

OBJECTIVE COMPUTER

KNOWLEDGE & LITERACY

1690+ OBJECTIVE QUESTIONS

**With Model
Solved Papers
TILL DATE**

USEFUL FOR: SSC (CGL, CHSL, MTS, Delhi Police)
★ IBPS (PO & Clerk) ★ SBI (PO & Clerk)
★ RBI (Grade 'B' & Assistant) ★ Insurance
★ Railways ★ MBA ★ Hotel Management
★ MCA ★ NDA ★ CDS ★ IES
★ Airforce etc. Exams & Departmental Exams



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**KIRAN INSTITUTE OF
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OBJECTIVE COMPUTER KNOWLEDGE & LITERACY

WITH SOLVED PAPERS OF (2015-2021)

1690+ Objective Questions

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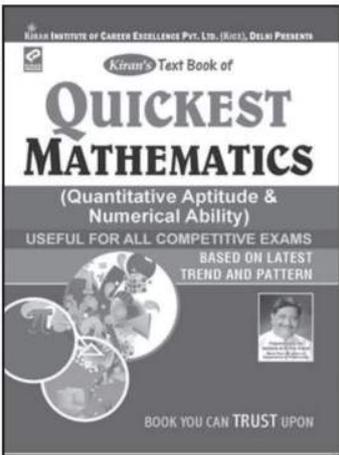
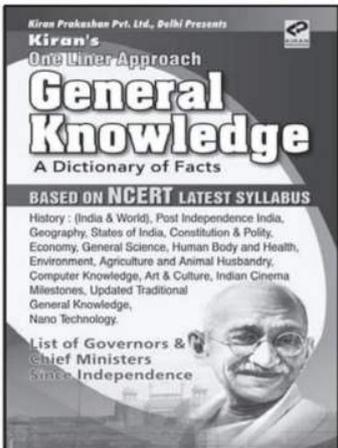
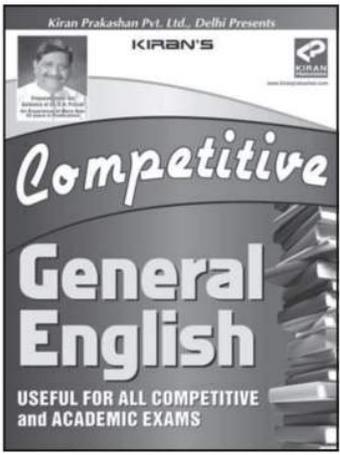
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Design & Layout by : **KIRAN COMPUTER SECTION**, New Delhi.

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STUDY MATERIAL

COMPUTER KNOWLEDGE & LITERACY

COMPUTER : AN INTRODUCTION

- Computer today has become an important part of our lives. Infact today we are living in the age of Information Revolution which is much to be owed, to the ability of computers of disseminating information at an incredible speed.
- From education to entertainment and from communication to business, computers are present every where. Thus in this, era of Information, it is crucial to have the basic knowledge of computer, its parts, its components and its application find way in a variety of fields.
- A sound theoretical base of computer and its applications would enhance the knowledge level of the reader and would definitely make the journey in the colourful world of computers, an exhilarating one.

Calculator : The device that performs mathematical operations but it has no storage capacity.

What is a computer ?

Computer : It is a device that works in electric medium and performs both mathematical and logical operations with storage capacity.

Basic Functions of Computer :

- (1) It accepts input data
- (2) It processes the given data
- (3) It produces output information
- (4) It stores the output for future use.

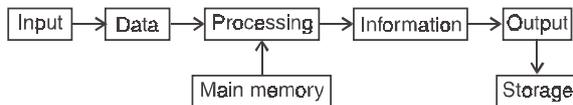


Figure shows the functioning of computer

BINARY SYSTEM

- Zero and one in their endless combination constitute binary system on which computers are based. A scheme of numeration with base ten requires, ten symbols or ciphers (including zero), whereas an arithmetic with the base two requires only two ciphers: 0 and 1.
- The binary numbers for the following numbers are written as 0-0, 1-1, 2-10, 3-11, 4-100, 5-101, 6-110, 7-111, 8-1000, 9-1001, 10-1010, 11-1011, 15-1111, 16-10000.
- Under the binary system all ordinary arithmetical operations are reduced to their simplest form. The binary system of numeration was used early in the 17th century by Thomas Harriot.

CLASSIFICATION OF COMPUTERS

- Computers can be classified into five types-Portable Computer, Mini Computer, Mainframe Computer, Micro Computer and Super Computer.
- **Portable Computer:-** These are the computers which can be carried from one place to another in the form of a briefcase or diary. It includes Laptop, Notebook and Personal Digital Assistant (PDA).

- **Micro Computer-** These are single user computers. Micro computers are often called as Personal Computers (PCs). The home computer is a PC providing education, entertainment, information and communication facility at home.
- **Mini Computer:-** They are medium level, multiuser computers. As compared to Mainframe Computers, these computers operate at slower speeds and have lesser memory. These are used by Insurance companies, Bank, Factories for keeping the records.
- **Mainframe Computer:-** Mainframe computers are expensive, large centralised computers. It is a multiuser computer and has large memory. It is capable of having speeds of the order of several billions of floating-point-operations per second. These computers help in railway reservation and such other operations.
- **Super Computer:-** Super computers are extensively used for solving very large computational problems in scientific research, engineering, industry, defence and business for variety of applications like molecular dynamics, aerospace, nuclear-weapon, seismic studies, oil-explorations, geology etc. ANUPAM, Cray-1, Param Padma are some super computers.

TYPES OF COMPUTERS BASED ON DATA TAKEN and OUTPUT

- Digital :** The computers count data or signals as "on" or "off" in binary digits only.
- Analog :** It recognises data as continuous measurement in wave form by continuous electrical pulses.
- Hybrid :** Computer that exhibit features of analog computers and digital computers. The digital component normally serve as the controller and provides logical operations while the analog component normally serve as a solver of differential equations. **Ex :-** HRS-100. **Ex ,** Computers in Hospitals.

Evolution of Computer

- **ABACUS :** It is the first computer introduced in 2000 BC
- 1617 : John naphier introduced napier's bones for calculation
- 1642 : Blaise Pascal invented PASCAL's calculator
- 1801 : Joseph Jacquard introduced Punched cards that were used in cotton looms and Weaving patterns to store data. It is considered an important step in the history of computing hardware.
- 1823 - 34 : Charles Babbage is called **father of Computers**. In 1822 he developed difference engine, made to compute values of polynomial functions. Babbage worked to design a more complex machine called the Analytical Engine. The major innovation was that the Analytical engine was to be programmed using punched cards.
- 1941 : JP Eckert and JW Mauchly invented ENIAC.
- **ENIAC :** Electronic Numeric Integrator and Calculator. First commercial electronic Computer. ENIAC was the first electronic general purpose computer. It was Turing-complete, digital and capable of being reprogrammed to solve "a large class of numerical problems".

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

- 1947 : John Von Neumann introduced EDSAC with storage capacity
- EDSAC : Electronic Delayed Storage Automatic Computer
- 1951 : Mauchiy and Eckert also invented UNIVAC.
UNIVAC : Universal Automatic Computer
- 1950 : EDVAC introduced (Electronic Discrete variable Automatic Computer)

- In 1971, the Intel 4004 world's first single chip micro processor was invented by Intel engineers Federico Faggin, Marcian Ted Hoff and Stanley Mazor.

Since, first electronic computers was invented in 1940's. So generation of computer start from here.

COMPUTER GENERATIONS

Generation	Years	Chief Components	Memory Elements	Operating System	Language	Examples
1st	1940-55	Vacuum Tubes/ Electronic valves for circuitry	Magnetic drums for memory	No	Machine language (Lowest-level programming language)	ENIAC EDSAC EDVAC UNIVAC
2nd	1956-63	Transistors (invented in 1947)	Magnetic cores Magnetic Tapes	No	Assembly Language, High level language e.g, FORTRAN, COBOL	IBM 700/1401 IBM 7030
3rd	1964-71	Integrated Circuits (semi conductors were used)	RAM, DISKS	LINUX	ALGOL C, C++ JAVA SQL	CDC 6600/760 IBM 360 IBM 370 CRAY-1
4th	1972-Present	LSI (Large Scale Integration)/ VLSI (Very Large Scale Integration)	All Primary, Secondary Storage devices	Windows DOS, LINUX	SQL ORACLE	All PC's & Desktops, CRAYX-MP
5th	Development Phase	Artificial Intelligence, Robotics & Nano Science	Some application such as voice recognition that are being used today are based on artificial intelligence.			

Artificial Intelligence : The Intelligence (science) involved and used by machines to perform the human activities such as writing, reading and all the human activities.

Nano Science : The Science / technology which involves in observation and deals with particles of 1-100 nm size itself. The term 'nano' refers to the metric prefix 10⁻⁹.

Robotics : The Sensitive operations in human body are performed through Rod like structures that acts according to machine instructions and these technology is called Robotics.

IMPORTANT DEVELOPMENTS IN THE FIELD OF COMPUTER

- 1938:- Konrad Zuse built the World's first binary digital computer, the Z1.
- 1948:- Claude Shannon identified the bit as the fundamental unit of data and the basic unit of computation.

- 1955 : The first fully transistorised computer, TRADIC developed.
- 1958 : Jack Kilby created the first integrated circuit.
- 1960 : COBOL designed for business use.
- 1964 : BASIC Created.
- 1965:- PDP-8, the first commercially successful mini computer developed.
- 1973:- Ethernet method of network connection devised.
- 1984:- Apple Computer launched the Macintosh, the first successful mouse driven computer.
- 1989:- Virtual Reality, a computer generated 3-D environment developed.
- 1993:- Intel introduces Pentium Processor.
- 2000:- Microsoft unveils Windows 2000.
- Intel announces Pentium 4.
- Microsoft unveils its C# (C-sharp) language.

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

e-WORLD

- (i) **e-book** :- An electronic book that is published in a format that is small in size, portable and at the same time have all the features of a print version.
- (ii) **e-paper** :- It is a portable, reusable storage and display medium that can be repeatedly written on several times. It is used for applications such as e-book, e-Newspaper etc.
- (iii) **e-library** :- It is a virtual library that stores and delivers exclusive content, collection of articles, reports, features and tools.
- (iv) **e-tailware** :- It is the software for creating on-line catalogues, ordering forms, credit checking and similar services for Web sites that sell goods and services to consumers.
- (v) **e-mail** :- 'Electronic mail', it is the act of sending and receiving messages through internet.
- (vi) **e-governance** :- It is the application of Information and Communication Technologies to the process of government functioning. Its objective is to provide speedy, responsive and transparent governance. Various e-governance projects have been launched in India. These include, 'Gyandoot' (Madhya Pradesh), 'FRIENDS' (Kerala), 'AKSHAYA', (Kerala).

COMPUTER ABBREVIATIONS

- ACD : Automatic Call Distributor.
- ADCP : Advanced Data Communication Protocol.
- ALU : Arithmetic Logic Unit.
- ASCII : American Standard Code for Information Interchange.
- ATDM : Asynchronous Time Division Multiplexing.
- BACP : Bandwidth Allocation Control Protocol.
- BASIC : Beginners All-Purpose Symbolic Instruction Code.
- BERT : Bit Error Rate Test.
- BIOD : Block Input/Output Daemon.
- BPS : Bit Per Second.
- CARP : Cache Array Routing Protocol.
- C-DAC : Centre for Development of Advance Computing.
- C-DOT : Centre for Development of Telematics.
- CXML : Commerce Extensible Markup Language.
- DAP : Data Access Protocol.
- DBML : Data Base Markup Language.
- DBMS : Data Base Management System.
- DHTML : Dynamic Hyper Text Markup Language.
- DIP : Dial-up Internet Protocol.
- DMA : Direct Memory Access.
- DOS : Disk Operating System.
- DRAM : Dynamic Random Access Memory.
- EAP : Extensible Authentication Protocol.
- EBCDIC : Extended Binary Coded Decimal Interchange Code.
- EDI : Electronic Data Interchange.
- EEPROM : Electronically Erasable Programmable Read Only Memory.
- EIP : Enterprise Information Portal.
- EPROM : Erasable Programmable Read-Only Memory.
- FDMA : Frequency Division Multiplexing Access.

- FLOPS : Floating Point Operations Per Second.
- FPS : Fast Packet Switching.
- FSP : File Service Protocol.
- FTAM : File Transfer Access and Management.
- FXS : Fax Transmit Format.
- GDP : Gateway Discovery Protocol.
- GSM : Global System for Mobiles.
- GUI : Graphical User Interface.
- HDF : Hierarchical Data File.
- HDLC : High Level Data Link Control.
- HDML : Handheld Device Mark-up Language.
- HDTV : High Definition Television.
- HID : Human Interface Device.
- HSSI : High Speed Serial Interface
- HTTPS : Hypertext Transfer Protocol Secure.
- ICM : Image Colour Matching.
- ICMP : Internet Control Message Protocol.
- IDRP : Interdomain Routing Protocol.
- IDS : Intrusion Detection System.
- IMAP : Internet Message Access Protocol.
- INSP : Internet Name Server Protocol.
- IOS : Internetworking Operating System.
- IP : Internet Protocol.
- IPP : Internet Printing Protocol.
- ITSP : Internet Telephony Service Provider.
- JPEG : Joint Photographic Experts Group.
- KBPS : Kilobits Per Second.
- LAWN : Local Area Wireless Network.
- LPP : Light-weight Presentation Protocol.
- MAN : Metropolitan Area Network.
- MAP : Mobile Application Port.
- MAPI : Mail Application Programming Interface.
- MB : Mega Bytes.
- Mbps : Mega bits per second.
- MCB : Memory Control Block.
- MCR : Magnetic Card Reader.
- MDLP : Mobile Data Link Protocol.
- MFLOPS : Million Floating point Operations Per Second.
- MFM : Modified Frequency Modulation.
- MGCP : Media Gateway Control Protocol.
- MIB : Management Information Base.
- MIDI : Musical Instrument Digital Interface.
- MIME : Multipurpose Internet Mail Extension.
- MIPS : Millions of Instruction Per Second.
- MIS : Management Information System.
- MMX : Multimedia Extension.
- MOLAP : Multi-dimension Online Analytical Processing.
- MPEG : Moving Pictures Expert Group.
- NAP : Network Access Point.
- NASDAQ : National Association of Securities Dealers Automated Quotation.
- NAT-PT : Network Address Translation-Protocol Translation.
- NETBIOS : Network Adapter Basic Input Output System.

