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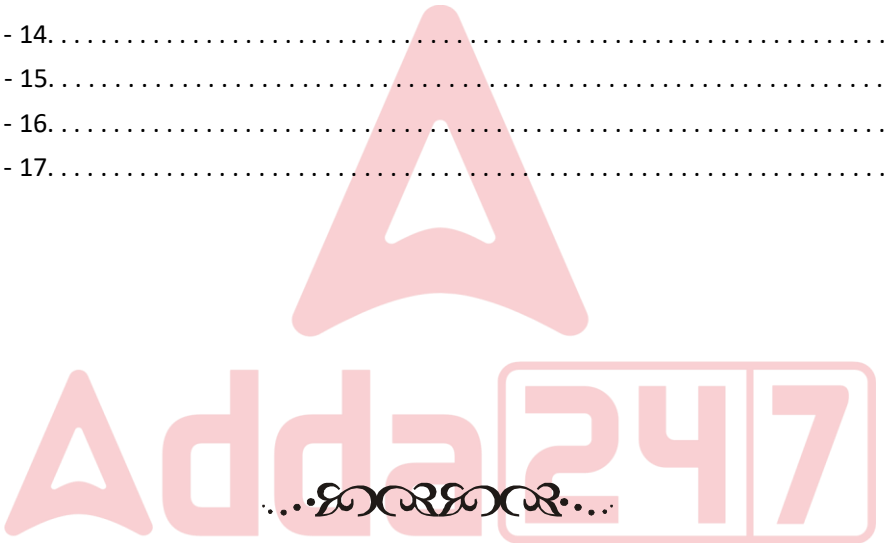


CHAPTE – 01

BASIC COMPUTER

ORGANIZATION OF COMPUTER

History of Computer - Before the invention of Computer, Calculator was introduced. Main difference between Calculator and Computer is that Computer can do logical operations and calculators can't do logical operations.
ABACUS - Abacus was developed in china in 2600 B.C by some Chinese people. The Word Abacus means calculating board. This apparatus used a series of moveable beads or rocks. The positions changed to enter a number and again to perform mathematical operations.

The abacus, also called a counting frame, is a calculating tool used for performing arithmetic processes. It is made of a beads or stones placed in grooves or strung on rods. Abacus is a Latin word that has its origins in the Greek words abax or abakon (meaning "table" or "tablet").

Leonardo DaVinci was credited with the invention of the world's first mechanical calculator in 1500. In 1642, Balise Pascal invented Adding Machine. Blasie Pascal's supporter think that Mechanical Calculator was introduced by Pascal.

Napier's Bones - John Napier was a mathematician who became famous for his invention of logarithms. John Napier built device for the purpose of multiplication in 1617 A.D The device was known as Napier's bones. His bones are set of eleven rods side by side products and quotients of large numbers can be obtained. The sticks were called bones because they were made of bone of ivory.

Charles Babbage was known as Father of computer. He invented Two machines. (i) In 1822, introduced Difference Engine. (ii) In 1834, introduced Analytical Engine. It was first demonstrated in Paris Museum.

First Digital Computer - ENIAC was the first digital computer. The ENIAC was invented by J. Presper Eckert and John Mauchly at the University of Pennsylvania and began construction in1943 and was not completed until 1946. It occupied about 1,800 square feet and used about 18,000 vacuum tubes as a storing device to store data, weighing almost 50 tons.

First computer with RAM - MIT introduces the Whirlwind machine March 8, 1955, a revolutionary computer that was the first digital computer with magnetic core RAM and real-time graphics.

The first minicomputer - In 1960 Digital Equipment Corporation released its first of many PDP computers the PDP-1.
The first laptop - First Laptop was introduced in 1981 by Adom Osborne and the company "EPSON" manufactured first Laptop.

The first computer company - The first computer company was the Electronic Controls Company and was founded in 1949 by J. Presper Eckert and John Mauchly, the same individuals who helped create the ENIAC computer. The company was later renamed to EMCC or Eckert-Mauchly Computer Corporation and released a series of mainframe computers under the UNIVAC name.
The first multimedia computer - In 1992 Tandy Radio Shack becomes one of the first companies to release a computer based on the MPC standard with its introduction of the M2500 XL/2 and M4020 SX computers.
The first Apple computer - Steve Wozniak designed the first Apple known as the Apple-I computer in 1976.

COMPUTER FUNDAMENTAL

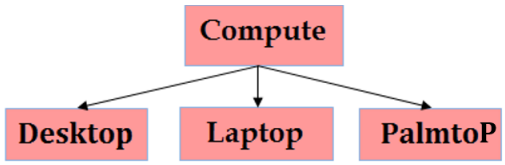
Computer -A computer is a device that accepts information and manipulates it for some result based on a program or sequence of instructions on how the data is to be processed. Computer i.e a combination of two words ''compute'' + ''er''. Compute means calculation and er means device.

In other word Computer is an electronic device. It can perform all type of mathematical and logical operation. It can accept data, store data, process data, retrieve data and print data.

Computer System:- A computer system is a set of components that works together to accomplish one or more task.

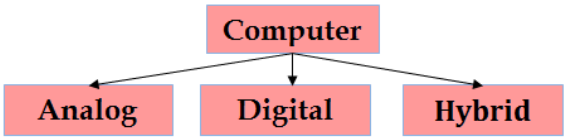
Computers are available in different sizes, shapes and weights. Due to different size and shapes they perform different task from one another. They are classified into various category on the basis of physical size, function and processing and storing capacity.

On the basis of physical size, computers are divided into three parts:-



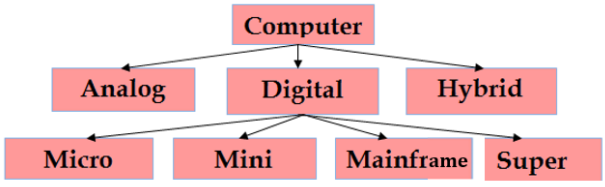
1. **Desktop:-** A computer designed for home and personal use. You cannot carry this computer like Laptop. It is a personal computer (PC) i.e for regular use at a single location.
2. **Laptop:-** A laptop computer is a portable computer and also known as Notebook. One can carry anywhere like briefcase. Another type of laptop is known as Net-book. Netbook is very popular among business man. One can use Net-book for small application like word-processing, accounting, presentation, internet accessing etc.
3. **Palmtop:-** A small computer that fits on one's palm. Palmtop is also called PDAs, hand help computers and pocket computers.

   Another classification of computer, on the basis of function, computers are divided into three parts:-



1. **Analog computer:-** Analog Machine was introduced by Lord Kelvin. In Analog computers numerical data are represented by measurable physical variables, such as electrical voltage, pressure, temperature etc. A thermometer is a simple analog computer. As the temperature varies, the mercury moves correspondingly.
2. **Digital computer:-** A computer that accepts and processes data in the form of number(0-9) and characters (A-Z) that has been converted into binary code. Most computers are digital.
3. **Hybrid computer:-** The feature of analog and digital machines are combined to create a hybrid computers. You can see hybrid computers in hospitals, geological department etc.

   One more classification of computer on the basis of processing speed and storing capacity, computers are divided into four parts. It is also known as types of Digital computer:-



1. **Micro computers:-** Micro computers known as Personal computers(PC). These are small, relatively inexpensive computers designed for personal use in home or office. It has lowest storing and processing speed. Users can use Micro Computers directly in Home, Office or Public places. Note that user uses micro computer that are digital and also can be laptop or Desktop.

2. **Mini computers:-** Mini computers are powerful computer as compare to micro computers. It has higher memory, provide faster operating speeds and larger storage capacities than microcomputer and used as server. Minicomputer system known as small mainframe computer system. A mini computer is a multiprocessing system capable of supporting from 2 to 200 users simultaneously.
3. **Mainframes computers:-** A mainframes computer is different from micro and mini. It has very high memory and processing speed and used as server (can support thousands of users). A mainframe is a high-performance computer used for large-scale computing purposes.

4. **Super Computers:-** Super computer is a different type of computer and can be used for complex type of application. e.g : scientific research, weather forecasting, weapon designing etc. India's first super computer PARAM-10000 developed by C-DAC, PUNE in 1998. Another super computers are Padam-Param (Param series), EKA, SAGA-220 etc. India;s fastest Super Computer is EKA designed by TATA.

COMPUTER OF FIRST GENERATION

ENIAC:- Electronic Numerical Integrator and Calculator

- It was first general purpose computer.
- Invented by John P. Eckret and John Mauchley in 1946
- Vacuum tube was used as a storage device (18000 V.T)
- Weight was around 70 tons

EDSAC:- Electronic Delay Storage Automatic Calculator

- It was invented by Maurice wilkies in 1949

EDVAC:- Electronic Discrete Variable Automatic Computer (1950)

UNIVAC:- Universal Advance Computer

- It was first commercial purpose computer.
- Invented by John P. Eckret and John Mauchley in 1952
- Vacuum tube was used as a storage device (around 28000 V.T)

Units uses in computers to store and process data:-

Bit :- The full form of Bit is "Binary Digit " or "Binary Integer". A bit is a single digit number in base-2 ('0 or 1') and is the smallest unit of computer data.

4 bit	=	1 nibble
8 bit	=	1 byte
1024 byte	=	1 Kilo byte
1024 Kilo byte	=	1 Mega byte
1024 Mega byte	=	1 Giga byte
1024 Giga byte	=	1 Tera byte
1024 Tera byte	=	1 Peta byte
1024 Peta byte	=	1 Exa byte
1024 Exa byte	=	1 Zetta byte
1024 Zetta byte	=	1 Yotta byte

CHARACTERISTICS OF COMPUTER

Computers are playing a main role in our everyday life. It solves the human problems very quickly as well as accurately. The important characteristics of a computer are:-

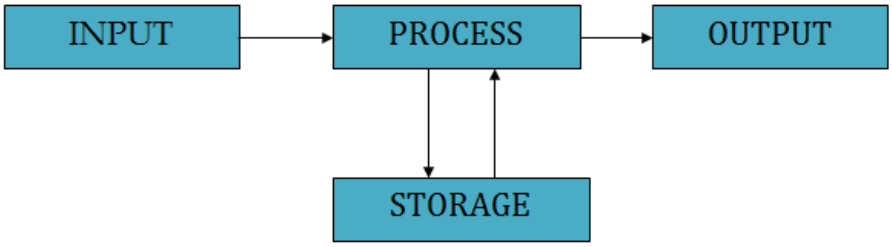
- **Speed:-** Computer is very fast and it takes only few seconds for calculations or you can say the speed of computer in terms of microsecond (10^{-6} part of a second) or nanosecond (10^{-9} part of a second).
- **Accuracy:-** The degree of accuracy of computer is very high and every calculation is performed with the same accuracy. The accuracy level is determined on the basis of design of computer. The errors in computer are due to human and inaccurate data. Everything or Result depends on the users input.
- **Storage Capacity:-** A computer has a very large capacity to store information. The Computer has an in-built memory where it can store a large amount of data. To store data in computer, hard disk is used. You can also store data in secondary storage devices such as floppies, which can be kept outside your computer and can be carried to other computers.
- **Reliability:-** Computers are considered to be very reliable machines. The computer respond as the per the instruction keyed into it. They do not make mistakes on their own. Computers error occurs when humans make errors while programming the computers. Reliability is the main key of computer.
- **Versatility:-** It means the capacity to perform completely different type of work. You may use your computer to prepare payroll slips. Next moment you may use it for inventory management or to prepare electric bills.
- **Diligence:-** A computer is free from tiredness. It can work for hours without creating any error. If millions of calculations are to be performed, a computer will perform every calculation with the same accuracy

Applications of a Computer :- Computers have become very popular in all fields. Here are some of areas where they are widely used. Some are given as below:

- **Education :-** Computers give students more flexibility with their studies. Computers are also used by teachers to prepare lessons, report card and as a reference tool.
- **Medicine:-** A large number of computerized equipment is used for medical tests in hospitals and clinics. They can be used for storing medical records of patients visiting big hospitals. Doctors can access these records of patients to diagnose.
- **Business :-** Every company or organization require computers for budgeting, accounting, billing, reporting, presentations etc. This information must be constantly maintained and updated. Computers are also used for sales forecasting, production, planning etc.
- **Science and Technology :-** Scientist and Engineers use the computers as a tool to experiment, design, and develop their ideas/projects. Architects use computer to design structures. Nuclear test can be simulated without damaging the environment. Computer aided designing (CAD) and Computer aided Engineering (CAE) are becoming very popular.

- **Communication :-** Today, computer is available in many office and homes and therefore there is a need to share data and programs among various computers with the advancement of data communication facilities. Using Internet facility, you can send E-mail to your friends and relatives.
- **Banking :-** Computers are being used in banks for carrying out everyday transactions like online enquiry of customers' balance, cheque verification and updating of balance, calculating interests etc. All progressive bank have installed Automated Teller Machines (ATM) to enable the customers to draw money from their accounts, money transfer etc.
- **Weather Forecasting:-** Data is collected from weather stations and satellites all over the world. Changes in weather and direction of winds can be analyzed with the help of computers. Timely prediction may avoid damage due to natural disasters.
- **Entertainment :-** Through computers, you can play various games, create your own music, watch cartoons or films, listen to your favorites music etc. Cartoons films are created very easily through computer animation. . Special effects like fire, battle earthquake, etc can be created for films.
- **Defence:-** In defence, computers can be very useful. Modern weapons and missiles are totally computer controlled.

Basic Structure of a computer System:- Computer's follows input → process → output cycle (IPO CYCLE) in order to perform a task. Input means giving data to computers and computer process as per the input, after processing it gives the output.



IPOS CYCLE:- It is how computer intake data , process the data, output information and then saves the information. I stands for input, P stands for processing, O stands for output, and S stands for storage.

- **Input :-** Input is the raw data entered into a computer from the input devices. It is the collection of numbers, letters, images, etc. Keyboard, Mouse, scanner, webcam, etc are some examples of the input devices.
- **Process :-** Process is the operation of data or information as per given instruction. It is totally internal process of the computer system. CPU (Central processing Unit) is the main processing device of the computer.
- **Output :-** Output is the result of processed data given by computer after data processing. we can save these results in the storage devices for the future use. Monitor, Printer, Speaker are the main output devices.
  The five basic operations that a computer performs are accepting data as a input, processing of data, outputting the information, storage of these data and process control.

ERROR, BUG and DEFECT

Error: it is deviation from logic, syntax or execution. Or programmatically mistake leads to error. A programmer can remove the error from the program.

Bug: A fault in a program which causes the program to perform in an unintended or unanticipated manner. Or Deviation from the expected result. A QA team or software tester can find the bug. Famous bug-millennium bug. (data Problem) i,e, Y2K Bug

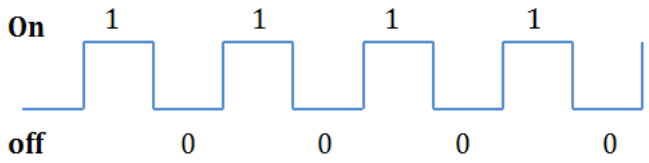
Defect: Mismatch between the requirements. From user point of view it effects the business directly. E.g instantly halt in the system.

Glitch: A minor malfunction, mishap, or technical problem on computer system known as Glitch.

DATA REPRESENTATION IN COMPUTER

Most computers are digital

- Recognize only two discrete states: on or off. On means 1 and off means 0.
- Computers are electronic devices powered by electricity, which has only two states, on or off



Data in computer is represent in binary form. To understand data representation one has to know four number system.

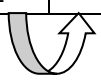
1. **Decimal number system:** In this system we use ten different symbol to represent any number. Therefore it's base is ten. Following are the symbol use in this system. 0, 1, 2, 3, 4, 5, 6, 7,8, 9. (0-9)
2. **Binary number system:** In this system we use only two symbols are used. i.e 0, 1. There it's base is two.
3. **Octal:** In this system eight symbol is used i.e 0, 1, 2, 3, 4, 5, 6, 7. Therefore it's base is eight. (0-7)
4. **Hexadecimal:** In this system sixteen symbol is used i.e 0 1 2 3 4 5 6 7 8 9 A B C D E F. Therefore it's base is sixteen. (0-F)

Conversion From one number system to another

1. **Decimal Conversion:**
   - **A. Decimal to binary:** Divide the given decimal number by 2 till possible and write the remainder in reverse order.

     E.g. I. $(225)_{10}$ = $(11100001)_2$

2	225	1
2	112	0
2	56	0
2	28	0
2	14	0
2	7	1
2	3	1
2	1	



$(225)_{10} = (11100001)_2$

B. Decimal to octal: Divide the given decimal number by 8 till possible and write the remainder in reverse order.

E.g. $(225)_{10} = (341)_8$

8	225	1
8	28	4
8	3	

C. Decimal to hexa: Divide the given decimal number by 16 till possible and write the remainder in reverse order.

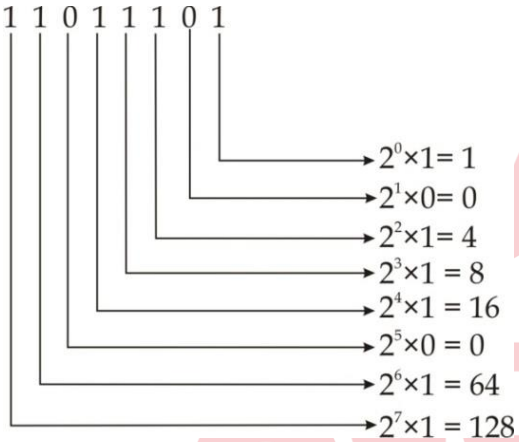
E.g. $(225)_{10} = (E1)_{16}$

16	225	1
	14	

2. Binary Conversion

A. Binary to Decimal

$(11011101)_2 = (221)_{10}$



$1+0+4+8+16+0+64+128 = (221)_{10}$

B. Binary to Octal: to find the octal value from the binary number,

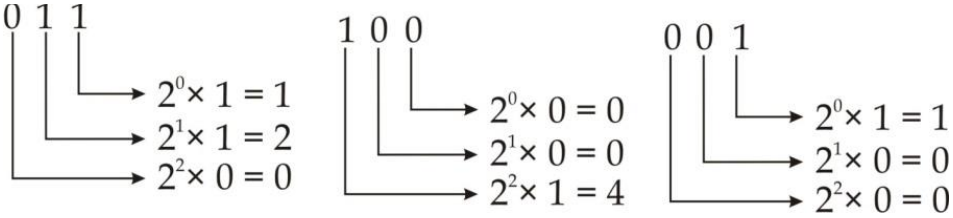
First method: - convert binary number into decimal number and then divide the decimal number by 8.

Second method: - make the group of three numbers and then find the individual value of that group

E.g. $(11100001)_2 = (341)_8$

011 100 001 -------- 1st group 001, second group 100 and 3rd group 011.

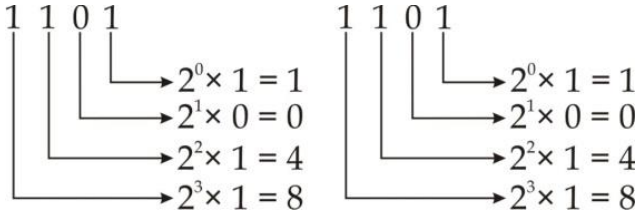
Individual value 001 = 1, 100 = 4, 011 = 3



$(0+2+1 = 3) \quad (4+0+0 = 4) \quad (0+0+1 = 1) = (341)_8$

C. Binary to Hexadecimal

$(11011101)_2$ = $(DD)_{16}$

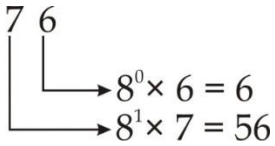


(1+0+4+8) (1+0+4+8) = $(1313)_{16}$ = $(DD)_{16}$

3. Octal Conversion

A. Octal to Decimal

$(76)_8$ = $(62)_{10}$

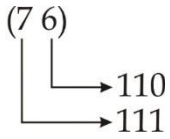


To find the decimal number from the octal number, position all the number and then multiply with them

B. Octal to Binary

To convert Octal number to binary, find the binary of individual number in the pair of three digit.

$(76)_8$ = $(111110)_2$

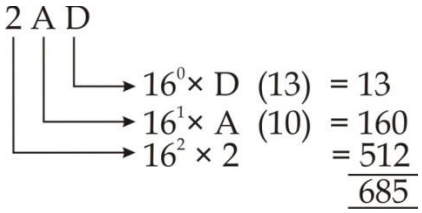


4. Hexa Decimal Conversion

A. Hexadecimal to Decimal

To find the decimal number from the hexadecimal number, position all the number and then multiply with them.

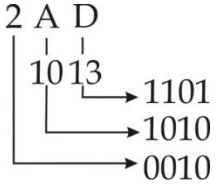
$(2AD)_{16}$ = $(685)_{10}$



B. Hexadecimal to Binary

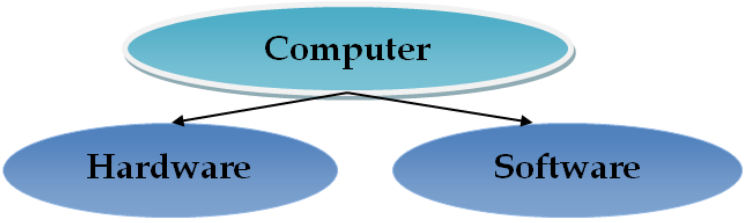
To convert octal number to binary, find the binary of individual number in the pair of four digit.

$(2AD)_{16}$ = $(001010101101)_2$



HARDWARE

Computer System is classified into two parts



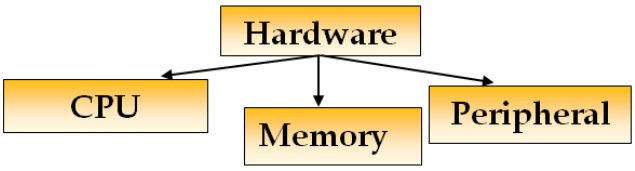
- **Computer Hardware:-** All the physical component that grouped together and form a complete system known as hardware. e.g:- PC-Case, motherboard, RAM, ROM, Hard Disk, Monitor, keyboard, mouse. etc.
- **System Unit:-** A system unit includes a board called a motherboard that holds a microprocessor chip (or a CPU), memory chips, and expansion slots. Electronic circuitry is printed on the board and it connects between two main parts of a microcomputer, the microprocessor and primary storage and other parts.

***Mother Board is known as System Board.**

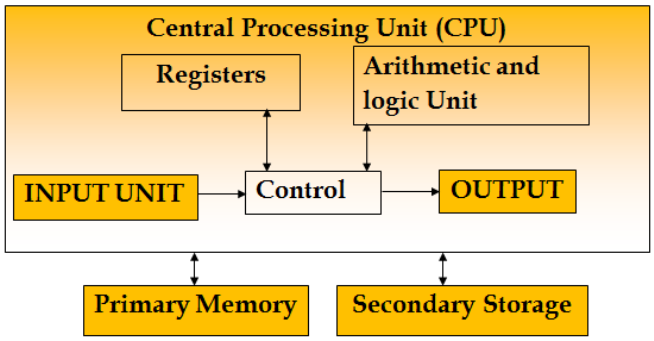
A system unit includes the following parts:

- Motherboard
- Microprocessor
- Memory Chips
- System Clock
- Buses
- Ports
- Expansion Slots and Cards

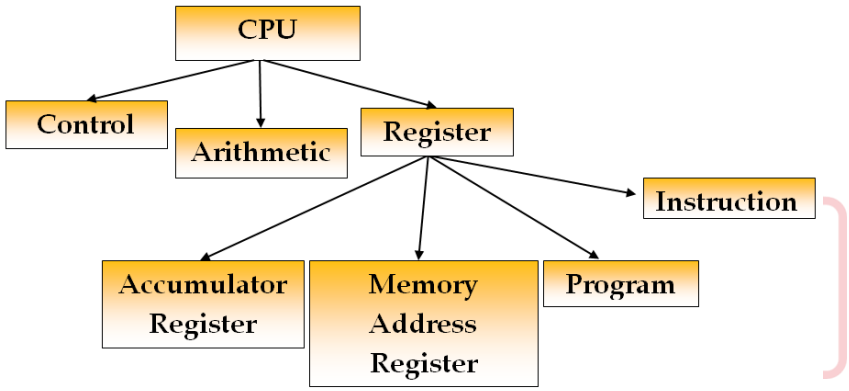
- **Hardware is divided into three parts:-**
  - Central Processing Unit (CPU)
  - Memory Unit
  - Peripherals Device



- **Central Processing Unit:-**: Central processing unit is called the brain of computer system. It is also known as micro processor when it is constructed on a single chip. Arithmetic logic and control unit along with registers forms a complete central processing unit and central processing unit along with input/output unit and memory unit forms a computer system.



- **Instruction Execution:-**The program which is to be executed is a set of instructions which are stored in memory. The CPU executed the instructions of the program to complete task. The major responsibilities of the instruction execution are with the CPU. The instruction execution takes place in the CPU with the help of registers, ALU and CU. When the processor executes instructions, data is temporarily stored in small, local memory locations of 8, 16, 32 or 64 bits called registers. These registers are:-
  - **Accumulator Register:-** Which stores the intermediate result of arithmetic and logical operations.
  - **Memory Address Register (MAR):-** Which contain the address of memory location to which data is to be stored.
  - **Program Counter (PC):-** Which contain the address of the next instruction to process.
  - **Instruction Register (IR):-** Which contain the current instruction being processed.

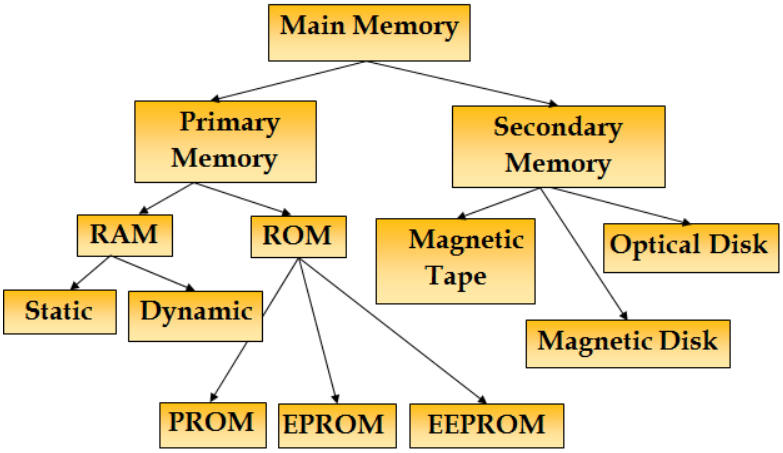


- **Microprocessor:-** Microprocessors processes the instruction. The microprocessor is made of millions of transistors. These are tiny electronic devices that carry an electric charge. The first microprocessor 4004 was invented by INTEL in 1971. It was 4 bit microprocessor designed for specific application. In 1972, first general purpose microprocessor 8008 was introduced. It was 8 bit microprocessor. At present 32/64 bit processor present in the market.

Note:- All CPU's are known as microprocessor but all processors are not CPU. Because CPU control all the components of the computer system where as processor only process the instruction. Processors can't control any component.

- **Control Unit:-** Control Unit controls the flow of information within the computer system. Control units are in-charge of the computer. Control units decode machine instructions and generate control signal. Control units may also control some external devices.
- **ALU (Arithmetical Logical Unit):** An arithmetic/logic unit (ALU) performs arithmetic and logic operations. It performs only four types of mathematical operations i.e. +, -, etc..

Main Memory Unit: Main Memory unit known as main memory or primary memory. Memory Unit is a internal memory. It is also known as semi conductor memory.



