database fails, there are other database files.

Types of Databases model - Hierarchical database model, Network Database Model, E-R database model, Relational database model

Hierarchical Database model - In a hierarchical database model, the data is organized into a tree-like structure. In simple language we can say that it is a set of organized data in tree structure. Its structure is like a tree with nodes representing records and branches representing fields.

Network Database model - Network database model organized data more like a graph and can have more than one parent node.

E. R. Database model - Full form of E. R. model is **Entity Relationship data model**. It is a high-level conceptual data model diagram. The Entity-Relation model represents real-world entities and the relationship between them.



Relational Database model - In relational model, the data and relationships are represented by collection of inter-related tables. Each table is a group of column and rows, where column represents attribute of an entity and rows represents records.

- **Attribute** – Attributes are the properties which define a relation.
- **Tables** – In the Relational model the relations are saved in the table format. It is stored along with its entities. A table has two properties rows and columns.
- **Tuple** – It is nothing but a single row of a table.
- **Relation Schema** – A relation schema represents the name of the relation with its attributes.
- **Degree** – The total number of attributes which in the relation.
- **Cardinality**– Total number of rows present in the Table.
- **Relation instance** – The set of tuples of a relation at a particular instance of time is called as relation instance.
- **Attribute domain**– Every attribute has some pre-defined value and scope which is known as attribute domain.

- **Primary Key** is used to uniquely identify each record in a table.
- **Primary Key – Unique + Not Null**
- When a master table contribute its own primary key to another table, then the contributed key of another table is known as **foreign key or reference key.**

SQL – Structured Query Language- SQL is a special purpose query language, designed for create or manage the RDBMS. The SQL programming language was first developed in the 1970s by IBM researchers Raymond Boyce and Donald Chamberlin.

SQL is divided in four major parts

DDL (Data definition language) - Commands - Create/Alter/Drop/Rename/Truncate

DML (Data Manipulation Language) – Commands – Select/Insert/Update/Delete

DCL (Data control language) - Commands – Grant/Revoke

TCL (Transaction Control Language) –Commands – Commit/Rollback/Savepoint.

File Name

A filename is a text string that identifies a file. Every file stored on a computer's hard disk has a filename that helps identify the file within a given folder. Filenames may contain letters, numbers, and other characters. Different operating systems also have different limits for the number of characters a filename can have. While older operating systems limited filenames to only 8 or 16 characters, newer OS's allow filenames to be as long as 256 characters. Of course, for most practical purposes, 16 characters is usually enough.

A file extension (or simply "extension") is the suffix at the end of a filename that indicates what type of file it is. For example, in the filename "myreport.txt," the .TXT is the file extension. It indicates the file is a text document.

List of some important File extensions for exams

- .doc - Microsoft Word Document file used by version 2003 and earlier.
- .docx - Microsoft Word Document file used by version 2007 and later.
- .dot - Microsoft Word document template file
- .docm - Microsoft Word document Macro file
- .xls - Microsoft excel file used by version 2003 and earlier.
- .xlsx - Microsoft excel file used by version 2007 and later.
- .ppt - Microsoft Power-point presentation used by version 2003 and earlier.
- .pptx - Microsoft Power-point presentation used by version 2007 and later.
- .pps - Microsoft Power-point slideshow used by version 2003 and earlier.
- .ppsx - Microsoft Power-point presentation used by version 2007 and later.
- .mdb - Microsoft Access database file used by version 2003 and earlier.
- .mdbx - Microsoft Access database file used by version 2007 and later.
- .mp3 - Audio file, originally defined as the third audio format of the MPEG-1 standard
- .mp4 - MP4 or MPEG-4 AVC (Advanced Video Coding)

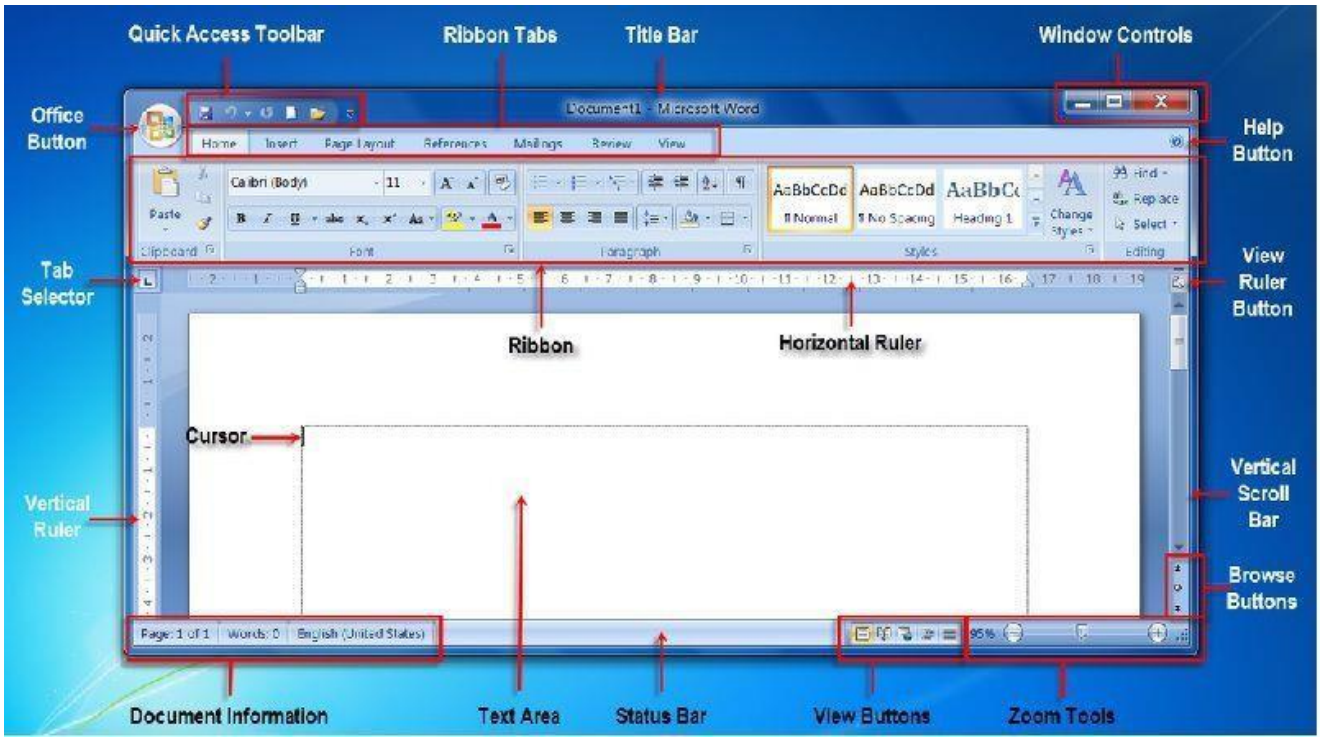
- .bak - Back up file.
- .bat - Batch file
- .txt - Text file (Notepad file)
- .rtf - Rich text format file
- .sys - System file
- .exe - Executable file
- .dll - Dynamic link library file
- .dat - data file
- .ini - Initialization file
- .fnt - Font file
- .ttf - True type font file
- .otf - OpenType font file
- .apk - Android Package kit
- .config - configuration file
- .jpeg - joint photographic expert group
- .gif - Graphics interchange format file
- .ico - Icon file
- .c - C language file
- .h - Header file
- .cpp - C++ language file
- .java - Java file
- .js - Java Script file
- .pl - Perl language
- .Py - Python Language file
- .rb - Ruby Language file
- .vbs - Visual Basic Script file
- .php - Hypertext Preprocessor
- .cs - C sharp language File (C#)
- .css - Cascading Style sheet
- .htm/html- Hypertext mark-up language
- .xhtml - Extensible Hypertext mark-up language
- .wml - Wireless mark-up language
- .xml - Extensible Mark-up language
- .gml - Geographical Mark-up language
- .asp - Active server page
- .jsp - Java server page
- .ico - Icon file
- .com - Command file
- .ptr - Pointer file
- .zip - Compressed file of WinZip
- .ar - Archive file
- .jar - Java archive file
- .swa - Shockwave audio file
- .midi - Musical instrument digital interface
- .bin - Binary file
- .cab - Cabinet file
- .lib - Library file
- .iso - disk image file
- .sdk - Software development file
- .jdk - Java development file
- .cad - computer aided design file (AutoCAD file)
- .123 - Lotus 1-2-3 file (spreadsheet file like excel)
- .sql - Structured query file
- .tif/tiff - Tagged image format file
- .wma - Window media audio file
- .wmv - Window media audio file
- .avi - Audio video interleave file
- .mpeg - Motion/Moving picture expert's group
- .flv - Flash video file
- .vob - Video object file
- .mkv - Matroska Video file
- .obj - Object file
- .rar - Roshal archive file
- .mime - Multipurpose internet mail extension
- .drv - Drivers file
- .vxd - Virtual device driver file
- .AI - Adobe Illustrator file
- .cdr - coral draw file
- .psd - photoshop file
- .pub - publication file
- .pdf - portable document format file
- .Pkg - package file
- .Png - portable network graphics file
- .temp - temporary file

MS-Office

Microsoft Office, or simply **Office**, is a family of client software, server software, and services developed by Microsoft. It was first announced by Bill Gates on August 1, 1988, at COMDEX in Las Vegas. Initially a marketing term for an office suite (bundled set of productivity applications), the first version of Office contained Microsoft Word, Microsoft Excel, and Microsoft PowerPoint.

It includes Outlook, OneDrive, Word, Excel, PowerPoint, OneNote, Access, and Publisher. **Microsoft Office 2019** is the current version of Microsoft Office, a productivity suite, succeeding Office 2016. Famous versions of MS-office are Office 1.0, 95, 97, 2000, XP, 2003, 2007, 2010, 2013, 2016 and 2019.

MS-Word



Microsoft Word is a word processor developed by Microsoft. It is used for creating, editing, formatting, storing, retrieving and printing of a text document. Microsoft Word's native file formats are denoted either by a .doc or .docx file extension.