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

- NFA : Network File Access Routine.
- NSP : Network Services Protocol.
- NVRAM : Non-Volatile Random Access Memory.
- OAIS : Open Archival Information System.
- OLTP : Online Transaction Processing.
- OMAP : Open Multimedia Application Platform.
- PAP : Password Authentication Protocol.
- PCM : Pulse Code Modulation.
- PDN : Public Data Network.
- PDP : Packet Data Protocol.
- PIN : Personal Identification Number.
- PRISM : Parallel Reduced Instruction Set Multiprocessing.
- PROM : Programmable Read Only Memory.
- PSDN : Packet-Switched Data Network.
- RAM : Random Access Memory.
- RARP : Reverse Address Resolution Protocol.
- RDBMS : Relational Data Base Management System.
- RIP : Routing Information Protocol.
- RTCP : Real-time Transport Control Protocol.
- SDRAM : Synchronous Dynamic Random Access Memory.
- SGML : Standard Generalized Markup Language.
- SIM : Subscriber Identification Module.
- SLIP : Serial Line Internet Protocol.
- SNA : Sub Network Access Protocol.
- SQL : System Query Language.
- SSML : Security Services Markup Language.
- STP : Spanning Tree Protocol.
- SWAP : Superior Wireless Application.
- SYSOP : System Operator.
- TCP/IP : Transmission Control Protocol/Internet Protocol.
- TDMA : Time Division Multiple Access.
- TFLOPS : Tera Floating-Point Operations Per Second.
- UDMA : Ultra Direct Memory Access.
- UIML : User Interface Markup Language.
- VOIP : Voice Over Internet Protocol.
- VRAM : Volatile Random Access Memory.
- VRML : Virtual Reality Modelling Language.
- VSAM : Virtual Storage Access Method.
- WCCP : Web Cache Control Protocol.
- WML : Wireless Markup Language.
- WSDL : Web Services Description Language.
- XAML : Extensible Authority Markup Language.
- XML : Extensible Markup Language.
- ZIP : Zone Information Protocol.

COMPUTER TERMINOLOGY

- **Assembly Language** : It is a low-level of language which uses mnemonic statements to generate machine code. It is typified by its speed of execution and small executable file size. They are hardware specific and therefore programme written on one particular machine may not work on another.
- **Association for Women in Computing (AWC)** : A professional society dedicated to the advancement of women in computer related fields. Founded in 1978.

- **Advanced Technology Attachment Packet Interface (ATAPI)** : A standard that makes it very easy to connect a CD-ROM drive to an Enhanced IDE host adapter.
- **Active Server Pages (ASP)** : A standard for scripting server side web pages.
- **Analog** : Describing a system, particularly an electronic device, that uses a continuous physical quantity to represent information.
- **ANSI (American National Standard Institute)** : ANSI is an organisation that fosters the development of technology standards in the United States. ANSI works with industry groups and is the US member of the International Standards Organisation (ISO) and the International Electrotechnical Commission (IEC).
- **API (Application Programming Interface)** : API is a method prescribed by a computer operating system or an application programme which a programmer who is writing an application programme can use to make requests of the operating system or another application.
- **ARPA Net** : A predecessor of the Internet where the methodology and software on which the Internet is based were tested. No longer in existence. Started in 1969 with funds from the Defense Department's Advanced Projects Research Agency.
- **ASCII** : American Standard Code for Information Interchange. This is a de-facto worldwide standard for code numbers used by computers to represent all upper and lowercase English letters, numbers, punctuation, etc.
- **Back-up File** : A copy of file created as safety precaution in case any harm occurs to the original.
- **BAK** : The MS-DOS file name extension usually attached to a file containing backup data.
- **BAR Code** : A printed pattern of wide and narrow vertical lines (bar) used to represent numerical code in machine readable form. A bar code reader scans bar code with the help of special device and converts the bar code into a readable data with the help of special software.
- **Beginner's All-Purpose Symbolic Instruction Code (BASIC)** : An easy to use high level programming language which is now replaced by improved version of Microsoft Visual Basic.
- **Basic Input/Output System (BIOS)** : A set of programmes encoded in Read Only Memory (ROM) in IBM PC-compatible computers. These programmes handle start up operations and low-level control for hardware such as key boards, monitor and diskdrives.
- **Bulletin Board Service/System (BBS)** : A commercial data communications network where users/subscribers can send messages, get advice on software or use entertainment features by means of direct-dial modern links. The popularity of Internet has eroded the popularity and use of BBS.
- **Blind Carbon Copy (BCC)** : In e-mail, a copy of message that is sent to one or more persons without the knowledge of other recipients. Also called **Blind Courtesy Copy**.
- **BGP** : Border Gateway Protocol.
- **BMP** : Bitmap (file name extension): this is file name extension for files which contains images stored as a set of bits.
- **Bit** : A short form for binary digit. A bit is capable of recording 'off' or 'on' condition in the form of binary digit '0' or '1' respectively.

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

- **Byte** : Contiguous bits form a byte.
1 Kilobyte = 1024byte
1 Megabyte- 1,048,576 bytes.
- **Boot** : An initiating automatic routine that is read into RAM when a computer is first turned on. This provides the necessary environment for subsequent loading of all or part of the operating system, software applications etc. It prepares the computer for use. The process of starting the computer is called boot and restarting is called warm boot.
- **Bootstrap Protocol (BOOTP)** : It is an internet protocol that enables work stations or local area network to find their Internet Protocol (IP) addresses dynamically.
- **Bits per inch (bpi)** : In magnetic media such as backup tape drives or disk drives, the measurement of the media's recording density is done in bpi.
- **Broadband Integrated Services Digital Network (BISDN)** : A high band width digital telephone standard of transmitting upto 1.5Mbps over fiber optic cables.
- **BOPS** : Billions Operations Per Second.
- **Bubblejet Printer (BJP)** : A variation of the inkjet printer concept that uses the heating element instead of piezoelectric crystals to shoot ink from nozzles.
- **BANDWIDTH** : The amount of data that can flow through a channel. The higher the bandwidth, the more data that can travel at one time.
- **Binary File** : A file containing information such as a program, compressed archive, an image or a document etc., the contents of the file generally can't be displayed or printed without using some program.
- **Browser** : Browser is a client software that allows the user to display and interact with a hypertext document i.e., it is a client software which helps users to navigate the www.
- **Bus** : A bus is a transmission path on which signals are dropped off or picked up by devices that are attached to it. If a device is addressed by the signal, it pays attention, otherwise, it discards the signal. The term comes from auto-buses that travel along a fixed route, picking up and dropping off passengers.
- **C** : C is a programming language that has been widely used for operating systems and applications. Many versions of UNIX- based operating systems are written in C.
- **C++** : C++ is an object-oriented version of the popular C programming language. It combines the C language features with object-oriented capabilities. It has been adopted as the in-house programming language of a number of companies like Sun Microsystems and Apple Computers.
- **CAD (Computer-Aided Design)** : CAD is a software used by architects and engineers to create technical drawings
- **CASE (Computer-Aided Software Engineering)** : CASE is a computer-assisted method to organise and control software development. It is especially useful in large, complex projects that involve many software components and people. It allows the designers, code writers, testers, planners and managers to share a common view of where the project stands.
- **COBOL(Common Business-Oriented Language)** : COBOL was the first high-level programming language for business applications. Over the past 35 years, many payroll, accounting and other business applications have been written in COBOL, and they are still in use.
- **Communications Software** : A programme that controls the modern and establishes connectivity with another computer.
- **Cyber Space** : Cyber means to steer guide or control. This term was first used in science fiction. It means the global pool of information held on computer networks, connected together by sophisticated transmission technology, that can be accessed by anyone.
- **Cache** : It is a memory storage area that keeps frequent use data readily available to the computer so that the Computer does not retrieve them from slow storage devices.
- **Compressed Application Binary (CAB)** : It is Microsoft compressed file format.
- **Computer Aided Design (CAD)** : A CAD program is used to design a wide ranging industrial products, ranging from machine parts to home using computer.
- **Computer Aided Design and Drafting(CADD)** : Used for industrial design and technical drawing. It is similar to CAD except that it has additional features that enable the user to produce drawing conforming to engineering conventions.
- **Computer Aided Software Engineering(CASE)** : The use of software package to
 - CD** : Compact Disc.
 - CD-DA** : Compact Disc-Digital Audio.
 - CD-I** : Compact Disc-Interactive.
 - CD-R** : Compact Disc- Recordable.
 - CD-RW** : Compact Dist-Rewritable.
 - CPU** : Central Processing Unit.
 - CGI** : Common Gateway Interface.
 - CHAT** : Conversational Hypertext Access Technology.
- **Clock** : An electronic circuit that generates evenly spaced pulses at speeds of millions of Hertz(MHz). The pulses are used to synchronise the flow of information through the computer's internal communication channels.
- **Clock Speed** : The speed of computer is measured in clock speed. High clock speed is synonymous with high processing capability. Clock speed is measured in Mega Hertz(MHz).
- **.Com** : Command- It is a file name extension.
- **.com** : Commercial business. It is domain name as appears in website address like www.Indya.com.
- **Com** : In MS-DOS, Com is a device name that refers to the serial ports available in the computer. A computer can have upto four Comports designated as COM1,COM2, COM3 and COM4.
- **Computer Virus** : A programme designed as a prank or as sabotage that replicates itself by attaching to other programmes and carrying out unwanted and sometimes dangerous operation. Internet technologies have made the 'connected' computer more vulnerable to be attacked by virus.
- **CON** : Console-A terminal consisting of keyboard and monitor. In multi-user system console is synonymous with terminal.
- **CGI** : Common Gateway Interface. A way of interfacing computer programmes with HTTP or WWW servers so that a server can offer interactive sites instead of just static text or images.
- **CGI** : Common Gateway Interface (file name extension). A file that makes it possible for HTTP server to interface with computer programmes to provide interactive functions.

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

- **DATACOM** : Data Communication.
- **DBMS** : Database Management Systems: An application programme that provides the tool for data retrieval, modification, deletion and insertion.
- **RDBMS** : Relational Database Management System.
- **Defragmentation** : A procedure in which all files on a hard disc are re-written on disc so that all parts of each file are written to contiguous sectors. This is done to improve the speed of computer.
- **Desktop Computer** : A personal computer or professional workstation designed to fit on standard office desk that's equipped with sufficient memory and disk storage to perform business computing tasks.
- **Desktop Publishing (DTP)** : The use of personal computer for the purpose of printing pages having text and/or graphics using desktop publishing software is called Desktop Publishing.
- **Digital Signature** : An encrypted tamper-proof attestation that is usually attached to encrypted e-mail message or certificate.
- **DOS** : Disc Operating System.
- **DLL** : Dynamic Link Library: The MS-DOS file name extension attached to collection of library routines.
- **DMA** : Direct Memory Access.
- **DNS** : Domain Name System.
- **Dot Matrix Printer (DMP)** : An impact parameter that forms text and graphic images by hammering the pin end against a ribbon in a matrix (pattern) of dots. These printers are fast and cheap but the output is of poor quality and creates noise.
- **Dots per inch (dpi)** : A measure of resolution that states the number of dots that the device can print, scan or display in a linear inch.
- **DUN** : Dial up Networking.
- **Dial-up access** : Access to the Internet through a telephone line and a modem.
- **Digital** : Digital technology generates, stores and processes data in terms of two states: positive and non-positive. The positive state is expressed or represented by the number 1 and the non-positive state by the number 0. Data that is transmitted or stored with digital technology is expressed as a string of 0s and 1s. Digital technology is mainly used with new communication media, such as satellite and fibre optic transmission.
- **DNS** : Domain Name System, a distributed database system for translating computer names, like giasbm01.vsnl.net.in into a numeric IP addresses like 202.54.130 and vice-versa.
- **DOMAIN** : The highest subdivision of the Net, usually referring to a country or the type of organisation, such as edu for education, or .com for commercial.
- **Domain** : The smaller network making up the Internet, and having many computers or even smaller networks within it, is called a domain. The domain may represent either a type of organisation or a geographical location.
- **Download/Upload** : To download is to transfer a file from another computer to the user's computer. To upload is to send a file to another computer.
- **EAROM** : Electrically Alterable Read Only Memory.
- **EDI** : Electronic Data Interchange. A standard for the electronic exchange of business documents such as invoices and purchase orders.
- **EDRAM** : Eraseable/Extended Dynamic Read Only Memory.
- **EGA** : Enhanced Graphics Adapter.
- **ERP** : Enterprise Resource Planning. The planning and management of all resources in an enterprise is called ERP. An ERP system is multi-module software system. A ERP typically contains relational database and application for managing, purchasing inventory, personnel etc.
- **EXE** : Executable (file name extension)
- **E-zine** : Electronic Magazine. Also called digizine.
- **XML** : Extensible Markup Language.
- **Ethernet** : It is the most popular type of LAN, in which communications through radio frequency signals is carried by a co-axial cable. Software protocols used by Ethernet Systems vary, but include TCP/IP and Navel Netware.
- **Ethernet Card** : A network adapter that enables a computer to connect to an Ethernet. It is a printed circuit board that is in built or motherboard or is plugged on computer which is on Ethernet.
- **Extranet** : An Intranet (Internal TCP/IP network) that has been selectively opened to a firm's suppliers, customers and strategic allies.
- **FAQ** : Frequently Asked Questions.
- **FAT16** : A file Allocation table that restricts the maximum size of a hard drive to 2.1 GB. This limitation stems from the use of 6 bit addressing method.
- **FAT 32** : A FAT that uses 32-bit operating system and removes the previous limitation of 2.1 GB of hard disk by employing a 32 bit cluster addressing system.
- **FDD** : Floppy Disk Drive.
- **FAX** : Facsimile- To send printed pages between two location using telephone lines.
- **FLOP** : Floating point operations per sec. This is the unit of measurement of the speed at which computer carries out floating point operations.
- **File Transfer Protocol (FTP)** : A client/server protocol for exchanging files with a host computer.
- **File Allocation Table (FAT)** : It is a hidden file located in sector 0 on a floppy/Hard disk. It contains information about the sizes of files stored and also the information about which cluster contain which file.
- **.GOV** : It is governmental domain name denoting a government office or agency.
- **.GIF** : It is file extension where acronym for Graphics Interchange Format. These files are widely used to encode and exchange graphics files on the Internet.
- **GML** : Generalised Markup Language.
- **GSP** : Global Service Provider.
- **Green PC** : A computer system designed to operate in energy efficient manner.
- **Graphical User Interface (GUI)** : A design for the part of program that interacts with the user and that uses icons/graphic representations to represent programme features.