There are two part of memory unit:-

- **RAM-** (Random Access Memory) It is a read and write memory. It is a volatile and temporary memory. Two Types of RAM. RAM is used by Users.
- Static RAM is called static because it will continue to hold information without refreshment i.e. it does not required refreshment
- Dynamic RAM is called dynamic because it require refreshment. It loose information with time.
    - ROM (Read Only Memory) It is a permanent memory, read only memory and Non-Volatile. ROM allows data and instruction to be read and does not allow user to write anything on it. The contents of ROM are written by the manufacturer at the time of manufacturing.
- PROM (Programmable Read Only Memory):- PROM can be custom-programmed by the user using special circuitry. A PROM can be changed /updated only once.
- EPROM (Erasable Programmable Read Only Memory):- This type of ROM can have its contents erased by ultraviolet light and then reprogrammed by a PROM programmer. This procedure can be carried out many times; however, the constant erasing and rewriting will eventually render the chip useless.
    - EEPROM (Electrical Erasable Programmable Read Only Memory) :- This type of ROM works in a similar way to Flash memory in that it can its contents can be 'flashed' for erasure and then written to without having to remove the chip from its environment. EEPROMs are used to store a computer system's BIOS, and can be updated without returning the unit to the factory. In many cases, BIOS updates can be carried out by BIOS update.
- **Flash memory -** Flash memory is non-volatile memory that is an integrated circuit that does not need continuous power to retain the data. It is much more expensive than magnetic storage. However, flash memory is widely used with car radios, cell phones, digital cameras, PDAs, MP3 players, and printers.

  Difference between memories

	Access Time	Storage Capacity	Cost/bit of storage
Primary Memory	Faster	Smaller	High
Secondary Memory	Slower	Higher	Low

Based on access time, storage capacity and cost/bit storage, the memory devices can be categorized into three kinds of memory system.

- Semiconductor memory such as RAM, ROM, PROM, EPROM, EEPROM and Flash Memory.
- Magnetic Memory such as Hard disk, Floppy disk, and magnetic tapes.
- Optical Memory such as Compact disk, Digital Video/Versatile disk (DVD), Blu-Ray disk.

Port:- Port is a connecting socket outside the system into which different type of cables are plugged. It is place where device are physically connected. There are many type of ports used in computer system. These ports are:-

- Serial Port
- Parallel Port
- USB Port (Universal serial bus)
- SCSI Port (Small Computer system Interface)

  - **Serial Port:-** Serial port transmits one bit of a byte, one at a time as a single stream of bits. It is used for transmitting slow data over long distances. E.g Dialup modem, serial mice use serial ports.
  - **Parallel Port:-** A Parallel port transmit 8 bit of byte of data in parallel. It is used for transmitting fast data over short distances. It is used to connect printer, monitor, projector etc.
  - **USB Port:-** A USB port can connect up to 127 peripheral devices such as a mouse, digital camera, scanners, speakers etc. It also permit to connect plug and play device.
  - **Small computer System Interface (SCSI Port):-** SCSI port allows data to be transmitted in a daisy chain to up to 7 devices at a higher speed (32 bit at a time). It is fast data transmitting device is used to connect HDD (Hard disk drive, CD-ROM drives etc with the computer.

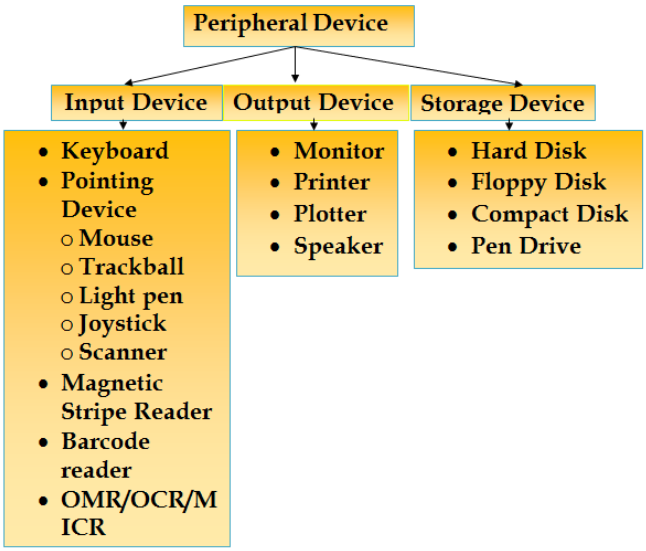
A bus is a set (group) of parallel lines that information (data, addresses, instructions, and other information) travels on inside a computer. Information travels on buses as a series of electrical pulses, each pulse representing a one bit or a zero bit. The control unit and internal storage are linked together by sets of parallel electrical lines called bus.

An internal bus is a bus inside the processor, moving data, addresses, instructions, and other information between registers and other internal components or units

An external bus is a bus outside of the processor (but inside the computer), moving data, addresses, and other information between major components (including cards) inside the computer.

Peripherals Device:- Auxiliary equipment used in computer like input device , output device , storage device, communication device or other functions under the direct control of a computer.

- **Input device –**A computer hardware or device capable of accepting data or instructions. E.g keyboard, mouse, light pen, joy stick, bar code reader, scanner, microphone etc
- **Output device –** A Computer hardware of device capable of displaying the result of the processed data. E.g monitor (VDU), printer, plotter, speaker etc.
- **Storage device-** A computer hardware devices used for storing information permanently. It is also known as secondary memory. E.g. hard disk, floppy disk, compact disk, pen drive etc.
- **Communication device -** microphone, modem, router



Input Device:-

- **Keyboard:-** Keyboard is a most common data entry device. Using Keyboard, User can type text and execute commands.
- It is known as standard input device.
- Use keyboard in GUI and CUI.

- **No of Keys on Keyboard**
  - minimum number of keys → 101 keys (without WIN key)
  - minimum number of keys→ 104 keys(with WIN key)
  - minimum number of keys→ 84 keys (on Laptop)

- **Layout of keyboard:-** There are three type of layout of keyboard
  - QWERTY
  - AZERTY
  - DVORAK

  Note: QWERTY is the most common and standard Layout of the keyboard

Another Keys on Keyboard:-

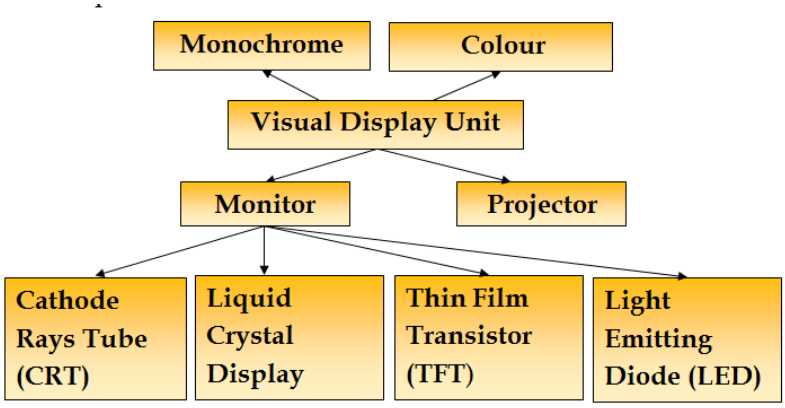
- **Function Key:-** There are 12 function keys available on the keyboard. F1 to F12.
- **Modifier key:-** Ctrl key, Alt key and Shift key are the modifier key.
- **Toggle Key:-**Num Lock , Caps Lock and Scrl Lock are known as toggle key.
- **Mouse:-** It is known as standard pointing device. You can use mouse only in GUI. Mouse was invented by Douglas Engelbart in 1967. There are two type of mouse. These are
- Mechnical mouse
- Optical Mouse
- **Trackball:-** Trackball is another pointing device that is used instead of mouse. Now a days trackball is used to control cursor movement on mobile phone to access internet.
- **Light pen:-** It is also a pointing device. You can use light pen for digital signature. A light pen can work with any CRT- based monitor, but not with LCD screens, projectors or other display devices.
- **Joy Stick:-** It is also known as pointing device. Joystick are used for computer games as they provide a better control.

- **Scanner:-** A scanner allows you to capture documents or pictures that are printed on paper and turn them into digital format to be viewed on a computer. Scanners can be of different Types:-
  - Handheld scanner:- To use handheld scanner, you simply pass the scanner over the image or document you want to scan.
  - Flatbed scanner:- The flatbed scanner is similar to a photocopier machine. You can place an image or document on the glass scanning surface to scan.
- **Microphone:-** A microphone is a device to input sound information. It allows you to record sound and voice to place onto the computer.
- **Barcode Reader:-** Barcodes are different groups of vertical bars that can be read by a barcode reader. Barcodes are printed on nearly every products that you can buy. A Barcode reader is also known as Point of sale scanner.
- **Barcode:-** A bar code is the small image of lines (bars) and spaces that is affixed to retail store items, identification cards, and postal mail to identify a particular product number, person, or location. In Barcode, there are 13 digit available which is divided into 4 section.
  - First 2 digit—(1-2) → Country code
  - Next 5 digit----(3-7) → Manufacturing code
  - Next 5 digit—(8-12) → product code
  - Last digit—(13) → Check code

- **Optical Character Reader (OCR):-** OCR is the recognition of printed or written text characters by a computer. This involves photo scanning of the text character-by-character, analysis of the scanned-in image, and then translation of the character image into character codes. OCR is being used by libraries to digitize and preserve their holdings.
- **Optical Mark Reader (OMR):-** OMR is a device which can detect the presence or absence of a mark on a paper. Light is incident onto the paper and the reflected light is detected. OMR is used in reading answer sheet. Questionnaires.
- **Magnetic Ink Character Recognition (MICR):-** MICR use special ink which can be magnetized, to print characters that can then be read and decoded by special magnetic devices. This system is widely used by banks for processing cheques. The check number, the bank and branch code and the account number are printed with ink containing magnet particle of iron oxide.

❖ **Output Device:-**

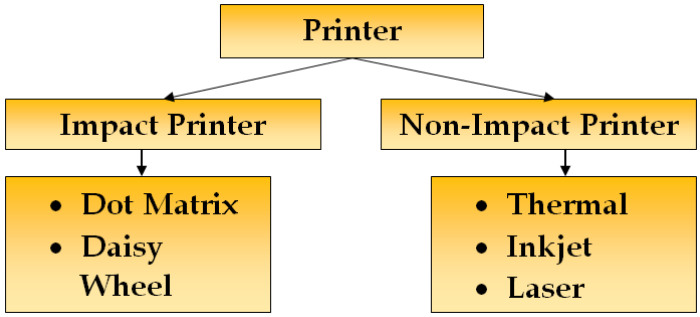
- **Monitor:-** Monitor is known as Standard output device. It is also known as visual display unit. The monitor displays the computer's user interface and open programs, allowing the user to interact with the computer



Monitors color Offered by Various video standards:-

- **Monochrome→** Mono means single and chrome means colour i.e. black and white.
- **Color**
  - CGA (Color Graphics Adapter): 4color/resolution 320*320
  - EGA (Enhanced Graphics Adapter): 16 color/resolution 640*350
  - VGA (Video Graphics Array): 256 color/resolution 640*480
  - XGA (Extended Graphics Array): 65536 color/resolution 800*600- true color and 1024*768
  - SVGA (Super Video Graphics Array): 16,777,216 color/resolution 1280*1024

- **Printer:-** Printer is output device that prints text or image on paper. The output given out by the printer on a paper is called hard copy. Printers are divided into two parts:
  - **Impact Printer:-** Impact printers are the oldest printer still in action. With this type of printer something strikes paper and ribbon together to form a character. e.g dot matrix printer, chain printer etc
  - **Non Impact Printer:-** Non Impact printer does not involve striking the paper. Instead, they use ink sprayer toner powder.



Note:- The resolution of printer is measured in dpi (dots per inch). Laser printers are the example of page printer, and inkjet printers are the example of line printers.

Another type of printers available in the market:-

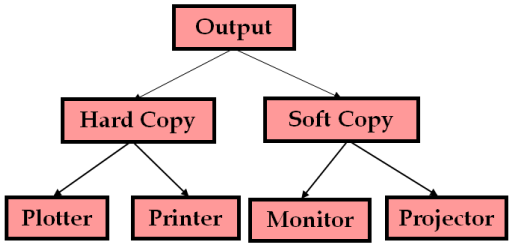
Label Printers are the smartest way to print labels one at a time. There are multi-purpose printers, that can print different types of labels. For example, label printers used in supermarkets can print bar codes as well as normal text. There are also some label printers that can print different sizes of labels on goods.

POS receipt and banking printers these printers realize innovative technology and functionality to increase productivity, and reduce costs. A receipt printer plays an integral role in any POS (Point-of-Sale) system, signaling the cash drawer to open when the transaction is completed.

Plotter:- A plotter can be used to produce high quality, accurate and bigger drawings. They are usually used for computer aided design (CAD) and computer aided manufacture (CAM) applications such as printing out for houses or car parts. Plotters are available in two designs : Flatbed and drum.

Based on the hard copy and soft copy outputs, the output devices are classified into two types:-

1. Hard copy
2. Soft copy



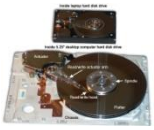
Speaker:- A speaker is an output device that is used to play sound. Speakers allow you to hear sounds and music on computer.

Storage Device:-

- **Hard Disk:** A magnetic disk on which you can store computer data. Hard Disk is a computer main storage device and can hold more data and faster then other storage device. The hard drive was first introduced on September 13, 1956.

- **Floppy Disk:-** A small, portable magnetic disk that is used to store and transport computer data. It is also known as a diskette. There are two type of floppy disk. 1. 3½ inch and it can hold 1.44 M.B data and 5¼ inch data and can hold 1.2 M.B data. First floppy was made by IBM

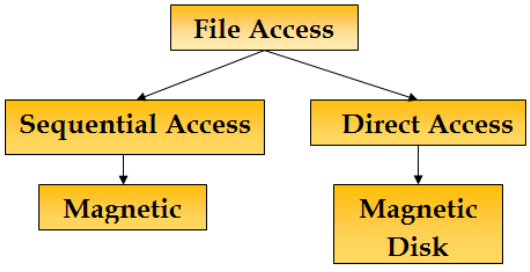
- **Compact Disk (CD):-**A CD known as optical disk. A compact disc, or CD, is an optical storage medium with digital data recorded on it. The digital data can be in the form of audio, video, or computer information. Firstly CD was introduced as Read Only device but now technology allow user to record data on it. A newer technology, the digital versatile/video disk (DVD). A CD was invented by James T. Russell in 1960. Some variations of the CD include:



CD-ROM→WORM(Write once and read many)→CD-RW

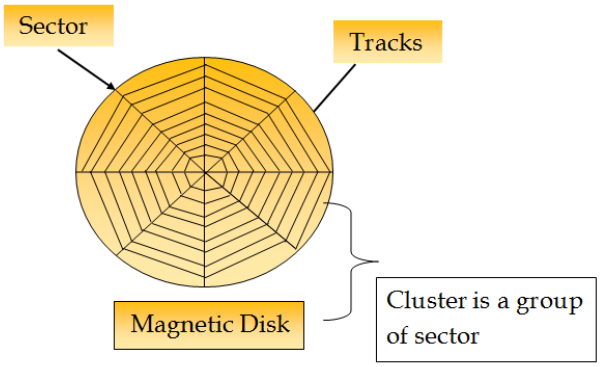
- **Pen Drive:-** A small portable USB flash drive consists of flash memory data storage device integrated with USB. A pen drive is a plug n play device known as USB flash drive, jump drive, thumb drive etc. The USB Flash Drive was introduced in 1996 and invented by Dov Moran

File Access on Disk:-



- **Disk Access time:-** Disk operate in semi-random mode of operation and normally are referenced block wise. The data access time on disk consists of two main components:-
- **Seek Time:-** Time to position the head on a specific track. On a fixed head disk it is the time taken by electronic circuit to select the require head while in movable head disk it is the time required to move the head to a particular track.
- **Latency Time:-** The time required by a sector to reach below the read/write head.

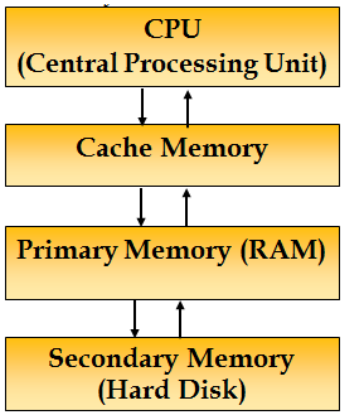
- Disk Formatting:- Formatting is a three-step process that deletes all of your old data and prepares your entire disk for storing new data.
  - The formatting program removes the references to your old files. This makes the files inaccessible to most programs because the programs won't know where the files are located on the hard drive.
  - Disk is to divided into tracks and sectors.
  - A new file called a file allocation table is created. This file will be used to store the locations of data on the disk.



❖ **Booting Process:-**All computers running Operating system share the same startup sequence:

- **POST (Power on Self Test):-** When power is turned on POST programme start running. It is the diagnostic testing sequence that test a computer's basic input/output system. Then BIOS (or "starting program") runs to determine if the computer keyboard, random access memory, disk drives, and other hardware are working correctly and it start searching for operating system. First it search the floppy disk and then C: drive and If OS is found it start loading in the main memory.
- **Virtual memory:-**Virtual memory is the use of space on a hard disk drive (HDD) to simulate additional main memory. Virtual memory permits software to run in a memory space (i.e., a logical memory) whose size is greater than the computer's RAM. Or you can say, if your computer lacks the random access memory (RAM) needed to run a program or operation, Windows uses virtual memory to compensate.
- **Cache memory:-** Cache is the fastest memory and most expansive memory. It increases the efficiency of central processing unit. It lies between CPU and main memory. The CPU uses cache memory to store instructions that are repeatedly required to run programs, improving system speed. The advantage of cache memory is that the CPU does not have to use the motherboard's system bus for data transfer.

  The cache makes any data frequently used by CPU instantly available. If the required information is not located in the cache, a fetch is made from the main memory.



Generation of Computer:- (Hardware)

1ST Generation (1940-1958)	**Vaccum Tube**
2nd Generation (1959- 1964)	Transistors
3rd Generation (1965-1970)	I.C (integrated circuit)
4th Generation (1971- present)	LSI(Large Scale integration), VLSI(Very large scale integration) ULSI (Ultra large scale integration)
5th Generation (today)	Still under development phase

Basics of Memory

A memory is just like a human brain. It is used to store data and instructions. Computer memory is the storage space in the computer, where data is to be processed and instructions required for processing are stored. Memory is primarily of three types –

- Cache Memory
- Primary Memory/Main Memory
- Secondary Memory

4.1 Cache Memory

Cache memory is a very high-speed semiconductor memory which can speed up the CPU. It acts as a buffer between the CPU and the main memory. It is used to hold those parts of data and program which are most frequently used by the CPU. The parts of data and programs are transferred from the disk to cache memory by the operating system, from where the CPU can access them.

Advantages

The advantages of cache memory are as follows –

- Cache memory is faster than main memory.
- It consumes less access time as compared to main memory.
- It stores the program that can be executed within a short period of time.
- It stores data for temporary use.

Disadvantages

The disadvantages of cache memory are as follows –

- Cache memory has limited capacity.
- It is very expensive.

4.2 Primary Memory (Main Memory)

Primary memory holds only those data and instructions on which the computer is currently working. It has a limited capacity and data is lost when power is switched off. It is generally made up of semiconductor device. These memories are not as fast as registers. The data and instruction required to be processed resides in the main memory. It is divided into two subcategories RAM and ROM.

Characteristics of Main Memory

- These are semiconductor memories.
- It is known as the main memory.
- Usually volatile memory.
- Data is lost in case power is switched off.
- It is the working memory of the computer.
- Faster than secondary memories.
- A computer cannot run without the primary memory.

4.3 Secondary Memory

This type of memory is also known as external memory or non-volatile. It is slower than the main memory. These are used for storing data/information permanently. CPU directly does not access these memories, instead they are accessed via input-output routines. The contents of secondary memories are first transferred to the main memory, and then the CPU can access it. For example, disk, CD-ROM, DVD, etc.

Characteristics of Secondary Memory

- These are magnetic and optical memories.
- It is known as the backup memory.
- It is a non-volatile memory.
- Data is permanently stored even if power is switched off.
- It is used for storage of data in a computer.
- Computer may run without the secondary memory.
- Slower than primary memories.

PORTS's

A connection point that acts as interface between the computer and external devices like mouse, printer, modem, etc. is called port. Ports are of two types –

Internal port – It connects the motherboard to internal devices like hard disk drive, CD drive, internal modem, etc.

External port – It connects the motherboard to external devices like modem, mouse, printer, flash drives, etc. Let us look at some of the most commonly used ports.

- **Serial ports** transmit data sequentially one bit at a time. So, they need only one wire to transmit 8 bits. However, it also makes them slower. Serial ports are usually 9-pin or 25-pin male connectors. They are also known as COM (communication) ports or RS323C ports.
- **Parallel ports** can send or receive 8 bits or 1 byte at a time. Parallel ports come in form of 25-pin female pins and are used to connect printer, scanner, external hard disk drive, etc.
- **USB Port (USB)** stands for Universal Serial Bus. It is the industry standard for short distance digital data connection. USB port is a standardized port to connect a variety of devices like printer, camera, keyboard, speaker, etc.
- **PS/2 Port (PS-2)** stands for Personal System/2. It is a female 6-pin port standard that connects to the male mini-DIN cable. PS/2 was introduced by IBM to connect mouse and keyboard to personal computers. This port is now mostly obsolete, though some systems compatible with IBM may have this port.
- **Infrared port** is a port that enables wireless exchange of data within a radius of 10m. Two devices that have infrared ports are placed facing each other so that beams of infrared lights can be used to share data.
- **Bluetooth Port- Bluetooth** is a telecommunication specification that facilitates wireless connection between phones, computers and other digital devices over short range wireless connection. Bluetooth port enables synchronization between Bluetooth-enabled devices. There are two types of Bluetooth ports –
  - Incoming – It is used to receive connection from Bluetooth devices.
  - Outgoing – It is used to request connection to other Bluetooth devices.

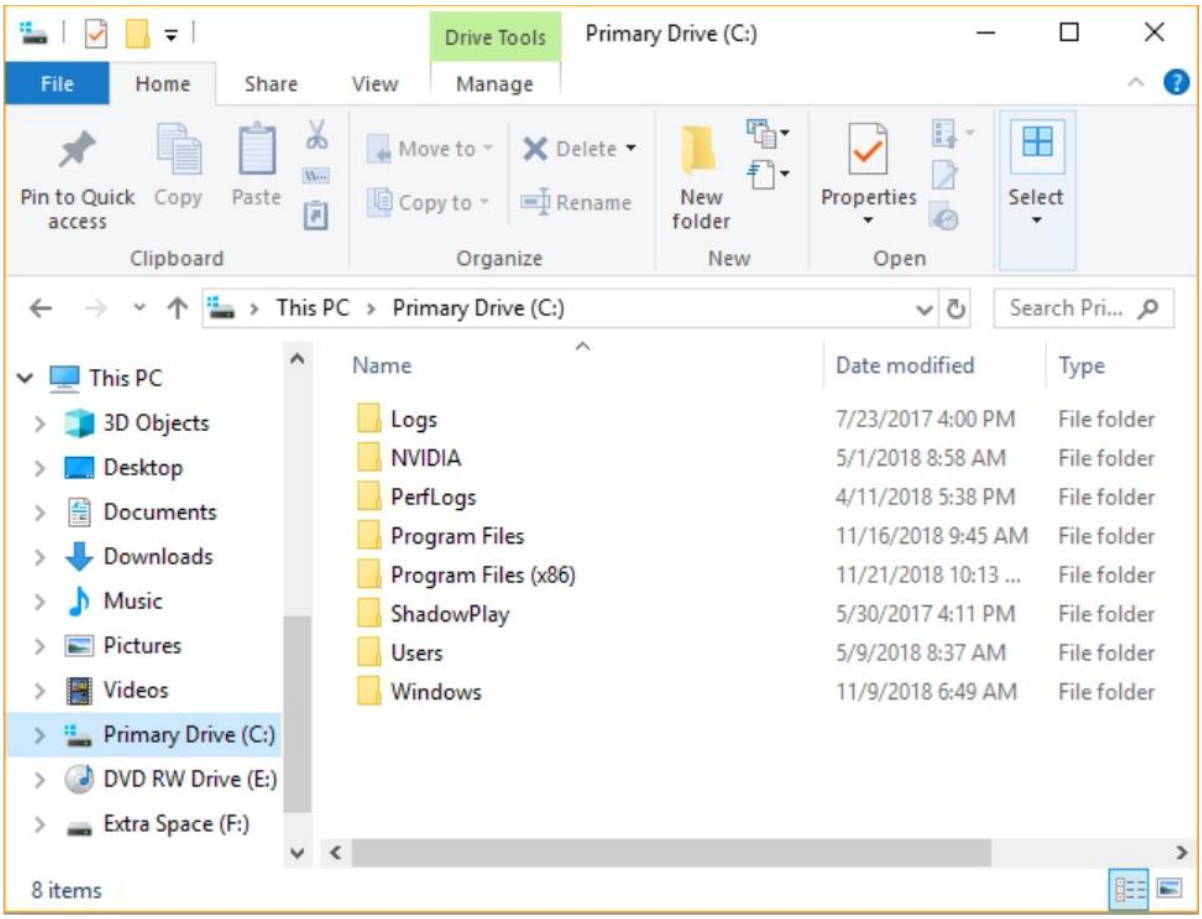
Windows Explorer/File Explorer

Windows Explorer/File Explorer:

Windows Explorer was introduced with Windows 95 and later renamed File Explorer. It is a file manager application that enables users to navigate and manage data, drives, folders, and files on their computer or mobile device.

Each time that a computer user accesses a disk or opens a folder containing files, they are using the Windows/File Explorer utility.

For accessing the file system, it offers a graphical user interface that allows users to access files, folders, or content stored on the computer. It presents multiple user interface items on the screen like the desktop and taskbar as it is also an element of the OS (operating system). The below screenshot is an example of a File Explorer Window in Windows 10.



History of File Explorer

In 1995, test versions of a shell refresh were released by Microsoft for the first time, which name was the Shell Technology Preview, and often referred to informally as "NewShell." The main objective of this update was to replace the 3.x Program Manager that was based upon the shell. The Cairo development group began to handle the entire program.

There were two public releases of the Shell Technology Preview, made available to MSDN and CompuServe users: May 26, 1995 and August 8, 1995. Both held Windows Explorer builds of 3.51.1053.1.

Examples that describe what can be done in File Explorer:

1) Search for a file or folder - On your computer, in the search tab, File Explorer allows you to find any file or folder.
2) Open a document - With the help of creating a My Documents folder, it is much simple to find your documents in Windows. To open the document, first, you are required to open the File Explorer and then open My Documents and double-click on the file that you want to open.
3) Open a programme - In the Start Screen or Start menu, almost all programs create a shortcut to open the programs that make it easy to open the program quickly. However, with the help of Explorer, you can also open a program.

Some other system tasks which can be performed by using Windows Explorer.

- Create a shortcut
- Change and view drives
- Rename a file
- Copy a file
- Move a file
- Delete a file

In Windows 10, the following sections are comprised in the initial File Explorer window:

- File Explorer ribbon: The ribbon feature includes buttons that are used to manage your files and folders on your computer, and it looks like the ribbon featured in Microsoft Office.
- Navigation Panel: It offers the users access to their storage devices, as well as their libraries of documents and images or other data. It also includes network devices and folders that are frequently used.
- Frequent folders: The Frequent folders feature allows the users to access folders that they have worked with recently.
    - Recent files section: It includes files and documents that you have opened recently.