Tabs of MS-Word- File, Home, Insert, design, Layout, References, Mailing, Review, and View. **The File tab** opens the Info Window and has options arranged in a vertical array: Info, New, Open, Save, Save As, Print, Share, Export, Close, Account, Feedback and Options.

The ribbon containing Tabs also have a new feature of Share and Comment at the extreme right corner.

Note- Each tab has many commands which are grouped into specific categories. Following are the groups for commands under various tabs of MS Word:

Home : Clipboard, Font, Paragraph, Styles and Editing

Insert : Pages, Tables, Illustrations, Add-ins, Media, Links, Comments, Header & Footer, Text, Symbols

Design : Document Formatting, Page Background

Layout : Page Setup, Paragraph, Arrange

References: Table of Contents, Footnotes, Research, Citation &Bibliography, Captions, Index, Table of Authorities

Mailings: Create, Start Mail Merge, Write &Insert Fields, Preview Results, Finish

Review: Proofing, Accessibility, Language, Comments, Tracking, Changes, Compare, Protect

View : Views, Page Movement, Show, Zoom, Window, Macros

Help : Help

Page Orientation - Portrait and Landscape options are available in Orientation category of Page Setup.

Alignments- Alignment refers to the position of text between the margins. Left/ Right/ Center/ Justify

Auto complete - Auto complete is a feature in word that automatically completes the spelling of days of the week and months of the year that have more than five letters in their names.

Header & Footer -Header and Footer option is used to display information such title and page number of the document.

Title Bar - The bar at the top of the window that bears the name of the window.

Menu bar/Tab Row - A screen element of MS Word that is usually located below the title bar that provides categorized option, is called Menu Bar(in older Version)/ Tab Row(in newer Version).

Editing - To change the value of data is known as editing.

Formatting - To change the look and appearance of data.

Format Painter -To copy the styles and formatting of text and then apply it to another text.

Indents- In word processing, the word indent is used to describe the distance, or number of blank spaces used to separate a paragraph from the left or right margins. Left, Right, First Line and Hanging Indent.

Margins- the strips of white space around the edge of the paper. Most word processors allow you to specify the widths of margins. Left, Right, Top, Bottom.

Case –

1. **Sentence case** (Only first letter of sentence is capital).
2. **Lower case** (All letters of sentence are small).
3. **Upper case** (All letters of sentence are capital).
4. **Capitalize each word** (Only first letter of each word in a sentence is capital).
5. **Toggle case** (in this all capital letters are converted into small letters and all small letters are converted into capital letters).

Superscript - A symbol or character that appears slightly above a line.

Subscript - A symbol or character that appears slightly below a line is called a subscript.

Font Size - Range of font size (1 to 1638).

Table- A combination of rows and columns. Total number of rows in a table – 32767. Total number of columns in a table – 63.

Watermark- A watermark is a faded background image that displays behind the text in a document.

Mail merge-Mail Merge is a useful tool that allows you to produce multiple letters, labels, envelopes, name tags, and more using information stored in a list, database, or spreadsheet. When performing a Mail Merge, you will need a Word document (you can start with an existing one or create a new one) and a recipient list, which is typically an Excel workbook.

Footnote - A footnote is additional information found at the bottom of the current page in a document.

Endnote - An endnote is similar, but they are only found at the end of a document and contain reference information about quoted material.

Hyperlink-A hyperlink is a word, phrase, or image that you can click on to jump to a new document or a new section within the current document. (Ctrl + Click).

Macros- A macro is a series of commands (Shortcuts and recording) that is recorded so it can be played back (executed) at a later time. Macros are great for reducing the amount of work you have to do on a series of steps that you perform frequently.

Thesaurus- Thesaurus is used for finding a synonym for a word in the document.

Some important shortcut keys used in MS-

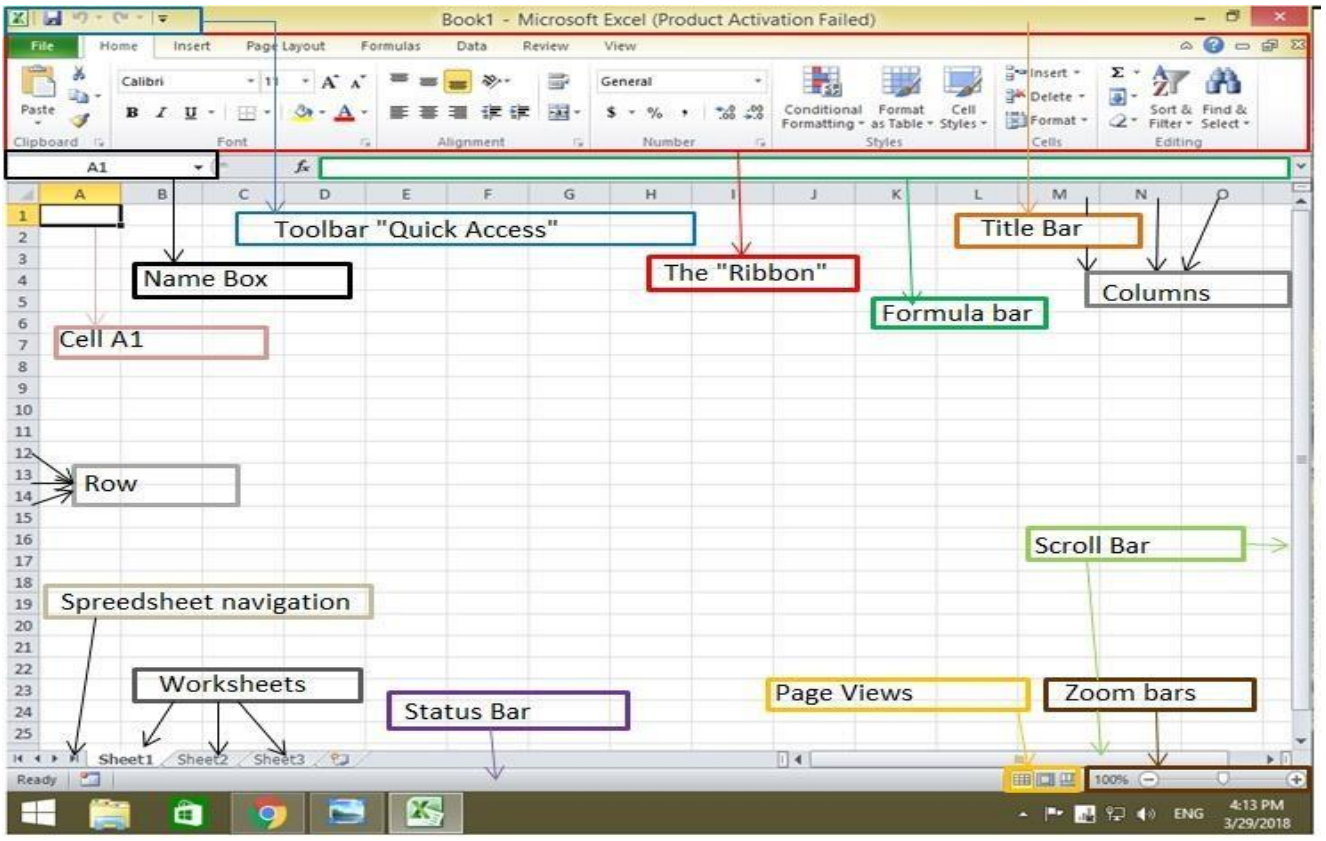
Word

Ctrl+0	Toggles 6pts of spacing above the paragraph.
Ctrl+A	Select all contents of the page.
Ctrl+B	Bold highlighted selection.
Ctrl+C	Copy selected text.
Ctrl+D	Open the font preferences window.
Ctrl+E	Aligns the line or selected text to the center of the screen.
Ctrl+F	Open find box.

Ctrl+I	Italic highlighted selection.
Ctrl+J	Aligns the selected text or line to justify the screen.
Ctrl+K	Insert a hyperlink.
Ctrl+L	Aligns the line or selected text to the left of the screen.
Ctrl+M	Indent the paragraph.
Ctrl+N	Opens new, blank document window.
Ctrl+O	Opens the dialog box or page for selecting a file to open.
Ctrl+P	Open the print window.
Ctrl+R	Aligns the line or selected text to the right of the screen.
Ctrl+S	Save the open document. Like Shift+F12.
Alt+F, A	Save the document under a different file name.
Alt+X	Show the Unicode code of a highlighted character.
Ctrl+T	Create a hanging indent.
Ctrl+U	Underline the selected text.
Ctrl+V	Paste.
Ctrl+W	Close the currently open document.
Ctrl+X	Cut selected text.
Ctrl+Y	Redo the last action performed.
Ctrl+Z	Undo last action.
Ctrl+Shift+L	Quickly create a bullet point.
Ctrl+Shift+F	Change the font.
Ctrl+Shift+>	Increase selected font +1pts up to 12pt and then increase font +2pts.
Ctrl+]	Increase selected font +1pts.
Ctrl+Shift+<	Decrease selected font -1pts if 12pt or lower; if above 12, decreases font by +2pt.
Ctrl+[	Decrease selected font -1pts.
Ctrl+/+c	Insert a cent sign (¢).
Ctrl+Shift+*	View or hide non printing characters.
Ctrl+<left arrow>	Moves one word to the left.
Ctrl+<right arrow>	Moves one word to the right.
Ctrl+<up arrow>	Moves to the beginning of the line or paragraph.
Ctrl+<down arrow>	Moves to the end of the paragraph.
Ctrl+Del	Deletes word to right of cursor.
Ctrl+Backspace	Deletes word to left of cursor.
Ctrl+End	Moves the cursor to the end of the document.
Ctrl+Home	Moves the cursor to the beginning of the document.
Ctrl+Spacebar	Reset highlighted text to the default font.
Ctrl+1	Single-space lines.
Ctrl+2	Double-space lines.
Ctrl+5	1.5-line spacing.
Ctrl+Alt+1	Changes text to heading 1.
Ctrl+Alt+2	Changes text to heading 2.
Ctrl+Alt+3	Changes text to heading 3.
Alt+Ctrl+F2	Open new document.
Ctrl+F1	Open the Task Pane.
Ctrl+F2	Display the print preview.