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

- **Greeking** : The use of symbols to show text or graphics that cannot be shown in sufficient detail for the whole document to be legible is called greeking. Some word processors use a print preview feature that's similar to greeking.
- **.H** : Header (file name extension. Used in programming language c/ctl).
- **HDML** : Handheld Device Markup Language.
- **Handshaking** : A method for controlling the communication between two devices so that one device transmits data only when the other device is ready.
- **HIMEM** : High Memory.
- **HDD** : Hard Disk Drive.
- **HPC** : Handheld Personal Computer.
- **HFS** : Hierarchical File System: In an operating system a method of organising files in tree structure. The topmost level called root directory which contains leaves called sub-directories which further contain sub-directors. Such a file systems is called HFS.
- **HTML** : Hyper Text Markup Language. It is markup language behind the appearance of documents on the World Wide Web (WWW).
- **HTTP** : Hyper Text Transfer Protocol. The protocol most often used to transfer information from WWW server to browsers, which is why web addresses begin with http://
- **HTTPS** : Hyper Text Transfer Protocol Secure. A variation of HTTP that provides special security for online transaction on WWW.
- **IBM** : International Business Machine.
- **ICMP** : Internet Control Message Protocol. It is an extension to the original Internet Protocol that provides much needed error and congestion control.
- **IMAP** : Internet Message Access Protocol. IMAP is one of the two fundamental protocols in the internet e-mail (other being POP3) that governs how and where user stores their incoming mail messages. In IMAP, mails are stored on the mail server.
- **Info Bahn** : A form preferred by some for the Information Superhighway, a high speed information system that would link homes, schools and offices.
- **Inkjet Printer** : A non-impact printer that forms an image by spraying ink from a matrix of tiny jets.
- **IANA** : Internet Assigned Numbers Authority. A unit of Internet Architecture Board (IAB) that supervises the allocation of IP (Internet Protocol) addresses, port address and other numerical standards on the Internet.
- **IP** : Internet Protocol: In TCP/IP, the standard that describes how an Internet Connected Computer should break data down into the packets for transmission across the network, and how those packets should be addressed so that they arrive at their destination. IP is the connectionless part of TCP/IP protocols.
- **ISDN** : Intergrated Services Digital Network.
- **IP Address** : A 32-bit binary number that uniquely and precisely identifies the location of a particular computer on the Internet.
- **ISP** : Internet Service Provider.
- **JDK** : Java Development Kit is a package of Java utilities and development tools created by Sun Microsystems that represents the de facto standard for the Java Programming language.
- **JPEG** : Joint Photographic Experts Group. A graphics format that is ideal for complex pictures/graphics.
- **JSP** : Java Server Pages.
- **Kb** : Kilobit.
- **KB** : kilobyte.
- **LAWN** : Local Area Wireless Network.
- **LAN** : Local Area Network.
- **LCD** : Liquid Crystal Display. It is a low-power display technology used in laptop computers and small battery power electronic devices.
- **LED** : Light Emitting Diode. A small electronic device made from semiconductor materials.
- **LINUX** : An operating system designed by Linus Torvalda.
- **LPT** : Line Printer Terminal. It is a device name that refers to a parallel port to which one can connect parallel printers.
- **Mainframe** : A multiuser computer designed to meet the computing needs of a large organisation. Originally, the term mainframe referred to the metal cabinet that housed the CPU.
- **MFLOPS** : Million Floating Point Operations per second.
- **MDLP** : Mobile Data Link Protocol.
- **MIME** : Multipurpose Internet Mail Extension. It is an internet standard that specifies how tools such as e-mail programs and web browsers can transfer multimedia files (including sound, graphics and video) via internet. Prior to MIME all the data transferred via the Internet had to be coded in ASCII text.
- **MIPS** : Million Instructions per sec. It is a method of measuring the rate at which the computer executes microprocessor instructions.
- **ML** : Machine Language.
- **MODEM**- Modulator Demodulator. A device that converts the digital signals generated by the serial port to the modulated analog signals required for transmission over a telephone line and likewise transforms incoming analog signals to their digital equivalents.
- **MP3** : MPEG-I Audio layer III (MPEG Audio Layer 3).
- **MRAM** : Magnetic Random Access Memory.
- **MSCDEX** : Microsoft Compact Disk Extension.
- **MIDI** : Musical Instrument Digital Interface. A standard communications protocol for the exchange of information between computers and musical synthesisers.
- **MTOPS** : Millions of Theoretical Operations per Second.
- **Net BIOS** : Network Basic Input/Output System.
- **NCIC** : National Crime Information Centre.
- **NIC** : Network Information Centre.
- **ODBC** : Object Database Connectivity. It is a standard that enables applications (including web browsers) to communicate with variety of database applications.
- **OEM** : Original Equipment Manufacturer.
- **OOP** : Object Oriented Programming.
- **OP Code** : Operation Code.
- **OS** : Operating System.
- **OMR** : Optical Mark Recognition.
- **OOPS** : Object Oriented Programming and System.
- **PABX** : Private Automatic Branch Exchange.
- **PAN** : Personal Area Network.

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

- **PDF** : Portable Document Format. It is a file extension/a portable document file format created by Adobe Systems.
- **PIM** : Personal Information Manager. It is a program that stores and retrieves a variety of personal information including notes, memos, names and addresses etc.
- **P-Mail** : Paper Mail.
- **PNP** : Plug and Play. A hardware standard that requires each hardware be capable of identifying itself.
- **POP3** : Post Office Protocol. An internet e-mail standard that specifies how an internet connected communicates as mail handing agent.
- **POST** : Power on Self-Test. It is internal testing which is performed when the computer is started or reset. Encoded in ROM, the POST program first checks the microprocessor by having it perform a simple operations.
- **PPP** : Point to point Protocol. One of the two standards by which computers are connected directly to internet via dial up telephone connection. (The other is s1 IP).
- **PROM** : Programmable Read-Only Memory.
- **PSTN** : Public Switched Telephone Network.
- **PEA** : Pocket Ethernet Adapter.
- **PIF** : Picture Interchange format file. (A file extension).
- **PIN** : Personnel Identification Number : It is a digital number used for accessing highly secure information.
- **Protocol** : In computer terminology, it is a set of rules or standard designed so that computers can exchange information with a minimum of error.
- **Random Access Memory (RAM)** : It is computer's primary working memory in which program instructions and data are stored so that they can be accessed directly by the CPU via processor's high speed external data bus. RAM is often called Read/Write Memory. In RAM-CPU can read and write data. RAM does not retain its contents when the power to the computer is switched off.
- **Types of RAM and their background of usage** : Till a decade ago, the only type of RAM available was DRAM (Dynamic RAM), so named because it changes its content constantly. Specifically the DRAM then available was EDO-RAM (Extended Data-Out DRAM); while the RAM was working on current bit, it was already extending its reach for the next bit.
- EDROM was replaced by SDRAM (Synchronous DRAM) in 1990's. In this, the access speed was increased over the earlier EDO-RAM. At present most of the computers use it.
- However in 1998, a radically different technology of RAM called-RDRAM (Rambus DRAM) came in which some architectural modifications were done to increase the speed. All the Pentium-4 PC's are tied with RDRAM. But this RAM is quite expensive.
- In 2000, a new variant of SDRAM that offers faster performance, comparable to RDRAM, and price closer to SDRAM was launched which is called DDR-RAM (Double Data Rate-RAM).
- **RDBMS** : Relational Data Base Management System. It is a database management system that comes with all necessary support programs, programming tools and documentation.
- **Read Only Memory (ROM)** : It is the portion of computers storage that does not lose its contents when one switches

off the computer. ROM contains essentials system programmes that cannot be erased.

- **Rich Text Format (RTF)** : A text formatting standard developed by Microsoft that allows the word processor to create file with some of the formatting instructions.
- **Ripper** : A programme that can extract audio tracks from audio CD's and write these to computer's hard disk—generally to WAV files. Also called CD ripper.
- **Scandisk** : A Window utility that checks magnetic disks (Floppies and Hard Disk) for errors such as lost clusters and file system irregularities.
- **SCSI** : Small Computer System Interface. A high speed interface that can connect to a computer, devices such as hard drives, ROM Floppy drives, tape drives, scanners and printers.
- **SDK** : Software Development Kit.
- **SGRAM** : Synchronous Graphic RAM. It is a type of DRAM that can synchronise with the computer's clock speed enabling significantly higher speed of data transfer as compared to earlier DRAM.
- **S-HTTP** : Secure Hyper Text Transfer Protocol. It is the extension of HTTP that supports secure commercial transactions on web.
- **SLIP** : Serial Line Internet Protocol. The earliest of the two ways in which a PC connects to Internet through Dial Up Networking. SLIP defines the transport of data packets through an asynchronous telephone line. Therefore, SLP enables computers not directly connected to LANs to be fully connected to the Internet.
- **SMTP** : Simple Mail Transport Protocol. It is an Internet protocol that governs the transmission of e-mail over computer networks. It does not provide any support for transmission of data other than plain text.

SOFTWARE HANDSHAKING

- **Spoof** : Is to deceive or to fake, especially with the intension of gaining unauthorised access to computer resources.
- **SPOOL** : Simultaneous peripheral Operations On Line.
- **Spoder** : A utility programme, often included with an operating system that routes printer commands to a file on disk or in RAM rather to a printer, and then doles out the printer commands when CPU is idle.
- **SRAM** : Static Random Access Memory. A type of RAM that holds its contents without constant refreshing from CPU.
- **SHTML** : Server-side Hyper Text Markup Language.
- **SMS** : Short Messaging Service.
- **SVGA** : Super Video Graphics Array. It is an enhancement of VGA (Visual Graphics Array) so as to obtain better picture.
- **System File** : A programme or data file that contains information that the operating system needs, distinguished from the programme or data files that the application programme uses.
- **Telephony Application Programme Interface (TAPI)** : It is a set of standard programming functions that can be implemented by application that interface with telecommunication equipment.