Keyboard Shortcuts

❖ **Windows Shortcut**

F1:	Help
CTRL+ESC:	Open Start menu
ALT+TAB:	Switch between open programs
ALT+F4:	Quit program
SHIFT+DELETE:	Delete item permanently

❖ **Shortcut command by using Windows button**

Windows Logo+L:	Lock the computer
Windows Logo:	Start menu
Windows Logo+R:	Run dialog box
Windows Logo+M:	Minimize all
SHIFT+WindowsLogo+M:	Undo minimize all
Windows Logo+E:	Windows Explorer
Windows Logo+D:	Minimizes all open windows and displays the desktop

❖ **Internet Explorer Short cut:-**

CTRL+B	Open the organize favorites dialog box
CTRL+E	Open the Search Bar
CTRL+F	Start the find utility
CTRL+H	Open the History Bar
CTRL+I	Open the favorites Bar
CTRL+L	Open the Open dialog box
CTRL+N	Start another instance of the browser with same web address
CTRL+O	Open the open dialog box (same as CTRL+L)
CTRL+P	Open the Print dialog box
CTRL+R	Update the current Web Page
CTRL+W	Close the current Window
Ctrl + Mouse wheel	Zooms in and out of document.

To do this	Press
Go to "Tell me what you want to do"	Alt+Q
Open	Ctrl+O
Save	Ctrl+S
Close	Ctrl+W
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Select all	Ctrl+A
Bold	Ctrl+B
Italic	Ctrl+I
Underline	Ctrl+U
Decrease font size 1 point	Ctrl+[

Increase font size 1 point	Ctrl+]
Centre text	Ctrl+E
Left align text	Ctrl+L
Right align text	Ctrl+R
Justify align text	Ctrl+J
Cancel	Esc
Undo	Ctrl+Z
Re-do	Ctrl+Y
Zoom	Alt+W, Q, then tab in Zoom dialog box to the value you want.
Copy formatting from text.	Ctrl+Shift+C
Apply copied formatting to text.	Ctrl+Shift+V

Create and edit documents

To do this	Press
Split the document window.	Alt+Ctrl+S
Remove the document window split.	Alt+Shift+C or Alt+Ctrl+S
Save a document.	Ctrl+S

Delete text and graphics

To do this	Press
Delete one character to the left.	Backspace
Delete one word to the left.	Ctrl+Backspace
Delete one character to the right.	Delete
Delete one word to the right.	Ctrl+Delete
Cut selected text to the Office Clipboard.	Ctrl+X
Undo the last action.	Ctrl+Z
Cut to the Spike. (Spike is a feature that allows you to collect groups of text from different locations and paste them in another location).	Ctrl+F3

Find, replace and go to specific items in the document

To do this	Press
Open the search box in the **Navigation** task pane.	Ctrl+F
Replace text, specific formatting, and special items.	Ctrl+H
Go to a page, bookmark, footnote, table, comment, graphic, or other location.	Ctrl+G
Switch between the last four places that you have edited.	Alt+Ctrl+Z

Work with documents in different views

To do this	Press
Switch to Read Mode view	Alt+W, F
Switch to Print Layout view.	Alt+Ctrl+P
Switch to Outline view.	Alt+Ctrl+O
Switch to Draft view.	Alt+Ctrl+N

Change Paragraph Alignment

To do this	Press
Remove a paragraph indent from the left.	Ctrl+Shift+M
Create a hanging indent.	Ctrl+T
Reduce a hanging indent.	Ctrl+Shift+T
Remove paragraph formatting.	Ctrl+Q

Insert Special Characters

To insert this	Press
A field	Ctrl+F9
A line break	Shift+Enter
A page break	Ctrl+Enter
A column break	Ctrl+Shift+Enter
An em dash	Alt+Ctrl+Minus Sign (on the numeric keypad)
An en dash	Ctrl+Minus Sign (on the numeric keypad)
An optional hyphen	Ctrl+Hyphen
A nonbreaking hyphen	Ctrl+Shift+Hyphen
A nonbreaking space	Ctrl+Shift+Spacebar
The copyright symbol	Alt+Ctrl+C
The registered trademark symbol	Alt+Ctrl+R
The trademark symbol	Alt+Ctrl+T
An ellipsis	Alt+Ctrl+Period
A single opening quotation mark	Ctrl+`(single quotation mark), `(single quotation mark)
A single closing quotation mark	Ctrl+' (single quotation mark), ' (single quotation mark)
Double opening quotation marks	Ctrl+` (single quotation mark), Shift+' (single quotation mark)
Double closing quotation marks	Ctrl+' (single quotation mark), Shift+' (single quotation mark)
An AutoText entry	Enter (after you type the first few characters of the AutoText entry name and when the ScreenTip appears)

TCP	Transmission Control Protocol
FTP	File Transfer Protocol
TFTP	Trivial File Transfer Protocol
SFTP	Secure File Transfer Protocol
SMTP	Simple Mail Transfer Protocol
HTTP	Hyper Text Transfer Protocol
HTTPS	Hyper Text Transfer Protocol Secure
UDP	User Datagram Protocol
ARP	Address Resolution Protocol
Tel Net	Telecommunication Networking
POP3	Post Office Protocol Version3
BGP	Border Gateway Protocol
P2P	Point to Point Protocol
PPP	Peer to Peer Protocol
IP	Internet Protocol
SNMP	Simple Network Management Protocol
NTP	Network Time Protocol
SIP	Session Initiation Protocol
DHCP	Dynamic Host Configuration Protocol
IMAP4	Internet Message Access Protocol Version 4
RARP	Reverse Address Resolution Protocol
SSH	Secure Shell
MIME	Multipurpose Internet Mail Extension
SMIME	Secure MIME
ALGOL	Algorithmic Language
ANSI	American National Standard Institute
ATM	Asynchronous Transfer Mode
AS	Autonomous System
BASIC	Beginners All Purpose Symbolic Instruction Code
BIOS	Basic input Output System
BPS	bit Per Second
DNS	Domain Name Server
EDI	Electronic Data Interchange
URL	Uniform Resource Locator
GIF	Graphics Interchange Format
ASCII	American Standard Code for Information Interchange
ASP	Active Server Pages
BCC	Blind Carbon Copy
CC	Carbon copy
CAD	Computer Aided Design
CDMA	Code Division Multiple Access
GSM	Global System for Mobile Communication
CMOS	Complementary Metal Oxide Semi-Conductor
CMYK	Cyan Magenta Yellow Block
GPS	Global Positioning System

GUI	Graphical User Interface
HDMI	High Definition Multimedia Interface
GIGO	Garbage in Garbage Out
LIFO	Last In First Out
FIFO	First In First Out
PING	Packet Internet Gopher
HDD	Hard Disc Drive
NIC	Network Interface Controller/Cord
HDTV	High Definition Television
ISP	Internet Service Provider
JPEG	Joint Picture Expert Group
LCD	Liquid Crystal Display
LED	Light Emitting Diode
TFT	Thin Film Transistor
CRT	Cathode Ray Tube
MIDI	Musical Instrument Digital Interface
MPEG	Moving Picture Expert Group
PDA	Personal Digital Assistants
PDF	Portable Document Format
ARPANET	Advanced Research Projects Agency Network
SQL	Structured Query Language
USB	Universal Serial Bus
VIRUS	Vital Information Resource Under Siege
VOIP	Voice Over Internet Protocol
IVR	Interactive Voice Response
WIFI	Wireless fidelity
WIMAX	Worldwide Interoperability for Microwave Access
ADSL	Asymmetric Digital Subscriber Line
API	Application Program Interface
ARP	Address Resolution Protocol
RARP	Reverse ARP
ICANN	Internet Corporation of Assign Names & Numbers
DPI	Dots Per Inch
DSL	Digital Subscriber Line
FAT	File Allocation Table
MANET	Mobile Ad-Hoc Network
MIPS	Million Instruction Per Second
BIPS	Billion Instruction Per Second
TIPS	Trillion Instruction Per Second
NAT	Network Address Translation
IEEE	Institute of Electrical and Electronic Engineer
IMAP	Internet Message Access Protocol
ISDN	Integrated Servers Digital Network
ISO	International Standard Organization/ International Org for Standardization
DHTML	Dynamic Hyper Text Markup Language
MAC	Media Access Control
CAN	Campus Area Network
PAN	Personal Area Network

SAN	Storage Area Network
CNM	Circulatory Network Mode
IPV4	Internet Protocol Version 4
IPV6	Internet Protocol Version 6
DBMS	Data Base Management System
MODEM	Modulator Demodulator
RAM	Random Access Memory
ROM	Read Only Memory
SMPS	Switch Mode Power Supply
OMR	Optical Mark Reader / Recognition
OCR	Optical Character Reader / Recognition
BCR	Bar Code Reader
MICR	Magnetic Ink Character Reader / Recognition
PCB	Printer Circuit Board
SRAM	Static RAM
DRAM	Dynamic RAM
PROM	Programmable ROM
EPROM	Electrically PROM
EEPROM	Electrically Erasable PROM
HDD	Hard Disc Drive
FDD	Floppy Disc Drive
CD	Compact Disc
DVD	Digital Video/Versatile Disc
BRD	Blu Ray Disc
HVD	Holographic Versatile Disc
ACID	Atomicity Consistency Isolation Durability
WYSIWYG	What you see is what you get

GLOSSARY

A

- **Access time -** The amount of time it takes for requested information to be delivered from disks and memory.
- **Antivirus software -** A program designed to look for and destroy viruses that may infect the memory of a computer or files stored on a computer.
- **Artificial intelligence (AI) -** Computer systems that attempt to imitate human processes for analyzing and solving problems.
- **Accumulator -** A local storage area called a Register, in which the result of an arithmetic or logic operation is formed.

B

- **BIT -** It is basic unit of computers. It has two values 1 & 0 only.
- **BYTE -** Combination of 8 Bits.
- **Basic Input Output System (BIOS) -** Also known as ROM BIOS. It provides an abstraction layer for the hardware, i.e., a consistent way for application programs and operating system to interact with input/output devices.
- **Bug -** A software bug is an error, flaw, failure, or fault in a computer program or system produces an incorrect or unexpected result.
- **Bus -** A pathway along which electronic signals travel between the components of a computer system.

C

- **Cookie -** A packet of information that travels between a browser and the web server.
- **Crash -** Your computer or application no longer works correctly and so you "loose" all the work you've done since the last time you saved.
- **Command -** An instruction that causes a program or computer to perform a function.
- **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.
- **Clock Speed** - The speed of computer is measured in clock speed. High clock speed is synonymous with high processing capability. It is measured in Megahertz (MHz).
- **Column -** A vertical block of cells in a table or spreadsheet.

D

- **Delete -** To remove an item of data from a file or to remove a file from the disk.
- **Debugging -** Locating and eliminating defects in a program.
- **Desktop -** The electronic work area on a display screen.
- **Dots Per Inch (DPI) -** It is defined as the measure of the resolution of a printer and scanner, or monitor.
- **Domain Name -** A unique name that identifies a particular website and represents the name of the server where the web pages reside.

E

- **Edit -** To make certain changes in existing data.
- **Ethernet Card -** A network adapter that enables a computer to connect to an Ethernet.

F

- **Fax -** A shortened form of the word facsimile. A copy of a document transmitted electronically from one machine to another.
- **File transfer protocol (FTP) -** A set of guidelines or standards that establish the format in which files can be transmitted from one computer to another.
- **Firewall -** A security system usually consisting of hardware and software that prevents unauthorized persons from accessing certain parts of a program, database, or network.
- **Flash Memory** - It is a type of non-volatile computer storage chip that can be electrically erased and reprogrammed. It was developed by EEPROM.

G

- **Gateway -** A machine that links two networks using different protocols.
- **Gigabyte -** A measurement of the storage capacity of a device. One gigabyte represents 1024 megabytes.
- **Google –** search engine on the web.
- **Gopher -** A protocol used for locating and transferring information on the internet. It is an internet search tool that allows users to access textual information.
- **GUI -** Graphical User Interface uses icons and menus to carry out commands such as opening files, delete files, move files etc..
- **Graphic Interchange Format (GIF) -** A simple file format for pictures and photographs that are compressed so that they can be sent quickly.

H

- **Hard copy -** Text or graphics printed on paper; also called a printout.
- **Hard disk -** A rigid type of magnetic medium that can store large amounts of information.

- **Hyperlink -** An image or portion of text on a webpage which is linked to another webpage.
- **Hub-**A network device that connects multiple computers on a LAN so that they can communicate with another network and the internet.
- **Header -** Repetitive information that appears at the top (the head) of every page of a document.
- **Hypertext transfer protocol (HTTP) -** The protocol used on the World Wide Web that permits Web clients (Web browsers) to communicate with Web servers

I

- **Icons-**In a graphical user interface (GUI), a small, pictorial, on screen representation of an object, such as a document, program, folder or disk drive.
- **Instant messaging (IM) -** A chat program that lets people communicate over the Internet in real time.
- **Internet protocol (IP) address** - A unique set of numbers that identifies a computer over a network.
- **Internet service provider (ISP) -** An organization that provides access to the Internet for a fee.
- **Intranet -** A private network established by an organization for the exclusive use of its employees. Firewalls prevent outsiders from gaining access to an organization's intranet

J

- **JPEG -** Joint Photographic Experts Group. A format for storing complex graphics in compressed form.
- **Justification -** Aligning lines of text at the left margin, the right margin, both margins, and the centre. Text aligned at both margins is considered fully justified.

K

- **Keyboard -** The device used to enter information into a computer.
- **Kilobyte -** A measurement of the storage capacity of a device. One kilobyte represents 1024 bytes.

L

- **LAN -** A local area network (LAN) is a computer network that interconnects computers within a limited area such as a home, school, computer laboratory, or office building, using network media.
- **Laptop computer -** A portable computer. Also known as a notebook computer.
- **Landscape Orientation –** The positioning of the page so that the information is printed across the long dimension of the page.
- **Liveware -** It is a term to describe the human system, opposed to hardware or software in a computer.

M

- **Macro virus -** A type of virus that attaches itself to documents or word processing templates.
- **Malware -** Software that disrupts normal computer functions or sends a user's personal data without the user's authorization.
- **Memory -** The part of a computer that stores information.
- **MemoryCell -** A circuit in memory that represents a single bit of information.
- **Mass Storage -** Storage systems that provide access to hundreds of billions of bytes of stored data. They are often referred to as Archival Storage because of the very large volumes of historical or backup data they can store.
- **MIPS -** An acronym derived from millions of instructions per second. Used to measure the speed of a processor.
- **Morphing -** The transformation of one image into another image.
- **Mobile Commerce (m-Commerce) -** A form of e-commerce that has the ability to conduct monetary transactions via a mobile device such as a cell phone.

- **Mozilla -** a web browser and successor to Netscape Communicator.
- **Multitasking -** The ability of a computer to execute more than one program at a time.

N

- **NIBBLE -** Combination of four bits.
- **Network -** A system of interconnected computers.
  They are of three types i. e. LAN, MAN, WAN.
- **Network Interface Card (NI(c) -** This is a part of the computer that allows it to talk to other computers via a network protocol like TCP/IP.
- **Node -** A computer which is attached to the network. Each node has its own address on the network so that it can be uniquely identified and can communicate with other nodes on the same or different network.

O

- **Offline -** Refers to the state in which a computer is temporarily or permanently unable to communicate with another computer.
- **Online -** Refers to the state in which a computer is ready to communicate with other computers.
- **Open source software -** Software that makes the underlying source code available to all users at no charge.
- **Operating system (OS) -** Software that manages the internal functions and controls the operations of a computer.

P

- **Palmtop computer -** A portable computer smaller than a notebook (or laptop) computer that fits on the palm of your hand. Also called a handheld computer.
- **Password -** A user's secret identification code, required to access stored material. A procedure intended to prevent information from being accessed by unauthorized persons.
- **Piracy -** The illegal copying of software or other creative works.
- **Peripherals -** A connectable device that has an auxiliary function outside the permanent system configuration such as plotters, printers and graphic displays.
- **Phishing -** A type of computer fraud that tries to trick users into revealing their passwords and other confidential information.
- **Pixel -** A smallest picture element of a digital image. The smaller the pixels, the higher the resolution.
- **Port -** An electrical connection on the computer into which a cable can be plugged so that the computer can communicate with other devices such as printer or modem.
- **Protocol -** A set of rules and regulations that coordinates the exchange of information over the network.
- Portrait orientation - Positioning paper so that information is printed across the short dimension of the paper.

Q

- **Query -** An alternate pipe form of operating system, which handles data in the form of messages rather than bytes.
- **Qwerty -** It is one of the standard computer keyboard, with the character Q, W, E, R, T, Y on the top row of letters on the keyboard.

R

- **Response time -** The time a computer takes to execute a command.
- **Retrieve -** To call up information from memory or storage so that it can be processed in some way.
- **Record -** A collection of all the information pertaining to a particular subject.
- **Row -** A horizontal block of cells in a table or spreadsheet.

- **Resolution -** Measurement of the degree of sharpness of a displayed image. It is defined as number of pixels per square inch on a computer generated display.
- **Register -** A temporary storage unit for quick, direct accessibility of a small amount of data for processing.

S

- **Save As –** Give the file a name and/or store the file in a certain place.
- **Save -** Tell the computer to create a file on disk that has the information you've put into the document.
- **Scroll bar -** Allows you to move around through your document.
- **Shut down - To** quit all applications and turn off the computer.
- **Spam -** unwanted repetitious messages, such as unsolicited bulk e-mail.
- **Scanner -** An input device that can copy a printed page into a computer's memory, thus doing away with the need to type the copy.
- **Screen saver -** A program that changes the screen display while the user is away from the computer.
- **Server -** A computer that manages a shared resource and provides a set of shared user services to the clients.
- **Search Engine -** Software that searches, gathers and identifies information from a database based on an index, keywords or titles.
- **Spam -** Unwanted repetitious messages, such as unsolicited bulk e-mail.
- Soft copy - Information shown on the display screen.
- **Sort -** To arrange fields, records, or files in a predetermined sequence.
- Surfing the Net - Browsing through various Web sites on the Internet in search of interesting things.

T

- **Trash -** Place where you put files and folders that you want to delete or get rid of.
- **Topology -** The structure of the network, including physical connections such as wiring schemes and logical interactions between network devices.
- **Track -** A ring on a disk where data can be written.
- **Telnet -** A protocol for remote computing on the internet that allows a computer to act as a remote terminal on another machine, anywhere on the internet.
- **Touchpad -** The device on a laptop computer that takes the place of a mouse.
- **Touch screen technology -** The technology that permits a user to perform a function simply by touching the screen on an appropriate spot.

U

- **Uninterrupted Power Supply (UPS) -** A Battery powered backup system that provides enough electricity to a computer during a power outage so that a user can save files before shutting down the computer.
- **Universal Serial Bus (USB) -** A common standard for connecting multiple peripherals to a computer as needed.
- **Upload -** To transfer information from a client computer to a host computer.

V

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

W

- **WAP -** Wireless Application Protocol is a specification for a set of communication protocol used to allow wireless devices to access the internet and other utilities.
- **Web browser -** Software that permits a user with a click of a mouse to locate, display, and download text, video, audio, and graphics stored in a host computer on the Web.
  The most common Web browsers now in use are Internet Explorer, Google Chrome and Mozilla Firefox.

- **Web site -** One or more related pages created by an individual or an organization and posted on the World Wide Web.
- **Wi-Fi (Wireless fidelity) -** A process that permits high-speed wireless transmission of data.
- **Word processing -** The electronic process of creating, formatting, editing, proofreading, and printing documents.
- **Workstation -** A desktop computer that runs applications and serves as an access point in a local area network.

Z

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

BACKUP DEVICE

What is Backup?

Having a backup these days is mandatory for any organization concerned with their information and data. A file backup is a copy of a file that is stored in a separate location from the original. Backing up is making copies of data which may be used to restore the original after a data loss event. This new copy of data is the Backup. You can have multiple backups of a file if you want to track changes to the file.

Why we Backup?

There are many reasons why your organization may want to back up their data. The primary reason is to recover data after its loss. The loss can occur by accidental deletion, a virus attack, or a software or hardware failure. If any of those things occur and your files are backed up, you can easily restore those files. Preventing events that result in loss of data is most desired, but backing up data provides the protection for data after a system failure. Individual computers being backed up are different than servers being backed up. Individual computer users can back up their own information when desired and using methods they desire, whereas data on organization servers need more formal backup procedures. Backups are ALWAYS necessary. In the event that your computer system fails, it is important to have a good copy of your data saved.

Backup Steps:
The Basics
1. Find the files that you want to backup (documents, spreadsheets, databases, etc.)
2. Copy the files to backup media (USB Drive, external drive, cloud storage drive, etc.)
3. Repeat above at scheduled frequency Note: this is a rudimentary level of backup. Ideally, you should keep your files organized in folders for easy identification of files needing backup.

Backup Considerations Method:

There are multiple methods of storing backup data. Some methods are described in the Methods of Backups section.

What to Backup:

There is a wide range of information that can be backed up. Files that are stored can be backed up on desktops, notebooks, laptops, and servers. In addition, data managed by applications you use such as email programs, client intake programs, homeless shelter programs, QuickBooks, and other programs should also be backed up. An organization should discuss which information is most important. It is important that organization information be backed up whether it resides in the office, and/or on any home computers that people may be working on for office work.

Frequency:

Backups must occur regularly in order to prevent data loss. The more scheduled backups that take place the better off your organization. Frequent backups take time, money, and resources but the benefits outweigh these negatives. See Backup Frequency section. Examples of backup frequency are given in the Example of a Backup Schedule section

Storage Location:

It is a good practice to keep some backup information offsite. In the event that a natural disaster occurs, your backup will mean nothing if it got destroyed with all the computers and the building.

Security:

Whether the backup data is onsite or offsite, you will want to ensure the backup information is secure and accessible only by those authorized to use it to restore lost data. See Security Considerations section.

Retention:
The amount of history to be saved is another thing to consider. Depending on the nature of your business, you may want to keep backups that are years, months, weeks, or even just a day old. Keep in mind that the more backups you wish to save, the more space you will need to have (increased cost).

- **Backup Devices**

You can setup regular backups of data in-house (locally), or via an external service (vendor).

Locally-Managed Backups
Many Windows operating systems such as XP and Windows 7 include Backup utilities for setting up regular backups of important files. There are also software packages (free and purchased) that can be used to backup data. In either case, wizards typically guide you through the process of setting up your backup, and include things such as designating the destination device for your backups (see options below), choosing the folders/files to be backed up, and specifying the frequency of backup. Keep in mind that if you use any of the non-cloud-based destination options for your backup data, it is advisable to keep a copy of the backup device contents in a secured location separate from the office.

Backup Destination Options

Flash storage or USB drives are forms of storage in which data can be easily erased or edited. The most common form of flash storage is the flash drive. This should be used if your organization needs a cheap, physical, and portable storage. While these may be extremely portable, it is also very easy to lose these drives. It is best to always keep track of the physical location of all external storage devices.

CD/DVD is an easy and inexpensive way to backup up data. CD/DVD storage is known as disc storage. This type of storage is digitally recording the data onto the disc. The main problem with this form of storage is size. Often times these discs are limited to megabytes and often times organizational data will exceed that. But disc storage is great for limited amounts of data or data that may have to go to multiple places. The cost of a CD usually goes for only about $.18 cents per disc.

External hard drive allows for the backing up of larger amounts of data than CDs, DVDs, and flash drives. An external hard drive device is physically separated from the computer itself, and is also portable. It operates in a similar way that flash drives do, but allows for the storing of larger amounts of data.

Cloud storage is a service model in which data is stored remotely and made available to users over a network (typically the Internet). It enables you to store your files online with the ability to access and share them from any computer connected to the internet. The files are kept on an external server, and the hosting company makes them available to you online. It offers great convenience, but security and cost are potential concerns.
Many cloud storage options (such as Dropbox, SkyDrive, Google Drive, etc.) work by staying synced with a dedicated folder on your hard drive. Therefore, ensure your backup routine includes that special folder and you will be able to access your cloud storage files in the event of internet outage or other disaster.
Below is a list of some popular cloud storage options. Most services are free up to a certain number of gigabytes. After that, prices vary by the number of gigabytes stored.
Dropbox
Amazon Cloud
SugarSync
SkyDrive

Vendor-Managed Backups
A backup service is another option where you pay companies that specialize in performing backups for you. Your data is stored on servers they own.
Restoring data from a backup service is significantly slower than a local backup since your data is in another location. Also, costs of this service and security of your data must be considered when choosing this option.

Considerations when using a Backup Service

Before storing any files on someone else's server, make sure that the hosting organization is legitimate. Do they really host files? Do they have a reputable name? Also it is important to make sure the organization is trustworthy. Are the files only available to you? Or are they available to everyone? Last is the organization reliable. In the event of a catastrophe, will the backed-up files be available to you? Are their servers ever down?

Security Considerations for Backup Data

Security attacks — whether in the form of malicious Internet content, theft of physical devices, login violations, or denials of service (meaning others are prevented from accessing your site) — can catch nonprofits off-guard, especially smaller and mid-sized organizations that may be unaware of possible threats, and unprepared to deal with them once they occur.

Yet data leakage to the public, systems down-time, and reputation loss resulting from such security violations can easily turn away new and existing constituents if such situations are not handled appropriately and quickly. This may, in turn, impact on the organization's reputation and future opportunities for growth.

A computer virus outbreak or a network breach can cost an organization thousands of dollars. In some cases, it may even lead to legal liability and lawsuits. Because of these risks, you should ensure your backup data is protected against unauthorized access.

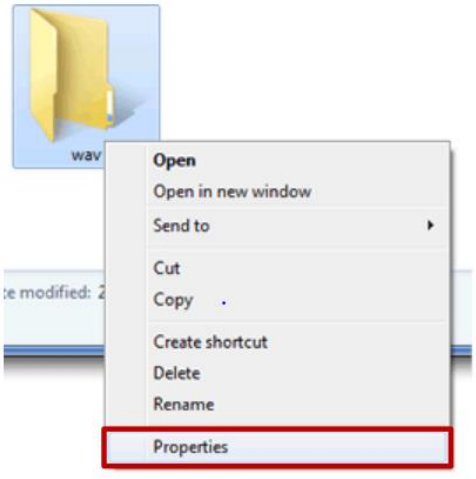
It is important to carefully examine any contracts with the off-site backup provider. This is because another entity will have the actual possession of some of the most valuable assets to your organization. This is why it is mandatory that your organization seek audit rights, and assurance that the company's hiring procedures include thorough background checks. Your organization must to everything in its power to ensure the safety of all assets.
It is also important to make sure that your organization uses locked containers to transport and valuable assets or information such as backup data. Locks will discourage some threats and also prevent another customer from inadvertently loading your information onto their own system.

Encryption of data is the process of transforming information to make it unreadable to anyone except those possessing special knowledge. Encryption must take place with any valuable information, including sensitive information in backup data. Not every piece of information should be available to and easily readable by the public. Some data is sensitive and should be protected for safety and privacy reasons.
In order to use encrypted data later on (e.g., if you need to use your encrypted backup data to restore your system after a failure), the data must be decrypted. Decryption is the process of restoring encrypted data to a readable format. Some steps for encrypting and decrypting data are below.