Ctrl+Shift+>	Increases the selected text size by one font size.
Ctrl+Shift+<	Decreases the selected text size by one font size.
Ctrl+Shift+F6	Switches to another open Microsoft Word document.
Ctrl+Shift+F12	Prints the document.
F1	Open help.
F5	Open the *Find*, *Replace*, and *Go To* window in Microsoft Word.
F7	Spellcheck and grammar check selected text or document.
F12	Save As.
Shift+F3	Change the case of text
Shift+F7	Runs a Thesaurus check on the selected word.
Shift+F12	Save the open document. Like Ctrl+S.
Shift+Enter	Create a soft break instead a new paragraph.
Shift+Insert	Paste.
Shift+Alt+D	Insert the current date.
Shift+Alt+T	Insert the current Time.

MS-Excel



Microsoft Excel is a spreadsheet application developed by Microsoft for Microsoft Windows and M ac OS.It features calculation, graphing tools, pivot tables, and a macro programming language called Visual Basic for Applications.

The tabs are as follows: File, Home, Insert, Page Layout, Formulas, Data, Review, and View.

Following are the groups of Commands available under tabs of Excel:

Home: Clipboard, Font, Alignment, Number, Style (for Conditional Formatting of table), Cells (to insert, delete and format cells), Editing (AutoSum, Sort & Filter, Find & Select)

Insert: Tables (Pivot Table, and Tables); Illustrations(Pictures, Online Picture, shapes and Icon); Add-ins; Charts; Tours (3D Map); Sparklines (Line, Column, Win/Loss);Filters; Links; Text; Symbols

Page Layout: Themes; Page Setup (Margin, orientation, page size, print area, breaks, background and print titles); Scale to fit; Sheet Options (Gridline, headings); Arrange

Formulas: Insert Function; Function Library; Defined Names; Formula Auditing; Calculation

Data: Get external Data; Get & Transform (New query, show queries, from table, recent sourc es); Connections; Sort and Filter; Data Tools; Forecast (what-if analysis, forecast sheet); Outline

Review: Proofing (Spelling, Thesaurus); Accessibility; Insights-smart lookup; Comments; Changes (Protect sheet, protect workbook, share workbook, allow users to edit ranges, track changes)

View: Workbook Views (Normal, Page Break Preview, Page Layout, Custom Views); Show (gridlines, ruler. formula bar, headings); Zoom; Window; Macros

Some important facts regarding MS-Excel

- The intersection of a row and column is called a Cell.
- The cell in which we are currently working is known as Active Cell.
- A Worksheet is made of columns and rows, wherein columns run Vertically and rows run Horizontally.
- Microsoft Excel has the basic features of all spreadsheets, using a grid of cells arranged in numbered rows and letter-named columns to organize data manipulations like arithmetic operations
- The letter and number of the intersecting column and row is the Cell Address.
- Short cut key to insert a new worksheet in MS-Excel is ALT + Shift + F1 + or Shift + F11.
- Sheet tab is the tab at the bottom of the worksheet window that displays the name of the worksheet.
- A Microsoft office document that contains one or more worksheets is known as a Workbook.

	Excel 2003 and older version	Excel 2007 and newer version
1. Extension	.XLS	.XLSX
2. Number of Column	256	16384
3. Number of Rows	65536	1048576
4. First cell address	A1	A1
5. Last cell address	IV65536	XFD1048576

In order to work correctly, a function must be written a specific way, which is called the **syntax**. The basic syntax for a function is the **equals s ign (=)**, the **function name** (SUM, for example), and one or more **arguments**. Arguments contain the information you want to calculate. For example, the function **= AVERAGE (B1:B9)** would calculate the **average** of the values in the cell range B1:B9. This function contains only one argument. Multiple arguments must be separated by a **comma**. For example, the function **= SUM(A1:A3, C1:C2)** will **add** the values of all of the cells in the three arguments

Some important functions used in Microsoft Excel

- **AUTOSUM**: Allows you to automatically insert the most common functions into your formula, including SUM, AVERAGE, COUNT, MIN, and MAX.
- **LEFT** : Returns a specified number of characters from the start of a supplied text string
- **TRIM** : Removes duplicate spaces, and spaces at the start and end of a text string.
- **LOWER**: Converts all characters in a supplied text string to lower case
- **PROPER**: Converts all characters in a supplied text string to proper case (i.e. letters that do not follow another letter are upper case and all other characters are lower case)
- **UPPER**: Converts all characters in a supplied text string to upper case
- **CONCAT**: Joins together two or more text strings
- **MID**: Returns a specified number of characters from the middle of a supplied text string
- **RIGHT**: Returns a specified number of characters from the end of a supplied text string
- **REPT** : Returns a string consisting of a supplied text string, repeated a specified number of times
- **IF**: Tests a user-defined condition and returns one result if the condition is TRUE, and another result if the condition is FALSE
- **LEN**: Returns the length of a supplied text string
- **DATE** : Returns a date, from a user-supplied year, month and day
- **TIME**: Returns a time, from a user-supplied hour, minute and second
- **NOW**: Returns the current date & time
- **TODAY**: Returns today's date
- **DAY** : Returns the day (of the month) from a user-supplied date
- **MONTH**: Returns the month from a user-supplied date
- **YEA R**: Returns the year from a user-supplied date
- **ABS** : Returns the absolute value (i.e. the modulus) of a supplied number
- **SUM** : Returns the sum of a supplied list of numbers
- **PRODUCT**: Returns the product of a supplied list of numbers
- **POWER**: Returns the result of a given number raised to a supplied power
- **MOD**: Returns the remainder from a division between two supplied numbers
- **SUBTOTAL**: Performs a specified calculation (e.g. the sum, product, average, etc.) for a supplied set of values
- **ROUND**: Rounds a number up or down, to a given number of digits
- **SUMIF** : Adds the cells in a supplied range, that satisfy a given criteria
- **COUNT** : Returns the number of numerical values in a supplied set of cells or values
- **COUNTA**: Returns the number of non-blanks in a supplied set of cells or values
- **COUNTBLANK**: Returns the number of blank cells in a supplied range
- **COUNTIF**: Returns the number of cells (of a supplied range), that satisfy a given criteria
- **MAX** : Returns the largest value from a list of supplied numbers
- **MIN**: Returns the smallest value from a list of supplied numbers

- **AVERAGE**: Returns the Average of a list of supplied numbers

Some Important Shortcut keys of Microsoft Excel

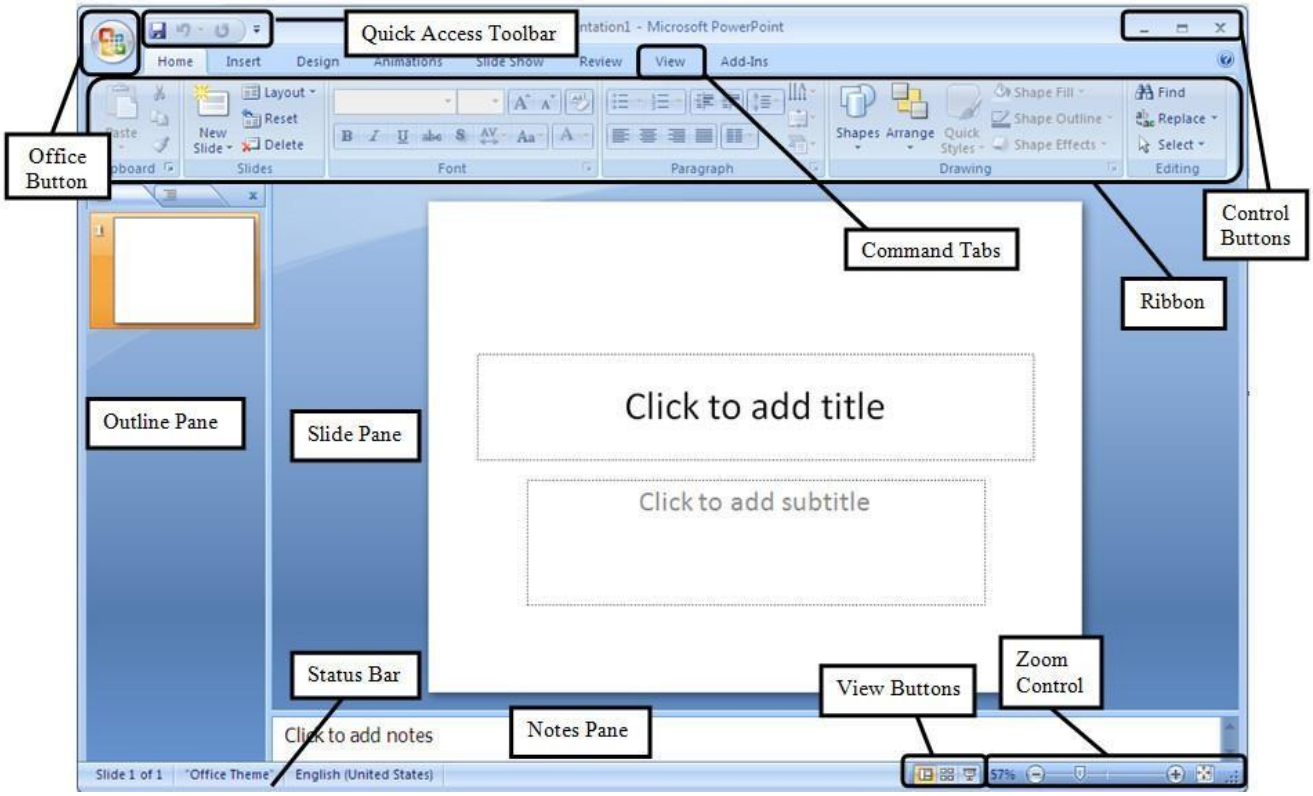
Close a spreadsheet	Ctrl+W
Open a spreadsheet	Ctrl+O
Go to the Home tab	Alt+H
Save a spreadsheet	Ctrl+S
Copy	Ctrl+C
Paste	Ctrl+V
Undo	Ctrl+Z
Remove cell contents	Delete key
Choose a fill colour	Alt+H, H
Cut	Ctrl+X
Go to Insert tab	Alt+N
Bold	Ctrl+B
Centre align cell contents	Alt+H, A, then C
Go to Page Layout tab	Alt+P
Go to Data tab	Alt+A
Go to View tab	Alt+W
Open context menu	Shift+F10
Add borders	Alt+H, B
Delete column	Alt+H,D, then C
Go to Formula tab	Alt+M
Hide the selected rows	Ctrl+9
Hide the selected columns	Ctrl+0
Move to the previous cell in a worksheet or the previous option in a dialog box.	Shift+Tab
Move one cell up in a worksheet.	Up Arrow key
Move one cell down in a worksheet.	Down Arrowkey
Move one cell left in a worksheet.	Left Arrow key
Move one cell right in a worksheet.	Right Arrowkey
Move to the edge of the current data region in a worksheet.	Ctrl+arrow key
Enter End mode, move to the next nonblank cell in the same column or row as the active cell, and turnoff End mode. If the cells are blank, move to the last cell in the row or column.	End, arrow key
Move to the last cell on a worksheet, to the lowest used row of the rightmost used column.	Ctrl+End
Extend the selection of cells to the last used cell on the worksheet	Ctrl+Shift+End