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

- **Tunnelling** : It is a mechanism of forwarding traffic from remote users to a corporate network through an existing public IP network. Data is encapsulated within an IP datagram and then decapsulated at the other endpoint of the tunnel.
- **Trunk** : It refers to aggregation of multiple telecom lines or virtual local area networks to increase a bandwidth.
- **Terminator** : It is an electrical impedance attached to the open end of a transmission line to eliminate reflections. Electrical circuitry at the end of a cable are designed to match impedances for the purpose of preventing the reflection of electrical signals when they reach the end of the cable.
- **Telemedicine** : The provision of high quality, up-to-date medical information to medical practitioners. In rural and community health centres, doctors, who are out of touch with the latest knowledge may make faulty diagnosis or prescribe an out of date therapy. A telemedicine system can provide there high quality information and thus could save lives.
- **TIF** : The file extension to a file containing graphics in Tagged Image File Format (TIFF). TIF files are often used to hold scanned photographic images.
- **TPI** : Tracks per inch. A measurement of the data storage density of magnetic disks, such as floppy disks.
- **Transducer** : A device that converts a detectable physical phenomenon such as sound, pressure, or light into electronic signals that can then be processed by computer.
- **Trojan Horse** : A programme that appears to perform a valid function but has some hidden instructions in its code that can cause severe damage to the system on which the programme runs. Unlike computer virus, Trojan horse cannot replicate themselves.
- **TELNET** : A terminal emulation protocol that lets a user lag in remotely to other computers on the Internet. It has a command line interface which will assume automatically that the resource is located in the same directory that contains RELURL.
- **UID** : User Identifier.
- **UHF** : Ultra High Frequency.
- **UPS** : Uninterruptible Power Supply/System. A battery system that can supply continuous power to a computer in the event of power failure for some time (approx. 10-15 minutes) after supply loss so that the user can save his work and shut down the computer safely.
- **URL** : Uniform Resource Locator. In the World Wide Web (WWW), it is one of the two basic kind of Uniform Resource Identifier (URL). It is string of character that precisely define an Internet resource's type and location.
- **URI (Uniform Resource Identifier)** : In the HTTP, a string of characters identifies an Internet resource of WWW including the type of resource and its location. There are two types of URIs. Uniform Resource Locators (URLs) and relative URLs (RELURL).
In RELURL string of character gives only the file name and does not specify its location or type. Web Browser (as Parsers) resource.
- **USERID** : User Identification.
- **VAN** : Value Added Network. A public data network (PDN) that provides value added services for corporate customers including end-to-end dedicated lines with guaranteed security.
- **VDU** : Video Display Unit : Synonymous with Monitor,
- **V Disk** : Virtual Disk. It's a storage technique in which the complete storage disk (CD etc.) can be copied to hard disk. The virtual disk of storage disk acts similar to the original disk.
- **VEGA** : Video-7 Enhanced Graphite Adapter.
- **VRAM (Video Ram)** : Specially designed DRAM chips to maximise the performance of video adapters.
- **VFAT** : Virtual File Allocation Table. The file allocation table used in Windows 95 is called VFAT. It uses Protected Mode, an operational state that allows a PC to address all its memory.
- **W3 (WWW)** : World Wide Web. A global hypertext system that uses the Internet as its transport mechanism.
- **W3C** : World Wide Web Consortium. An independent standard body composed of university researchers and industry practitioners that is devoted to setting effective standards to promote the orderly growth of WWW.
- **WAN** : Wide Area Network : A commercial data network that provides data communications services for business and governmental agencies.
- **WAV** : (Waveform Audio) File name extension for audio-files.
- **WORM (Write Once Read Many)** : An optical disk drive with storage capacities of upto 1 TB. After once writing the data the disk drive becomes Read Only storage medium. WORM is used to keep large database.
- **Win..XP** : Windows The "Experience".
- **WML** : Wireless Mark-up Language.
- **WMP** : Windows Media Player.
- **WRAM** : Windows Read Only Memory.
- **XDF** : Extended Density Format.
- **XHTML** : Extensible Hypertext Mark-up Language.
- **XML** : Extensible Mark-up language. A language for creating mark-up languages.
- **.z** : Packed file (file name extension).
- **.Z (upper case)** : Compressed file (file name extension).
- **.ZIP** : Compressed file (File Name Extension).
- **Y-Modem** : It refers to error free file transfer protocol that can be used on error-corrected links and to transfer multiple files with a, single command.
- **Quantum Computers** : It is a device that harnesses physical phenomena unique to quantum mechanics to realise a fundamentally new mode of information processing. In it, the fundamental unit of information (qubit) is quaternary in nature.
- **Analog Transmission** : It refers to the signal transmission over wires or through the air. The information is sent and received by combining amplitude, frequency and phase signals.
- **Wap-enabled Phone** : These are telephones enabled with wireless access protocol (Wap), through which it can have access to Internet Content.
- **Worm** : A worm is a virus that does not infect other programme. It makes copies of itself, and infects additional computers (typically by making use of network connections) but does not attach itself to additional programmes, however a worm might after, install or destroy files and programmes.

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

- **Password** : A code used to gain access (login) to a locked system. Good passwords contain letters and non-letters and are not simple combination such as Virtue 7.
- **Piracy** : The illegal copying of software for distribution with the organisation or to friends, clubs or other groups or for commercial duplication and resale, which causes a huge loss to the software industry.
- **Roaming** : The ability to use a communications device such as a cellphone or personal digital assistants and be able to move from one cell or access point to another without losing the connection.
- **Swapping** : It is the process of replacing one segment of a programme in memory with another and restoring it back to the original when required.
- **Intranet** : A private network inside a company or organisation that uses the same kinds of software as are found on the public Internet but that is only for internal use.
- **Finger** : An Internet software tool for locating people on other Internet sites. Finger is also sometimes used to give access to non-personal information, but the most common use is to see if a person has an account at a particular Internet Site. Many sites do not allow finger requests, but many do.
- **Browser** : It is a client programme (software) that is used to log at various kinds of Internet resources.
- **Backbone** : A high speed line or series of connections that forms a major pathway within a network, is known as backbone. It is a relative term as a backbone in a small network will likely be much smaller than many non-backbone lines in a large network.
- **Cyber Space** : The virtual community created by the information society, which has removed all physical demarcations, geographical boundaries and political limitations is known as the Cyber space.
- **Netizens** : Citizens having access to Internet are called netizens. It gives an idea about computer penetration in the country and the world as a whole.
- **Ethernet** : A type of network that allow audio and video information to be carried along with computer data. It is based on Local Area Network (LAN) technology.
- **Voice Answer Back (VAB)** : It is an audio response device that can link a computer system to a telephone network, thus providing voice response to inquiries made from telephone terminals.
- **Robotics** : It is a technology which enables an electromechanical system which can be programmed to perform manual tasks.

SOFTWARE

- Software brings life into the computer. It is nothing but instructions (or a program) required to run the computer.
- It guides the hardware how to do its job. A computer is otherwise a general-purpose machine.
- It is software which differentiates among the various kinds of jobs a computer can perform.
- Software consists of electronics instruction.
- A specific set of instructions that drive a computer to perform a specific task is called a Program.
- When a computer is using a particular program, it is said to be running or executing that program.

Microsoft, WordPerfect, Ami pro for Windows open office word, Google drive document are few of the Windows-based word-processors available in the market. Oracle, Ingres, Informix, Unify are some of the commercially available Rational Database Management Systems (RDBMS) packages.

- Diagnostic are the programs used to diagnose the problems of your computers.
- These are very important programs and are able to rectify the problems of your computer to a certain extent by the programmer itself.
- Typical examples of such programs are Scan Disk, Smart Dog and Norton Utilities etc. Coreldraw, PowerPoint and Persuasion are the Presentation Graphics or Business Graphic Packages which works in the Windows environment.

CHARACTERISTICS OF COMPUTER

Computer has become an essential part of our day-to-day activities. Computers are used more or less in every sphere of life. Its growing importance, is because of its unique features.

■ ACCURACY

Computers are very accurate. They do make mistakes but seldom. This is because of their physical circuit. Even if they make mistakes, it might be because of the faulty programs, some mistake made while feeding in the data or poorly designed system. The highly efficient error detecting techniques of the computer prevent its from showing false results.

■ SPEED

The computer was initially invented as a very high-speed calculator. This helped in completing many scientific projects that were previously impossible. The landing on the moon would not have been possible if computer had not been there, neither would we take an umbrella if saw clear sky and weather forecast told us that it would rain in the afternoon. We would have taken a lot of time in making the arrangements for flying abroad if computers were not there to book our seats so easily and fast. This ability to get the answers fast enough so that one has time to take an action on them (to make alternative arrangements in case of reservations) makes real-time -computing possible. Electrical pulses, so its speed is virtually instantaneous. When talking about speed of the computer, we don't talk in seconds or microseconds but in nanoseconds (10^{-9} seconds) or even picoseconds (10^{-12} seconds). You can very well imagine the speed of computer by the fact that a computer can add two 18-digit numbers in 300 to 400 nanoseconds, that means that it can do about 3 million calculations per second.

■ VERSATILITY

This means that the computers are capable of performing any type of task, provided the activity could be put into logical steps. It can be used from cooking (microwave oven) to spending a night on the moon (through satellites). In today's world it is difficult to imagine even a single field which is untouched by computer invasion.

■ STORAGE

A human mind acquires some knowledge and after it has used, it might keep it in its subconscious mind or might even forget it after some time. But computers can store massive amounts of information. This information can be used and reused time and again for years (unless something goes wrong with the hardware). Today's computers have the disks, which have the capacity of storing billions of characters. This is big enough to store the complete Britannica Thesaurus, dozens of computer programs or the applications, thousands of songs, huge databases, all the projects we have ever done in our life and much more.

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

■ MEMORY

Sometimes if we try to recall what we studied last year, we are not able to recollect. In case of computer, it's not like that. If we store any information in the computer's memory, it remains there till we delete it. Moreover the memory of computer is unlimited, we can store as long as we want.

■ AUTOMATION

A computer is much more than just a calculator in which we need to give the instructions at every step. It is an intelligent device and if programmed for an activity, it keeps doing it till it finishes, without any human intervention.

■ DILIGENCE

Computer being a machine, does not show any signs of fatigue, tiredness, lack of concentration, or lost interest. The speed, accuracy and the quality would be absolutely same in the first and the last calculation, even if millions of calculations are done by computer. It will not complain even once that they are bored. Thus, it is best specially for monotonous and voluminous work. Although that is a threat for the people who are working on the same kind of jobs.

■ RELIABILITY

Above all qualities of the computer make them reliable and also make us too dependent on them. They can be run for years and years without any loss of data or any other problem.

Although it has got so many uses but the only limitation we could find is that they are not creative.

- They are designed and run by humans only.
- They might make the exact copy of Picasos paintings but actually can not give the world their original creations.

CLASSIFICATION OF COMPUTERS

There is computer in the car you drive, there could be a PC on your desk or your study table at home. The weather report you get daily also involves computer but all of them do not fall into the same category. They are different by means of hardware, software, built purpose and everything. Initially computers were classified on the basis of their size, speed and cost but now there are many more attributes attached to them.

SUPER COMPUTERS : Consider the application where a space shuttle or a satellite launcher has to be controlled. The volume of data involved in these applications is enormous. But, the analysis of this data is to be done in fractions of a second. To achieve their performance, some special computers have been built. They are known as Super Computers. In India, these types of computers have been installed at weather forecasting departments and other leading research institutions.

MAINFRAME COMPUTER : The mainframes are bigger in size, have vast amount of memory and can handle larger than minicomputers. Apart from that their input/output operations are very fast. For these reasons, the mainframes are generally used in environments where lot of data has to be processed like banks and research institutions.

BASIC COMPONENTS OF COMPUTERS

A basic computer system consists of three **primary components**:

1. Memory
2. Central Processing Unit (CPU)

This unit consists of

- (a) Control Unit (CU)
- (b) Arithmetic and Logical Unit (ALU)

3. Input/Output Unit

1. **Memory** : The memory provides a storage medium for the data and instructions to be executed. For the arithmetic and logical unit to operate efficiently, the stored information should be directly accessible at high speed. This access time is generally measured in terms of microseconds while the capacity is measured on terms of Kilo/ Mega bytes. The primary storage unit components have traversed the path from vacuum tubes to transistors. This has also resulted in miniaturization, speed improvement, accuracy, reliability and durability of the whole system.

2. **CPU** : The Control unit together with the arithmetic logical unit (ALU) is known as the Central Processing Unit (CPU) or the brain of the computers. This is responsible for the execution of programs and synchronization of entire system. Since input, output and secondary storage devices are at the periphery of the CPU, these are called the peripheral devices or simply peripherals.

3. **I/P and O/P Unit** : The function of the input device is to read and send data to the central processing unit of the computer. The data is sent from the input device to the CPU over cables. The data travels only in one direction, i.e., from the input device to the CPU. The input device is analogous to human eyes, ears and nose.

The function of the output device is to report the data that has been processed in the CPU. The processed data again travels in one direction, this time from the CPU to the output device over cables (channels). The output device is analogous to human speech and other actions.

COMPUTER TERMINOLOGY

BITS, BYTES, KILOBYTES, MEGABYTES : Before starting with the computer description, it is useful to become proficient with the data size terminology.

Computer have a very elementary way to store data :

- They can remember only 0 or 1. A value of 0 or 1 is called bit and all computer data are stored as sequences of bits.
- A sequence of 8 bits is called a byte, which is a quantity large enough to store usually a letter or a digit (even though sometimes 2 bytes are necessary).
- Modern computers are able to deal with enormous quantity of bytes, forcing us to introduce other quantities:
 - Kilobyte (KB), approximately 1,000 bytes,
 - Megabyte (MB), approximately 1,000 KB or one million bytes,
 - Gigabyte (GB), approximately 1,000 MB or one billion bytes,
 - Terabyte (TB), approximately 1,000 GB or one trillion bytes.

Usually the text of a whole book can fit in some KB, while for an image in a good resolution (let's say ready to be printed on A4 paper) or for a modern song some MB are required, and a film in high quality needs some GB.

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

Computer box

The computer appears as a big rectangular metal box, which is usually never opened by the user and which contains its internal components.

The most popular component is the **processor**, which is the brain of the computer. Here all the calculations and logical operations are carried on, and the whole computer is administered. The last generation of processors on the market is the **quad core** generation, processors which contain inside four processor.

SYSTEM ARCHITECTURE

The computers architecture is mainly divided into three types of devices as

- (a) **Input Devices** : The devices which gives instructions to the computer are called Input devices.

Examples : Mouse, keyboard, Microphone, Scanner, CD-Drive, Joystick, Barcode Readers, Reel Camera, OCR, OMR, Webcam, MICR Device etc.,

- (b) **Output Devices** : The devices which gives output data to users are output devices.

Examples : Monitor, Speakers, Printers, Plotters, Headphone and Projector etc.

- (c) **Processing Device** : CPU is responsible for taking data inputted by the user and then performing any necessary processing.

- (d) **Peripheral Device** : Devices that are connected to CPU (Both input and output devices). **Example of Input peripherals** are keyboards, scanner, webcams, microphones. **Example of Output peripherals** are computer displays, printers, projectors, computer speakers.

INPUT DEVICES

- (a) **Mouse** :

- It is a pointing device that detects two dimensional motion relative to a surface.
- It works on principle of drag and drop icons (objects)
- To get Properties of any object, we have to press Right button of mouse.
- The scroller is present between two buttons of mouse.
- Two types of mouse : Ball mouse and optical mouse.

- (b) **Key Board** :

- The most widely using device for Input. It is a typewriter-style device.
- We use QWERTY keypad boards. A keyboard typically has characters engraved or printed on the keys and each press of a key typically corresponds to a single written symbol.
- Each press on key of key board is " keystroke"
- key stroke is first converted into ANSI Code.
- ANSI - American National Standard Institute

IMPORTANT KEYS :

- **Capslock** : It is used to change the letter case of Text
- **Function keys** : F1 to F12 are 12 functional keys.
- **NumLock** : It locks the Number pad and change the numbers into directional keys.
- **Modifier keys** : Alt, Ctrl, Shift
- **Task manager keys** : Alt + Ctrl+ Del. (Turn off user accounts)
- **End** : To bring cursor to the end of current line.