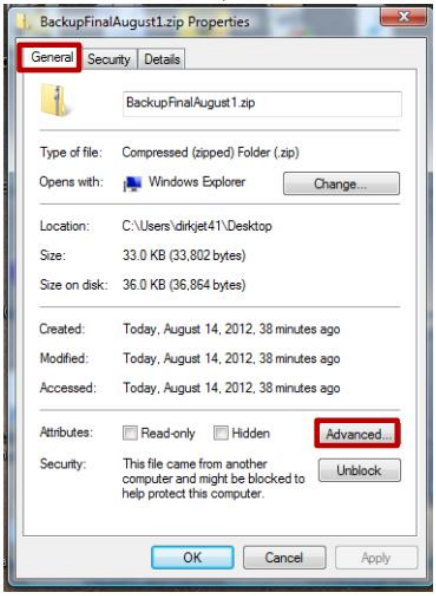
Steps to Encrypt a file or folder

These instructions are for Windows XP, Vista, Windows 7 Professional, Windows 7 Ultimate, or Windows 7 Enterprise.

1. Right-click the folder or file you want to encrypt, and then click Properties.

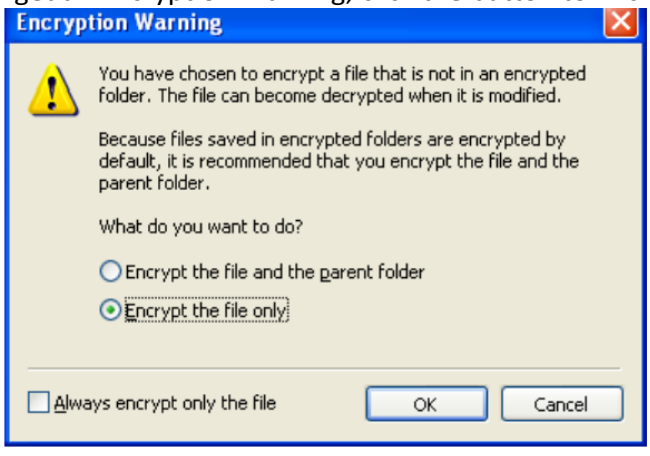


2. Click the General tab, and then click Advanced.



3. Select the Encrypt contents to secure data check box, and then click OK, and click OK again to exit the Properties window.

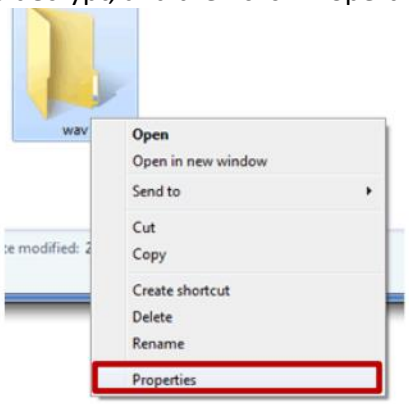
4. If you are encrypting a file and get an Encryption Warning, click the button to Encrypt the file only, then click OK.



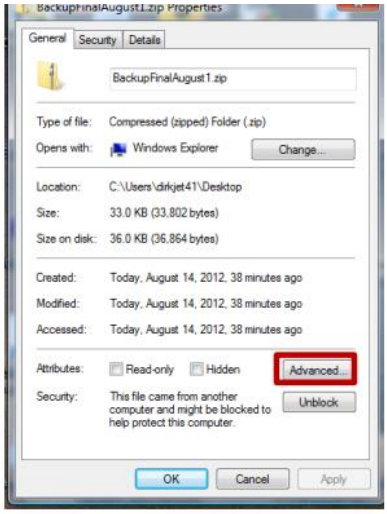
Note: The first time you encrypt a folder or file, you should back up your encryption certificate. The encryption certificate is the "key" that is used if you ever need to decrypt (i.e., use or read) encrypted data again. If your certificate is lost or damaged and you do not have a backup, you won't be able to use the files that you have encrypted.

Steps to decrypt a file or folder

1. Right-click the folder or file you want to decrypt, and then click Properties.



2. Click the General tab, and then click Advanced.



3. Click the Encrypt contents to secure data check box to remove the check mark that was previously there, and then click OK, and click OK again to exit the Properties window.

Backup Frequency

How often you back up your data depends on the number of files or records you create and how often you create them. If you create new files or records every day, you might want to schedule backups weekly or even daily. If you occasionally create many files—for example, if you save a lot of digital photos from a fundraising event, back them up right away and then you may not need to back them up again.

MS WINDOWS

Windows

Operating System is a system software. Operating system is the software that manages all the computer's resource. Operating system performs basic tasks, such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk and controlling the peripheral devices. In another word we can say, it provides interface between hardware and software. There are so many operating systems available like WIN 95, 98, 2000, XP, Vista, Win 7, WIN NT. There are two types of platform available on which operating system works i.e. GUI and CUI.

CUI- (Character User Interface):- In CUI, to execute anything we need to use command. Without command not any action will perform on the screen. For GUI, only keyboard is required. E.g DOS

GUI:- (Graphical User Interface):- A program interface that takes advantage of the computer's graphics capabilities to make the program easier to use. .A graphical user interface (GUI) is a human-computer interface that uses windows, icons and menus and which can be manipulated by a mouse and a keyboard as well. An icon is a small picture or symbol in a GUI that represents a program, a file, a directory or a device. Icons are used both on the desktop and within application programs. Commands are issued in the GUI by using a mouse, trackball or touchpad to first move a pointer on the screen to, or on top of, the icon, menu item or window of interest in order to select that object. for example, icons and windows can be moved by dragging and objects or programs can be opened by clicking on their icons.

User Interface:- User Interface is one, which allow user to communicate with the system in order to perform certain tasks. User interface is generally designed in a computer to make it easier to use.

History:- Bill Gates announced Microsoft Windows in Nov 10,1983. In Nov 20, 1985 announced Microsoft Windows 1.0. Microsoft released latest window, Windows 7 in Oct 22, 2009.

Microsoft announced development of its first operating system that incorporated a GUI in November 1983, and the initial version, Windows 1.0, was released in November 1985. Windows 2.0, released in December 1987, represented a improvement over the Windows 1.0 with its addition of icons and overlapping windows, but in 1995 with the launching of Windows 95 that Microsoft was able to offer a relatively high quality GUI.

The Apple Macintosh, launched in 1984, was the first commercially successful use of a GUI. The Macintosh introduced the first menu, icons, and point-and-click, mouse driven processing.

Advantages of GUIs

An advantage of GUIs is that they make computer operation more effective and friendly so it is easier to learn and use. It is much easier for a new user to move a file from one directory to another by dragging its icon with the mouse

GUI feature the following basic components:-

- **Pointer:–** A symbol that appears as a small arrow on the display screen and that you move to select objects and commands.
- **Pointing device:–** A device, such as a mouse or trackball, that enables you to select objects on the display screen.
- **Icons:–** Small pictures that represent commands, files, or windows. By moving the pointer to the icon and pressing a mouse button, you can execute a command or convert the icon into a window.

- **Desktop:–** The area on the display screen where icons are grouped is often referred to as the desktop because the icons are intended to represent real objects on a real desktop.
- **Windows:–** You can divide the screen into different areas. In each window, you can run a different program or display a different file.
- **Menus:–** Most graphical user interfaces let you execute commands by selecting a choice from a menu.
- **Microsoft Windows Basic:-** Windows XP, 2000, 98, NT, ME... all of these are windows operating systems.
- **The Desktop:–** The Microsoft Windows desktop is made of various parts. From the upper left to the lower left side of the screen, there are small pictures or images called icons. Each one is used to make the computer do something. Here is an example:

The TaskBar:- In the bottom section of the screen, there is a long object on which you can find START button. It is called Taskbar. It was first introduced with Win 95 and now it is a part of every Windows operating system.

On the left side of the taskbar, there is an object labelled Start  or  . In some versions (Windows 95, 98, Windows Server 2003), the color of the taskbar may be gray (or Silver). In some other versions like Windows Me, the taskbar may be yellowish. In Windows XP, it may be blue. In Windows 7, you can find transparent or with color.

Operation on Windows Screen

We can start operating windows by clicking on START button or, icons available on screen. When we click on start button we can find the screen shown below: -

Screen of WIN 7

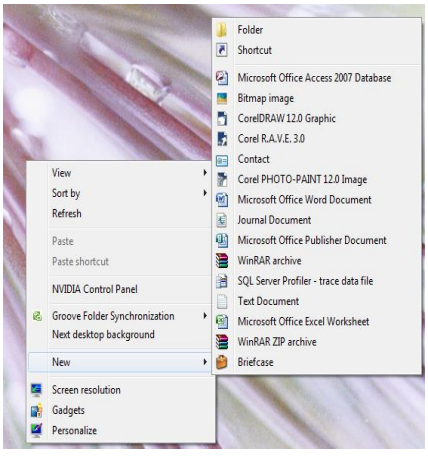
- **All Program:-** After clicking on START button, you can click on All Program to work on desired software or program.
- **Control Panel:-** You can use control panel to change system setting, adding hardware and software, controlling user accounts etc.

Important Icon on Desktop:-

Some important Icons on desktop are given below:-

- **My Computer:-** This is one of the important icon available on your desktop screen which allows user to access drives, printers, control panel etc.
- **Recycle Bin:** When we delete the file or folder, it goes into the Recycle bin. If we delete any file by mistake then we can find it in Recycle bin and we can restore it to its original place. If you want to delete permanently then clear the recycle bin. Recycle bin uses the space of hard disk.
- **My Network Place :** It shows all network connection, which you can use to connect your computer system.
- **My Documents :** This is available on the start menu , if you want to use it for fast access then you can create shortcut and place it on desktop. It is a location for storing all documents like text file, word wife, spreadsheet etc.

The Icon and Shortcuts:- The icons and shortcuts are small images situated on the desktop of Windows. Like buttons, icons have the objective of immediately executing a given program. To start the related application simply double-click with the left mouse button.



To Organise Desktop Icons:-

- Click on the desktop with the right button of the mouse.
- Select on the menu Arrange Icons By.
- As the menu is displayed you can chose to organize them by Name, Size, item type or date modified.
- If you click on view option you will find the option of auto arrange, show desktop icon, large icons, medium icons etc in Win 7

To Create Shortcut:-

- Click on the desktop with the right button click of the mouse.
- Select the option Shortcut on the New menu. A dialog box will appear so that we can indicate the progra3m for which we want the shortcut created.
- Click on Browse button, to find the program.
- Select the desired unit and look for the file or folder you want.
- After selecting the file or folder click on Ok.
- Click Next.
- Type a name for the Shortcut.
- Click Finish.

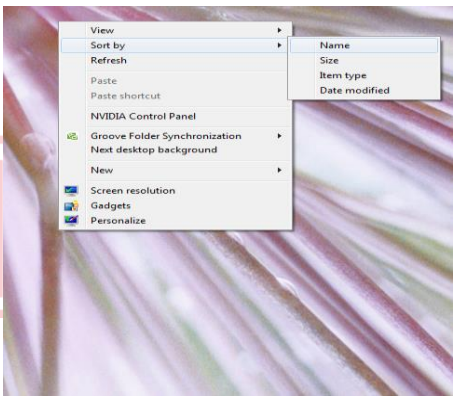
To change the Date and Time

- Double-click on the clock on the task bar to open the dialog box.
  To change the day month, year then click on change date and time setting to change it.
- After clicking on change date and time you will get another window to change date and time, and here you have to change according to your choice
- After changing date and time click on OK.

Accessories program on Windows: - In Accessories, there are so many small program for user. To open accessories use the following step:-

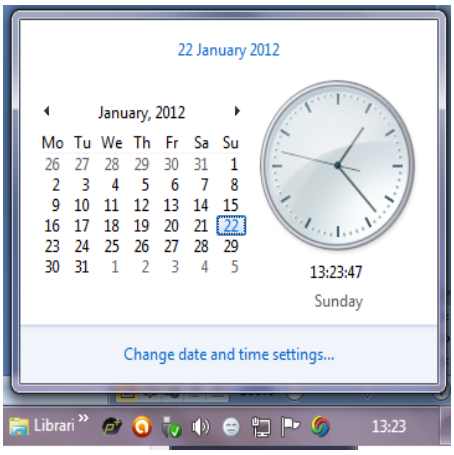
❖ Click on start button → All programs→ and then click on Accessories.

- **Calculator:-** We can use calculator to perform addition, subtraction and other mathematical operation. You can also use advance capabilities of scientific and statistical calculator.
- **Command Prompt:-** Command prompt is used to open DOS.
- **NotePad:-**NotePad is a most commonly used to edit text or rea text on your system. The extension name of NotePad is .txt
- **RUN dialogue Box:-** It is a powerful feature of operating system. RUN option is used to open any file or folder directly. The shortcut to open RUN dialogue box then press win button + R.
- **Sound Recorder:-** Sound Recorder is to record the sound of user. To open sound recorder

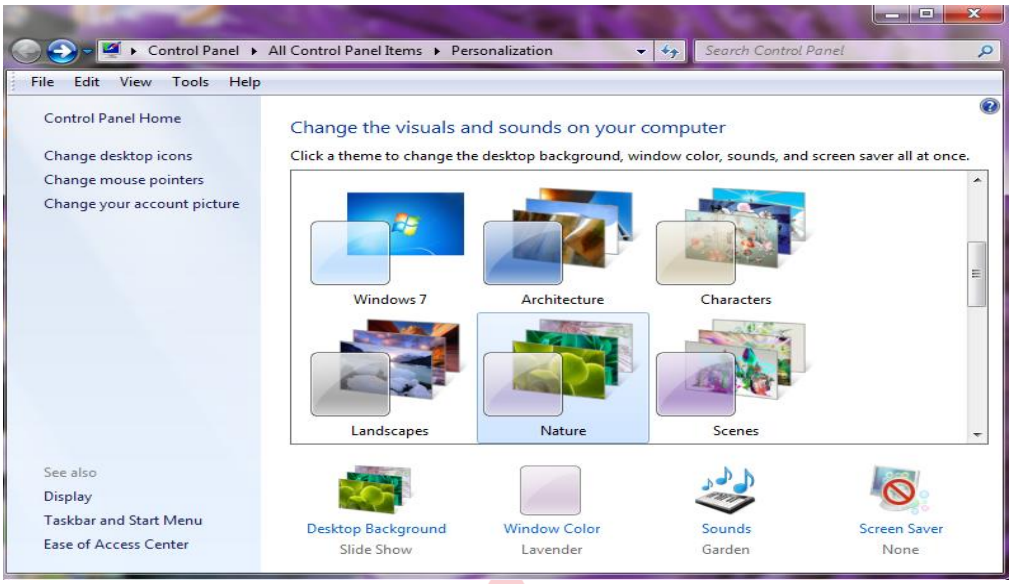


❖ Click on Start button→all programs→Accessories→sound recorder

- **Window Explorer:-** The quickest way to start up the Explorer is through the icon on the task bar or desktop. It is a necessary tools in an windows operating system. The explorer consists basically of two sections. On the left side there is the directory tree, which is the list of units and folders. Only units and folders appear, no files. On the right side there is another section, which will show the content of the folder that we have opened on the left section. This section shows its folders and files.

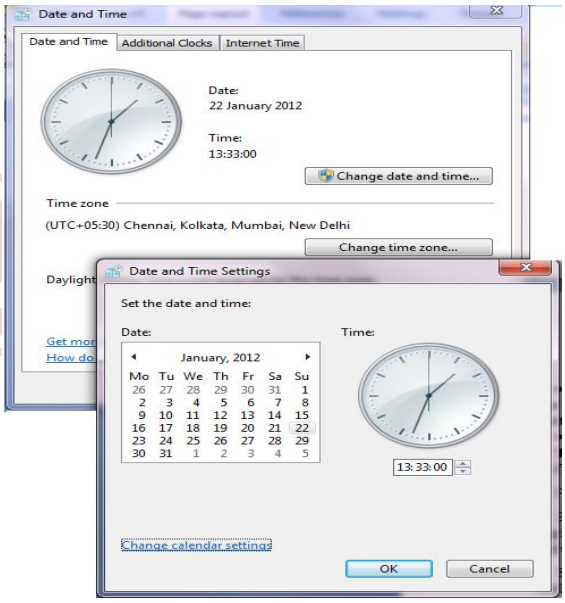


Click on Start→Select All programs→SelectAccessories→Select Windows Explorer



On Windows XP Click right mouse button on the desktop and select the option Properties from the shortcut menu. The Display properties window will appear.

- **Parts of Windows:** All the windows have the same basic parts. To open any application on window that have toolbar, maximize, minimize button, close button, scrollbar boarders and corners.
  - **Toolbar:-** In Toolbar it displays the name of the documents and program.
  - **Maximize, minimize button, and close button:-** These buttons hide the window, enlarge the window and close the windows.
  - **Menu Bar:-** It contains the item that you click to make choice.
  - **Scroll Bar:-** Scrolls bar scroll the contents of the windows.



- **Moving a Window:-** To move a window , point to the file and folder with the mouse pointer and then drag the window to the desired location.
- **Changing the size of the window:-**
  - To make a window fill the entire screen click on maximize button or double click on windows icon.
  - To return a maximized window to its former size click on restore button.

- To Resize the window point to any the windows's borders or corners.
  A window that is maximized cannot be resized. You have to restore it to its previous size first. Shortcut of the maximize the current windows then press Ctrl +f10.
- **Hiding a window:-** Hiding of your current window is know is minimizing the windows. If you want to hide the window without closing it then minimize it by clicking on minimize button. The short cut of minimizing window is to press window button +M
- **Closing a Window:-** Closing a window means removing it from the desktop . If you have completed your work on the document then you can click you close button to remove it from the desktop. You can use the shortcut command also by pressing on Alt+F4

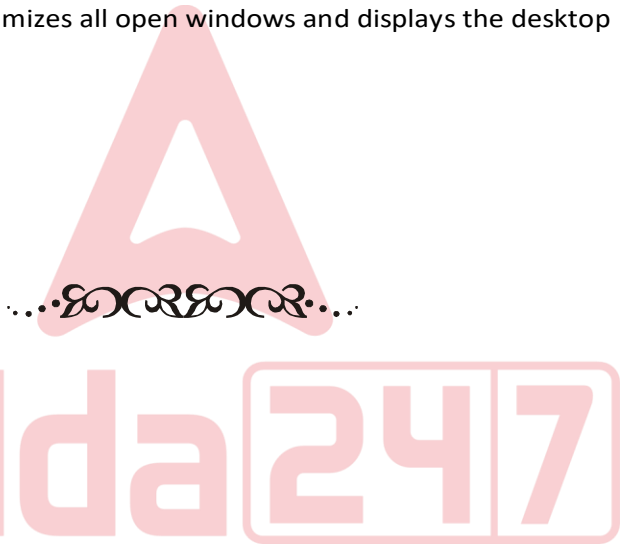
Switching between windows:- If you have open more than one program or document on your desktop then you can use ALT + TAB to switch between opened program.
Computer shutdown:- After using the computer, you can exit from it, which is to as shutting down the computer.

❖ **Windows Shortcut**

F1:	Help
CTRL+ESC:	Open Start menu
ALT+TAB:	Switch between open programs
ALT+F4:	Quit program
SHIFT+DELETE:	Delete item permanently

❖ **Shortcut command by using Windows button**

Windows Logo+L:	Lock the computer
Windows Logo:	Start menu
Windows Logo+R:	Run dialog box
Windows Logo+M:	Minimize all
SHIFT+WindowsLogo+M:	Undo minimize all
Windows Logo+E:	Windows Explorer
Windows Logo+D:	Minimizes all open windows and displays the desktop



CHAPTE – 02

WORKING WITH INTERNET AND E-MAIL

WEB BROWSING AND SEARCHING

Web Browsing and Searching –

What is a Browser?

A software program that is used to explore, retrieve, and display the information available on the World Wide Web is called a browser.

A browser is a client program as it runs on a user's computer or mobile device and contacts the webserver for the information requested by the user. The web server sends the data back to the browser that displays the results on internet-supported devices. On behalf of the users, the browser sends requests to web servers all over the internet by using HTTP (Hypertext Transfer Protocol).

A browser requires a smartphone, computer, or tablet and the internet to work.

The purpose of a web browser is to fetch content from the Web or from a local storage device and display it on a user's device.

The history of Web Browser-

- The first web browser, called World Wide Web, was created in 1990 by Sir Tim Berners-Lee. Later, it was renamed Nexus to avoid confusion caused by the actual World Wide Web.
- The Lynx browser was a text-based browser, which was invented in 1992. It was not able to display the graphical content.
- Although, the first graphical user interface browser was NCSA Mosaic. It was the first most popular browser in the world, which was introduced in 1993.
- In 1994, there were some improvements occurred in Mosaic and came to Netscape Navigator.
- In 1995, Microsoft introduced the Internet Explorer It was the first web browser developed by Microsoft.
- A research project started on Opera in 1994. Later, it was publicly introduced in 1996.
- Apple's Safari browser was introduced in 2003. It was specifically released for Macintosh computers.
- In 2004, Mozilla introduced Firefox as Netscape Navigator.
- In 2007, a browser Mobile Safari was released as Apple mobile web browser.
- The popular browser Google Chrome was launched in 2008.
- The fast-growing mobile-based browser Opera Mini was released in 2011.
- The Microsoft Edge browser was launched in 2015.

The web browser has various features, some of them are:

- Home Button
- Zoom
- Address Bar
- Print
- Refresh Button
- Bookmarks

- Download
- History
- Tabbed Browsing

The Web Browser works through some components which are:

- **HTML -** HTML (Hypertext Markup Language) code that describes how content should be displayed on the screen, in your case it would be displaying your website's content.
- **JavaScript** - JavaScript that helps you interact with the elements on your webpage by using event handlers such as clicking an image or link to make it open in another tab, opening another window or navigating to a new page, etc.
- **CSS** - CSS (Cascading Style Sheets) is used for styling different types of websites and for adding colors and fonts to text or images on a webpage. For example, changing font color, size, and style depending on whether it is bold, italicized, or underlined, etc.
- **Images/GIFs** - this contains all the pictures from your website as well as any other files like videos/music you want to display on your site e.g photos taken by customers during their visit to the shop which can be viewed by customers after logging into their account on my website using social media platforms like Facebook and Twitter.

Search Engines-

It is software accessed on the Internet that searches a database of information according to the user's query. The engine provides a list of results that best match what the user is trying to find.

For users, a search engine is accessed through a browser on their computer, smartphone, tablet, or another device. Most new browsers use an Omnibox, which is a text box at the top of the browser. The Omnibox allows users to type in a URL or a search query. You can also visit one of the major search engines' home page to perform a search.

E-Banking

E-Banking –

Electronic Banking which is also known as e-banking is an arrangement between a bank or a financial institution and its customers that enables encrypted transactions over the internet.

E-banking has various types that cater to customers' different requirements, which can be resolved online.

E-banking is also helpful for non-financial transactions such as changing your ATM PIN, getting a mini statement, updating your personal details, balance inquiry, or printing an account statement.

Essentially, it refers to any transaction that doesn't involve any movement of funds to or from your account.

Types of E-banking –

- **Mobile and Internet banking** - Any transaction – financial or non-financial – that you make over through a web page (generally the bank's website) or a web application constitutes internet banking.
- **Credit and debit cards** - Credit and debit cards are also a form of E-banking. Debit cards help you withdraw cash from ATMs and POS (Point of Scale) machines. While credit cards allow customers to borrow funds up to a pre-approved limit and help them avail a range of offers.
- **ATMs** - An ATM, which stands for automated teller machine, is a specialized computer that makes it convenient to manage a bank account holder's funds. ATM was the first E-banking service provided by banks when they started going digital. An ATM makes the process of withdrawing and depositing money convenient.
- **Electronic Fund Transfer (EFT)** - Electronic funds transfer is the electronic transfer of money from one bank account to another, either within a single financial institution or across multiple institutions, via computer-based systems, without the direct intervention of bank staff. Some examples of EFT are National Electronic Funds Transfer (NEFT), Immediate Payment Service (IMPS) and Real-Time Gross Settlement (RTGS).
- **Electronic Data Interchange (EDI)** - EDI is a technology that is restricted to business transactions. It is used to improve operational efficiency and reduce transaction costs across a supply chain consisting of manufacturers, suppliers, logistics providers, retailers, and wholesalers, etc. EDI has succeeded in making transactions across businesses paperless and seamless.

DIFFERENT TYPES OF ONLINE FINANCIAL TRANSACTIONS ARE

National Electronic Fund Transfer (NEFT) –

National Electronic Funds Transfer (NEFT) is a nation-wide payment system facilitating one-to-one funds transfer. Under this Scheme, individuals, firms and corporates can electronically transfer funds from any bank branch to any individual, firm or corporate having an account with any other bank branch in the country participating in the Scheme.

Individuals who do not have a bank account (walk-in customers) can also deposit cash at the NEFT-enabled branches with instructions to transfer funds using NEFT. However, such cash remittances will be restricted to a maximum of Rs.50,000/- per transaction.

Real Time Gross Settlement (RTGS) –

RTGS is defined as the continuous (real-time) settlement of funds transfers individually on an order-by-order basis. The RTGS system is primarily meant for large-value transactions. The minimum amount to be remitted through RTGS is 2 lakh. There is no upper ceiling for RTGS transactions.

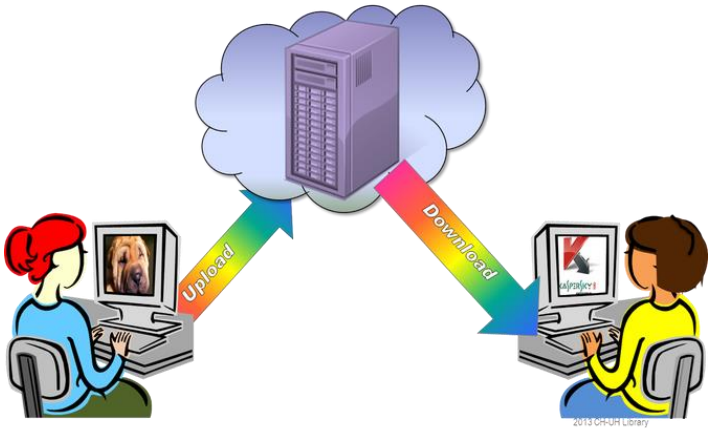
Immediate Payment Service (IMPS) –

Immediate Payment Service is an instant payment inter-bank electronic funds transfer system in India. IMPS offers an interbank electronic fund transfer service through mobile phones. The service is available 24x7 throughout the year including bank holidays.

Electronic Clearing System (ECS) –

Electronic clearing system provides faster method of effecting periodic and repetitive payments by 'direct debit' to customers' accounts (duly authorised) thereby minimising paper transactions and increasing customer satisfaction. Electronic Clearing Service (Debit) envisages "a large number of debits and one credit" in the case of collection of electricity bills, telephone bills, loan instalments, insurance premia, Club fees, etc by the Utility Service Providers.

Downloading and Uploading



While exploring the Internet, you've probably encountered the terms **downloading** and **uploading**. **Downloading** means receiving data or a file from the Internet on your computer. **Uploading** means sending data or a file from your computer to somewhere on the Internet.

These terms describe activities you may have already learned how to do. If you've ever opened an example document in one of our tutorials, you've downloaded that file. If you've ever shared a photo you took on Facebook or another social media site, you've uploaded that photo.

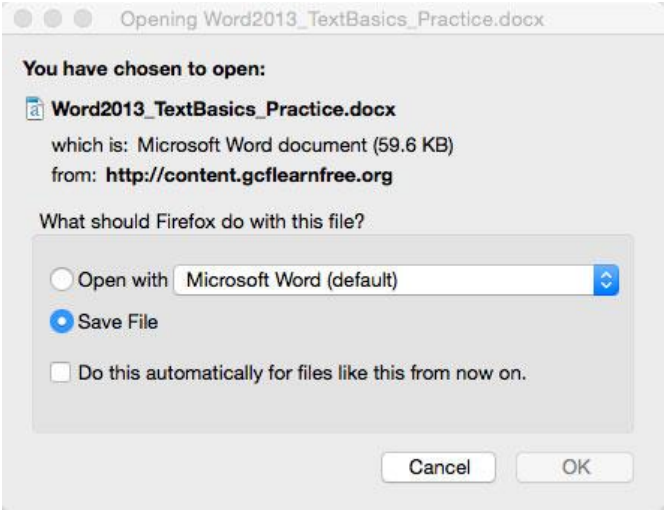
Downloading

Usually, when you download a file, you will start the download by clicking a link to that file. Many of our tutorials contain links to files, like this:

Download our Link https://s3.ap-south-1.amazonaws.com/www.careerpower.in/2021/17204.pdf

If you click the link, your browser should prompt you to select one of two methods for downloading the file.