(lower-right corner).	
Move to the cell in the upper-left corner of the window when Scroll Lock is turned on.	Home+Scroll Lock
Move to the beginning of a worksheet.	Ctrl+Home
Move one screen down in a worksheet.	Page Down
Move to the next sheet in a workbook.	Ctrl+PageDown
Move one screen to the right in a worksheet.	Alt+Page Down
Move one screen up in a worksheet.	Page Up
Move one screen to the left in a worksheet.	Alt+Page Up
Move to the previous sheet in a workbook.	Ctrl+Page Up
Move one cell to the right in a worksheet. Or, in a protected worksheet, move between unlocked cells.	Tab
Open the Format Cells dialog box.	Ctrl+1
Format fonts in the Format Cells dialog box.	Ctrl+Shift+F orCtrl+Shift+P
Edit the active cell and put the insertion point at the end of its contents. Or, if editing is turned off for the cell, move the insertion point into the formula bar. If editing a formula, toggle Point mode off or on so you can use arrow keys to create a reference.	F2
Add or edit a cell comment.	Shift+F2
Open the Insert dialog to insert blank cells.	Ctrl+Shift+Plus(+)
Open the Delete dialog box to delete selected cells.	Ctrl+Minus (-)
Enter the current time.	Ctrl+Shift+colon (:)
Enter the current date.	Ctrl+semicolon (;)
Copy a formula from the cell above the active cell into the cell or the Formula Bar.	Ctrl+apostrophe (')
Move the selected cells.	Ctrl+X
Copy the selected cells.	Ctrl+C
Paste content at the insertion point, replacing any selection.	Ctrl+V
Open the Paste Special dialog box.	Ctrl+Alt+V
Italicize text or remove italic formatting.	Ctrl+I or Ctrl+3
Bold text or remove bold formatting.	Ctrl+B or Ctrl+2
Underline text or remove underline.	Ctrl+U or Ctrl+4
Apply or remove strike through formatting.	Ctrl+5
Switch between hiding objects, displaying objects, and displaying placeholders for objects.	Ctrl+6
Apply an outline border to the selected cells.	Ctrl+Shift+ampersand (&)
Remove the outline border from the selected cells.	Ctrl+Shift+underline (_)

Display or hide the outline symbols.	Ctrl+8
Select an entire Pivot Table report.	Ctrl + Shift +asterisk (*)
Edit the active cell and put the insertion point at the end of its contents. Or, if editing is turned off for the cell, move the insertion point into the formula bar. If editing a formula, toggle Point mode off or on so you can use arrow keys to create a reference.	F2
Expand or collapse the formula bar.	Ctrl+Shift+U
Cancel an entry in the cell or Formula Bar.	Esc
Complete an entry in the formula bar and select the cell below.	Enter
Move the cursor to the end of the text when in the formula bar.	Ctrl+End
Select all text in the formula bar from the cursor position to the end.	Ctrl+Shift+End
Calculate all worksheets in all open workbooks.	F9
Calculate the active worksheet.	Shift+F9
Display the Function Arguments dialog box when the insertion point is to the right of a function name in a formula.	Ctrl+A
Insert argument names and parentheses when the insertion point is to the right of a function name in a formula.	Ctrl+Shift+A
Invoke Flash Fill to automatically recognize patterns in adjacent columns and fill the current column	Ctrl+E
Cycle through all combinations of absolute and relative references in a formula if a cell reference or range is selected.	F4
Insert a function.	Shift+F3
Create a chart of the data in the current range in a separate Chart sheet.	F11
Define a name to use in references.	Alt+M, M, D
Paste a name from the Paste Name dialog box (if names have been defined in the workbook.	F3
Move to the first field in the next record of a data form.	Enter
Create, run, edit, or delete a macro.	Alt+F8

MS-Power-point - PowerPoint is a slideshow presentation program that's part of the Microsoft office suite of tools. PowerPoint slides can be plain with only text, or they can include pictures and even animation, including moving text and images. Text can be formatted in the same way as text can be formatted in Microsoft Word, including colour, size, and font type. In PowerPoint 2016 there are 9 tabs followed by a new

feature of “Tell me what you want to do” arranged in a horizontal fashion. The tabs are as follows: File, Home, Insert, design, Transition, Animation, Slide Show, Review, and View.



1. File

At one end of the ribbon is the File tab, which you use for the behind-the-scenes stuff you do with a file, such as opening, saving, sharing, exporting, printing and managing your presentation. Click the File tab to open a new view called the Backstage.

2. Home

The home tab in PowerPoint has following groups: Clipboard, Slides, Font, Paragraph, drawing and Editing. The Slides group contains commands to insert new slide, choose slide layout, reset the positions and formatting of the slide placeholders and option to organize your slides into sections.

3. Insert

Click Insert to add something to a slide. This includes pictures, shapes, charts, links, text boxes, video and more. The Insert Tab has following groups of commands: Slides, Tables, Images, Illustrations, Add-ins, Links, Comments, Text, Symbols and Media.

4. Design

On the Design tab, you can add a theme or colour scheme, or format the slide background. The design tab has following categories or groups of commands:

Themes- Each theme has its own unique set of fonts, effect, colour to create a visually appeasing and overall look of the slide.

Variants - The current theme or style can be customized using various colour schemes through variants. **Customize** - This group contains commands to change slidesize and Format Background. Designer.

5. Transitions

Set up how your slides change from one to the next on the Transitions Tab. Find a gallery of the possible transitions inthe Transition to This Slide group – click More Button at the side of the gallery to see all of them. Timing controlling is also present in this tab.

6. Animations

User may use the Animations tab to choreograph the movement of things on his slides. Apart from adding animation you can also customize its duration and timing as you need by using advanced animation and timing group of commands.

7. Slide Show

On the Slide Show tab, set up the way that you want to show your presentation to others.

8. Review

The Review tab lets you add comments, run spell-check, or compare one presentation with another and language translation features also.

9. View

Views allow you to look at your presentation in different ways, depending on where you are in the creation or delivery process. Views name in power-point are: Normal, Outline view, Slide Sorter, Note Page, Reading View, slide master, Handout master, Note master.

10. Tools tabs When you click some parts of your slides, such as pictures, shapes, Smart Art or text boxes, you might see a colourful new tab appear.

For example, the Drawing Tools tab appears when you click a shape or text box. When you click a picture, the Picture Tools tab appears. Other such tabs include Smart Art Tools, Chart Tools, Table Tools and Video Tools. These tabs disappear or change when you click something else in your presentation.

MS POWERPOINT 2016 SHORT CUT KEYS

Ctrl+N : Create a new presentation
Ctrl+O : Open an existing presentation
Ctrl+S : Save a presentation
F12 or Alt+F2: Open the Save As dialog box
Ctrl+W or Ctrl+F4: Close a presentation
Ctrl+Q : Save and close a presentation
Ctrl+Z : Undo an action
Ctrl+Y : Redo an action
Ctrl+F2: Print Preview View
F1 : Open the Help pane
Alt+Q : Go to the "Tell me what you want to do" box
F7 : Check spelling

Alt or F10 : Turn key tips on or off
Ctrl+F1: Show or hide the ribbon
Ctrl+F : Find and replace -in a presentation
Alt+F : Open the File tab menu
Alt+H : Go to the Home tab
Alt+N : Open the Insert tab
Alt+G : Open the Design tab
Alt+K : Go to the Transitions tab
Alt+A : Go to the Animations tab
Alt+S : Go to the Slide Show tab
Alt+R : Go to the Review tab
Alt+W : Go to View tab

Alt+X : Go to the Add-ins tab

Alt+Y : Go to the Help tab

Ctrl+Tab: Switch between open presentations

Ctrl+A : Select all text in a text box, all objects on a slide, or all slides in a presentation (for the latter, click on a slide thumbnail first)

Tab: Select or move to the next object on a slide

Shift+Tab: Select or move to the previous object on a slide

Home : Go to the first slide, or from within a text box, go to the beginning of the line

End : Go to the last slide, or from within a text box, go to the end of the line

PgDn : Go to the next slide

PgUp : Go the previous slide

Ctrl+Up/Down Arrow: Move a slide up or down in your presentation (click on a slide thumbnail first)

Ctrl+Shift+Up/Down Arrow : Move a slide to the beginning or end of your presentation (click on a slide thumbnail first)

Ctrl+X : Cut selected text, selected object(s), or selected slide(s)

Ctrl+C or Ctrl+Insert : Copy selected text, selected object(s), or selected slide(s)

Ctrl+V or Shift+Insert: Paste selected text, selected object(s), or selected slide(s)