- **Tab key** : To indent (initialise) the paragraph

- **Cursor key** : Keys which move the cursor to different position on the screen.

Ex. Page up, Page Down keys

- **Toggle keys** : Key which performs 2 different actions on Pressing.

Ex. Caps Lock, Num Lock

- (c) **Scanner** : The electrical device that converts hard copy of text / image into a computer photographic image that can be stored in the computer memory.

Common scanner software Application Program Interfaces :

- (i) SANE : Scanner Access Now Easy
- (ii) TWAIN : Most common used scanners
- (iii) ISIS : Image and Scanner Interface Specification
- (iv) WIA : Windows Image Acquisition

- (d) **Joystick** : The device used in computer for playing games as an directional device.

- (e) **Barcode Readers** :

Barcode : The lines of different length and width found on tags/products and this code is recognized by computer system.

Barcode Reader : Through Input Automation, these readers take the rate/cost of product automatically at POS (point of sale) Systems.

- (f) **MICR Device** : It is a device that can recognise human readable characters printed on documents such as cheques using a special magnetic ink.

MICR Code - Magnetic Ink character Recognition Code is a character recognition technology used mainly by banking industry to ease the processing and clearance of cheques and other documents.

- This technique used for cheque clearance in Banks.

- MICR Code is of 9 digits – 785 576 350
City Bank Branch codes

- First 3 digits indicates city code
- Middle 3 digits indicates Bank code
- Last 3 digits indicates Branch code

Example: 785 576 350
Delhi SBI Pitampura Branch

- (g) **OMR** : Optical mark recognition

- (h) **OCR** : Optical character recognition

OUTPUT DEVICES

- (a) **MONITOR** : The device mostly used for viewing output.

- It is also called visual Display Unit (VDU)
- Monitors clarity is based on its Resolution
- Resolution is measured in Dpi (dots per inch)
- Each dot is called pixel.
- As the number of pixels increases, screen clarity is increased.
CRT Cathode Ray Tube Screen Low clarity
LCD Liquid Crystal Display Screen Medium clarity
LED Light Emitting Diode screen High clarity
- As the number of dots increases on screen, the space between dots is decreased

- (b) **PRINTERS** : Output device which produces the hard copy are called printers

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

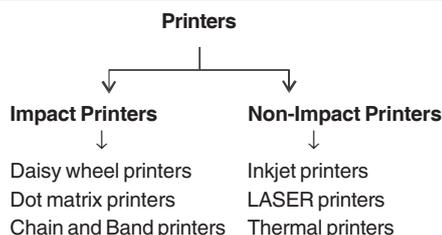


Figure : Printers classification

- (i) **Impact Printers** : This type of printer strikes paper and ribbon together to form character on paper.
 – Graphics cannot be printed by using these printers.
- **Daisy wheel** : These are typewriters and slow printing Only for text.
 - Petals are typewriter keys
 - **Dot matrix** : These are called pin printers.
 - These are bidirectional printers
 - used in railway ticket printing
 - **Band Printer** : Very fast, expensive and sound making.
 - Used in printing current Bills, Bus Tickets etc.,
- (ii) **Non-Impact Printers** : Speed measured in characters per second
 – It does not strike the paper but uses ink spray or toner powder.
- **InkJet** : Used for colour printing
 - It uses ink to spray on paper
 - These are replaced with Laser printers.
 - **Laser** : – It prints more number of pages per minute, than other printers.
 - It prints high resolution on paper
 - It prints high quality graphics
 - Now a days widely used printers
 - **Thermal Printer** : It uses heat on chemically treated paper
 - Fax machines are example.
- (c) **PLOTTER** : It is a printer, accuracy measured in terms of repeatability and resolution.
 – It is most widely used for large size colour printing (Graphics)
 – It has penlike structures which prints graphics on flex according to computer instructions
Ex : Movie Banners Printing.
- **Spooling** : The process of maintaining on order of pages that has to be printed in sequence.
 - The order of sequence is maintained by the spooler (special numeric code)

DEVICES ACTING AS BOTH INPUT AND OUTPUT DEVICES

Few devices that gives input and also show or get the output through same device.

Examples : MODEM, FAX, Touch Screen, AT-Headset, Digital camera.

- (i) **MODEM** : It stands for Modulator and Demodulator. It is a device that modulates signals to encode digital information and demodulates signal to decode the transmitted information.

Modulator – Converts Binary Signal into Analog wave

Demodulator – Converts Analog wave into Binary signals.

- (ii) **FAX** : It is also called Facsimile (telecopying or telefax). The original document is scanned with a fax machine (or a telecopier), which processes the contents as a single fixed graphic image, converting it into a bitmap, and then transmitting it through the telephone system in the form of audio frequency tones.

– It consists scanner for paper scanning as input to send.
 – It has printer to print on paper which is received as FAX message.

– So FAX takes input and produces output also.

– Bitmap is a type of memory organization or image file format used to store digital images.

- (iii) **Touch Screen** :

– The touch screen is used for both input and output.

Ex : Touch screen Mobiles, Touch screen Monitor.

- (iv) **Digital Camera** :

– This camera takes / captures the image (input)

– Same image can be seen on camera screen (output)

- (v) **AT-Head set** : Advanced Technology Headset

– Headset (Mic and Speakers) is used for talking and hearing the voice

Ex: Mobile phone Headset

CENTRAL PROCESSING UNIT (CPU) :

It has various names as :

- Processor, System unit
- Computer tower
- Brain of computer

CPU Hardware :

● The CPU is containing many hardware components that combinely called as system unit. As discussed in components of computer.

What is Hard ware and Software ?

Hardware : The physical components of a Computer that we can see and touch.

Ex : CPU, Monitor, Keyboard, Hard disk, Floppy Disk, CD etc.

Software : It refers to the programs which are required to operate the computer, we cannot touch and see.

Ex. Windows-8, Android, DOS, Windows7, MS-Office, Operating System etc.,

CPU - HARDWARE COMPONENTS

- (1) **Motherboard** :

- Most essential part of computer
- It is also called system board
- It contains RAM, ROM, Expansion slots, CMOS Battery, BIOS Chip, SMPS, FAN etc.,
- The communication between all these components is passed through BUSES,
- It holds together many crucial components of a computer, including CPU, memory and connectors for input and output devices.

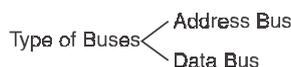
COMPONENTS ON MOTHER BOARDS

- (a) **CMOS Battery** :

- It stands for complimentary metal oxide semiconductor Battery
- It is made of lithium metal

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

- Its main functions are :
 - (i) To maintain RTC (Real Time Clock) in the computer system
 - (ii) To wake up the BIOS (Basic Input Output System) to perform the POST (Power on Self Test).
- (b) **BUSES** : The communication lines between the components on the mother board are called buses.



Address Bus :

- It carries only address from Hard disk to RAM
- It is unidirectional bus

Data Bus :

- It sends the data from RAM to Hard disk and receives data from Hard disk to RAM
- It is Bidirectional Bus

(c) BIOS CHIP : (Basic Input Output System)

- It is the ROM chip on mother board
- BIOS chip is hardware and it contains BIOS software files so it is called **FIRMWARE**.
- BIOS memory cannot be deleted because it is ROM.

(d) FAN :

- It is the cooling agent for mother board components and CPU.

(e) Expansion slots :

- These are slots provided to install the extra cards such as video graphics cards and multimedia cards.
- These slots are present on mother board.

(f) SMPS : Switch Mode Power Supply

- It supplies power to CPU by converting AC to DC. (AC - Alternate Current, DC - Direct Current)

(g) PCI Slot : Peripheral component interface slots (connecting external devices)

(h) Processor Chip :

- Processor converts the input to output and made up of silicon metal
- So Computers are called as silico Sapiens.
- Processor speed is measured in Hertz
Examples : Intel-core, AMD-k5, AMD ATHLON-64 core 2duo, pentium series, i5, i7 etc.,
- Speed of processor : MHz = 1 Million cycles per second.
 GHz = 1 Billion cycles per second
- We have CISC and RISC type of processors

CISC
<ul style="list-style-type: none"> ● Complex Instruction Set Computer ● It allows more number of micro electronic signals ● It uses complex addressing modes <p>Ex. Pentium Pro, II, III</p>
RISC
<ul style="list-style-type: none"> ● Reduced Instruction set computer ● It allows small and limited number of signals ● It uses simple addressing modes <p>Ex. IBM RS-6000, MC-88100</p>

(i) Random Access Memory (Read and write memory) (RAM)

- It is a form of computer data storage.

- It is volatile memory because it loses data when system is turned off.
- It can perform operations in Random.
- It is a hardware device in Rectangle shape.
- Its size varies from 256 MB to 8 GB.
- RAM is called system memory, Internal memory or memory.
- It allows data items to be read and written in approximately the same amount of time, regardless of the order in which data items are accessed.

TYPES OF RAM :

(i) SRAM : Static Random Access Memory

- It is the high speed RAM (It has 6 Transistors in it)
- It can continue to work / process with out refreshing the system
- It is costly in price

(ii) SDRAM : Synchronus Dynamic RAM

- To reduce the cost of SRAM, this SDRAM was invented
- It has the same properties as SRAM only.

(iii) DRAM : Dynamic Random Access Memory

- It is low in speed of Access (It has 1 Transistor and 1 Capacitor)
- It requires many number of times to refresh the system

Market Availability of RAM :

(i) SIMM : Single Inline Memory Module

- It has 30 or 72 pins
- It supports 16 and 32 bit data transfer Rates

(ii) DIMM : Dual Inline Memory Module.

- It has 168 pins
- It supports 64 Bit data transfer Rate
Ex. DDR 1, 2, 3 (DDR = Double Data Rate), DDR 3 is the fastest RAM

(2) Read Only Memory (ROM) : It is a class of storage medium used in computers and other electronic devices.

- It is non volatile memory and permanent memory.
- It cannot be erased. It is read only memory but not write to it.

TYPES of ROM :

(i) PROM : Programmable ROM (It is Empty chip to add any program to it)

(ii) EPROM : Erasable Programmable ROM

(iii) EEPROM : Electrically Erasable Programmable ROM

(iv) Flash EEPROM memory : It works faster than EEPROMs because it erase a block or the entire chip and then rewrites it.

PORTS :

MIDI PORT : Musical Instruments digital input

- These ports present on CPU front or Back side
- These ports are used to connect speakers, MIC, Head Sets.

Parallel Port :

- These ports present on Backside of the CPU
- These ports are used to connect printers and Scanners in previous days and now also

USB Port : Universal Serial Bus.

- This port is to connect all external devices with the cable
- Now pendrives and data cables are connected to this port only.

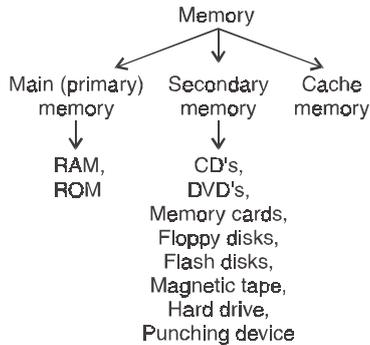
Hard Disk :

- The storage point of computer is the hard disk

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

- It stores operating system, softwares and Data etc.
 - Memory varies from GB's to TB's in size for Hard disk capacity.
- Note :** System requires more memory to save voice, graphics, images as compared to text data.

TYPES OF MEMORY AND DEVICES



(i) **Primary Memory :**

- It is system's main memory called RAM
- This is used only for processing data not for storing the data
- It is temporary and volatile memory **or** Internal memory.

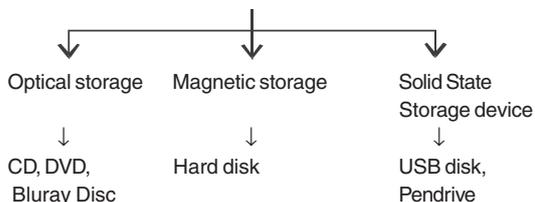
(ii) **Cache memory :**

- The fastest memory in computer and it is volatile
- It holds the previous instructions of computer
- These chips are very costly.

(iii) **Secondary memory :**

- The memory which is stored for further or future use is secondary memory.
- The memory is non-volatile but it can be manipulated (changed)
- It is also called Auxillary memory **or** External memory
- Examples of secondary storage devices
 - CD'S , floppy disks
 - DVD'S, memory cards
 - Flash cards and magnetic Tapes

Secondary Storage Devices



These storage devices mainly differ in the following aspects :

- Technology used to store data.
- Capacity of data they can hold.
- Size of storage device.
- Portability of storage device
- Access time to store data

CD : Compact Disc.

- Its memory capacity is 700 MB
- Invented by James Russel in 1965
- It is written or read by **laser beam of light**
- Three basic types of CDs : CD-ROM, CD-R and CD-RW
 - (i) CD-ROM (Compact disk read only memory) : They are used for selling movies, music etc.
 - (ii) CD-R (Compact disk-Recordable) : It can be written only once. So, it is known as Write once, Read many times (WORM). It is used for creating backup, creating music CDs etc.
 - (iii) CD-RW (CD-Rewritable) : Also known as erasable disks. It can be used to save data several times and also we can delete data several times.

DVD : Digital versatile disc

- Its memory size is 4.7 GB

Bluray Disc :

- 25 GB and 50 GB memory disks are called Bluray discs
- Bluray Discs are used to store high definition quality videos only.

Solid state storage devices :

These devices have got no moving parts and data is stored and retrieved from them in similar manner as it would be from computer memory.

Ex : USB disk, Pen drives, Flash drive etc.

Disk formatting :

Formation of Tracks and sectors on any disk is called Disk formatting

- UDF : Universal Disk Format (FAT / NTFS)
- Clusters on disk holds the data.

Flash devices / Flash memory :

- The devices like digital camera, ipods are connected through cables to access their memory in computers
- These type of devices are flash devices and has non - volatile memory.