- **Open with** will download the file and load it immediately in the specified program.
- **Save File** will download it and save it to your hard drive.



Either way, once you click OK, the download begins. Your browser will indicate the progress and time remaining on the download.

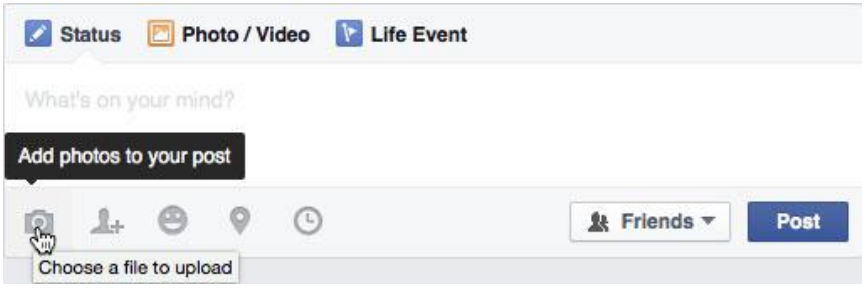
Once the download is complete, either the file will be saved to your computer or it will open in the program you selected. If you have trouble finding the file after you've downloaded it, check out our Finding Your Downloads lesson.

Some browsers don't always start this download process when you click the link to a file. In these cases, you can right-click the link, then click **Save Link As**, then select a location to download the file.

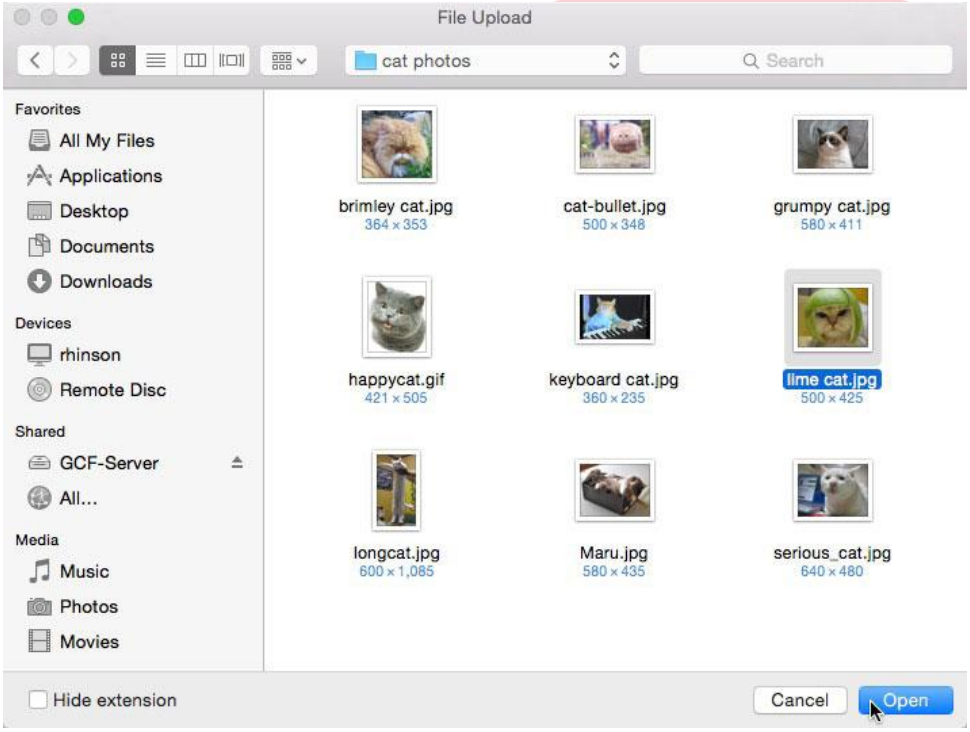
Uploading

If a site allows uploads, it will have an upload utility to help perform the file transfer. Each site handles this process differently, but we'll give some common examples. Usually, the site will have help pages to walk you through the upload process.

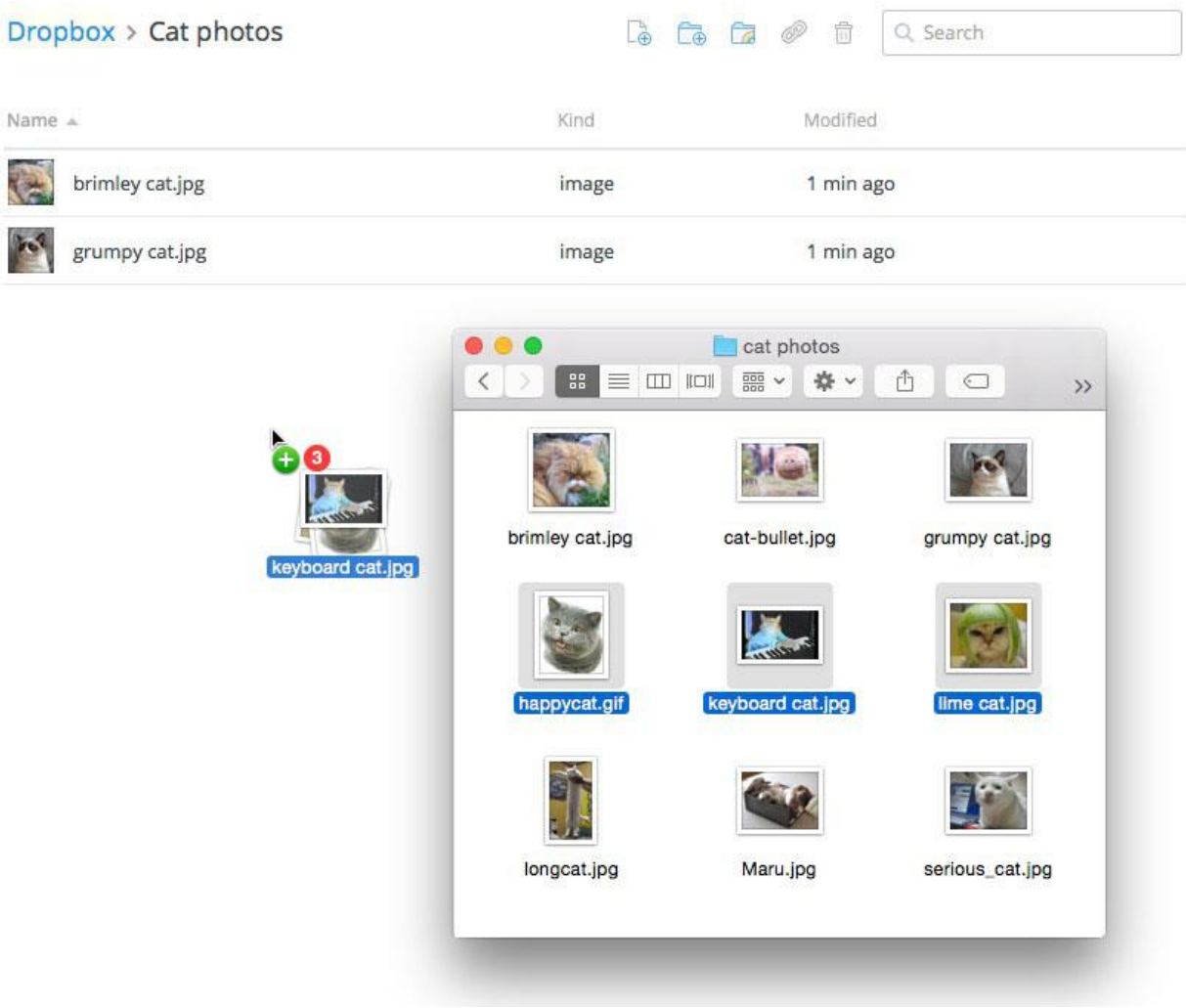
Many sites have an upload button that opens a dialog box. For example, Facebook has a camera icon that begins the upload process.



A dialog box will appear, prompting you to select a file. Browse to the location where your file is stored, select it, then click the Open button. Afterward, a progress bar tracking the upload process will appear on the page.



Some sites support a drag-and-drop interface. For example, when logged in to Dropbox you can drag the files from a folder on your computer and drop them into the browser window.



Many other upload utilities have similar features. A more detailed example of uploading a file is available in our google drive tutorial.

Managing an E-mail Account

E-Mail –

What is e-mail?

E-mail is a brief of Electronic Mail which is a communication method that uses electronic devices to deliver messages across computer networks. "Email" refers to both the delivery system and individual messages that are sent and received.

More about e-mail:

- Email is an electronic medium of exchanging digital messages and files over the Internet using electronic devices, such as computers, laptops, smartphones, etc.
- Almost every computing device comes with email systems by default, which can be activated by connecting to any email service platform. It operates across the Internet and provides a basic user interface, including a text editor, to create or compose new emails.
- Email is accessible across both local area networks and computer networks, primarily the Internet. The store-and-forward approach is the foundation of present-day email systems. Email servers receive, deliver, forward, and store emails.
- Users and their computers do not need to be online at the same time in order to send or receive messages; instead, they simply need to establish a connection to a mail server or webmail interface.
- Multipurpose Internet Mail Extensions (MIME) have allowed Internet email, which was once an ASCII text-only communication tool, to transport attachments with multimedia content and text in various character sets.
- While international email is standardized and uses UTF-8 for internationalized email addresses, it is not yet commonly used.

History of E-mail-

- Email has existed in some form since the 1970s when programmer Ray Tomlinson created a way to transmit messages between computer systems on the Advanced Research Projects Agency Network (ARPANET).
- On the ARPANET, the Simple Mail Transfer Protocol (SMTP) protocol was introduced in 1983.
- Email usage spread throughout the business, governmental, academic, and defense/military sectors in the 1980s and 1990s.
- Email usage started to spread to the general public in the mid-1990s with the introduction of webmail (email for the web era) and email clients.
- In the 2000s, email had been widely used. Instant access to emails is made possible by the rise in the use of smartphones since the 2010s.

What are the parts of an E-mail?

SMTP envelope - The SMTP "envelope" is the data communicated between servers during the email delivery process. It consists of the sender's email address and the recipient's email address. This envelope data tells the mail server where to send the message, just as a mail carrier references the address on an envelope in order to deliver a letter to the correct location.

Header - Like the SMTP envelope, the email header provides critical information about the sender and recipient. The header may also contain a number of optional fields that allow the recipient to reply to, forward, categorize, archive, or delete the email.

Body - The body of an email contains any information the sender wishes to send: text, images, links, videos, and/or other file attachments, provided that they do not exceed the email client's size restrictions.

Advantages of E-mail-

1. Email service is free to use.
2. Users can send and receive several emails.
3. Unlike traditional or physical mail systems, emails are very quick and deliver messages instantly.
4. Because of file attachment features, Email allows people to share images, audio, video, documents, etc. This helps elaborate the message correctly and also encourages the flow of information.
5. Emails can be stored for a long time digitally, and this helps to keep the records. Emails and attachments can be managed using email clients.

E-mail Management-

Email management involves the systematic control of the quality and quantity of electronic messages that are sent from within, and received by, an organization.

The vast quantities of emails held in inboxes, sent folders, and deleted items folders put the organization at risk and adversely impact the performance of email servers in the organization.

Without the management of emails, it is difficult for organizations to meet their legal preservation requirements in the event of litigation and government investigations, increasing the effort and cost in responding to eDiscovery and disclosure.

Ways to manage an E-mail account:

1. Make Frequently Checking Emails a Priority
2. Use Multiple Browsers When Checking Email Accounts
3. Forward Emails to a Master Account
4. Use a Desktop Email Client

   Create Folders and Filters for Your Multiple Email Accounts

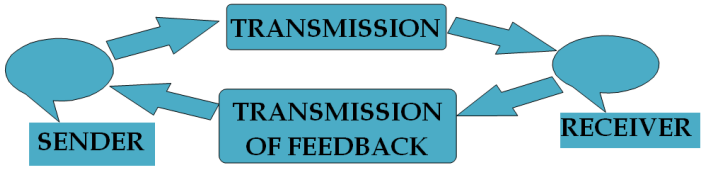
DATA COMMUNICATION

Data Communication are the exchange of data between two devices via some form of transmission medium such as wire cable. Communication can be defined as the exchange of information between one group or person and another group or person. This communication can be between people within the same organisation (internal communication) or with people or groups outside the organization (external communication).
The effectiveness of data communication system depends on four fundamental characteristics:- such as Delivery , accuracy, timeliness, and jitter.

- **Delivery:-** The system must deliver data to the correct destination. Data must be received by user and only by the device.
- **Accuracy:-** The system must deliver the data accurately.
- **Timeliness:-** The system must deliver data in a timely manner. Data delivered late are useless.
- **Jitter:-** Jitter refer to the variation in the packet arrival time.

In Data communication there are 4 basic Terms:- Data, Signal, Signalling ad Transmission are frequently used.

- **Data:-** Data are entities that convey meaning. Data are representation of something whereas information refer to the content or interpretation of data.
- **Signals:-** Signals are electric or electromagnetic encoding of data.
- **Signalling:-**Signalling is propagation of signal along suitable communication medium.
- **Transmission:-** Transmission is communication of data achieved by the proposition and processing of signals.
- **Components:-** A data communication system has five components.
- **Message:-** The message is the information to be communicated. Information include text, numbers, pictures audio and video.
- **Sender:-** The sender is the device that sends the data message. It can be a computer, workstation, telephone, video camera etc.



- **Receiver:-** The receiver is the device that receives the message. It can be a computer, workstation, telephone, video camera etc.
- **Transmission medium:-** Transmission medium is the physical path by which a message travels from sender and to receiver. Example are twisted pair cable, fiber-optic etc.
- **Protocol:-** A protocol is a set of rules (written in the form of program) to perform specific task or action eg. Http, ftp etc.that govern data communication. It represents a agreement between the communicating devices.
- **Concept of Data Communication:-** The concept of data communication evolved from sharing the computation power of a computer along with various resources available in a computer environment such as printers, hard disk etc. Data communication can be used to transfer as exchange confirmation within one building, one city, across cities, countries and continents.
- **Data communication Code (Data encoding) -** Every character (letter, number, symbol) is composed of a group of bits called codes. The most widely used codes are the ASCII (American standards code for information interchange), EBCDIC (Extended Binary coded Decimal Interchange code.

	ASCII	EBCDIC
Controlling Authority	ANSI	IBM
Number of Bits	7	8
Number of characters	128	256

COMMUNICATION SPEED OR RATE

The speed at which two computers exchanges or transmit data is called communication rate on transmission speed. The unit of measurement of the speed is measured in bits per seconds (bps) or baud. Normal PC based communication transferred using 300 to Mbps whereas mainframe computers uses 19,200 baud.

Communication protocols/Standard:- Protocols is set of rules that perform specific task. In other words protocols are technical customs or guide-lines that govern the exchange of signal transmission and reception between equipments. Both hardware and software are designed to handle specific protocols.

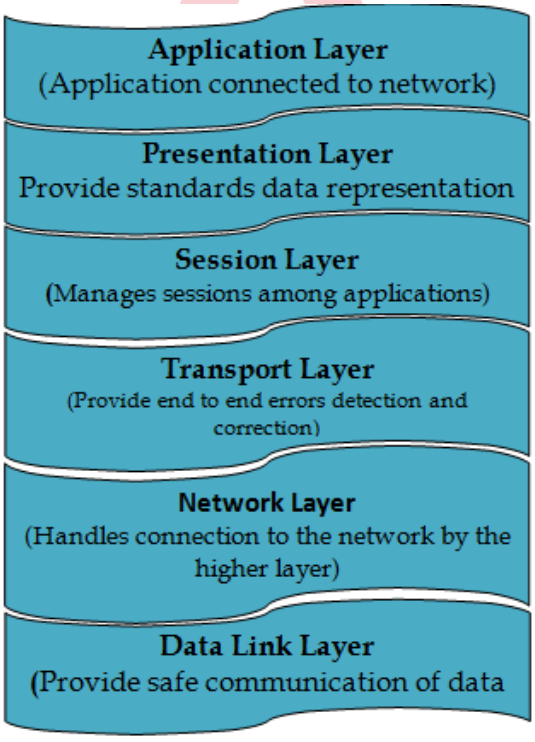
Communication protocols are usually defined and approved by some international body such as ISO, CCITT or IEEE. Some of function on protocols regulates are:-

- Control of information transfer
- Structure and formats of data
- Error recoveries
- Retransmission control
- Interfaces management.

PROTOCOL LAYERS

The OSI (Open Systems Interconnection) Data Model:- It is ISO standard for computer networks design and functioning. It has 7 layers and each layer playing a specific role when applications are communicating over the net.

OSI LAYER DIAGRAM

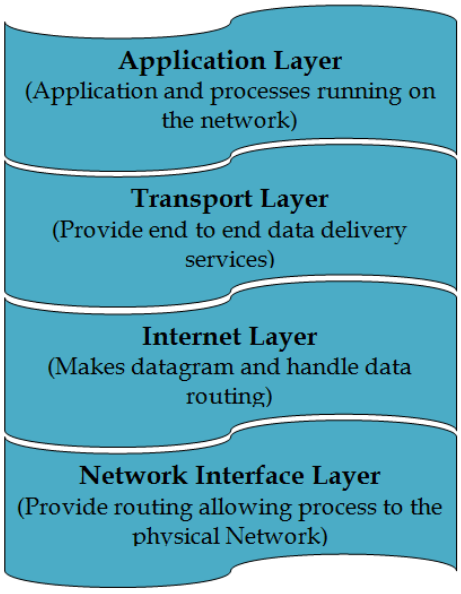


- **Physical layer:** ensures a safe and efficient transmission of data; consists of electronic circuits for data transmission.
- **Data link layer:** in charge of data encapsulation under the form of frame and their interpretation at the physical layer.
- **Network layer:** in charge of packets transmission from a source A to a destination B.
- **Transport layer:** in charge of the delivery of packets from a sources process A to a destination process B.
- **Session layer:** in charge of the management of dialogue between sources and destination.

- **Presentation layer:** determines the format of the data transmitted to applications, data compressing/decompressing, encrypting etc.
- **Application layer:** contains the applications which are used by the end-user, such as PowerPoint, Word etc.

The TCP/IP Model:- Consists of only 4 layers: application, transport, internet and network layer.

TCP/IP Model



- **Network Interface layer** -Provides the same functionality as the physical, the data link and network layers in the OSI model and Mapping between IP addresses and network physical addresses. Encapsulation of IP datagram, e.g packets, in format understandable by the network.
- **Internet layer:-** Based on the Internet Protocol (IP), which provides the frame for transmitting data from place A to place B.
- **Transport layer:-** Based on two main protocols: TCP (Transmission Control Protocol) and UDP (User Datagram protocol)
- **Application layer:-** Combines the functions of the OSI application, presentation, and session layers. And Protocols involved in this layer: HTTP, FTP, SMTP, DNS etc.

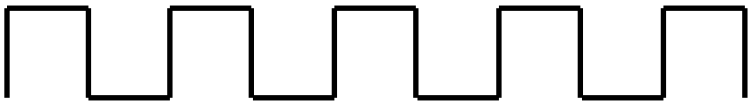
Bandwidth:- The number of bits that can be transmitted over a network in a given time, usually measured Hz(Hertz).

Broadband:- Broadband is a term referred to some technologies that offers high speed internet connectivity depending on framework and environment. It is a network connection with high enough bandwidth to allow for streaming audio and video. Broadband basically works through its bandwidth. As you increase the width of the band, so you get the speedy access to the internet.

Analog and Digital Transmission:-

- **Analog Signal:-** An analog signal is one that is continuous with respect to time and may take on any value within a given range of values. Human voice, video and music when converted to electrical signal using suitable device produce analog signals. Landline phone uses analog signal.

- **Digital signal:-** A digital signal may take on only a discrete set of values within a given range. Most computers and computer related equipment is digital.



Data Flow:- Communication between two devices can be Simplex, Half-Duplex, Full-Duplex.

- **Simplex:-** It is one way data transmission. e.g pager, radio, T.V
- **Half-Duplex:-** In Half- Duplex, each station can both transmit and receive but not at the same time. The half-duplex mode is like a one-lane road with traffic allowed in both direction. e.g:- Wireless, Walky-talky
- **Full-Duplex:-** In Full-Duplex mode, data can be transmit and receive at the same time. It is a two day data transmission simultaneously. e.g Telephone, video conferencing etc.

Data Communication Modes:- Data can be transmitted from source to destination in a number of ways. The different modes of data transmission are:-

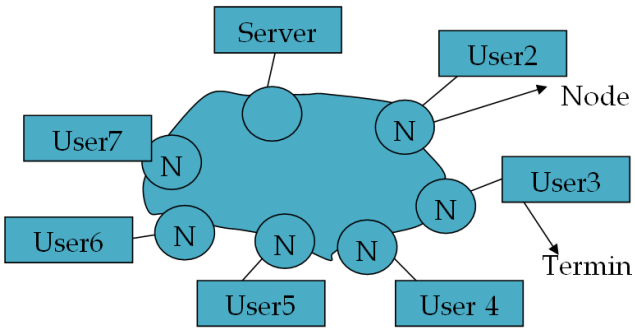
- **Parallel and Serial Transmission :-** There is always need to exchange commands data and other control information between two communication system There are two option and these are:-
- **Serial Transmission:-** In Serial transmission bits are transmitted serially, one after another. There are single lines available for this transmission. This a very slow method for transmitting data from one place to another.
- **Parallel transmission:-** All the bits of a byte are transmitted simultaneously on separate lines. There are multiple lines available for this transmission. This a very fast method for transmitting data from one place to another.

❖ **Asynchronous and Synchronous Transmission:-** One of the major difficulties in data transmission is that of synchronizing the receiver with the sender. The two mechanisms used for synchronization are:-

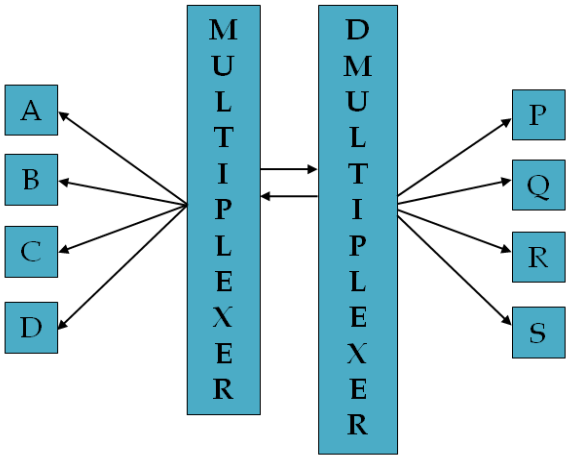
- **Asynchronous transmission:-** Asynchronous transmission sends single character at a time framed by start bit and 1 or 2 stop bits. Each frame begins with a start bit that enables the receiving device to adjust to the timing of the transmitted signal. This transmission is used to transmit character data and is ideally suited for characters that are transmitted at irregular intervals, such as when users are typing in character data from the keyboard.
- **Synchronous transmission:-** In synchronous transmission, the whole block of data bits is transferred at once, instead of one character at a time. A sync signal is used to tell the receiving station that a new frame is arriving and to synchronies the receiving station. Synchronous transmission is used when high-volumes of data are to be transmitted.

Communication Hardware:- Communication hardware divided into three parts:-

- **Sender receiver hardware:-** Sender and receiver hardware for handling communication messages, data transfer etc.
- **Node and workstation:-** In communication networks, a node is a connection point. A physical network node is an active electronic device that is attached to a network, and is capable of sending, receiving, or forwarding information over a communications channel. The device used to communicate a data communication network is called workstations. These workstation may be terminal, printer, telephone in other communication devices. A workstation known as terminal, client or slave.

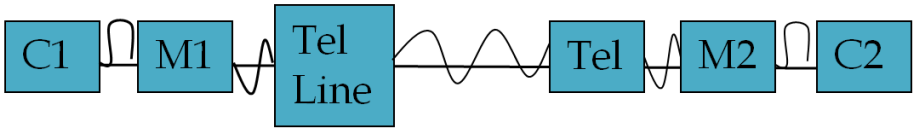


- **Multiplexer:-** Multiplexing is a device which convert multiple input signals into a single signal for transmission. Multiplexer is a device that combines several input information signals into one output signal, which carries several communication channels. e.g A Telephone lines that use for our daily conversation can carry hundreds of conversation using multiplexing
- **De-multiplexer:-** De-multiplexer is a device which divide single lines into a multiplex line.

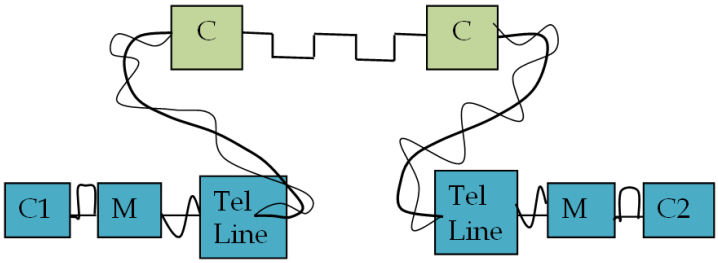


Types of multiplexer:-

- **Frequency Division Multiplexing (FDM):-** combines two or more signals at the transmitter by frequency multiplying up the different signals by different amounts. This composite signal is then transmitted and the receiver separates the individual signals, frequency multiples down and produces the originals. FDM is still used with cable TV, some older analog cellular systems, and most commonly YOUR FM RADIO.
- **Time Division Multiplexing (TDM):-** gives each signal a time slot for transmission e.g. A 10 micro-sec, B 10 micro-sec, C 10 micro-sec, A 10 micro-sec, B 10 micro-sec, C 10 micro-sec etc. There are two types of TDM, Synchronous TDM and Statistical TDM. Synchronous TDM is widely used with T carriers and ISDN. E.g T.V transmission
- **Wavelength Division Multiplexing (WDM):-** WDM is a modification of TDM and FDM. It performs the same function of multiplexing data, but it uses different colored lasers to send multiple channels over the same physical line. WDM only runs over fiber optic lines but has an advantage because it can combine multiple connection types such as ATM (Asynchronous Transmission Mode), OC, etc into one physical fiber line.
- **Code division multiplexing (CDM):-** An advanced technique that allows multiple devices to transmit on the same frequencies at the same time using different codes. It is used for mobile communication.
- **Communication device:-** There are several types of communication devices or interface used in data communication. These devices are connection between receiver and sender hardware involved data communication. Some of these devices are:-
- **Modem:-** Modem is a combination of two words 'Mo+Dem'. Mo stand for Modulation and Dem stand for demodulation. Modem is a device which convert digital signals into analog signal and analog signal into digital signal. You can use modem with computer.



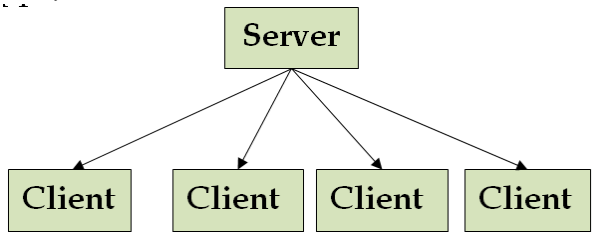
- **Codec:-** Codec does opposite function as modem but can not be used with computer.