Ctrl+Alt+V : Open the Paste Special dialog box

Delete : Remove selected text, selected object(s), or selected slide(s)

Ctrl+B : Add or remove bold to selected text

Ctrl+I : Add or remove italics to selected text

Ctrl+U : Add or remove underline to selected text

Ctrl+E : Center a paragraph

Ctrl+J : Justify a paragraph

Ctrl+L : Left align a paragraph

Ctrl+R : Right align a paragraph

Ctrl+T : Open the Font dialog box when text or object is selected

Alt+W,Q: Open the Zoom dialog box to change the zoom for the slide

Alt+N,P: Insert a picture

Alt+H,S,H: Insert a shape

Alt+H,L: Select a slide layout

Ctrl+K : Insert a hyperlink

Ctrl+M : Insert a new slide

Ctrl+D : Duplicate the selected object or slide (for the latter, click on a slide thumbnail first)

F5 : Start the presentation from the beginning

Shift+F5: Start the presentation from the current slide (this one is great when you want to test out how the slide your currently working on will look in your presentation)

Ctrl+P : Annotate with the Pen tool during a slideshow

N or Page Down: Advance to the next slide during a slideshow

P or Page Up: Return to the previous slide during a slide show

B : Change the screen to black during a slideshow; press B again to return to the slideshow

Esc : End the slideshow

Full form and Abbreviations

AAC - Advanced Audio Coding

AI - Artificial Intelligence

ALGOL- Algorithmic Language

ALU - Arithmetic Logic Unit

AOL - America Online

API - Application Program Interface

ARP - Address Resolution Protocol

ASP - Active Server Pages

ATM - Asynchronous Transfer Mode

AVI - Audio Video Interleave

ASCII - American Standard Code for Information Interchange

AT - Advanced Technology
AUI - Attachment Unit Interface
BASIC - Beginner's All-purpose Symbolic Instruction Code
BCD - Binary Coded Decimal
BHTML- Broadcast Hyper Text Mark-up Language
BMP - Bitmap
BIOS - Basic Input Output System
B2B - Business to Business
B2C - Business to Consumer
BIU - Bus Interface Unit
BPS - Bytes Per Second
BCC - Blind Carbon Copy
CC - Carbon Copy
CAI - Computer Aided Instruction
CDMA - Code Division Multiple Access
CRT - Cathode Ray Tube
CAD - Computer Aided Design
CADD - Computer Aided Design and Drafting
CD - Compact Disk
CDRW - Compact Disk Rewritable
CAM - Computer Aided Manufacturing
CROM - Computerized Range of Motion
CDROM - Compact Disk Read Only Memory
CMD - Command
CISC - Complex Instructions Set Computers
COBOL- Common Business Oriented Language
CPI - Clock / Cycle Per Instruction
CPU - Central Processing Unit
CSS - Cascading Style Sheets
CUI - Character User Interface
DAT - Digital Audio Tape
DDR - Double Data Rate
DDRSDRAM - Double Data Rate – Synchronous Dynamic Random Access Memory
DOS - Disk Operating System
DOC - Data Optimizing Computer
Doc - Document
DVD - Digital Versatile/Video Disk
DVI - Digital Visual Interface
DVD-R -Digital Versatile Disk Recordable
DVD-RW-Digital Versatile Disk Rewritable
DBMS -Data Base Management System
DRAM -Dynamic Random Access Memory
DDL -Data Definition Language
DHTML-Dynamics Hyper Text Mark-up Language
DML -Data Manipulation Language
DNS -Domain Name System
DPI -Dots Per Inch
DNA -Distributed Internet Architecture
DARPANET-Defence Advanced Research Project Agency Network
DVR -Digital Video Recorder
E-Commerce-Electronic Commerce
EDGE -Enhanced Data Rate for GSM (Global System for Mobile Communication) Evolution
EDI -Electronic Data Interchange
EDP -Electronic Data Processing
EDSAC-Electronic Delay Storage Automatic Calculator
EDVAC-Electronic Discrete Variable Automatic Computer
EB -EXA BYTE
EiB -EXBI BYTE
EROM -Erasable Read Only Memory
EPROM-Erasable Programmable Read Only Memory
EEPROM-Electronically Erasable Programmable Read Only Memory
E-Mail -Electronic Mail
EFS -Encrypted File System
EDC -Electronic Digital Computer
ENIAC -Electronics Numerical Integrator And Calculator
FDC -Floppy Disk Controller
FDD -Floppy Disk Drive
FORTRAN-Formula Translation
FTP -File Transfer Protocol
FS -File System
FAT -File Allocation Table

FPS -Frames Per Second
FLOPS -Floating Point Operations Per Second
FM -Frequency Modulation
GB -Giga Byte
GiB -GIBI BYTE
GIF -Graphic Interchangeable Format
GDI -Graphical Device Interface
GPRS -General Packet Radio Service
Google- GOOGLE is Global Organization of Oriented Group Language of Earth
GUI -Graphical User Interface
Gbps/GBPS -Gigabytes/Gigabits Per Second
3GP -3rd Generation Project
3GPP -3rd Generation Partnership Project
GML -Geographical Mark-up Language
GSM -Global System for Mobile Communication
GHz -Giga Hertz
GIGO -Garbage In Garbage Out
HDMI -High Definition Multimedia Interface
HTTP -Hyper Text Transfer Protocol
HTTPS -Hyper Text Transfer Protocol Secure
HTML -Hyper Text Mark-up Language
HD -Hard Disk
HDD -Hard Disk Drive
HPC -Handheld Personal Computer/High Performance Computer
HP -Hewlett Packard
HSDPA-High Speed Downlink Packet Access
ISO -International Organization for Standardization
IMAP -Internet Message Access Protocol
INTEL -Integrated Electronics
ISP -Internet Service Provider
INFO -Information
IP -Internet Protocol
IPV 4 -Internet Protocol Version 4
IPV 6 -Internet Protocol Version 6
IO -Input Output
IOP -Input Output Processor
IBM -International Business Machines
IC -Integrated Circuit
ICT -Information Communication Technology
IT -Information Technology
JAR -Java Archive
J2EE -Java 2 Platform Enterprise Edition
JAD -Java Application Descriptor/Development
JPEG -Joint Photographic Expert Group
JS -Java Script
JSP -Java Server Page
KB -KILOBYTE
Kbps -Kilobits Per Second
KBPS -Kilo Bytes per second
LAN -Local Area Network
LCD -Liquid Crystal Display
LED -Light Emitting Diode
LLL -Low Level Language
MAN -Metropolitan Area Network
MB -Motherboard/ Megabyte
Mbps -Megabits per second
MBPS -Megabytes Per Second
MHz -Mega Hertz
MIPS -Million Instructions Per Second
MIME -Multipurpose Internet Mail Extensions
MICR -Magnetic Ink Character Recognition
MPEG -Motion Picture Experts Group
Mp3 -MPEG Audio Layer 3
Mp4 -MPEG – 4 AVC (Advanced Video Coding)
NAT -Network Address Translation
NIC -Network Interface Card
NTP -Network Time Protocol
NTFS -New Technology File System
OMR -Optical Mark Reader/Recognition
OOP -Object Oriented Programming
ORACLE-Oak Ridge Automatic Computer and Logical Engine
OS -Operating System
OPENGL-Open Graphics Library

OSI -Open Systems Interconnection
PC -Personal Computer
PPPoA-Point to Point Protocol Over ATM
PPP oE -Point to Point Protocol Over Ethernet
PDF -Portable Document Format
PHP -Hypertext Preprocessor
PB -PETA BYTE
PiB -PEBI BYTE
PNG -Portable Network Graphics
PNP -Plug and Play
PDA -Personal Digital Assistant
PPP -Point to Point Protocol
PAN -Personal Area Network
PROM -Programmable Read Only Memory
PCI -Peripheral Component Interconnect
POST -Power On Self-Test
PSU -Power Supply Unit
PING -Packet Internet/Internetwork Groper
RAM -Random Access Memory
RDBMS-Relational Data Base Management System
ROM -Read Only Memory
RIP -Routing Information Protocol
RPM -Revolutions Per Minute
RTF -Rich Text Format
SMPS -Switch Mode Power Supply
SMTP -Simple Mail Transfer Protocol
SRAM -Static Random Access Memory
SIM -Subscriber Identity Module
SAM -Sequential Access Method
SNAP -Sub Network Access Protocol
SNOBOL-String Oriented Symbolic Language
SDD -Solid State Drive
SW -Software
SIU -Serial Interface Unit
SMS -Short Message Service
SQL -Structured Query Language
TB -TERA BYTE
TiB -TEBI BYTE
TCP -Transmission Control Protocol
TBPS -Tera Bytes Per Second
TXT -Text
TAPI -Telephony Application Programming Interface
UMTS -Universal Mobile Telecommunication System
URL -Uniform Resource Locator
UHF -Ultra High Frequency
USB -Universal Serial Bus
UNIVAC-Universal Automatic Computer
UPS -Uninterruptible Power Supply
UI -User Interface
VAN -Value Added Network
VDU -Visual Display Unit
VIRUS -Vital Information Resource Under Seized
VCD -Video Compact Disk
VHF -Very High Frequency
VGA -Video Graphics Array
VGA -Video/Visual Graphic Adapter
VOIP -Voice Over Internet Protocol
VRAM -Video Random Access Memory
VPN -Virtual Private Network
VRML -Virtual Reality Modelling Language
WAN -Wide Area Network
WAP -Wireless Application Protocol
WORM -Write Once Read Many
Windows – Wide Interactive development for office work solution
WWW -World Wide Web
WBMP -Wireless Bitmap Image
WLAN -Wireless Local Area Network
WMV -Windows Media Video
WML -Wireless Mark-up Language
WINS -Windows Internet Name Service
WMA -Windows Media Audio
XP - Experience
XT -Extended Technology
XMF -Extensible Music File
XML -Extensible Mark-up Language

XMS -Extended Memory Specification
XHTML-Extensible Hyper Text Mark-up Language
XSL -Extensible Style Language
Yahoo -Yet Another Hierarchical Officious Oracle
YB -YOTTA BYTE
YiB -YOBI BYTE
ZB -ZETTA BYTE
ZiB -Zebi Byte

Terminology of Computer

➢ **Access Time** The time interval between the instance at which data is called from a storage device and the instance when delivery begins.