- Memory accessed through cables is called flash memory

Virtual memory : When ever the RAM memory is not sufficient to hold the processing data, it uses hard disk memory as hidden memory to process the specific task. So the memory utilised from hard disk is called virtual memory.

- virtual memory is **present in hard disk**.

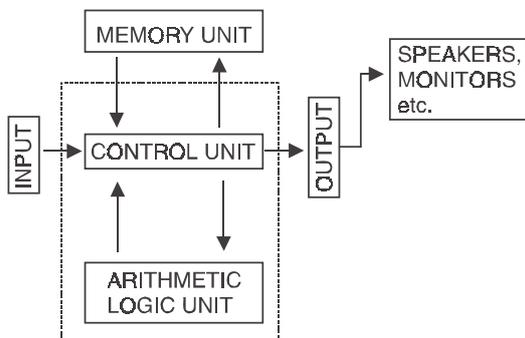
Example : When installing operating system (8.2 GB), if the RAM is 4GB size, it uses hard disk during Installation process only.

Memory Cards : Memory cards are used in digital cameras, mobile phones etc.

- SD cards are used in all these devices
- SD stands for secure digital memory cards (SDMC, SDHC)

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

CPU Processing units :



CPU mainly divided its processing into ALU, CU and MU

(i) **ALU** : Arithmetic and Logic Unit

- It performs all the arithmetic and Logical processing of CPU
- The registers are present in ALU, that holds very small memory and performs Simple math operations

Accumulator : It holds the processing data and output result to display

Program counter : It holds the next instruction that has to be performed by ALU or Registers

Memory Data Register or Memory Buffer Register (MDR or MBR) :

- It holds the complete data on the hard disk while Processing.
- It acts like a buffer and holds anything that is copied from the memory ready for the purpose to use it.

(ii) **CU** : Control Unit

- The Control unit controls and Coordinates all the parts of computers (system components)
- Control pins are present and that controls all the components of computer.

(iii) **MU** : Memory Unit

- It contains RAM, ROM, Hard Disk

LANGUAGES AND SPECIFICATION

FORTRAN

- Formula Translation (1957)
- Coding used for scientific research / Calculations

COBOL

- Common Business Oriented Language (1957)
- Used in business computations

ALGOL : Algorithmic Language

- The language that given a scope for developing the C, C++ and Java languages

C :

- Invented by Dennis MacAlistair Ritchie in 1972
- This language coding replaced by Java now

- **Printf** takes the output statements in code
- **Scanf** takes input data in code

C++ :

- The computer games (Basic) were developed using this language, invented by Bjarne Stroustrup (1983)

HTML : Hyper Text Markup Language.

- The web pages are saved or viewed in HTML format only

JAVA : Applets can be created by this language.

- The language used for webpage creation, websites hosting
- Developed by sun micro systems, invented by James Gosling and his Team

XML : extended Markup Language (world wide web consortium)

PHP : Personal Home Page. (Designed by Rasmus Lerdorf -1995)

SQL :

- Structured Query Language.
- Used for database tables creation

ASP.NET :

- The language came in recent days for programming (web designing)

Note : The computers cannot understand any of the above languages, it needs only machine language or Binary code to understand.

- Binary code means 0's and 1's

JAVASCRIPT :

- JavaScript, often abbreviated as JS, is a programming language that conforms to the ECMAScript specification.
- JavaScript is high-level, often just-in-time compiled, and multi-paradigm.
- It has curly-bracket syntax, dynamic typing, prototype-based object-orientation, and first-class functions.

PYTHON :

- Python is an interpreted, high-level and general-purpose programming language.
- Python's design philosophy emphasizes code readability with its notable use of significant whitespace.

Programming Language Translators :

- Computer can understand only binary code / machine code
- So, we are writing our program in Java, C and C++ or Assembly language, so to convert this code in to Binary code we need translator.

Translator : The translator converts the given code in to machine code or binary code.

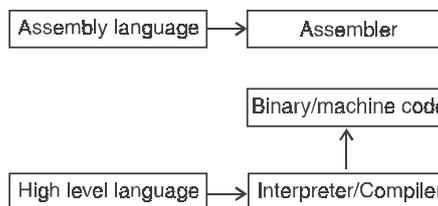


Figure : Translators of Languages

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY

- (i) **Assembler :**
 - It converts the Assembly Language code into machine code
- (ii) **Interpreter :**
 - It Compiles the program code line by line and checks for errors
 - It consumes more time because it checks code line by line
- (iii) **Compiler :**
 - It compiles the entire program code in a single time for errors
 - It is a time saving translator.
 - It cannot execute the programs but converts source code into object code

Terms Related to Programming Language :

- (i) **Instruction :** Any single text given to computer is called instruction. **Ex.** 0 or 1
- (ii) **Program :** The combination of 'n' number of instructions is called a program.
 - Set of Programs are also called as softwares
- (iii) **Algorithm :** The step by step instructions of a program written in sequence order is called algorithm
Ex: Sum of 2 numbers.
Step 1 : start
Step 2 : Take x, y, z
Step 3 : Calculate $Z = x + y$
Step 4 : Print Z
Step 5 : Stop
- (iv) **Flow chart :** The graphical (pictorial) representation of the pseudocode or algorithm are called flowchart

Symbols used in flowchart

- Flow Direction (Arrow mark)
- Start / stop (Ellipse)
- ▭ Input / output (parallelogram)
- ▭ Processing data (Rectangle)
- ◇ Decission making (Rhombus)
- connector to next page (circle)

Different types of Languages :

- (i) **Low level Languages :** Machine understandable languages
Ex. Assembly Language, COBOL, PASCAL, BASIC.
- (ii) **High level Languages :** Human understandable languages
Ex. C++, Java, SQL, VB, Python, Javascript.
 - Assembly Languages uses MNEMONICS as code in symbols.
 - C language is High level Language with some features of low level language.

IMPORTANT TERMS

- **Control structures :** The Conditions and Loops written in source code
- **Reserved Words :** The words that are kept aside for its use by programming language.
- **Bug :** It is also called error (mistake in program code) or Glitch.
- **Testing :** Finding errors in the software.
- **Debugging :** The process of correcting the errors in the software code.
- **Platform :** The combination of operating system and processor is called platform
Example : Apple macintosh and PC'S are 2 different platforms

- **Patch :** The vendor - created programs that are available through Internet to repair software is called patch.
- **API'S :** Application program Interfaces is a set of routines, protocols and tools for building software applications. API makes it easier to develop a program by providing all the building blocks.
- **Executing :** The process of carrying out commands is called executing.

Types of Errors

- (i) **Logical errors :**
 - The fault in the logic of program code causes to get wrong outputs / results.
 - In this case program is executed to get result
Ex. Correct logic $z = x + y ;$
 Mistake logic $x = z + x ;$
 - We get output for x in place of z due to logical error
- (ii) **Syntax Errors :**
 - The fault / mistake in the syntax (structure) of the program code cause failure to execute it
 - In this case program is not executed
Ex. Missing of semicolons in the code
 Correct syntax $z = x + y ;$
 Mistake syntax $x = z + y$
 - We will not get output
 - A **functional Language** reflects the way people think in **mathematical way**.
 - A programming Language consists of set of Rules *and* Syntax and structure. It is the Intermediate between human language and machine language.

SDHC : Secure digital high capacity

SDMC : Secure digital memory cards

LOGIC GATES : These are the basic building blocks of IC'S

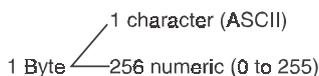
- We have 3 basic Logic gates mainly as AND, OR, NOT.
 - A digital circuit result in output based on states of input signals
- AND All input must be in '1', to produce '1' as output
- OR Any one input or more is '1' to produce '1' as output
- NOT It is also called **inverter**
 It has only one input one output
 If input is '1', the output is '0', viceversa
- NOR Any one input or more is '1' to produce '0' as output
- NAND All input must be in '1', to produce '0' as output
- XOR If any one input is '1', but not if 2 or more input are '1', the output is '1'

Memory Measurement : Memory in computer is measured in Bits

Bit	Binary digit (either 0 or 1)			
4 Bits	Nibble			
8 Bits	1 Byte			
1 Kilobyte	1024 bytes	10^3	2^{10} Bytes	
Megabyte	1024 KB	1 million Bytes	10^6	2^{20} Bytes
Gigabyte	1024 MB	1 Billion Bytes	10^9	2^{30} Bytes
Terabyte	1024 GB	1 Trillion Bytes	10^{12}	2^{40} Bytes
Peta Byte	1024 TB	10^{15}	2^{50} Bytes	1 Quadrillion Bytes

- Exabyte, Zettabyte, Yottabyte are the next higher measurement

STUDY MATERIAL : COMPUTER KNOWLEDGE & LITERACY



KBPS Kilobytes per second

Kbps Kilo bits per second

Note : "Always 'B' represents Byte, 'b' represents bit

Portable platform : The program written in any or language can be run on portable platform.

Bootng : The process of loading operating system from disk to RAM is called Bootng

- Without bootng, computer cannot perform any task

(i) **Warm bootng :** The process of restarting/ turning on the computer, which is under on / working position

(ii) **Cool Bootng :** The process of starting / turning on the system which is under off position

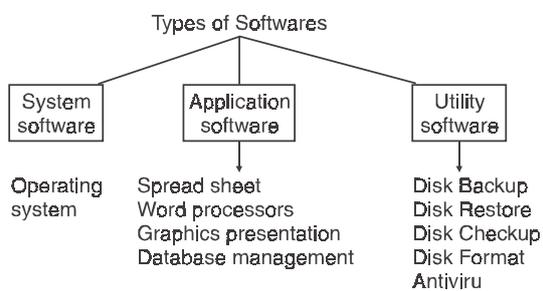
Sequence of operations in Bootng :

Load BIOS	Perform POST	Load Operating System	Check configurations settings
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Here (i) POST Power on self test
 Checks whether all CPU components are connected in proper way or not.
 POST performed by BIOS only.

SOFTWARES

SOFTWARE (S/W) : The set of programs written by programmers to perform some specific tasks is called software. Software is a set of programs.



1. System Software : The software which performs various types of functions in order to manage and organise files of computer. It is mandatory software to run a computer.

- It provide a platform for running application software.
- It can be divided into two different categories, operating systems and utility software.

Operating system is the system software and supervisor of computer functions. It creates interface between user and computer. Examples of operating system :

- (i) **Z/OS :** It is a 64-bit Operating system for mainframe computers produced by IBM. It can directly communicate via TCP/IP (IPv6).
- (ii) **Windows Operating System :** Introduced in 1985 by microsoft corporation. It supports GUI (Graphical User

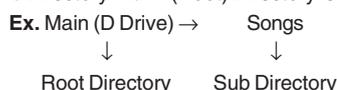
interface) mode. It is not a free operating system (Commercial Software), supports multi tasking. Windows 95, 98, ME, XP, 7, Server, 8, vista are few examples

(iii) **LINUX Operating System :** It is a free operating system. It is a multi-user operating system, supports multiprogramming (time sharing). It was introduced in 3rd Generation.

(iv) **MS-DOS :** DOS stands for disk operating system. It is command driven operating system. It is single user operating system. Directories are storage files.

DOS Commands
 Is – list of directories
 mkdir – make new directory

- Directory within (Root) Directory is sub directory



Examples for few DOS Flies :

- . exe - Executable file
- . com - Command files
- . Bat - Batch Files .
- . Prg - Program files
- . Sys - System files

(v) **UNIX :** It is a family of multitasking, multiuser computer operating systems. Developed in Bell labs by Ken Thompson, Dennis Ritchie.

(vi) **Solaris :** It is an Uxix operating system developed by Sun Microsystems. It is known for its scalability.

(vii) **Ubuntu :** It is a Debian based Linux operating. It is based on free software.

(viii) **Apple macintosh :** This operating system is only for Apple Products. Steve jobs is the founder.

(ix) **Mobile Phone o/s :** Ex. Bada, Symbion, Android, Windows 8, IOS (Inter Networking Operating System for Apple Phones). Smartphones uses this operating system for Google Applications.

Functions of Operating System :

- Memory Management
- User Interface
- Input / output management
- Information Management
- Process Management

Classification of operating System :

(i) **Multi-User o/s :** It allows 2 or more users to run the programs at the same time. Ex. UNIX / LINUX

(ii) **Multi Tasking o/s :** It allows more than one program to run concurrently. Ex: UNIX, WINDOWS

Example of multitasking: working on computer and Listen to Songs at a time.

(iii) **Multi Processing :** It supports running a program on more than one CPU or processor

(iv) **Multi threading :** It supports different parts of a single program to run concurrently on system.

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2. Application Software : These are the end - user programs that do real-work for users. It cannot run without system software. These are created for user convenience only

Examples :

- Word Processor s/w MS Word, words star, softword, word perfect
- Graphics Presentation s/w MS Power point, Corel ldraw, Flash
- Spread sheet s/w MS Excel.
- Database Management s/w MS Access.

- System software and Application software are two basic types of softwares

Syntax : Set of Rules in programming Language

FAT : File Allocation Table

NTFS : New Technology File System

3. Utility Softwares : These are the softwares that maintain and check for health of computer by scanning and managing data. These softwares performs a single and specific task

Examples :

- (i) Disk Backup s/w creates backup of system files and data
- (ii) Disk Restore s/w Restores the backup files to system from backup image
- (iii) Disk checkup s/w It checks the data of disk
- (iv) disk format s/w Formation of tracks and sectors on disk
- (v) Antivirus s/w It detects and deletes the virus in system

4. Firmware : The hardware chip that is having storage of software is called firmware.

Ex. BIOS operating system is stored on BIOS chip.

5. Embedded Software : The software that is used for specific devices such as car, TV, Washing Machine and Watch etc. is called Embedded Software .