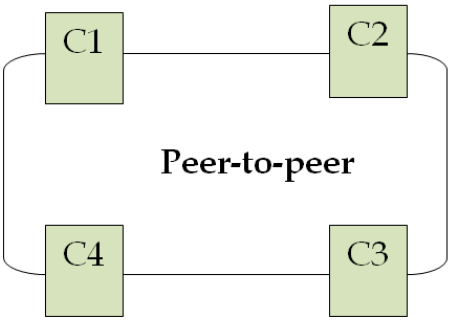
- **Communication channels:-** The most basic hardware is the media through which data is transferred. There are several types of media available and the choice of media depends on cost of transmission, efficiency of data transmission and transfer rate.:-
- **Two wire open line:-** This is the simplest of all the transmission media. It consists of simple pair of metallic wires made of copper or aluminum of between 0.4 and 1 mm diameter. This is used for short distance, upto 50 m and can transfer upto 19,200 bps.
- **Twisted pair cable:-** A twisted pair consists of insulated conductors that are twisted together. It is used for communication upto distance of 1 K.M and can achieve transfer rate of 1-2 mbps. Twisted pair cable widely used in telephone network.
- **Coaxial cable:-** A coaxial cable consist of a solid conductor running coaxial inside a solid or braided outer annular conductor. A coaxial cable can be used over a distance about 1 KM and can achieve a transfer rate of upto 100 mbps. A coaxial cable is of two types:- a 75 ohm cable which is used by cable TV operator and the 50 ohm cable which is used in high speed broadband.
- **Fiber optics cable:-** A fiber optics cable carries signals in the form of fluctuating light in a glass or plastic fiber. It has very high data transfer rates of about 1000 mbps. These are known as guided media.
- **Radiowave, microwave and satellite:-**Radiowave, microwave, satellite channels use electromagnetic propagation in open space. It covers large geographical area. These are known as un-guided media.

Network:- A network is a way or means of transmitting or receive of information from one or more sources.
Architecture:- Networks can be broadly classified as using either a peer to peer or client/server Architecture.

- **Client Server Architecture:-** Client/Server Architecture is one in which the client (PC or workstation) is the requesting machine and the server is the supplying machine, both of which are connected via a LAN or WAN. The client contain the user interface and may perform some or all of the application processing. Server can be high speed micro computer, minicomputers or even mainframes.
  A network architecture in which each computer or process on the network is either a client or a server. Servers are powerful computers or processes dedicated to managing disk drives (file servers), printers (print servers), or network traffic (network servers). Clients are PCs or workstations on which users run applications.



- **Peer-to-peer Architecture:-** A type of network in which each workstation has equal capabilities and responsibilities is called peer-to-peer network. Each workstation act as both client and server/ There is no central repository for information and there is no central server to maintain. Data and resources are distributed throughout the network and each user is responsible for sharing data and resources connected to their system. . This is simpler and less expensive network but not perform under heavy loads. A peer to peer network known as distributed network.



Difference between Client-Server and Peer to Peer Network Architectures

The main difference between client-server and peer to peer systems is that in the client-server architecture, there are designated clients that request for services and servers that provide services, but in peer to peer systems, peers act as both service providers and service consumers. Further, client-server systems require central file server and they are expensive to implement than peer to peer systems. On the other hand, in the client-server system, a dedicated file server provides level of access to the clients, providing better security than peer to peer systems where security is handled by the end users.

- **Computer Network:-** A computer network consists of two or more autonomous computers that are connected together in order to share resources(files, printers, modem etc), share application, allow electronic communication etc.

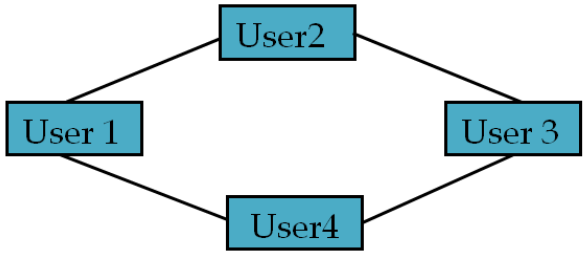
A computer network includes, the network operating system in the client and server machines, the cables, which connect different computers and all supporting hardware in between such as bridges, routers and switches. In wireless system, antennas and towers are also part of the network.

Types of Computer Network:- Computer network are generally classified according to their structure and the area:-

- Local Area Network (LAN):- In LAN, computers are connected locally within a room, building or in a small area. A LAN can range from simple (two computers) to complex (hundred of computers and peripherals).
- LANs connect workstations and personal computers. User can share data as well as devices like printers, fax etc and can use LAN to communicate with each other, by sending e-mail or chatting. Examples of LAN technology: Ethernet, Token Ring, and Fibber Distributed Data Interconnect (FDDI).

Characteristics of LAN are:-

- Configured to small area i.e it connects several devices over a distance of 5 to 10 KM.
- High Speed.
- Low error rates
- Data and hardware sharing between user.
- Operates at speed ranging from 10Mbps to 100 Mbps. Now a days 1000Mbps are available.

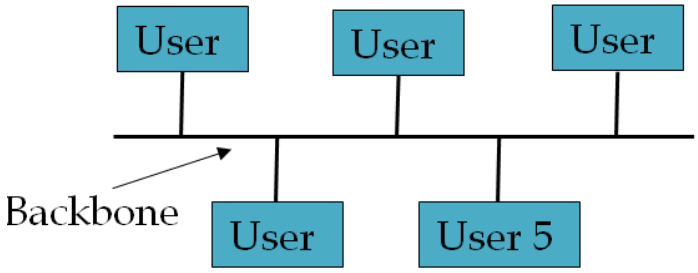


Network Topology:- Topology is physical arrangement of computer system in a network. Or refers to the shape of networks. Some of the most common network topologies are:-

- **Bus topology:-** In bus topology, all devices are connected to a central cable, called the bus or backbone. The bus topology connects workstations using a single cable. Each workstation is connect to the next workstation

in a point to point fashion. All workstation connect to the same cable. An extension to the bus topology is tree topology.

Advantage of Bus topology:- Installation is easy and cheap. Connection are simple and easy to use. Data can be transmitted from the both sides.
Disadvantage of Bus topology:- A single fault in the cable stops all transmission. Fault identification is difficult.

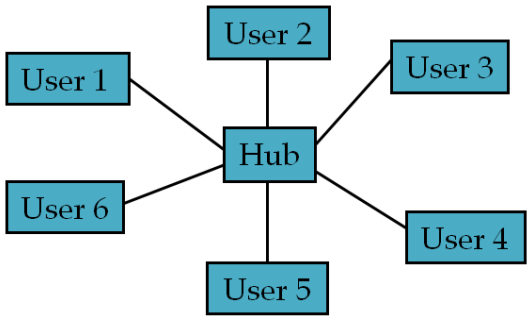


- **Ring topology:** - In ring topology, all devices are connected to one another in the shape of a closed loop, so that each device is connected directly to each other i.e the ring topology connects workstations in a closed loop. Data is transmitted around the ring in one direction only. Each station passing on the data to the next station till it reaches its destination. The common implementation of this topology is token ring.

Advantage of Ring topology:- Easy to install and modify the network and fault isolation is simplified.
Disadvantage of Ring Topology:- Adding or removing computer disrupts the entire network. A break in the ring can stop the transmission in the entire network. Finding fault is difficult.

- **Star Topology:-** Star topology uses a central hub through which, all components are connected. A central hub is the host computer and at the end of each connection is a terminal. Communication on the connecting links between the stations and the central station of star topology can be bi-directional and are point to point.

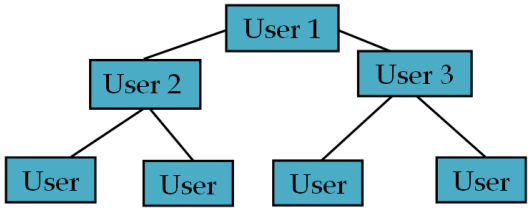
Advantage of Star Topology:- Expansion or modification is easy. Single computer failure does not affect the network.
Disadvantage of Star Network:- Failure in the central hub brings the entire network to halt.



- **Tree topology:-** Tree topology is LAN topology in which only one route exists between any two node on the network. It is similar to the star topology but the nodes are connected to the secondary hub, which in turn is connected to the central hub.

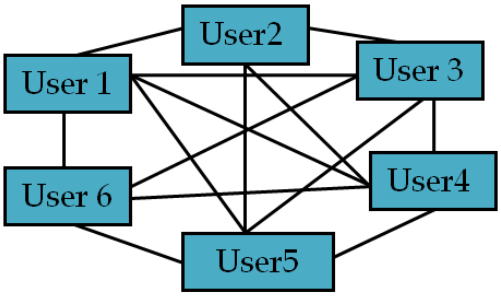
Advantage of Tree Topology:- Installation and configuration of tree network is easy. Less expensive when compared to mesh topology.

Disadvantage of tree Topology:- Failure in central hub brings the entire network to a halt. More cabling is required when compared to bus topology.



- **Mesh topology:-** Devices are connected with many redundant interconnections between network nodes. In a well connected topology, every node has a connection to every other node in the network. Mesh topology are used in critical connection of host computers (typically telephone exchange). Alternate path allow each computer to balance the load to other computer systems in the network by using more than one connection path available.

Advantage of Mesh topology:- Failure in one of the computers does not affect the entire network. Privacy between computers is maintained as messages travel along dedicated path.
Disadvantage of Mesh Topology:- Amount of caballing required is high. A large number of I/O ports are required.



LAN HARDWARE AND SOFTWARE

LAN Hardware:- There are basic hardware component of LAN are:-

- **Transmission channel:-** Four types of channels are used for data communication in LAN. They are 1. Twisted pair cable. 2. Coaxial cable 3. Radio waves.
- **Network Interface Unit (NIU):-** Network interface units connect each devices in the LAN network to shared transmission device. It contain rules and logic to access the LAN. NIU is also used to implement LAN protocols and for device attachment. Its function depends on the type of topology used in LAN.
- **Servers:-** One of the major benefits of LAN is sharing expensive resources such as storage devices, printer etc. This is achieved through providing servers on LAN. It is dedicated computer that controls one or more resources. This contains both hardware and software interface for LAN. Three major categories of servers used in LANs are :-
- **File server:-** File server is used to share storage space for files. It is used to taking periodical backup and also provide gateway to other servers within and between LANs.
- **Printer server:-** Printer server is used to handle printing works of all workstation connected in the network.
- **Modem Server:-** In LAN environment also modem is required to get connected to other network or simply use a telephone. A modem server is used to share resource by all connected workstations in a network.
- **Work stations:-** In a network, computers are connected with servers or main computer known as workstation/terminal/client/slave.

LAN Software/Operating System:- Main software of LAN is operating system, manage workload with number of various type of server attached to it. It has two aspects 1. Server software 2. Workstation software. LAN Operating system facilitates the sharing of expensive resources such as printer, storage space etc. There are various type of LAN operating system for example Novel Netware, Win NT, Win 2000 server, Unix etc.

- **Metropolitan Area Network (MAN):-** A type of computer network that is designed for a city or town is known as MAN. MAN is larger than LAN and smaller than WAN.
- **Wide Area Network (WAN):-** A Network that covers a large geographical area and covers different cities, states, and countries known as WAN. One LAN can be connected to other LAN over any distance via telephone and radio waves. A system of LANs connected in this way is called WAN.

LAN Devices:-

- **Switch:-** A device that directs data packets along a path. It may include the function of a router. In general, a switch is a simpler and faster mechanism than a router as it does not maintain knowledge of the networks. A switch is not always required in a network.
- **Hub:-** A hub is a central connecting device in a network. Data arrives at the hub from one or more devices and is forwarded out using just one cable. For example, four cables from three computers and a printer are connected to a hub and then a single cable connects the hub to a server. A hub can also include a router. The data simply passed through the hub without any change.

WAN Devices:- Routing is responsible for searching a path between two computing devices that wish to communicate and for forwarding the data packets on this path. Devices such as bridges, router and gateway provide this routing function.

- **Bridges:-** Bridges are used to connect two LANs that use identical protocols over a wide area. The bridge act as an address filter which picks up packets from one LAN that are intended for a destination on another LAN and passes these packets on the network.
- **Router:-** Routers can be used to connect networks that may not be similar. Routers provide connectivity between two LANs or two WANs over large geographical distances.
- **Gateway:-** Gateways are used to connect two dissimilar LANs. A gateway is required to convert data packets from one protocol to another before forwarding it, as it connect two dissimilar networks.

Types of Wide Area Network:-

- **Public Network:-** Public Network are those networks which are installed and run by the telecom authorities and are made available to any organisation or individual who subscribe it.
- **Public Switched Telephone Network (PSTN):-** The feature of the PSTN are its low speed, the analog nature of transmission, a restricted bandwidth and its widespread availability. PSTN is designed for telephone, modems. These are used for data communication. It is also used for FAX.
- **Public Switched Data Network (PSDN):-** The term PSDN covers a number of technologies. The main feature of PSDN are their high level of reliability and the high quality of the connection provided. It can support both low and high speeds at appropriate costs. It can also be used to link computer system and networks of one organisation to several other organisation. PSDN is very popular for connecting public and private mail system to implement electronic mail services with other companies.
- **Value added Services/Network (VAN/VAD):-** In CAN, the provider of such services must process, store and manipulate the data that is carried on the network. The technique is used in specific types of business in which it is advantageous to be able to share information with other companies in the same line. Electronic Data Interchange (EDI) is one area for value added services in which two trading partners exchange trading documents such as purchase orders, invoices, transportation etc using electronic means. In india, Videsh Sanchar Nigam Ltd (VSNL) is a service provider.
- **Integrated Services Digital Network (ISDN):-** The ISDN is a networking concept providing for the integration of voice, video and data services using digital transmission media and combining both circuit and packet switching techniques. Uses can use their digital connection to telephone company for transmitting both voice and data over the same twisted pair cable which connects their telephone.

- **Private Network:-** Private network is used by particular individual or organisation. It has its own standards and protocols. Private network may follow standards guideline or may not follow these guide lines. It depend upon the organisation or individuals for which it has been developed. e.g Intranet
- **Virtual Private Network (VPN):-**VPN uses a technique known as tunnelling to transfer data securely on the Internet to a remote access server on your workplace network. Using a VPN helps you save money by using the public Internet instead of making long–distance phone calls to connect securely with your private network. There are two ways to create a VPN connection, by dialling an Internet service provider (ISP), or connecting directly to Internet.

Network Addressing:- IP addresses are broken into 4 octets (IPv4) separated by dots called dotted decimal notation. An octet is a byte consisting of 8 bits. The IPv4 addresses are in the following form: 192.168.10.1

TYPES OF ADDRESSES: There are two types of addresses:

A. Logical Address: The logical address is what the IP (Internet Protocol) address, can also be called virtual address, is and it looks like this 216.109.112.135. IP address can change and often does when you have a high speed Internet connection. It is in hierarchical fashion i-e a network part and a host part.
- **IP Version 4; Address:** IPV4 uses 32 bits to define each address. IPV4 uses four 1 byte decimal numbers separated by dots.
- **IP Version 6; Address:** IPV6 uses 128 bits to define address. IPV6 uses hexadecimal numbers that are separated with colons. It is better for mobile network. It has larger address space.

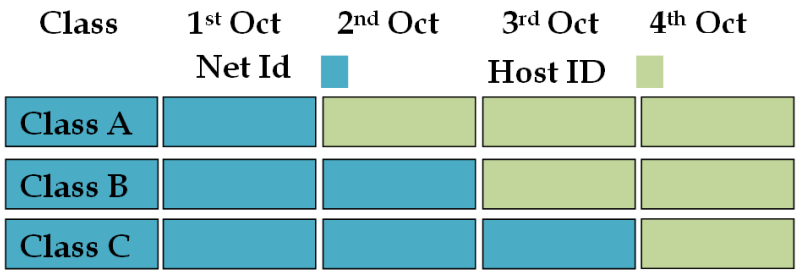
B. Physical Address: The physical address is just like mailing address it is real, it is also called MAC address (Media Access Control address) and loo=ks like this 00-56-7E-4A-DD-8D i-e in a hexadecimal form. It is different for every technology e.g Ethernet uses different physical addresses than other technologies available. The communicating applications (source/ destination applications) must also be identifiable.

Internet address:- Consists of 4 bytes separated by periods. Example: 136.102.233.49
- The R first bytes (R= 1,2,3) correspond to the network address;
- The remaining H bytes (H = 3,2,1) are used for the host machine.
- InterNIC Register: organization in charge of the allocation of the address ranges corresponding to networks.

Criteria considered:
→ Geographical area (country)
→ Organization, enterprise
→ Department
→ Host

There are two parts of an IP address:
- Network ID
- Host ID

IP addresses divided into 5 classes. The various classes of networks specify additional or fewer octets to designate the network ID versus the host ID.



Class A: Class A addresses are specified to networks with large number of total hosts. Class A allows for 126 networks by using the first octet for the network ID. The first bit in this octet, is always set and fixed to zero. And next seven bits in the octet is all set to one, which then complete network ID. The 24 bits in the remaining octets represent the hosts ID, allowing 126 networks and approximately 17 million hosts per network. Class A network number values begin at 1 and end at 127.

Class B: Class B addresses are specified to medium to large sized of networks. Class B allows for 16,384 networks by using the first two octets for the network ID. The two bits in the first octet are always set and fixed to 1 0. The remaining 6 bits, together with the next octet, complete network ID. The 16 bits in the third and fourth octet represent host ID, allowing for approximately 65,000 hosts per network. Class B network number values begin at 128 and end at 191.

Class C: Class C addresses are used in small local area networks (LANs). Class C allows for approximately 2 million networks by using the first three octets for the network ID. In class C address three bits are always set and fixed to 1 1 0. And in the first three octets 21 bits complete the total network ID. The 8 bits of the last octet represent the host ID allowing for 254 hosts per one network. Class C network number values begin at 192 and end at 223.

Class D and E: Classes D and E are not allocated to hosts. Class D addresses are used for multicasting, and class E addresses are not available for general use: they are reserved for future purposes.

CHAPTE – 03

SOFTWARE

Software Introduction

Introduction

As you know, the hardware devices need user instructions to function. A set of instructions which get a single outcome are called program. Many programs functioning together to do a task make a **software**.

For example, a word-processing software enables the user to create, edit and save documents. A web browser enables the user to view and share web pages and multimedia files. There are two categories of software –

- System Software
- Application Software

2.1 System Software

Software required to run the hardware parts of the computer and other application software are called **system software**. System software acts as **interface** between hardware and user applications.
System software includes –

- Operating System
- Language Processor
- Device Drivers

Operating system (OS) is the software program that manage software and hardware resources of computer. Operating system manages a computer's basic functions like storing data in memory, retrieving files from storage devices, scheduling tasks based on priority, etc.

Language Processor
An important function of system software is to convert all user instructions into machine understandable language. When we talk about human and machine interactions, languages are of three types –

Machine language – This language is nothing but a collection of 0s & 1s (binary digit) that the machines can understand. It is completely machine dependent.

Assembly language – This language introduces a layer of abstraction by defining **mnemonics**. **Mnemonics** are English like words or symbols used to denote a collection of 0s&1s. Assembly level language is **machine dependent**.

High level language – This language uses English like statements and is completely independent of machines and uses translator. Programs written in high level languages are easy to create, read and understand. It is also called **source code.**
e.g.-Java, C++, Fortran, Pascal etc. .

Language Translator- A language translator helps in converting programming language into machine language. There are three types of language translator–

Assembler – Converts assembly level program into machine level program.

Interpreter – Converts high level programs into machine level program line by line.

Compiler – Converts high level programs into machine level programs at one go rather than line by line.

Device Drivers

System software that controls and monitors functioning of a specific device on computer is called **device driver**. Each device like printer, scanner, microphone, speaker, etc. that needs to be attached externally to the system has a specific driver associated with it. When you attach a new device, you need to install its driver so that the Operating System(OS) knows how it needs to be managed.

2.2 Application Software

A software that performs a single task and nothing else is called **application software**. Application software are very specialized in their function and approach to solving a problem. It is also called the end-user programs. These programs do the real work for users. Here are some commonly used application software –

- Word processing
- Spreadsheet
- Presentation
- Database management
- Multimedia tools

2.3 Utility Software

Utility software is system software designed to help analyze, configure, optimize or maintain a computer. Examples of utility software include –

- Antivirus software
- Disk management tools
- File management tools
- Compression tools
- Backup tools

2.4 Categorization of Software-

Freeware

Freeware is software that is distributed without demanding a fee for its usage. These programs are available either as fully functional software for an unlimited period.

Ownership of any freeware is retained by its developer. The developer can change future releases from freeware to a paid product (freeware) if he wishes so. Also, a freeware is typically distributed without its source code. This is done to prevent any sort of modification by its users. Plus, the license with which a free program is distributed may permit the software to be freely copied but not sold.

Crippleware

Some software are offered as freeware – but with very limited features – or with the major feature missing. These are referred to as Crippleware. The ones that provides fully functional version has all the functions enabled and is

mostly available either as a commercial program or as a shareware. In most cases, the free programs promote a commercial offering.

Donationware

Sometimes, freeware is distributed to users with a regular reminder or request to make a donation to the author or to some third-party such as a charity. In such cases, freeware is referred as a Donationware.

Free Software

Many computer users aren't fully aware of this somewhat new and unrelated concept. Well, free software is software that gives a user freedom to run, copy, distribute, study, change and improve software. To be precise, free software is a matter of liberty, not price!

It essentially means a user can freely use, modify, and distribute a program stipulated to one condition: any redistributed version of the software must be distributed with the original terms of free use, modification, and distribution (known as copyleft). And unlike freeware, free software may be distributed for a fee.

Open Source

The term 'Open Source' is very close to 'free software' but not identical to it. We say this because, the source code of an open-source software is readily available to users but under a copyright, and one is freely allowed to re-distribute the software.

The concept of open-source program relies on the fact that a user can review a source-code for eliminating possible bugs in it. This is something that we do not observe in commercially developed and packaged programs. Programmers on the internet read and modify the source-code by eliminating the possible bugs. Thus, in this way programmers helps in providing more useful and bug-free product for everyone to use.

Shareware

Shareware is demonstration software that is distributed for free but for a specific evaluation period only, say, 15-30 days (Trialware). After the evaluation period the program gets expired and a user can no longer access the program. Only if you are interested in using the program further, the shareware provider may require you purchase a license for the software.

Apart from this there are some other terms related with computer softwares:

Adware

Adware, better known as advertising software is software that automatically renders advertisements. Most of these advertisements appear in the form of annoying pop-ups. However, one can disable the ads by purchasing a registration key. It can even change your home page, default search or install a tool bar. Like freeware, Adware too is available for computer users at no cost.

Bundleware

Bundleware gets its name from people 'bundling' different programs into one single installation program. The one installation for bundleware installs the main program that you want along with some other programs that you do not want.

Spyware

Spyware goes a few steps further and surreptitiously installs another software on your computer. The spyware may contain a code that sends information about the user's computer to the developer or to some other location whenever the user is connected to the Internet. This is done to display advertisements in the Web browser.

Malware

Typically referred as 'Malicious Software', Malware is any program with malafide intentions and which exploits data of a computer without its user's consent. Once on a computer hard drive, it can hijack your browser and track the websites you visit – and cause even worse damage.

In addition to this, it can hide itself deep within Windows and even reinstall itself after being removed completely, making it the most difficult program to be removed or cleaned. Virus, Trojans, etc. may all be considered as malware.

Scareware

Malware that is designed to trick users into downloading and buying non-functional or a dangerous software is referred to as Scareware or Rogue Software. How does it do this? Simple, it alarms scares a user by making him falsely believe that his computer is infected by potentially harmful viruses.

Once downloaded and installed, the program displays false virus alerts and instructs him to buy the 'full version' to remove the infections (fictional).

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Microsoft Office

MS Office is a package of applications or softwares based on specific purpose. MS Office was developed by Microsoft in 1988. MS Office is the application software consists of many applications including MS Word, MS Excel, MS Power point.

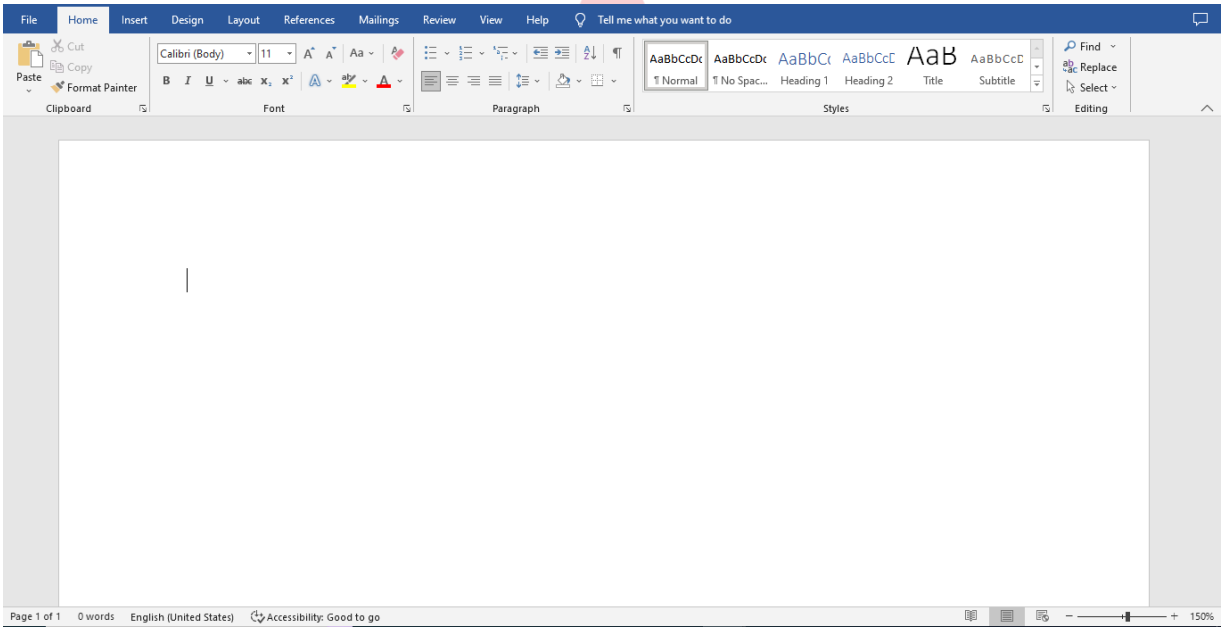
Microsoft Word

Definition of MS Word

MS Word is a commercial word processor. MS Word is a component of MS Office of productivity software. MS Word is one of the most important and widely used applications found on computer. One can edit, format and print the documents by using MS Word. The extension of Doc file is ".doc" or ".docx". WordStar is the earliest version of MS word.

How to Start MS Word on Your Computer?

Step 1: Click on the Start button
Step 2: Click on the Run option.
Step 3: Type winword and press enter. Now a blank document of MS Word will open.