➢ **Accumulator** A local storage area called a register, in which the result of an arithmetic or logic operation is formed It contains a single data register.

➢ **Active Directory** Active directory stores information about its users and can act in a similar manner to a phonebook. This allows all of the information and computer settings about an organization to be stored in a central, organized database.

➢ **Adware** It is a software package which automatically renders advertisements in order to generate revenue for its author.

➢ **ALGOL** It was the first language with a formal grammar. ALGOL was created by a committee for scientific use in 1958. Its major contribution is being the root of the tree that has led to such languages as Pascal, C, C+ + and Java.

➢ **Algorithm** In computing, an algorithm is a procedure for accomplishing some tasks which, given an initial state, will terminate in a defined end-state.

➢ **Alphanumeric** A character set that contains letters, digits and other special characters such as @, $, +. *, %. etc.

➢ **Amplifier** A device that takes in a weak electric signal and sends out a strong one. It is used to boost electrical Signals in many electronic devices such as radios, televisions and telephone.

➢ **Analog Computer** A computer that operates on data which is in the form of continuous variable physical quantities.

➢ **Android** It is a Linux based operating system designed Primarily for touch screen mobile devices such as smartphones and tablets computer.

➢ **Antivirus Software** Antivirus software consists of 3omputer programs that attempt to identify threat and eliminate computer virus and other malicious software (Malware)

➢ **Applet** A small java application that is downloaded from java based web browser.

➢ **Application Software** Application software is a subclass of computer software that employs the capabilities of a computer directly to a task that the user wishes to perform. e.g., word, excel etc.

➢ **Archive** It provides backup storage.

➢ **Arithmetic Logic Unit (ALU)** The arithmetic logic unit is a part of the execution unit, a core component of all CPUs. ALUs are capable of calculating the results of a wide variety of basic arithmetical and logical computations.

➢ **Artificial Intelligence** Fifth generation computing devices, based on artificial intelligence, are still in development, though there are some applications, such as voice recognition, that are being used today.

➢ **ASCII** (American Standard Code for Information Interchange) is a character set and a character encoding based on the Roman alphabet as used in Modern English and other Western European languages.

➢ **Assembler** A program that translates mnemonic statement into executable instruction.

➢ **Attribute** The characteristics of an entity are called its attributes.

➢**Backspace** key is used on the keyboard to delete the text. Backspace will delete the text to the left of cursor.

➢**Bandwidth** The maximum amount of data that can travel in a communication path in a given time, measured in bits per second (bps).

➢**Bar Code** A bar code is a machine-readable representation of information in a visual format on a surface. The first bar code system was developed by Norman Joseph Woodland and Bernard Silver in 1952.

➢**Basic Input/Output System (BIOS**) It is also known as ROM BIOS. It provides an abstraction layer for the hardware, i.e., a consistent way for application programs and operating system to interact with input/output devices.

➢**Binary Coded Decimal (BCD)** A coding system in which a 4 digit binary number represents each decimal digit from 0 to 9.

➢**Bit** A bit sometimes abbreviated as binary digit is the most basic information unit used in computing and information theory.

➢**Bitmap** A method of storing a graphic image as a set of bits in a computer memory. To display the image on the screen, the computer converts the bits into pixels.

➢**Blog** It is a discussion or informational site published on the world wide web.

➢**Bomb** A type of virus designed to activate at a specific date and time on your computer.

➢**Bluetooth** A protocol that permits a wireless exchange of information between computers. cell phone and other electronic devices within a radius about 30 feet.

➢**Booting** is a process which starts the operating system when a computer is switched on.

➢**Botnet** It is a collection of connected computers which are infected by Bot. A particular system infected by Bot is known as zombie.

➢**Boot** Sequence A boot sequence is the set of operations the computer performs when it is switched on which loads an operating system.

➢**Browser** A special software that enables users to read/view web pages and jump from one web page to another.

➢**Buffering** The process of storing data in a memory device, allowing the devices to change the data rates, perform error checking and error retransmission.

➢**Bug** A software bug is an error, flaw, failure, or fault in a computer program or system that produces an incorrect or unexpected result.

➢**Bulletin Board System (BBS)** An online information system, usually, set-up by an individual on a non-profit basis for the enjoyment of other individual with similar interest

➢**Bus** A circuit that provides a communication path between two or more devices of a digital computer system.

➢**Byte** A byte is commonly used as a unit of storage measurement in computers, regardless of the type of data being stored.

➢**Cache Memory** The speed of CPU is extremely high compared to the access time of main memory Therefore, the performance of CPU decreases due to the slow speed of main memory. To decrease the mismatch in operating speed, a small memory chip is attached between CPU and main memory whose access time is very close to the processing speed of CPU It is called the Cache Memory.

➢**Central Processing Unit (CPU)** The Central Processing Unit (CPU) performs the actual processing of data. It is the part of a computer system that interprets and carries out the instructions contained in the software. The CPU is generally called by its generic name 'Processor'. It is also known as the brain of computer.

➢**Chart Wizard** The chart wizard brings you through the process of creating a chart by displaying a series of dialog boxes.

➢**Channel** A medium for transferring information which is also called a line or circuit. A communication channel can be a physical link, such as a cable that connects two stations in a network or it can consist of some electromagnetic transmission.

➢**Chat** Typing text into a message box on a screen to engage in dialog with one or more people via the internet or other network.

➢**Client-Server** is a network architecture which separates the client from the server. Each instance of the client software can send requests to a server or application server.

➢**Clock Rate** The clock rate is the fundamental rate in cycles per second, measured in hertz, at which a computer performs its most basic operations such as adding two numbers or transferring a value from one processor register to another.

➢**CMOS** A type of computer chip which is able to operate with a very small amount of electricity from a battery. CMOS refers as complementary metal oxide semiconductor.

➢**Cookie** A packet of information that travels between a browser and the web server

➢**Command Line Interface** A Command Line Interface (CLI) is a method of interacting
with a computer by giving it lines of textual commands (that is, a sequence of characters) from the keyboard.

➢**Compact Disk (CDR)** CD-ROM disks are made of plastic and are coated with reflective metals. Their storage density is very high, storage cost is very low and access time is relatively fast. Each disk can hold about 700 MB of data.

➢**Compiler** A compiler is a computer program that translates a series of instructions written in one computer language (called the source language) into another computer language (also called the object or target language).

➢**Communication** Exchange of data between two or more devices.

➢**Computer Networks** is a collection of two more interconnected node and devices to share devices and data between them.

➢**Computer Graphics** Computer Graphics are visual presentations on a computer screen. Examples are photographs, drawings, line arts, graphs, diagrams, typography numbers, symbols, geometric designs, maps, engineering drawings or other images.➢**Computer Output Microfilm (COM)** An extremely high speed, low cost process that
records computer generated information directly from the computer tape or cartridge to a mini microfilm media.

➢**Cold Boot** Restarting the computer is called cold boot.

➢**Control Panel** which allows users to view and manipulate basic system settings and controls,
such as adding hardware. adding/removing software, controlling user accounts, changing accessibility options, etc.

➢**Computer Worm** A computer worm is a self - replicating computer program.

➢**Control Unit** A control unit is used in our system to control internal function.

➢**Cracker** The preferred term used to refer to a computer criminal who penetrates a computer to steal information or damage the program in some way.

➢**Crash** A malfunction in hardware or software that keeps a computer from functioning.

➢**Crawler** A web crawler is an internet bot that systematically browses the world wide web, typically for the purpose of web indexing. It is also called a web spider.

➢**Data** is raw facts and figures or we can say unprocessed information.

➢**Database** A collection of interrelated data saved in tabular

format by using a DBMS software.

➢**Data Abstraction** A data abstraction is a simplified view of an object that includes only features one is interested in while hides away the unnecessary details.

➢**Data Dictionary** The document that contains clear definitions of the data that will be used in setting up database management systems.

➢**Data Processing** Converting data into information, is called data processing.

➢**Data Flow Diagrams** A data flow diagram (DFD) is a graphical representation of the 'flow' of data through an information system.➢**Data Type** A data type is a defined kind of data, that is, a set of possible values and basic operations on those values.

➢**Debugging** is process of finding and reducing the number of bugs, or errors in a computer program.

➢**Degree** The number of fields associated with the database table or relation

➢**Device Driver** A device driver, often called a driver for short, is a computer program that enables another program, typically, an operating system to interact with a hardware device.

➢**Difference Engine** A difference engine is a mechanical special-purpose computer designed to tabulate polynomial functions. Difference engine was created in 1822 by Charles Babbage.

➢**Disk Operating System (DOS)** An operating system which contains the disk oriented commands and uses disk devices for permanent storage.

➢**Directory** In computing, a directory is an entity in a file system which contains a group of files and other directories. A directory contained inside another directory is called a sub-directory of that directory.

➢**Dot Matrix Printer** refers to a type of computer printer with a print head that runs back and forth on the page and prints by impact, striking an ink-soaked cloth ribbon against the paper, much like a typewriter.

➢**Domain Name** A unique name that identifies a particular website and represents the name of the server where the web pages reside.

➢**Dots Per Inch (DPI)** It is defined as the measure of the resolution of a printer, scanner or monitor. It refers to the number of dots in a one-inch line. The more dots per inch, the higher the resolution.

➢**Drag-and-Drop** In computer graphical user interfaces, drag and drop is the action of clicking on a virtual object and dragging it to a different location or onto another virtual object.

➢**Dumb Terminal** A computer terminal with no processing or programming capabilities, generally used for simple data entry or retrieval tasks.

➢**DVD** is an optical disk storage media format that can be used for data storage including movies with high quality video and sound.

➢**Dynamic RAM DRAM (Dynamic Random Access Memory)** is a type of random access memory which stores each bit of data in a separate capacitor.