Availability of Software (s/w) in Market :

- (i) **Commercial Software :** The pre-packaged software available for money in the market. It is not free, we have to buy from market **Example :** Windows, MS - Office
- (ii) **Open - source Software :** It is also called free ware. It is available at free of cost in Internet or open market. **Example :** Winzip and LINUX.
- (iii) **Share ware s/w :** The trial version of software that is available for users to share in the market and internet at free of cost. The trial versions are released for promotion of the product only. **Ex.** PDF converters online.
- (iv) **Proprietary s/w :** It is a custom s/w, developed to address the specific needs of a company is known as proprietary s/w. Softwares with copy rights protected are called proprietary **Device Drivers :** The special and specific programs written to perform task by specific devices only.

Example : Printer drivers, Webcam drivers, Scanner drivers

- **Windows ME :** In this, ME stands for Millenium Edition
- **Crash :** When your computer stops working suddenly without any instruction, this is called crash. Backup prevents data from system failure or crash.
- **Backup :** It creates a restore point for all the system files and data. It creates a separate copy of system data base.

Note : IBM introduced personal computer in 1981

KEYBOARDS AND LANGUAGES

Before starting this section it is necessary to take a close look at your keyboard. Locate these keys since they will be used in the rest of this manual and are very useful in many programs:

English Keyboard	Main Function
CTRL	
ALT	
ALTGR	Produce character on the key's right left
F1 to F12	
DEL	Delete next character
INS	Toggle insert/overwrite mode
Home or ↶	Go to beginning
END	Go to end
PG ↑ and PG ↓	Go one page up or down
BACK SPACE or ↵	Delete last character
ENTER or ↵	Enter data
TAB or ↵	Move through the window
SHIFT or ⇧	Capitalise letters
CAPS LOCK or ⇩	Keep SHIFT pressed
ARROWS ←↑→↓	Move the cursor

Regional and language settings

With a multilanguage Windows installation, keyboard setting or menus' languages may be changed ● clicking on the Start icon, ● choosing "Control panel", ● then "Clock, Language and Region", then "Change Display Language", and modifying the appropriate setting.

Another interesting option, available on every Windows installation is the numbers' and dates' formats. When in "Clock, Language and Region", choosing "Regional and Language options" and clicking on "Formats" then on "Customise this format...." the user is able to change the format of numbers, especially the decimal separator, the currency and the date format, especially the English (month-day) and European (day-month) formats.

Desktop and application bar

The first thing commonly seen after typing the login name and password (on those computers which require them) is the user's **Desktop**, a large area where the user drops the most commonly or recently used things. The Desktop is different for every user, if the computer asks for login name. It contains, usually on the bottom, the **application bar** with the **start menu** on the left. When clicking the left mouse key on this menu a long list of things appears; the most interesting ones are:

- **Programs**, with the complete list of programs installed on this computer.
- **Disconnect icons** from which the user can disconnect from the computer or turn it off.
- **Computer**, from which the user can access the computer's hard disks.
- **Network**, from which the user can access the network connected to the computer.

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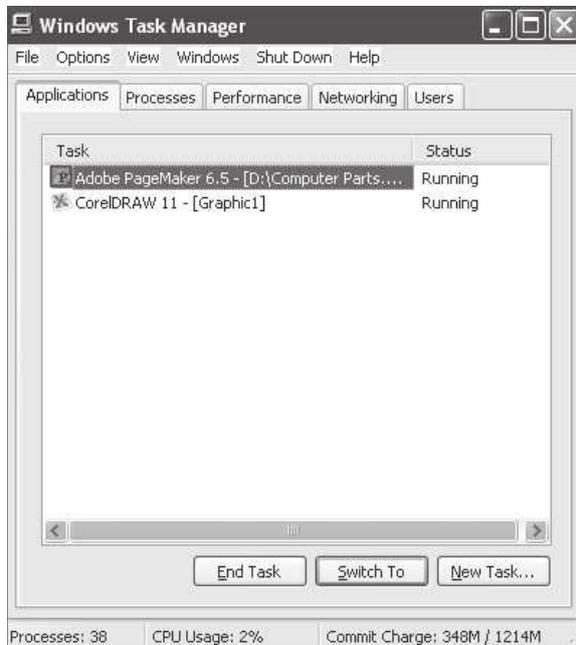
- **Control panel**, which contains the operating system configuration and should not be accessed unless the user perfectly knows what he is going to do.
- **User's home and Documents**, which contains all the user's files.

Next to the start menu's icon there are the **quicklaunch icons**, small images which start, when clicked on, the most common programs. At the center of the application bar there are the **currently running programs** and on the extreme right other running programs, usually those controlled by the operating system. Note that this is not an exhaustive list of running programs since most technical programs which are not considered interesting to the user (including viruses!) are not displayed on the application bar. The current keyboard language and the clock are also displayed in the application bar: to change their setting simply double click the mouse left key on their indication.

Computer locking problem

Microsoft Windows sometimes becomes unstable: it can unpredictably, without any warning and when the user does not expect it and typically when he is doing something very important and urgent, lock and refuse to respond to user's actions. When this happens, it is usually caused by the program that was used and therefore the first thing to do is to try to close the current program. If this does not improve the situation, the only other solution left is to turn off the computer. The list of operations to try until the computer answers to user's commands is :

1. if the mouse works, click the X button on the program window or otherwise press ALT+F4;
2. press CTRL+SHIFT+ESC; select the program from the list and press End program;
3. press CTRL+ALT+DEL and, from the bottom right icon, choose Shut Down;
4. press the computer on/off button;
5. unplug the electric power.



In any case all the current unsaved work will be lost; in the last two case the operating system can sometimes be damaged but very often it will repair by itself the next time the computer is turned on. Therefore it is always a very good idea to save very often the current work, especially when it is important, urgent, or difficult to redo.

DESKTOP

Hibernate Mode : The highest power saving mode when compared to sleep mode.

Sleep or Standby Mode : The power saving mode of computer. The files under process are not disturbed in this sleep mode.

GUI : ● Graphical user Interface.

- It creates Icons for applications, which we are able to see on the desktop.

- Desktop Icons are due to GUI Only

Recycle Bin : Whenever we delete some files using delete command, the file will reach Recycle Bin. If we want to permanently delete the file, without moving to Recycle Bin, we have to press "**Shift + Delete**" Command and then press enter key.

Rename Icon :

- To Rename the Icon we have to select Icon and **Press F2**
- Other wise, select Icon and Press Right button of mouse and select Rename option

Help Menu : Help is a command available in start menu.

Desktop : The home screen of computer which displays icons on it for user applications.

Cursor : The blinking Indicator that show you where your next action will happen. This is the Insertion pointer.

Prompt and Dialogue Box : A symbol or question on the screen that prompts you to take an action and tell the computer what to do next. **Example** : Do you want to delete ? Yes/No

It mainly appears due to human / user actions only.

Interrupt : The instruction or unique signal generated by a device, that tells the operating system that it is in need of immediate attention is called Interrupt.

Ex. During software Installation, It asks for to press "Next" to continue.

Windows Explorer : First, it is different from Internet Explorer. Windows Explorer is a file manager, where as Internet Explorer is a web browser. It displays the computer data in folder wise format.

Earlier it was known as File Explorer. It is included with releases of the Microsoft windows operating system from windows 95 onwards. It provide GUI for accessing the file systems.

Window : The Rectangular area on screen that displays a program, text or information is called window.

Ex. The contents of a directory, a text file or an image.

Speech Recognition Software : This software is used to take voice input where hands are not used to give input to the computer.

RFID : Radio Frequency Identification. It is the wireless use of electromagnetic fields to transfer data, for the purpose of automatically indentifying and tacking tags attached to objects.

It is the technology that detects the humans/animals location in forest / any where by tracking system

RFID Devices are inserted in to human / animals body's

Screen saver : It configured correctly, the screen saver will prevent interaction with your computer after a specified time period.

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Interface : The remote control that is used to turn on or off some machine is also called Interface.

File system

Before starting this section it is necessary to do the following operations:

1. open the Control Panel from the start menu icon
2. choose Appearance and Personalisation
3. choose Folder Options
4. choose View
5. deselect "Hide extensions for known file types".

Files and directories

- Software is stored on storage devices in a special container called **file**.
- The operating system uses a lot of files for itself and for its data, a program usually uses one file for itself and other files for its data, and the user uses some files for his data.
- A file is represented by a small picture called icon.
- Another special object is the **directory** or **folder**, which is basically a container for files and other directories and is represented with an icon depicting a yellow closed or open folder.
- Double clicking on a directory opens a new window which presents the directory content.
- Each storage device is a big directory, accessible from My Computer window, which contains directories and files.
- Each of these subdirectories may contain other files and other subdirectories, and so on in a **hierarchical** way, forming a tree with the hard disk (or another storage device) as the root, directories as branches and files as leaves.
- Choosing the Views menu of a directory windows will provide the user with five different ways to look at files and directories, the most important way being the Details which can show interesting information on files and directories such as their size and date of last modification.
- Each file and directory can be univocally identified by its **absolute path** or **address**.
- For directories it is the path which appears on the address bar of the directory window, while for files it is the path of their containing directory followed by "\ " and the file name.
- For example, the absolute path of directory "Common" in "HP" directory in "Program Files" directory in the D: hard disk is "D:\Program Files\HP\Common" as can be seen from the address bar. While, the HPeDiag.dll file has the absolute path "D:\Program Files\HP\Common\HPeDiag.dll".

Note that, for Windows operating system, capital or small caps letters in paths are perfectly equal.

- A special and tricky object is the **link** or **shortcut**. Although its icon looks like a file icon, the small curved arrow on the left corner clearly indicates that this object is a link.
- A link is simply an address to a file or directory, it is not a real file or directory.
- When the user clicks on the link, the computer behaves exactly as if the user is clicking on the real file or directory (if Windows can find the real one, which is not the case if in the meantime somebody deleted or moved it).

- However, any copy/move operation on the link will simply copy/move the link and not the real file or directory; especially copying/moving the link to another disk will probably cause it to malfunction. Therefore it is a good idea for novice users to avoid using links at all.

Files' operations

When double clicking on a file, Windows usually starts a program. The user is totally unaware of an important difference:

- double clicking on a program runs the program which was double clicked
- double clicking on a file calls the program associated with that file and runs it, at the same time telling the program to open the file. If no program is associated with that file type, Windows asks the user which program should open the file.

Copying a file means reproducing it to another location or to the same location with a different name. Copying a directory means reproducing it to another location, or to the same location with a different name, together with its entire tree of subdirectories and files. To copy a file or directory windows offers several methods, the most used being;

- drag the object to the destination. If a plus symbol does not appear, press CTRL key to have it appear while dragging. Release the object in the destination;
- select the object and click the right mouse button. Select "copy". Point the mouse to the destination and click the right mouse button. Select "paste". If the destination is the original location, the file name changes to "copy of.....".
- select the object and press CTRL+C. Point the mouse to the destination and press CTRL+V. If the destination is the original location, the file name changes to "copy of.....".

Moving a file means moving it to another location losing the file in the original place. Moving a directory means moving it to another location together with its entire tree of subdirectories and files. To move a file or directory windows offers several methods, the most used being:

- drag the object to the destination. If a plus or a link symbol does appear, press CTRL or SHIFT key to remove it. Release the object in the destination;
- select the object and click the right mouse button. Select "cut" and the icon becomes lighter. Point the mouse to the destination and click the right mouse button. Select "paste".
- select the object and press CTRL+X and the icon becomes lighter. Point the mouse to the destination and press CTRL+V.

To **create a link** to a file or directory:

- drag the object to the destination of the link. If a link symbol does not appear, press CTRL+SHIFT until it appears. Release the object in the destination;
- select the object and click the right mouse button. Select "create shortcut". A link is created in the same directory.

Deleting a file means often putting it into the trash can where it can be recuperated unless the trash can is emptied. Deleting a directory mean putting it to the trash can together with its entire tree of subdirectories and files. Pay special attention, since not always the trash can works correctly and sometimes files are

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deleted without passing through the trash can to delete a file or directory windows offers several methods, the most used being:

- drag the object to the trash can and release it;
- select the object and click the right mouse button. Select “Delete”,
- select the object and press DEL key.

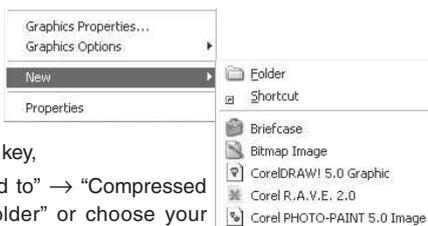
To rename a file or directory, simply select the object, click on the name and retype it. Usually Windows accepts every name, but novice users should stick with letters and numbers and spaces, since other characters may be forbidden.

To create a new directory, simply right click the mouse and choose “New” and “Folder”. After the creation, rename it.

Sometimes files occupy a lot of space and need to be reduced to save disk space or to be sent by e-mail; other times files must be put in a package to remain together or to be sent as a single file via e-mail. These two operations are accomplished compressing a set of files and directories, which means using a special program (WinZip or IZArc or Power Archiver or the operative system itself) to reduce (from 0% to 90% depending on the file type) the file size and produce a new single file called zip-archive containing all the selected files and directories.

To compress a set of files and directories:

1. select the files and directories all together,
2. click the right mouse key,
3. select “Send to” → “Compressed (zipped) Folder” or choose your compression program and select something like “Add to archive...”,



4. a dialog box may appear asking you to choose the zip-archive name and its destination.

5. to make it quicker, the compression program suggests a possible zip-archive name directly at step 3: the user can select it and rename or move it later.

Other files or directories may be added later to the zip-archive simply dragging them on the zip-archive file (this is a copy and not a move operation).

To extract files from a zip-archive file, simply click the right mouse key on the file and from the drop-down menu choose the appropriate extract option: the content will appear in the location you have chosen, together with all its directories' structure.