Features of MS Word

Text Editing

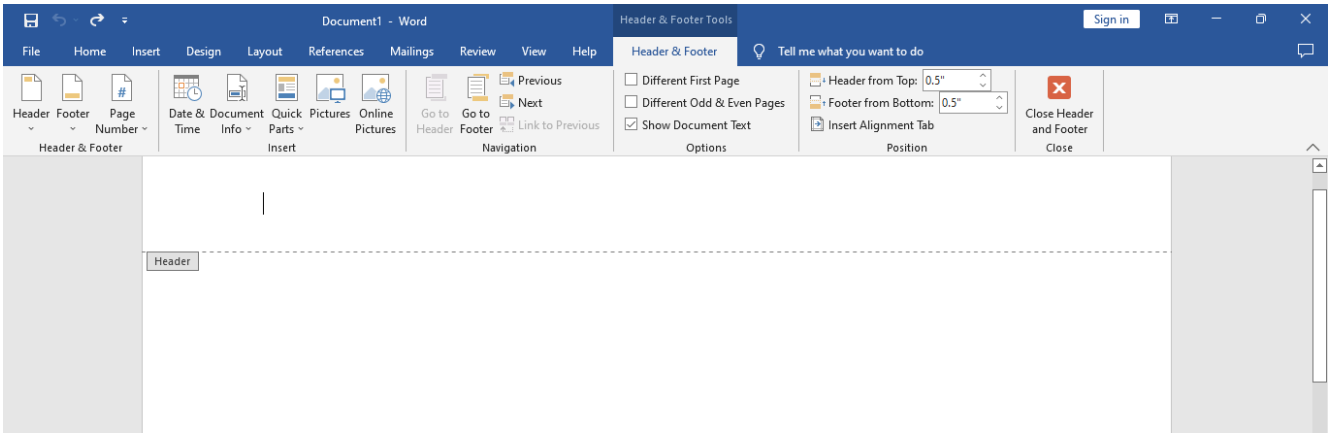
It provides the adding, editing and deleting text, i.e., Cut, copy and paste.

a. Click the **Edit** tab.
b. Select the text that you want to edit.
c. Using the tools in the edit toolbar, change the required formatting including font style, paragraph alignment, list formatting, and indentation options.

Formatting of Text: You can format the text in various styles such as italic, bold, underline, color the text, etc.

Spell Check: This feature provides you to check your spelling mistake and also suggest the correct words.

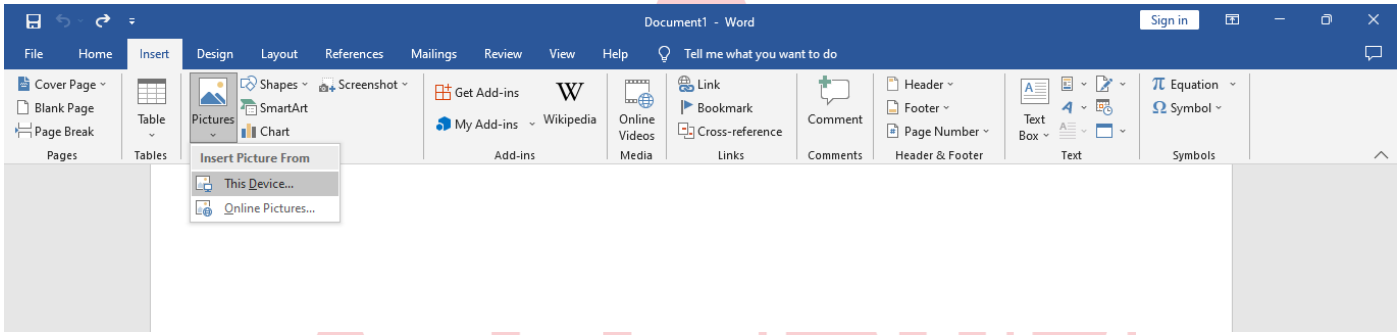
Header & Footer: It provides the header and footer you want to add in the document.



Insert Images

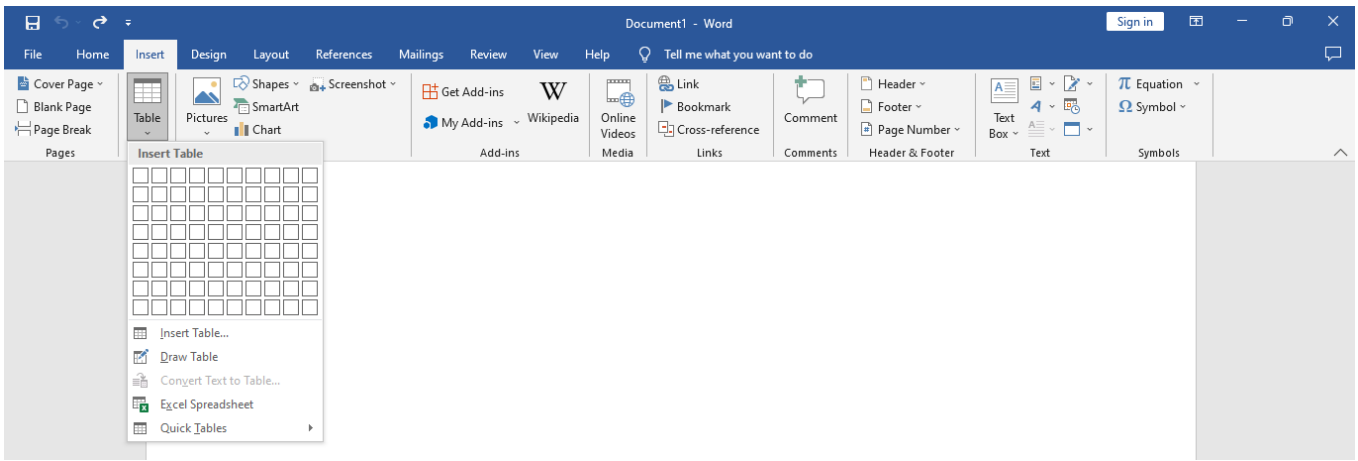
Any image can be added from your computer in the word document.

a. Click the **Insert** tab.
b. Place your cursor where you want to add an image.
c. To add an image from your computer, click **Image**.
d. Choose the image to add.

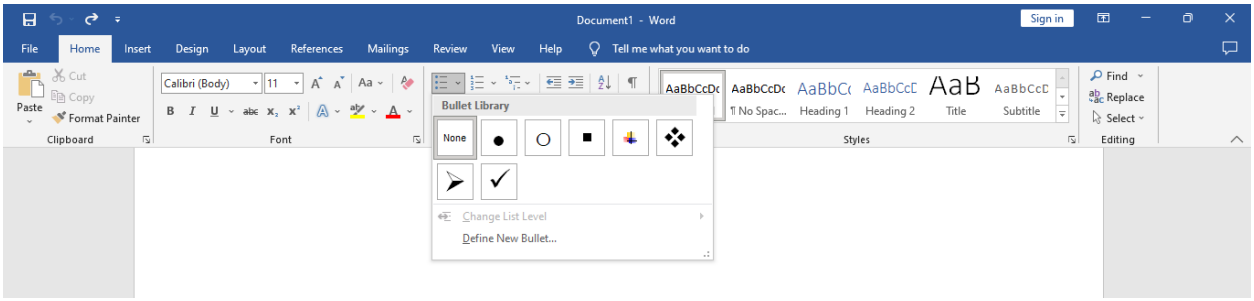


Insert Tables

Tables can be added with any number of rows and columns.



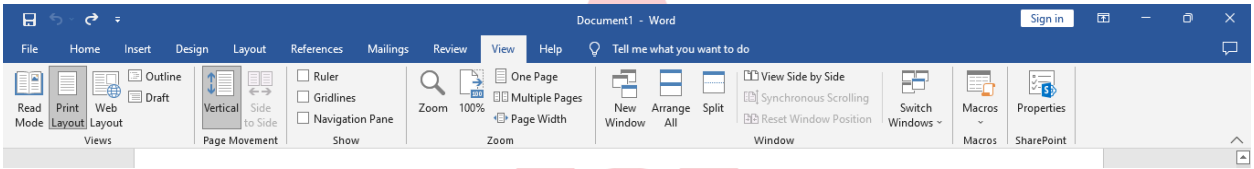
Bullets & Numberings: The statements can be displayed with the numberings and bullets.



View Menu

If you are viewing a .docx file, you can use the following review features:

a. Click the **Review** tab.
b. Click **Author** to enter the name that will be associated with the changes that you make in the document.
c. Turn on **Track Changes** if you want to keep track of the changes that you make to the document.
d. Turn on **Show Changes** to see all the changes that have been made to the document.
e. Click **Accept** to convert the currently selected tracked change to final text.
f. Click **Reject** to revert the currently selected tracked change to the previous text.
g. Click **Next** to go to the next tracked change in the document.



Microsoft Excel

Definition of MS Excel:

Microsoft Excel is a spreadsheet developed by Microsoft for Windows, macOS, Android and iOS. It features calculation, graphing tools, pivot tables, and a macro programming language called Visual Basic for Applications.
By default, documents saved in Excel 2007 to 2019 are saved with the .xlsx extension whereas the file extension of the prior Excel versions are .xls.

How to Start MS Excel on Your Computer?

Step 1: Click on the Start button
Step 2: Click on the Run option.
Step 3: Type excel and press enter. Now a blank document of MS excel will open.

What is Spreadsheet?

- An electronic document in which data is arranged in the rows and columns of a grid and can be manipulated and used in calculations.
- A spreadsheet is collection of electronic sheet which contain various type of data in to rows and columns.

What is Worksheet?

- Worksheet is a grid of cells made up of horizontal rows and vertical columns.
- By default there are three worksheet in excel.
- By default name of worksheet in BOOK1.

What is Workbook?

- Workbook – Combination of multiple worksheet is called workbook.
- Cell – Intersection of row and column is called Cell.

How Many Rows and Columns in Worksheet?

Version	Row	Column	Total
Excel 2010+	1048576	16384	17179869184
Excel 2010	1048576	16384	17179869184
Excel 2007	1048576	16384	17179869184
Excel 2003	65536	256	16777216
Excel 2002(XP)	65536	256	16777216
Excel 2002	65536	256	16777216
Excel 97	65536	256	16777216
Excel 95	16384	256	4194304
Excel 5	16384	256	4194304

Cell Address

There are three types of cell address in excel.

1. **Absolute address:** A unique number that specifies a unique location within the address space where an operand is to be found/deposited, or where an instruction is located. It generally specifies a memory location but in some cases specifies a machine register or an I/O device.

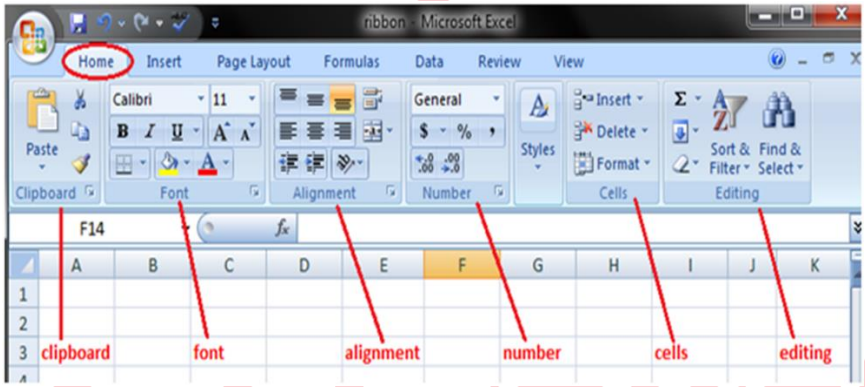
2. **Relative address:** *Relative addressing* is the technique of addressing instructions and data areas by designating their location in relation to the location counter or to some symbolic location. This type of addressing is always in bytes—never in bits, words, or instructions.
3. **Mixed address:** A mixed reference in Excel is **a type of cell reference different from the other two absolute and relative**. We only refer to the cell's column or row in the mixed cell reference. So, for example, in cell A1 if we want to refer to only the A column, the mixed reference would be $A1.

What is the use of Microsoft Excel?

- Microsoft Office Excel is a powerful tool used to create and format spreadsheets. Spreadsheets allow information to be organized in rows and tables and analyzed with automatic mathematics. Spreadsheets are commonly be used to perform many different types of calculations.

- Ribbon is on the top of worksheet, below the title bar or name of the excel file. It contains seven tabs: Home, Insert, Page Layout, Formulas, Data, Review and View.

- Each tab has its own specific groups of related commands. These groups have several additional commands that can be viewed by clicking the arrow at the right bottom corner of any group.



Office Button in Excel

When the office button is clicked, you will find a number of options to perform various tasks that are listed below:

New: To create a new file.

Open: To open an existing file on the computer.

Save: To save changes made in the open file.

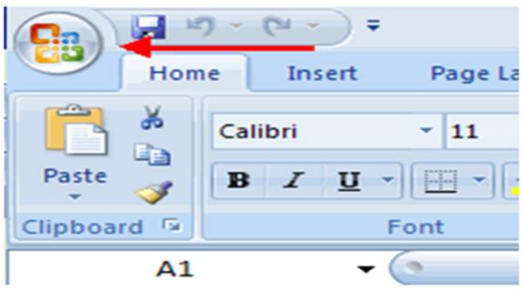
Save As: To save the file with specific name to a preferred location in the hard drive of the computer.

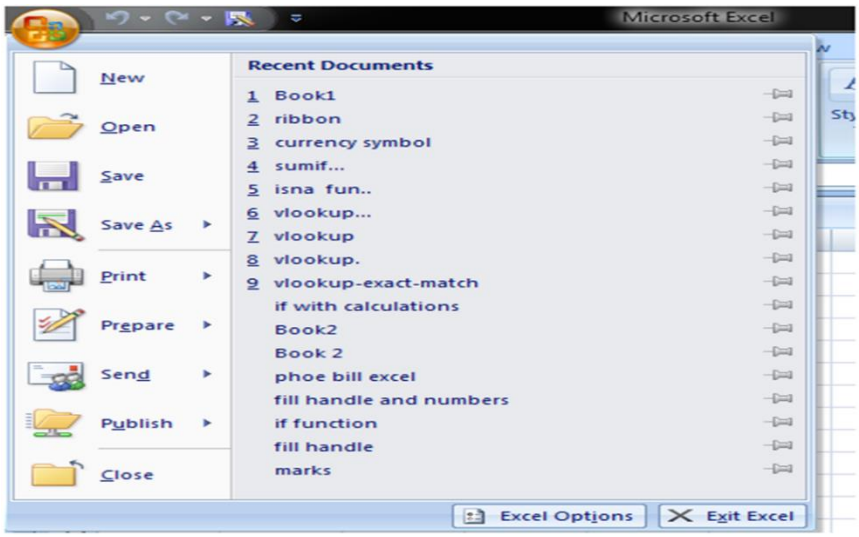
Print: To print the hard copy of the open document.

Prepare: To prepare the document for distribution. Send: To send the copy of the document to others.

Publish: To distribute the document to others.

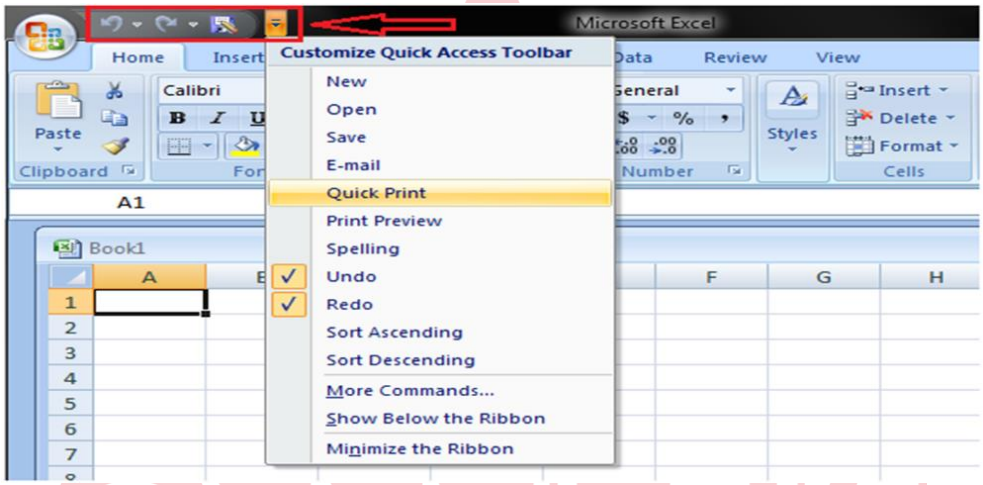
Close: To close the open document.





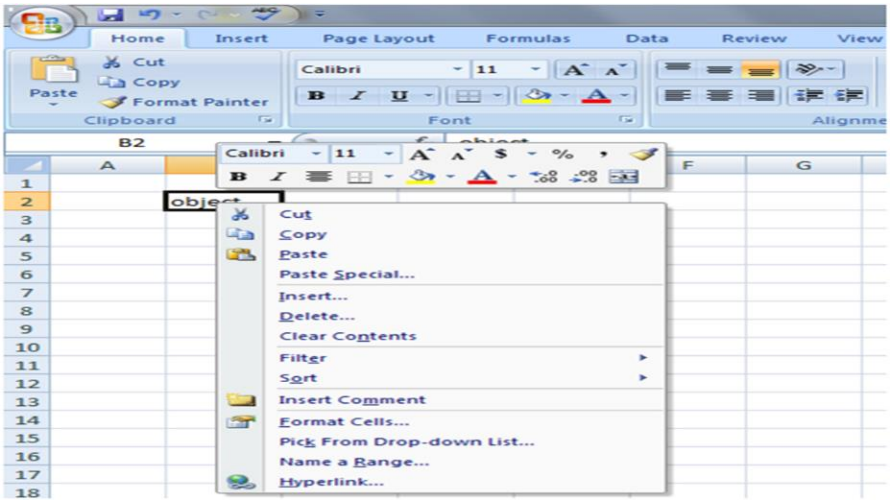
Quick Access Toolbar in Excel

It is a customizable toolbar located beside the quick access button and above the home tab. When you click the down arrow at the end of quick access toolbar it displays more commands.

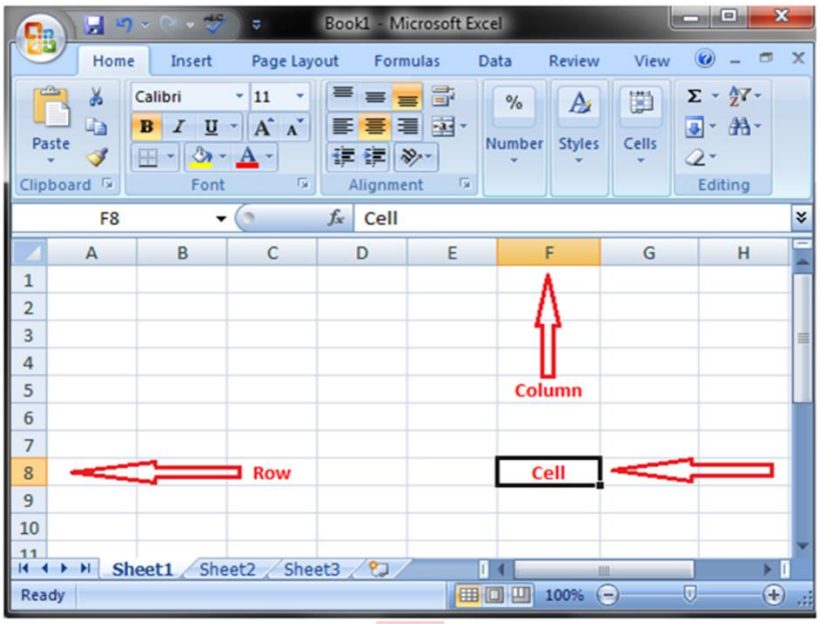


Mini Toolbar in Excel

It is a floating toolbar that appears above the shortcut menu when you right click a cell or other objects like a shape or chart. It displays commonly used formatting commands like Bold, Italics, Font Size and Font Color.

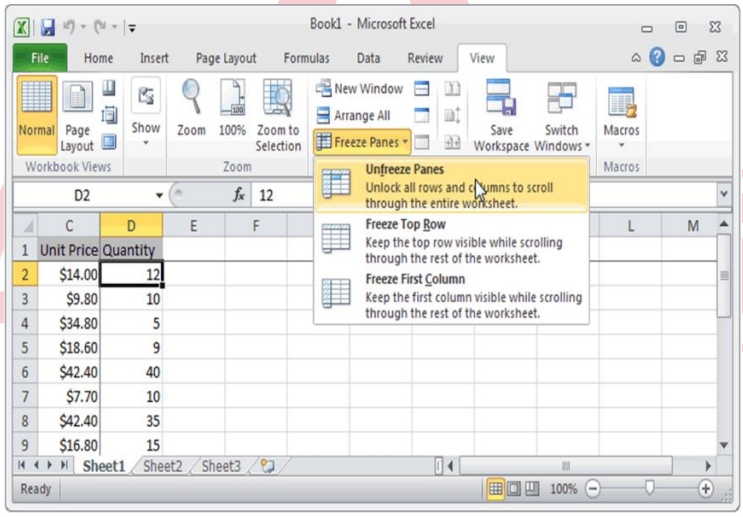


Worksheet, Rows, Columns and Cells in Excel



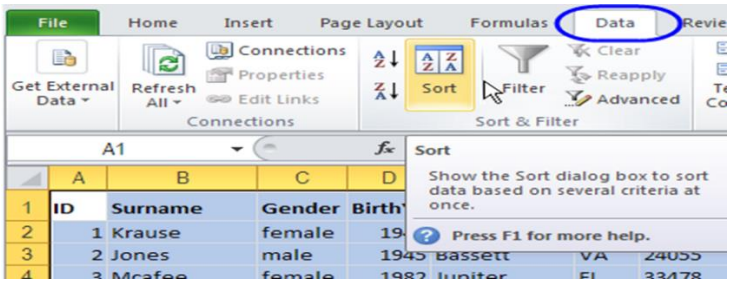
Freeze Panes

Freeze Panes are used to lock any row or column. The locked row or column will be visible on the screen even after we scroll the sheet vertically or horizontally.



Use of Sort and Filter

If you quickly sort data with the A-Z or Z-A button. Select one cell in the column you want to sort. Press Ctrl + A, to select the entire region. If all the data is selected, click Sort A to Z (smallest to largest) or Sort Z to A (largest to smallest)



How to prevent someone from copying the cell from your worksheet?

If you want to protect your worksheet from being copied, go into Menu bar > Review > Protect sheet > Password. By entering password you can prevent your worksheet from getting copied.

Features of MS Excel

Format Menu

The Format menu **allows users to control the formats of cells, columns, rows, worksheets and the workbook**. This menu also gives users access to templates of standard formats.

Tools Menu

Excel toolbar (also called Quick Access Toolbar. **It enables users to save important shortcuts and easily access them when needed**. read more) is presented to access various commands to perform the operations. In addition, it is presented with an option to add or delete commands to it to access them quickly.

Track Changes

To keep track of who makes what changes to the workbook, you can use Excel's Track Changes feature.

Thesaurus

We can use thesaurus to find the synonym of any word.

Data Menu

The Data menu contains many important functions in Excel, including imports and connections with databases. You also access the sort, filter, remove duplicates, data validation, consolidation, group, ungroup, and subtotal functions on the Data menu.

- Sort Command – We can arrange the data in ascending or descending order.
- Filtering – Data Filtering is the process by which we can find the specific Record in spreadsheet.
- Data Validation - Data validation is the smart tool that is used to control the information to enter the worksheet. By using data validation we can restrict the entry to the specific type of size.
- Pivot Table - A pivot table is a data summarization tool that is used in the context of data processing. Pivot tables are used to summarize, sort, reorganize, group, count, total or average data stored in a database.

Menu Bar

There are 9 menu in excel like File, Edit, View, Format, Insert, Tools, Data, Window, Help.

The File menu is the leftmost item in the Excel ribbon. The File ribbon items enable you to perform file management functions, including open, save, close, and print. You also use the File menu to import from external sources into Excel, along with options that allow you to tweak Excel itself.

The Home menu is the second menu in the Excel menu bar. The Home ribbon items include options for formatting font, color, conditional formatting, filter, number type, and more. All these functions help one in performing various effective calculations.

the Insert menu helps you insert various options and items into an Excel spreadsheet. You can insert a variety of things ranging from pivot table to picture, clip art, shapes, screen shots, charts and graphs, text box, header and footer, symbols, equation, and more.

Again, the name suggests the collection of functions on the **Page Layout menu**. You'll see many options for configuring pages for viewing and printing—including page size, margins, colors and fonts, and so forth. You can also customize cell height and width on the Page Layout menu.

The Formulas menu is where you find all the number-crunching options. Excel comes with lots of formulas including financial, logical, text, date & time, lookup & reference, and math & trigonometry.

The Data menu also contains many important functions in Excel, including imports and connections with databases. You also access the sort, filter, remove duplicates, data validation, consolidation, group, ungroup, and subtotal functions on the Data menu.

The Review menu is where many of those tasks take place. You can make comments in cells for your colleagues, check spelling, track changes, and even restrict permission using items in the Review menu.

On the View menu, you customize the way spreadsheets appear on your screen. Options include displaying grid lines between cells, toggling the formula bar and headings, and more. This menu also gives you options to view and record macros, as well—macros let you record common steps you perform so you don't have to repeat the same things over and over again!

Types of charts in Excel?

Excel Chart Types: Pie, Column, Line, Bar, Area, and Scatter Pie Chart. Column Chart. Line Chart.
Functions are predefined formulas that perform calculations by using specific values, called arguments, in a particular structure.

Microsoft Power Point

Definition:

MS PowerPoint is ***a program that is covered in the Microsoft Office suite*** and is bundled unitedly with Word, Excel, and other office productivity tools. MS Power point is a powerful slide show presentation program. MS Power point applies slides to communicate information rich in multimedia.

Advantages of MS Power Point

MS Power Point is useful in creating presentation, where one can add animation, photos, videos, and sound effects, making it more readable.

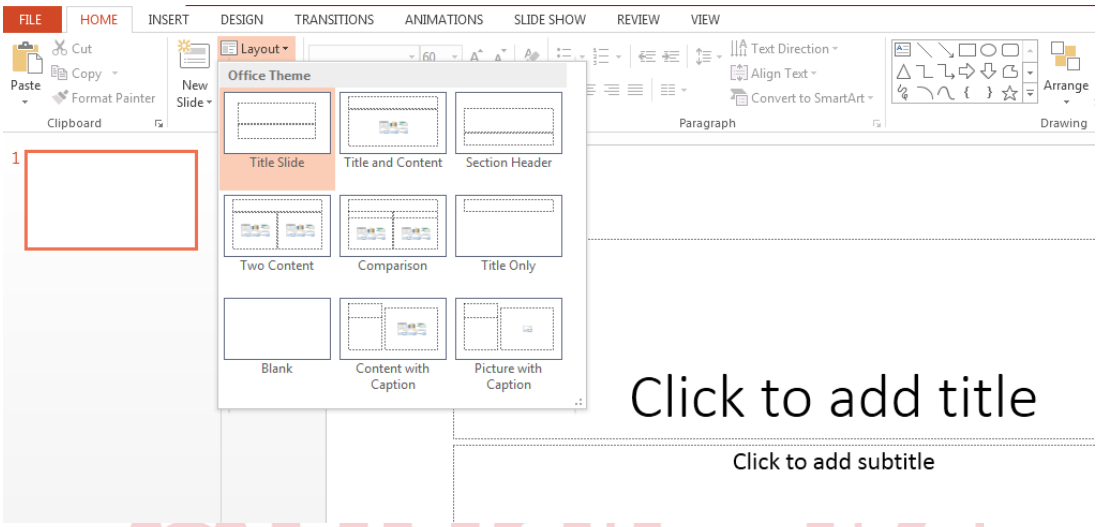
How To Start MS Power Point?