➢**EBCDIC** (Extended Binary Coded Decimal Interchange Code) is an 8-bitcharacter encoding used on IBM mainframe operating systems, like Z/OS, S/390,AS/400 and i5/OS.

➢**E-Commerce** Electronic commerce is a type of industry where buying and selling of product or services is conducted over Intranet.

➢**Editing** The process of changing information by inserting, deleting, replacing, rearranging and reformation.

➢**Electrically Erasable Programmable Read Only Memory (EEPROM)** A special type of Programmable Read Only Memory (PROM) that can be erased by exposing it to an electrical charge. It retains its

contents even when the power is turned off.

➢**Electronic Data Processing (EDP)** A data processing through equipment that is predominantly electronic such as digital computer.

➢**E-mail** Electronic mail, abbreviated e-mail is a method of composing, sending, storing and receiving messages over electronic communication systems.

➢**Encapsulation** It is a mechanism that associates the code and the data it manipulates into a single unit and keeps them safe from external interference.

➢**Encryption** In cryptography, encryption is the process of encoding messages (or information) in such a way that hackers cannot read it, but the authorised users can access it.

➢**Entity** An entity is something that has certain attributes or properties which may be assigned values.

➢**Escape Key** A key that permits the user to leave one segment of a program and move to another.

➢**Excel** allows you to create spreadsheets much like paper ledgers that can perform automatic calculations.

➢**Exe (.exe)** It is a common filename extension denoting an executable file (a program)in the DOS. MS- Windows.

➢**Execution Time** The total time required to execute a program on a particular system.

➢**Extranet** A technology that permits the users of one organisation's intranet to enter portions of another organisation's intranet in order to conduct business transactions or collaborate on joint projects.

➢**Fax** It stands for 'Facsimile machine'. It is used to transmit a copy of a document electronically.

➢**Field** The attributes of an entity are written as fields in the table representation.

➢**File** A collection of information stored electronically and treated as a unit by a computer. Every file must have its own distinctive name.

➢**File Allocation Table (FAT)** It is the name of a computer file system architecture. The FAT file system is a legacy file system which is simple and robust.

➢**File Manager** The file manager is an operating system utility that provides a user interface to work with file systems.

➢**Firewall** A security system usually consisting of hardware and software that prevents unauthorised persons from accessing certain parts of a programme database or network .

➢**Firmware** is a technology which has the combination of both hardware and software . It provides necessary instructions for how the device communicates with others computer hardware.

➢**Flash Memory** It is a type of non-volatile computer storage chip that can be electrically erased and reprogrammed. It was developed using EEPROM.

➢**Floating-point Numbers** Signed numbers held in a traction exponent format.

➢**Floppy disk** A floppy disk is a data storage device that is composed of a circular piece of thin, flexible magnetic storage medium encased in a square or rectangular plastic walled.

➢**Foreign Key** A field in a database table. which links it to another related table.

➢**Frequency** The number of oscillations of a signal per unit of time. It is usually expressed in cycles per second (cps or hertz Hz).

➢**Freeware** A form of software distribution where the author retains copyright of the software but makes the program available to others at no cost.

➢**Function Key** A special key on a computer keyboard or a

terminal devices keyboard that is used to perform specific functions. These keys are programmable so that a software product can put the function keys to specific uses. Many keyboards have function keys labelled from F1 to F12.

➢**Garbage In Garbage Out (GIGO**) It pertains to the fact that most computer errors are not errors, they are data errors caused by incorrect input data.

➢**Gateway** A device that is used to joint together two networks having different base protocols.

➢**Gigabyte** A gigabyte is a unit of information or computer storage equal to approximately one billion bytes.

➢**Glitch** A hardware problem that causes a computer to malfunction or crash.

➢**Gopher** A protocol used for locating and transferring information on the internet. It is an internet search tool that allows users to access textual information.

➢**Graphic Interchange Format (GIF)** A simple file format for pictures and photographs, that are compressed so they can be sent quickly.

➢**Graphical User Interface** A Graphical User Interface (or GUI) is a method of interacting with a computer through a metaphor of direct manipulating of graphical images and widgets in addition to text.

➢**Hacker** A computer criminal who penetrates and tempers with computer programs or systems.

➢**Hard Disk** A hard disk is a non-volatile data storage device that stores data on a magnetic surface layered onto disk platters.

➢**Hardware** physical components of our systems.

➢**High-Level Programming Languages** A high-level programming language is a programming language that is more user-friendly.

➢**Hit** A single request for information made by a client computer from a web server.

➢**Home Page** A starting point or a doorway to the website. It refers to the web page that identifies a website and contains the hyperlink to other web page in the website.

➢**Host Computer** A computer that provides information or a service to other computers on the internet. Every host computer has its own unique host name

➢**Hub** A network device that connects multiple computers on a LAN, so that they can communicate with one another.

➢**Hyperlink** An image or portion of text on a web page that is linked to another webpage.

➢**Hybrid Computer** Hybrid computers are made by taking the best features of the analog computer and digital computer. A simple example of this type is the computer used in hospitals.

➢**Hypertext Transfer Protocol (HTTP)** It is an important protocol used on the worldwide web for moving hypertext files across the internet. It requires an HTTP client program on one end and HTTP server program on other end.

➢**Icon** A symbol (such as picture or a folder) that represents a certain function on your computer. When the user clicks on the icon, the appropriate function is executed.

➢**Impact Printers** Impact printers transfer the image onto paper through a printing mechanism that strikes the paper called ribbon. Examples of impact printers are dot matrix printers and daisy wheel printers.

➢**Information** is the summarization of data according to a certain predefined purpose.

➢**Ink-Jet Printer** In an ink-jet printer. characters are formed as a result of electrically charged or heated ink being sprayed in fine jets onto the paper. Individual nozzles in the printing head produce high resolution characters.

➢**Input** In order to give instructions to a computer, the information has to be supplied to it. This information is given to the computers through an input device such as keyboard, mouse, scanner etc.

➢**Instant Messaging (IM)** A chat program that lets people communicate over the internet in real time.

➢**Instruction** A command or order given to a computer to perform a task.

➢**Instruction Cycle** Fetching and decoding operations of the machine cycle.

➢**Interface** A device or program that helps a user to communicate with a computer.

➢**Intelligent Terminal** Intelligent terminals are those which necessarily have processing power and non-volatile data storage space.

➢**Interpreter** A program that converts and executes the source code into machine code line by line.

➢**Internet** The Internet (also known simply as the net is the worldwide, publicly accessible system of interconnected computer networks that transmit data by packets witching using the standard Internet protocol.

➢**Internet Protocol (IP)** Address IP addresses are assigned to each and every computer on a TCP/IP network. It ensures that data on a network goes where it is supported to go e.g., 192.168.2.250

➢**Internet Service Provider** An Internet Service Provider (ISP) is a business organization that offers users access to the Internet and related services.

➢**Internet Protocol Suite** The Internet protocol suite is the set of communications protocols that implement the protocol stack on which the Internet and most commercial networks run.

➢**Integrated Circuits** Multiple electronic components combined on a silicon chip.

➢**JPEG** is an extension of image file. The term 'JPEG' is an acronym for the Joint Photographic Experts Groups.

➢**Joystick** A joystick is a computer peripheral or general control device consisting of a handheld stick that pivots about one end and transmits its angle in two or three dimensions to a computer.

➢**Kernel** It is the fundamental part of a program, such as an operating system, that resides in memory at all times.

➢**Keyboard** This is the standard input device attached to all computers. The layout of keyboard is just like the traditional typewriter of the type QWERTY. It also Contains some extra command keys and function keys.

➢**Key Field** A unique field in a record used to distinguish one record from another.

➢**Kilobyte** A kilobyte is a unit of information or computer storage equal to 1024 bytes. Itis commonly abbreviated KB. k byte or K byte.

➢**Label** One or more characters used to Identify a statement and instruction or a data field in a computer program.

➢**LAN** stands for Local Area Network in a LAN the connected computers are geographically close together. They are either in the same building or within a smaller area.

➢**Laptop** is a small, lightweight and portable battery-powered computers that can fit onto your lap. They each have a thin, flat and liquid crystal display screen.

➢**LASER Printer** A computer-driven photocopier that creates an original image of the text or graphics from the output of the computer onto a paper.

➢**LIGHT Pen** A light sensitive style for forming graphics by touching coordinates on a display screen. thereby seeming to draw directly on the screen.

➢**Link** A communication path between two nodes or

channel.

➢**LINUX** is an open source operating system, meaning that the source code of the operating system is freely available to the public.

➢**List Processing (LISP)** A high level programming language suitable for handling logical operations and non-numeric applications.

➢**Loop** A sequence of instructions that is executed repeatedly until a terminal condition occurs.

➢**Machine Language** The language of computer also called binary language. Instructions in this language are written as a sequence of O's and I's.

➢**Macro** A script that operates a series of commands to perform a function. It is set up to automate repetitive tasks.

➢**Mainframe** Sometimes it's called a server or CPU Mostly a mainframe is only a mainframe when compared to a desktop computer. It is bigger and much more powerful.

➢**Malware** (Malicious Software)It a software that disrupts normal computer functions or sends users.

➢**Mass Storage** It is referred to storage where large volume', of backup/data is stored.

➢**Memory** Temporary storage for information, including applications and documents. Computer memory is measured in terms of the amount of information it can store, commonly in megabytes or gigabytes.

➢**Menu Bar** The horizontal strip across the top of an application's window. Each word on the strip has a context sensitive drop-down menu containing features and actions that are available for the application in use.

➢**Merge** Combining two or more files into a single file.

➢**Metadata** Data about data, i.e., name, length, valid values or description of a data element. It is stored in a data dictionary and repository.

➢**Microcomputer** A microprocessor-based computer, consisting of an MPU, internal semiconductor memory, input and output sections and a system bus, all on one, or several monolithic IC chips inserted into one or several PC boards.

➢**Microprocessor** A complete Central Processing Unit (CPU) contained on a single silicon chip.

➢**MIDI** Stands for Music Instrument Digital Interface. It allows a computer to store and replay a musical instrument's output.