When double clicking on a compressed file, if the compression program is properly installed, it will open in a window as if it were a directory. But it is not a normal directory, it is simply a window, produced by the compression program, with the list of the zip-archive's content: the user should not open files from this window since it is a very unreliable way to modify files! Files can be copied from this window to a real directory simply dragging them to the directory. When the entire content of the zip-archive has to be extracted or when the user wants to preserve the original tree structure, it is better to use the Extract button of this special window.

File types

Windows identifies a file type by its extension, which is everything after the last dot in the filename. Usually it is a 3 or 4 character acronym. Using the file extension, Windows knows the file type and decides which program will open that file. If the file extension does not show up, follow the instructions below given in the table. The most important file types are :

File type	Typical programs that open it	Typical extensions
Program	itself	.exe .com .bat
Compressed	WinZip/IZArc / Power Archiver	.zip
Text	Notepad	.txt.csv
Document	Word/Acrobat/Powerpoint	.docx .doc. rtf .pdf .ppt.pptx
Sheet	Excel	.xlsx .xls .csv
Image	Explorer/Picture Fax Viewer/ Paint/Office Picture Manager	.jpg .jpeg .gif .bmp
Video	Media Player	.avi .mov .mpg .mpeg
Audio	Media Player/Win Amp	.mp3 .wav
Web page	Explorer	.html .htm

File sharing

On the same computer different programs can try to access the same file at the same time, or on network different users can try to do it. When this happens, Windows locks the file as soon as a program, able to write on it, opens it. Other programs trying to open it will be allowed to open it in read-only mode: they may read, but are not allowed to modify it, nor users are allowed to move or delete it but simply to copy it. As soon as the locking program

closes the file, Windows releases the lock and another program may take it.

Another way to forbid use of files is through permissions. Click the right button of the mouse on a file or directory and select “Proprieties” and “Security”. The security dialog box shows the list of users or groups of users who may access this object, while not listed users may not access it. For each user or group this dialog box displays the permissions, the most important being:

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- read permission, to copy and open the object;
- read and execute, same as read, plus run the object if it is a program;
- list content (for directories), to see the content;
- write permission (for directories), to create files and subdirectories;
- modify permission, same as read and execute, plus delete, move, rename, save modifications;
- full control, same as modify, plus change permissions.

The owner of the file usually has full control on it and may change permissions or add new authorized groups or users. A special group is the Administrators group (containing the users involved in technical administration of computers) which has full control on every object.

COMPUTER NETWORKING

Network : The group of computers connected together either physically or in wire less medium → We can share the files and Information, software, hardware (CPU) through network

- Internet is the popular network which allows millions of users to share information.

Node : Every computer in network is called Node. Both clients and servers are said to be Nodes.

What is a computer network

A computer network is a set of devices which communicate and share resources. These devices are mostly computers, and sometimes stand-alone hard disks, telephones, printers and terminals (processorless computers which must rely on other computers to work).

Resources sharing

Resources sharing is what makes computer networks different from a general networks and this is often over looked by the novice user. Resources which can be shared are:

- the processor or the memory: computers and terminals may use the computational resources of a more powerful computer;
- hard disks: computers and terminals often access each other hard disks to read data and sometimes may use a special computer as a storage machine;
- CD-reader or DVD-reader: computers may read CD and DVD physically inside the reader of another computer;
- programs: usually due to license's problems, a program may be installed only on some computers and others must use it through these computers;
- connection: due to security or commercial reasons, only some computers are connected to the Internet or to another network or to the telephone system and other computers must pass through these ones to connect.

Server and client

A computer network interaction is based on the client server architecture. When considering a single interaction, one computer is the server and the other one is the client. The server is the computer which is offering its resource, usually programmed to

wait until someone asks for its resource. The client is the computer which uses the resource, which sends the request to a waiting server.

For example, when sending a document to the printer, the user's computer is the client while the printer is the server; when retrieving personal e-mails, the user's computer is the client which connects to the mailserver asking for available e-mails. When talking to a friend on an Internet chat, the interaction is composed of two different interactions: the user's computer as a client is connected to the chat room's computer acting as a server, and the friend's computer does the same interaction.

The same computer may be the client for a service and the server for another service. For example, a library computer may have a CD inside its reader shared to the network (server for the CD) and may be at the same time used by a user to print his own documents (client for the printer).

TYPES OF NETWORK

1. PAN : Personal Area Network

The sharing of files / information between two computers by connecting them with cable / bluetooth / infrared Rays

By using PAN, we can also share internet connection typically within a range of 10 meters.

Example : A person travelling with a laptop, a personal digital assistant, and a portable printer could interconnect them without having to plug anything in using some form of wireless technology. PAN could also be interconnected without wires to the Internet or other networks.

2. LAN : Local Area Network

The small and single site network which connects the computers in a building and also to adjacent building.

HUB is the connecting device used in connecting computers in the LAN

Example : Internet cafes, college Labs, college hostel etc.

3. MAN : Metropolitan Area Network

The network that connects between different metropolitan areas (Ex : India to U.S.) Cable TV is the best example
Satellite signals also used in MAN.

4. WAN : Wide Area Network

This is the network geographically dispersed collection of LAN'S
To connect WAN, It uses X.25 protocol technology that widens the signal strength.

X.25 is a communication oriented protocol

Ex: Internet, www (world wide web)

- LAN and Topology both are same meaning

Types of LAN or Topologies :

Topology : The way of computers arrangement in connecting the LAN or Network is called Topology.

We have generally 6 topologies :

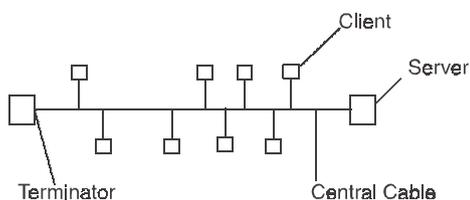
- (i) Bus Topology
- (ii) Ring Topology
- (iii) Star Topology
- (iv) Mesh Topology
- (v) Tree Topology
- (vi) Hybrid Topology

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(i) **BUS Topology :**

The computers are arranged in such a way that Bus seats are arranged in general life Bus.

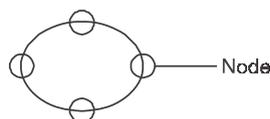
- Easy to connect a computer or peripheral to a linear bus.
- Requires less cable length than a star topology.



The central cable in this topology is called Backbone of Network. If the **Backbone fails**, the entire network fails.

Data Sent in Packets from server to the destination Computer (client). Terminators will absorb the signals sent by server to clients.

(ii) **Ring Topology :**



In Ring LAN, all the nodes are connected in a circular path. Here, there is no central server in the network. In this network, every device has exactly two neighbours for communication purposes. All messages travel through a ring in the same direction (either "Clockwise" or "Counterclockwise"). A failure in any cable or device breaks the loop and can take down the entire network.

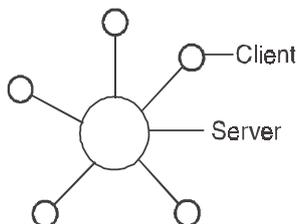
- To implement this network, one typically uses FDDI, SONET, or Token Ring Technology.

To avoid collisions in data transmission, the **tokens** are provided to all the nodes. When the token time comes to a specific node, it can transmit data to remaining systems / nodes. Failure in single node causes entire network failure. It contains n nodes and n connections in number.

Example : Found in office buildings or school campuses.

(iii) **Star Topology:** Many home networks use the star topology. A star network features a central connection point called a 'hub' that may be a hub, switch or router.

- It is easy to install and wire.
- Easy to detect faults and to remove parts.



The central Server sends data and receives data to / from all the clients. If one node fails, entire network does not fail. If central server fails, entire network will fail. Very easy for fault diagnosis.

Fail in network means loses its connectivity.

Star topology is the **best topology** to connect in Real life.

Low cost for construction of star topology. It contains n nodes and n-1 connections.

(iv) **Mesh Topology :**

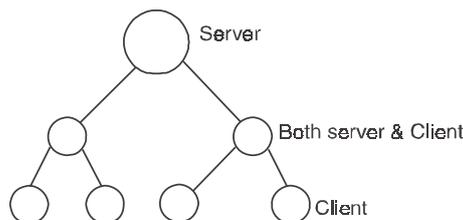
Very high cost in construction of mesh Topology. Each node has connection with all the remaining nodes. Very difficult for fault diagnosis. Messages sent on a mesh network can take any of several possible paths from source to destination.

Fault Diagnosis: Finding the disconnected wire or node in the network is called fault diagnosis.

BIO METRICS : Creating Login Pass Word through human body interaction

Ex. Breath Scan, eye scan, finger print, retina scan

(v) **Tree Topology :** It integrates multiple star topologies together onto a bus. It is supported by several hardware and software vendors. Point-to-Point wiring for individual segments is done.



The computers are connected from one to another. The possibility for a node to act both as **client and server is only in tree topology.**

Client : The active member of the network

It always sends request to server and waits for response from the server

Server : The passive (sleeping) member of the network

It waits for client requests and gives the response to them.

So, in tree topology the middle nodes are acting as both client and server.

(vi) **Hybrid Topology :** The connection of nodes with the combination of any of the two topologies is called as Hybrid Topology.

Ex: Bus topology + star topology
star topology + Ring topology

HUB's are the connecting devices in LAN / topology.

Docking station : The station to which the laptops are connected to make them for converting as projectors or big screens like desktop and LCD' Screens.

TYPES OF WAN'S

(i) **PSTN :** Public Switched Telephone Networks

Designed for telephone, which requires modem connection. It is used in FAX machine.

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It is analog transmission.

It is low speed transmission.

(ii) **PSDN** : Public Service Digital Network

This network connects public with private networks through e-mail services and chatting.

It is high Reliable and quality communication.

(iii) **VAN** : Value Added Network

It provides Electronic Data Interchange (EDI).

The owner rent out network for subscribers.

Ex: Invoice and sale purchase order.

(iv) **ISDN** : Integrated Services Digital Network

It uses both modems and multiplexers

It is for limited distance only.

Network Architecture : The construction of nodes (Computers) to form as network structure is called network Architecture

- **Virtual Private Network (VPN)** is a way to recognise a computer outside the LAN as a trusted computer : the user is identified with a password and his computer, even though connected via Internet, will be considered as part of the LAN, for as long as it remains connected. VPN is typically required to identify portable computers connected via wireless connection.

NETWORK COMPONENTS

Star topology : Computers and devices can be connected in different ways. The most typical topology is the **star network** : computers are divided into groups and are connected directly to a special device called **hub** (other similar devices called switch and router can do the same work). Every hub is connected to a main hub; in very large companies there are many main hub connected to a higher level hub, and so on.

Cables : The network connecting components are the cables, which often determine the speed of the LAN. Cables have a speed measure in **bps** (bits per second) which indicates how many bits can flow through the cable in one second.

- **Ethernet** cables have a speed of **10 Mbps** and can thus carry 1.25 MB each second, meaning that, for example, a 600 MB movie can be transferred in 8 minutes from one computer to another one, supposing no one (neither users nor computers) is using that network tract for other purposes during the transfer.
- **Fast Ethernet** cables have a speed of **100 Mbps**.
- **Giga Ethernet** cables have a speed of **1 Gbps**.
- **A wireless** network, a cableless network where computers use radio signals to communicate, has usually a theoretical speed of 100 Mbps but its practical speed, which can change a lot due to environment condition, is around **10 Mbps**.

To find out how much time does it take to transfer a file with a size expressed in bytes, divide the connection speed in bps by 8 to find out the byte rate per second and then divide the file size by the speed to find out the number of seconds it takes for the file transfer. For example, to transfer a 600 MB file through an Ethernet connec-

tion, find out the speed of 1.25 MB per second (1,250,000 bytes per second) and then divide 600 MB (or 600,000,000 bytes) by 1.25 (or by 1,250,000) to find out the time of 480 seconds, which is 8 minutes.

Gateway : When a LAN is connected to the Internet, there is one, or sometimes more than one, special computer called **gateway** dedicated to this connection and to keep relations with the outside world. Other network devices are internal and this special portion of the network is called Internet. The gateway is the only computer physically connected to the Internet and on it several administrative and security programs run. The main ones are :

- **Firewall** : a program in charge of rejecting unwanted incoming connection attempts (which can be attacks to the internal security) and sometimes of forbidding unauthorised outgoing connections (which can be users trying to perform operations the network owner does not want);
- **Domain Name Server (DNS)** : a program in charge of dealing with computer addresses
- **Webserver** : a program in charge of publishing web pages. The webserver offers the local web pages to users outside, answering to requests coming from external users;
- **Mailserver** : in charge of receiving e-mails from the Internet and dispatching them to the right local user (according to the name before the @ and of receiving e-mails from the local users and dispatching them to the right external mailserver (according to the domain name after the @).

These programs usually all run on the gateway for large companies' networks, while for smaller networks, such as the ones of small office or home environments, DNS, mailserver and web-server run on the Internet Provider computers (implying that the local network depends on external resources for e-mails, its own web pages and domain names) and the firewall usually runs on every computers.

TYPES OF MULTIPLEXING

(i) **FDM** : Frequency Division Multiplexing

It uses analog data transmission

Band pass filters are used in separating channels.

(ii) **SDM** : Space Division Multiplexing

It divides channels through space division

Ex: Stereo Headset.

(iii) **TDM** : Time Division Multiplexing

It divides channels through time division

It uses digital transmission of signals

(iv) **CDM** : Code Division Multiplexing

It divides channels based on their code

Ex: CDMA mobiles are separate from GSM mobiles

TYPES OF DATA TRANSMISSION

- Data Transmission is the process of communication of 'data between source (sender) and destination (Receiver)

(i) **Simplex Transmission** :

Source Data Destination

Sender Receiver

In this type, the communication is processed only in one direction from sender to Receiver.