➢**Minicomputer** Considered to be more capable than a microcomputer but less powerful than a mainframe.

➢**Minimize** A term used in a GUI operating system that uses windows. It refers to reducing a window to an icon, or a label at the bottom of the screen, allowing another window to be viewed.

➢**MIPS** An acronym derived from Millions of Instruction Per Second (MIPS) It is used to measure the speed of a processor.

➢**Mnemonic** A symbolic label or code remainder that assists the user in remembering a specific operation or command in assembly language.

➢**Modem** An acronym for Modulator/Demodulator that refers to specific equipment that provides a means of communication between two computer systems over conventional telephone lines.

➢**Monitor** The visual readout device of a computer system. A monitor can be in several forms a cathode ray tube (CRT), a liquid crystal display (LCD), or a flat-panel, full-colour display.

➢**Mouse** A manually operated input device for moving or entering positional information and other data or commands by accessing (pointing to) images on a monitor.

➢**Morphing** The transformation of one image into another image.

➢**Motherboard** Main circuit board of a micro-computer that contains the CPU, BIOS, memory, mass storage interfaces, serial and parallel ports, expansion slots and all the controllers required to control standard peripheral devices such as display screen, keyboard and disk drive.

➢**MS-DOS** An early operating system developed by Microsoft Corporation (Microsoft Disc Operating System).

➢**Multitasking** can simultaneously work with several programs or interrelated tasks that share memories, codes, buffers and files.

➢**Multithreading** It is a facility available in an operating system that allows multiple functions from the same application packages.

➢**Multiplexer** It is a device That combines multiple input signals into an aggregate signal for transmission.

➢**Multimedia Software programs** that combine text and graphics with sound, video and animation. A multimedia PC contains the hardware to support these capabilities.

➢**Network Interface Card (NIC)** This is a part of the computer that allows it to talk to other computers via a network protocol like TCP/IP

➢**Nibble** A sequence of four adjacent bits, or a half byte. A hexadecimal or BCD coded digit can be represented by a nibble.

➢**Non Volatile Memory** A memory where stored data remains undistributed by the removal of electrical powers.

➢**Object Code** Machine language code produced by a translator program, such as an assembler, interpreter, or compiler.

➢**Object Linking and Embedding (OLE**) A process that permits the user to take material from one source and insert it in another document.

➢**Object Oriented** A computer program and its data are modelled as a group of autonomous objects that respond to message sent by other object.

➢**Offline** It refers to the state in which a computer is temporarily or permanently unable to communicate with another computer.

➢**Online** It refers to the state of being connected to the networked computer system or the Internet.

➢**Operand** The part of a machine level instruction which tells the central processor, the location of the data to be manipulated by some operation.

➢**Operation Code (op-Code)** Part of a computer instruction word that designates the function performed by a specific instruction.

➢**Operating System** A set of instructions that tell a computer on how to operate when it is turned on. It sets up a filing system to store files and tells the computer how to display information on a video display.

➢**Peripheral** A term designating the various kinds of machines and devices that work in conjunction with a computer but are not necessarily part of the computer structure.
Typically, peripherals refer to the hardware devices external to a computer.

➢**Personal Computer (PC)** A single-user computer containing a Central Processing Unit (CPU) and one or more memory circuits.

➢**Piracy** The illegal copying of software or other creative works.

➢**Pitch** The number of mono space characters (with same width) that will fit in a 1-inchline of text.

➢**Pixels** An acronym derived from .picture element. The smallest element (a dot) on a display screen.

➢**Plug-In** This is a program that your browser uses to

manipulate a downloaded file. It differs from a Helper Application in that the plug-in works inside the browser window.

➢ **Record** A collection of all the information pertaining to a particular entity instance.

➢ **Register** A temporary storage unit for quick, direct accessibility of a small amount of data for processing. Most computers include a set of internal registers that can be accessed more quickly than the system's main memory

➢ **Remote Server** A network computer that allows a user on the network from a distant location to access information.

➢ **Response Time** The total time elapsed between submission of command and data to a computer and getting the result of computation.

➢ **Rich Text Format (RTF)** A type of document formatting which enables special characteristic like fonts and margins to be included within as ASCII file.

➢ **Router** A network device that enables the network to reroute messages it receives that are intended for other networks. The network with the router receives the message and sends it on its way exactly as received. In normal operations. they do not store any of the messages that they pass through.

➢ **Routing** The process of choosing the best path throughout the LAN.

➢ **Scanner** An electronic device that uses light-sensing equipment to scan paper images such as text, photos and illustrations and translate the images into signals that the computer can then store, modify, or distribute.

➢ **Search Engine** Software that makes it possible to look for and retrieve information on the Internet, particularly the Web. Some popular search engines are Alta Vista, Google, Hot-Bot, Yahoo!, Web Crawler and Lycos.

➢ **Sector** A section of a recording track on a magnetic disk.

➢ **Server** A computer that shares its resources and information with other computers on a network. This is a mainframe computer that serves the other computers attached to it.

➢ **Shareware** A software that is not free but is available for a free trial period.

➢ **Shell** A shell is an outer layer of a program that provides that user interface or the wayof instruct the computer.

➢ **Simplex** Transmission of data in one direction.

➢ **Socket** A bi-directional pipe for incoming and outgoing data that enables an application program to access the TCP/IP protocols.

➢ **Software** The set of computer programs, procedure and associated documentation related to the effective operation. Software includes: operating systems (system software). language translators (assemblers, interpreters and compilers) and application programs.

➢ **Source Code (Source Program)** A set of computer instructions in hard-copy or stored form. When written in a language other than machine language, the source code requires translation by an assembler (or macro assembler), interpreter, or compiler into object code.

➢ **Spam** Irrelevant or unsolicited messages sent over Internet, typically to large numbers of users, for the purpose of advertising. phishing spreading malwares, etc

➢ **Spreadsheet** Software that allows one to calculate numbers in a format that is similar to pages in a conventional ledger.

➢ **Swapping** Storing programs on disk and then transferring these programs into main storage as and when they are needed.

➢ **Synchronisation** This method ensures that the receiving end can recognise characters in order, in which the

transmitting end sends them in a serial data transmission.

➢**Systems Software** A general term for software that supervises, sequences and coordinates programs. Systems software may include programs, such as: operating systems, assemblers, interpreters, compilers, software debugging programs, text editors, utilities and peripheral drivers.

➢**Super Computer** The largest mainframe computer featuring exceptionally high speed
operation while manipulating huge amounts of information.

➢**TCP/IP** Stands for Transmission Control Protocol/Internet Protocol. This is a large
grouping of programs and standards that govern how information moves round the Internet.

➢**Template** A pre-established format for a document, stored in a computer.

➢**Terabyte (TB)** It's about a trillion bytes. Actually it's 2 to the 40th power or
10095111627776 bytes.

➢**Teraflop** A measure of a computer's speed. It can be expressed as a trillion floating point operations per second.

➢**Terminal** This is what you look at when you're on the Internet. It's your computer screen.

➢**Time Sharing** It refers to the allocation of computer resources in a time dependent
fashion to run several programs simultaneously.

➢**Topology** The structure of the network.

➢**Track** A ring on the surface of a magnetic disk.

➢**Trackball** Input device that controls the position of the cursor on the screen; the unit is
mounted near the keyboard and movement is controlled by moving a ball.

➢**Transfer Rate** The rate at which data is transmitted between two computers or other
electronic equipment.

➢**Uniform Resource Locator (URL)** The specific internet address for a resource such as an individual or an organisation.

➢**Unix** This is an operating system developed by AT & T. It's a big push that it allows one server to serve many different end users at one time.

➢**Upload** The processes of transferring information from a computer to a web site (or
other remote location on a network).

➢**UPS (Universal Power Supply or Uninterruptible Power Supply)** An electrical power supply that includes a battery to provide enough power to a computer during an outage to back-up data and properly shut down.

➢**User** Someone attached to a server or host.

➢**User-Friendly** Program A software program that has been designed to easily direct the user through the operation or application of a program. A menu-driven program is considered to be 'user-friendly'.

➢**Utility** A software program designed to perform a computer system's routine housekeeping functions, like copying, deleting files and/or providing techniques to simplify the execution of a program.

➢**Validation** The process of making sure that the forms and documents from a particular
transaction are correct.

➢**Virus** A piece of computer code designed as a prank or malicious act to spread from one computer to another by attaching itself to other programs.

➢**Volatile Memory** A memory whose contents are irretrievably lost when power is removed. If data in RAM must be saved after power shutdown, back-up in non-volatile memory (magnetic disk. tape. or CD-R) is essential.

➢**Webcam** A video camera/computer setup that takes live images and sends them to a Web browser.

➢**Window** A portion of a computer display used in a

graphical interface that enables users to select commands by pointing to illustrations or symbols with a 'Windows' is also the name Microsoft adopted for its popular operating system.

➢**Word** The set of binary bits handled by a computer as a primary unit of data. Typically, each location in memory contains one word.

➢**Word Processor** A computer system or program for setting, editing, revising, correcting, storing and printing text.

➢**Word Wide Web** ('www or 'The Web') A network of servers on the Internet that use hypertext-linked databases and files. It was developed in 1989 by Tim Berners-Lee, a British computer scientist and is now the primary platform of the Internet.

➢**Workgroup** Persons sharing files and data between themselves.

➢**WORM (Write-Once, Read-Many**) A high-density optical disks memory available in a variety of formats from 5.25" to 1.4". The Worm can be programmed once, permanently saving a user's data. It then becomes an optical disk read-only memory having essentially the same features as a CD-ROM. Also called CD-R (CDRECORDABLE).

➢**X-Y Plotter** A computer-driven printing mechanism that draws coordinate points in graph form.

➢**ZOOM** The enlarging or reducing an image displayed on a computer process of proportionately monitor.

➢**ZIP** Stands for Zone Information Protocol. This is an application that allows for the compression of application files.

➢**Zombie** A computer that has been hijacked by a cracker without the owner's knowledge and used to perform malicious tasks on the Internet.