Step 1: Click On Start Menu

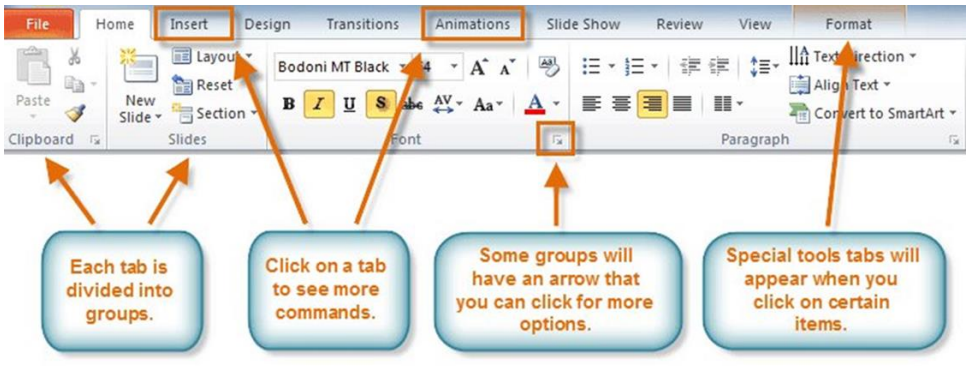
Step 2: Go to All Programs

Step 3: Click on MS Office

Step 4: Now choose the MS Power Point.

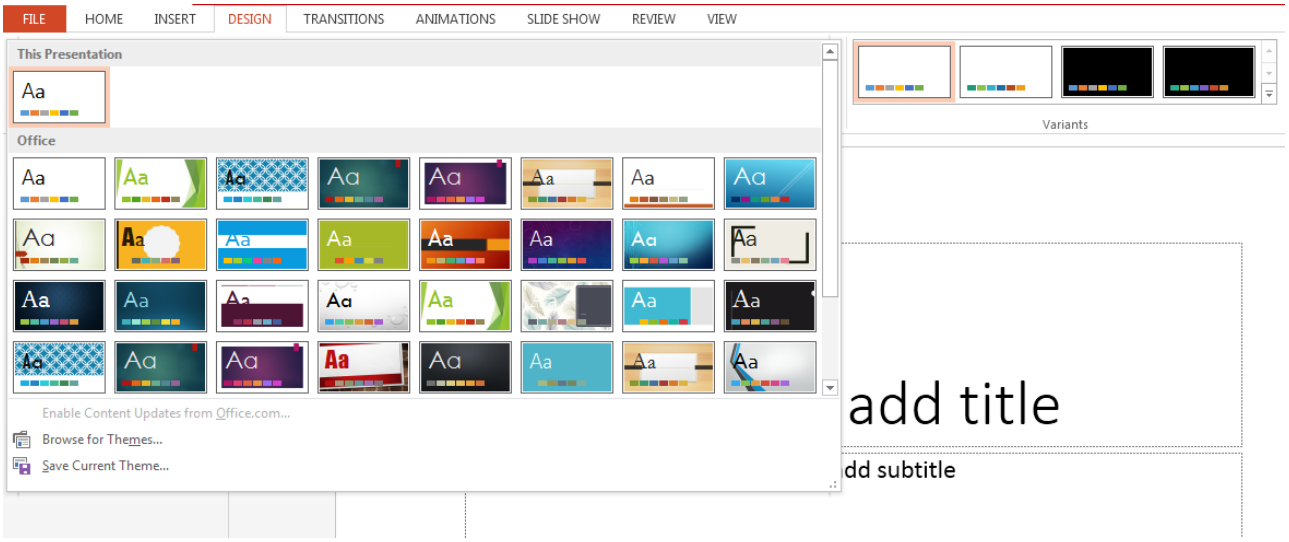


Features of MS Power Point



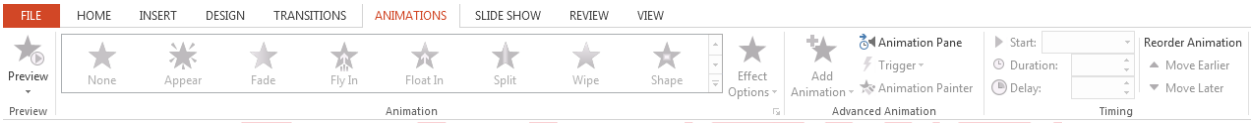
1. Insert: The insert menu is useful for adding text, pictures, shapes, or videos.

2. Design: The design menu is frequently used to apply pre-designed styles or themes to slide backgrounds.



3. **Transitions:** A slide transition is **the visual effect that occurs when you move from one slide to the next during a presentation**. You can control the speed, add sound, and customize the look of transition effects
4. **Animations:** Microsoft PowerPoint animations allow you to emphasize certain points of your current slide. There are primarily 3 categories of animations in PowerPoint. You can select any object in your slide and animate it with these animations:

- Entrance Animation
- Emphasis Animation
- Exit Animations



5. **Slide Show:** A slide show is **a presentation of a series of still images (slides) on a projection screen or electronic display device, typically in a prearranged sequence**. The changes may be automatic and at regular intervals or they may be manually controlled by a presenter or the viewer.
6. **Review:** The **Review** tab lets you add comments, run spell-check, or compare one presentation with another (such as an earlier version)
7. **View:** Views allow you to look at your presentation in different ways, depending on where you are in the creation or delivery process.
8. **Format: The PowerPoint Formatting toolbar offers an easy way to format your text**. Using this toolbar, you can change font, size, color, alignment, and text spacing. Accessing the Formatting Toolbar. The Formatting toolbar is generally located at the top of your screen, often to the right of the Standard toolbar.

Uses of MS Power Point

1. **PowerPoint in Education**
   Teachers can use PowerPoint to teach subjects lessons and chapters of any book. They can create or delegate to produce a complete presentation of a book. It gives the opportunity to the teacher to cover a topic in the different t slides.
2. **PowerPoint in Business**
   Business is all about creating a plan, marketing strategies, execution, and making methods to follow and integrate. PowerPoint helps people in business to create a plan, structure related to the business or organization.

3. **PowerPoint for Housewives**

   Housewives can easily invest their time in learning PowerPoint presentations. They can create slide shows in which they can generate numbers, calculations, alphabets, or all kinds of lessons they want to teach their kids in slideshows.

4. **PowerPoint in Governance and Citizen Services**

   PowerPoint documents can be printed so whenever the citizen visits any government sector they can easily find or access government services through the file or document.

5. **PowerPoint for Job Seekers**

   Through PowerPoint, job seekers can create digital resumes or multimedia resumes and it will become a unique way of presenting skills and knowledge in front of interviewers.

DBMS

Introduction

DBMS is one of the most important module for Specialist Officer (IT) Exam. As we've seen that the objective paper of Professional Knowledge (especially for Scale-I Officer) in IBPS Exam has many questions from Database and Networking Modules. Thus, aspirants should prepare DBMS thoroughly. The term DBMS stands for Data Base Management System. Now comes a question that *what is DBMS?*

DBMS is the acronym of Data Base Management System. DBMS is a collection of interrelated data and a set of programs to access this data in a convenient and efficient way. It controls the organization, storage, retrieval, security and integrity of data in a database.

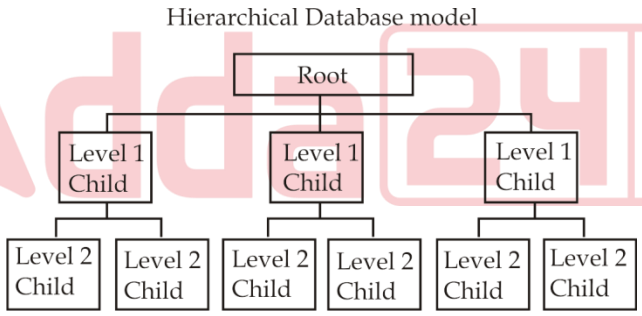
A database management system (DBMS) is a computer software that manages databases, it may use any of a variety of database models, such as the Hierarchical DBMS, Network DBMS and Relational DBMS.

The emergence of the first type of DBMS was between 1960's-70's; that was the Hierarchical DBMS. IBM had the first model, developed on IBM 360 and their (DBMS) was called IMS, originally it was written for the Apollo program. This type of DBMS was based on binary trees, where the shape was like a tree and relations were only limited between parent and child records.

1.1 Database Models

A database model shows the logical structure of a database, including the relationships and constraints that determine how data can be stored and accessed.

Hierarchical Database Model



Hierarchical Database model is one of the oldest database models. In the hierarchical data model, records are linked with other superior records on which they are dependent and also on the records, which are dependent on them. A tree structure may establish one-to-many relationship. Parents can have many children exhibiting one to many relationships. The grandparents and children are the nodes or dependents of the root. In general, a root may have any number of dependents.

A tree-structure diagram is the schema for a hierarchical database. Such a diagram consists of two basic components:

1. Boxes, which correspond to **record types**
2. Lines, which correspond to **links**

Pros:

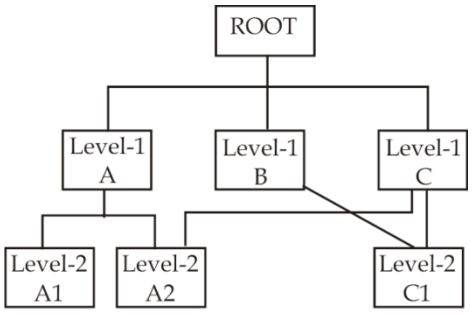
- ✓ The model allows easy addition and deletion of new information.
- ✓ Data at the top of the Hierarchy is very fast to access.

- ✓ It relates well to anything that works through a one to many relationships.

Cons:

- Realtime requirements are of more sophisticated relationships which this model fails to cater.
- The database can be very slow when searching for information on the lower entities.
- Many to many relationships are not supported.

Network Database Model



Network Database Model Diagram

The Network Database model can be viewed as an upside-down tree where each member information is the branch linked to the owner, which is the bottom of the tree. The network database model was a progression from the hierarchical database model and was designed to solve some of that model's problems, specifically the lack of flexibility. It addresses the need to model more complex relationships such as the many-to-many relationship which hierarchical model could not deal with.

The Network model replaces the hierarchical tree with a **graph** thus allowing more general connections among the nodes. The main difference of the network model from the hierarchical model, is its ability to handle many to many (N:N) relations. In other words, **it allows a record to have more than one parent.**

Pros:

- ✓ In the network database terminology, a relationship is a set. Each set comprises of two types of records.- an owner record and a member record,
- ✓ In a network model an application can access an owner record and all the member records within a set.
- ✓ Network Model supports data independence to some level as it draws a clear line of demarcation between programs and the complex physical storage details.

Cons:

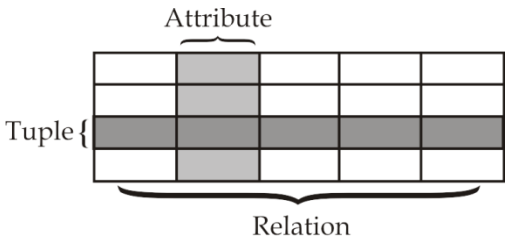
- The insertion, deletion and updating operations of any record require large number of pointers adjustments.
- A change in structure demands a change in the application as well, which leads to lack of structural independence.

Relational Database Model

Relational data model is the primary data model, which is used widely around the world for data storage and processing. The relational database model was a huge leap forward from the network database model. Instead of relying on a parent-child or owner-member relationship, the relational model allows any file to be related to any other by means of a common field. Relational databases go hand-in-hand with the development of SQL. Structured Query Language is a standardized language for defining and manipulating data in a relational database.

What are Tables in Relational Model?

Relations are saved in the format of Tables. This format stores the relation among entities. A table has rows and columns, where rows represents records and columns represent the attributes. Following are some terms associated with relations:



1. **Tuple –** A single row of a table, which contains a single record for that relation is called a tuple.
2. **Relation instance –** A finite set of tuples in the relational database system represents relation instance. Relation instances do not have duplicate tuples.
3. **Relation schema –** A relation schema describes the relation name (table name), attributes, and their names.
4. **Relation key –** Each row has one or more attributes, known as relation key, which can identify the row in the relation (table) uniquely.
5. **Attribute domain** – Every attribute has some pre-defined value scope, known as attribute domain.

Object-Oriented Database Model

Object Oriented Database Model (also referred to as object-oriented database management system or OODBMS), is a database management system (DBMS) that supports the modelling and creation of data as objects. This includes some kind of support for classes of objects and the inheritance of class properties and methods by subclasses and their objects. ODBMS were originally thought of to replace RDBMS because of their better fit with object-oriented programming languages. However, high switching cost, the inclusion of object-oriented features in RDBMS to make them ORDBMS, and the emergence of object-relational mappers (ORMs) have made RDBMS successfully defend their dominance in the data center for server-side persistence.

Relational databases store data in tables that are two dimensional. The tables have rows and columns. Relational database tables are "normalized" so data is not repeated more often than necessary. With traditional databases, data manipulated by the application is transient and data in the database is persisted (Stored on a permanent storage device). In object databases, the application can manipulate both transient and persisted data.

Entity-Relationship Database Model

The Entity Relationship Data Model ensure that you get a precise understanding of the nature of the data and how it is used by the enterprise, you need to have a universal model for interaction that is non-technical and free of ambiguities and easy readable to both technical as well as non-technical members. ***This is implemented with use of the ER Diagrams.***

ER model is based on two concepts:

- Entities, defined as tables that hold specific information (data)
- Relationships, defined as the associations or interactions between entities

What is Entity Relationship Diagram (ER-Diagram)?

ER-Diagram is a pictorial representation of data that describes how data is communicated and related to each other. Any object, such as entities, attributes of an entity, sets of relationship and other attributes of relationship can be characterized with the help of the ER diagram.

1.2 Advantages of today's' DBMS over earlier File Management System

These are some important advantages of today's DBMS:

Reduced Data Redundancy and Inconsistency: This means with DBMS the chances of multiple file formats, duplication of information in different files got eliminated. Which means it reduced data duplication and with this the data could stay more consistent.

Data Integrity: data integrity" refers to the accuracy and consistency of data stored in a database
DBMS ensures data integrity by managing transactions through **ACID** test = atomicity, consistency, isolation, durability. While such integrity is absent in file management system.

Sharing of Data: In DBMS, data can be shared by authorized users of the organization. The database administrator manages the data and gives rights to users to access the data.

Control Over Concurrency: In a file-based system, if two users can access data simultaneously, it is possible that they will interfere with each other. For example, if both users attempt to perform update operation on the same record, then one may overwrite the values recorded by the other. Most database management systems have sub-systems to control the concurrency so that transactions are always recorded with accuracy.

Backup and Recovery Procedures: In a computer file-based system, the user creates the backup of data regularly to protect the valuable data from damage due to failures to the computer system or application program. It is very time consuming method, if amount of data is large. Most of the DBMSs provide the 'backup and recovery' sub-systems that automatically create the backup of data and restore data if required.

Data Independence: The separation of data structure of database from the application program that uses the data is called data independence. In DBMS, you can easily change the structure of database without modifying the application program.

Database Architecture

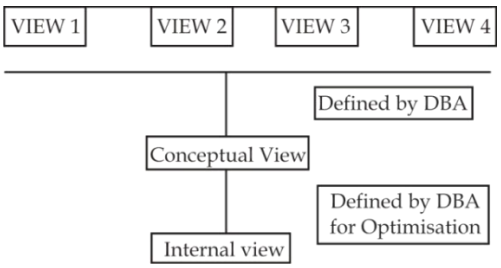
2.1 Data Abstraction – View Levels

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

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

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

3. Internal view/Physical Level
It is the lowest level of abstraction, closest to the physical storage method. It describes how the data is stored, what is the structure of data storage and the method of accessing these data. It is represented by internal schema.
View Level …Defined by User



2.2 Instances and Schemas

Schema can be defined as the design of a database. The overall description of the database is called the database schema.
You can relate it as something like types and variables in programming languages. Thus, essentially **Schema** is the logical structure of the database. Just like the View Levels in Data Abstraction Schema is of 3 types:

1. **Physical Schema:**
   The design of a database at physical level is called physical schema, how the data stored in blocks of storage is described at this level.

2. **Logical schema:**
   Logical schema can be defined as the design of database at logical level. In this level, the programmers as well as the database administrator (DBA) work. At this level data can be described as certain types of data records which can be stored in the form of data structures. However, the internal details (such as implementation of data structure) will be remaining hidden at this level.

3. **View Schema**
   View schema can be defined as the design of database at view level which generally describes end-user interaction with database systems.

- **Physical Data Independence**–the ability to modify the physical schema without changing the logical schema.
- Applications depend on the logical schema
- In general, the interfaces between the various levels and components should be well defined so that changes in some parts do not seriously influence others.

What is an Instance?
Databases change over time as information is inserted and deleted. The collection of information stored in the database at a particular moment is called an instance.

2.3 Database Languages

A database system provides a data-definition language to specify the database schema and a data-manipulation language to express database queries and updates.

1. **Data Definition Language:** DDL is used for specifying the database schema. It contains commands to create tables, alter the structure, delete tables or rename tables.

   Examples of DDL commands in SQL:
   To create the database instance – CREATE
   To alter the structure of database – ALTER
   To drop database instances – DROP
   To delete tables in a database instance – TRUNCATE
   To rename database instances – RENAME

2. **Data Manipulation Language:** As the name specifies itself DML is used for accessing and manipulating data in a database.

   Examples of DML commands in SQL:
   To read records from table(s) – SELECT
   To insert records into the tables – INSERT
   Update the data in tables– UPDATE
   Delete all the records from the table – DELETE

3. **Data Control Language:** DCL is used for granting and revoking user access on a database –

   Examples of DCL commands in SQL:
   To grant access to user – GRANT
   To revoke access from user – REVOKE

1. Entity-Relationship Model

What is an Entity?
In a database, we would be grouping only related data together and storing them under one group name called Entity / Table. This helps in identifying which data is stored where and under what name. It reduces the time to search for a particular data in a whole database.
Entities can be classified based on their strength. An entity is considered weak if its tables are existence dependent. Following are basic types of entities:

1. **Strong Entity**: Entities having its own attribute as primary keys are called strong entity. For example, EMPLOYE has EMPLOYE_ID as primary key. Hence it is a strong entity.
2. **Weak Entity:** Entities which cannot form their own attribute as primary key are known weak entities. These entities will derive their primary keys from the combination of its attribute and primary key from its mapping entity. The relationship between weak entity and strong entity set is called as ***Identifying Relationship***.
3. **Composite Entity:** Entities participating in the many to many relationships are called composite entity.

The relationship between weak entity and strong entity set is called as Identifying Relationship. The line connecting strong entity set with the relationship is single whereas the line connecting weak entity set with the identifying relationship is double. A member of a strong entity set is called dominant entity and member of weak entity set is called as subordinate entity. A weak entity set does not have a primary key, but we need a means of distinguishing among all those entries in the entity set that depend on one particular strong entity set. The discriminator of a weak entity set is a set of attributes that allows this distinction be made. A weak entity set is represented by doubly outlined box and corresponding identifying relation by a doubly outlined diamond. It is also called as the Partial key of the entity set.

Weak Entity Sets

Weak Entity Set: An entity set whose members owe their existence to some entity in a *strong entity set.*

- entities are not of independent existence.
- each weak entity is associated with some entity of the *owner* entity set through a special relationship.
- weak entity set may not have a key attribute.

Weak Entity set- Example

We depict a weak entity set by double rectangles. We underline the discriminator of a weak entity set with a dashed line.

For example: payment_number – discriminator of the *payment* entity set

Primary key for *payment* – (*loan_number, payment_number*)

Note: the primary key of the strong entity set is not explicitly stored with the weak entity set, since it is implicit in the identifying relationship. If *loan_number* were explicitly stored, *payment* could be made a strong entity, but then the relationship between *payment* and *loan* would be duplicated by an implicit relationship defined by the attribute *loan_number* common to *payment* and *loan.*

3.1 Attributes

Each entity is described by a set of attributes/properties.

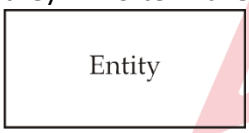
Types of Attributes

- Simple Attributes: having atomic or indivisible values. example: Dept – a string Phone Number - an eight-digit number
- Composite Attributes: having several components in the value. example: Qualification with components (Degree Name, Year, University Name)
- Derived Attributes: Attribute value is dependent on some other attribute. example: Age depends on Date of Birth. So, age is a derived attribute.
- Single-valued: having only one value rather than a set of values. for instance, Place Of Birth - single string value.
- Multi-valued: having a set of values rather than a single value. for instance, Courses Enrolled attribute for student Email Address attribute for student Previous Degree attribute for student.
- Attributes can be: simple single-valued, simple multi-valued, composite single-valued or composite multi-valued.

3.2 E-R Diagram

An ER diagram is a means of visualizing how the information a system produces is related. There are five main components of an ER Diagram:

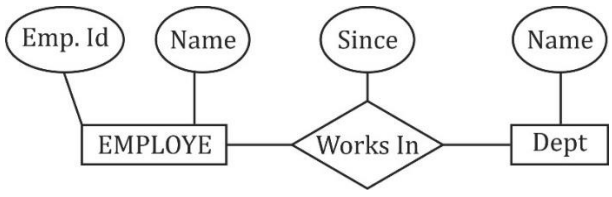
1. **Connecting lines, solid lines that connect attributes to show the relationships of entities in the diagram.**
2. **Entities: Represented by Rectangle**
   - Strong Entity: These shapes are independent from other entities, and are often called parent entities, since they will often have weak entities that depend on them.



   - Weak Entity: A weak entity is an entity that must defined by a foreign key relationship with another entity as it cannot be uniquely identified by its own attributes alone.

3. **Relationship: connects two or more entities into an association/relationship - Diamond**

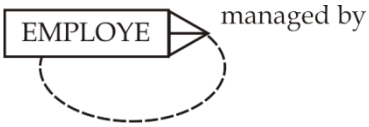
Here you can see: Employee Works in Department. EMPLOYE and Dept are Entity Types and WorksIn is the relationship represented with a diamond figure.



A **recursive relationship** is one in which the same entity participates more than once in the relationship. For Example: Every manager is also an employee. So, manager is not a new entity,
but just a subset of the instances of the entity EMPLOYEE.

Recessive Relationship:

EMPLOYE	MANAGER
Nikhil	Anuj
Sumita	Nikhil
Anuj	
Rahul	



Manages of

This also a representation of - many cardinality.

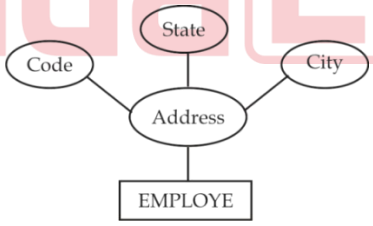
3.3 Attributes-Represented by Ovals

An Attribute describes a property or characteristic of an entity. For example, Name, ID, Age, Address etc can be attributes of an EMPLOYE.

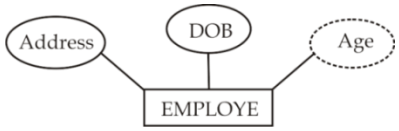
Key attribute represents the main characteristic of an Entity. It is used to represent Primary key. Ellipse with underlying lines represent Key Attribute. Here EmpId is the key attribute that is the primary key which will uniquely identify the EMPLOYE Records.

Double Ellipses is used to represent multivalued attributes.

An attribute can also have their own attributes. These attributes are known as **Composite attribute.**



Derived Attribute is calculated or otherwise derived from another attribute, such as age from a DOB (Date of Birth).



4. Cardinality

The cardinality of a relationship is the number of instances of entity B that can be associated with entity A. There is a minimum cardinality and a maximum cardinality for each relationship. Cardinality refers to the maximum number of times an instance in one entity can relate to instances of another entity. Ordinality, on the other hand, is the minimum number of times an instance in one entity can be associated with an instance in the related entity.

Cardinalit

Many

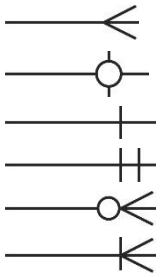
Zero or one

One

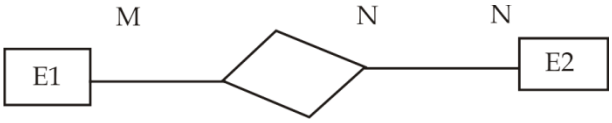
One (and only one)

Zero or many

One or many



Binary Relationships and Cardinality Ratio



- The number of entities from *E2* that an entity from *E1* can possibly be associated thru *R* (and vice-versa) determines the *cardinality ratio* of *R.*
- Four possibilities are usually specified:
  1. *one-to-one (1:1)*
  2. *one-to-many (1:N)*
  3. *many-to-one (N:1)*
  4. *many-to-many (M:N)*

Cardinality Ratios

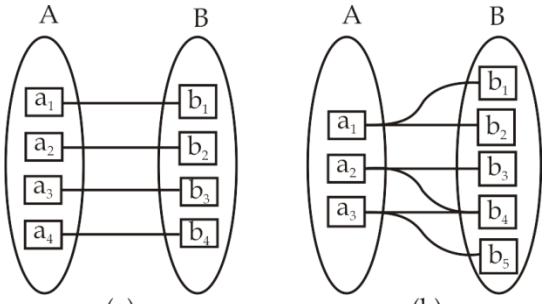
One-to-one: An *E1* entity may be associated with at most one *E2* entity and similarly an *E2* entity may be associated with at most one *E1* entity.

One-to-many: An *E1* entity may be associated with many *E2* entities whereas an *E2* entity may be associated with at most one *E*1 entity.

Many-to-one: … (similar to above)

Many-to-many: Many *E1* entities may be associated with a single *E2* entity and a single *E1* entity may be associated with many *E2* entities.

Mapping Cardinalities



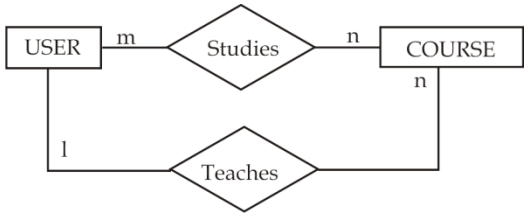
Note: Some elements in A and B may not be mapped to any elements in the other set.

Many to one Many to many

Note: Some elements in A and B may not be mapped to any elements in the other set.

Alternative Representation of Cardinality

Many to Many Relationship b/w User and course meaning any number of users can study or enroll in any number of course and these is one to many relationship b/w a teacher (which is also a user) and course meaning only one instructor can teach may number of courses



In one department we have many employees so the following represents – one to many relationships

And in case any number of employee may work in any number of department (many to many)

5. Keys

A ***super key*** of an entity set is a set of one or more attributes whose values uniquely determine each entity. A ***candidate key*** of an entity set is a minimal super key

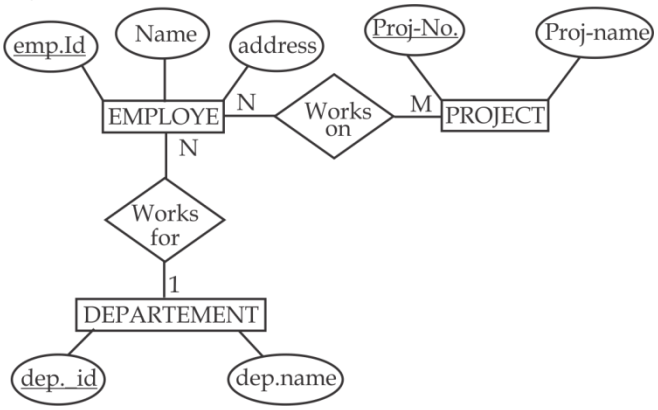
For Example: Customer-id is candidate key of *customer*
account-number is candidate key of *account*
Although several candidate keys may exist, one of the candidate keys is selected to be the ***primary key***.

Keys for Relationship Sets

The combination of primary keys of the participating entity sets forms a super key of a relationship set.
(*customer-id, account-number*) is the super key of *depositor*

- *NOTE: this means a pair of entity sets can have at most one relationship in a particular relationship set.*
- E.g. if we wish to track all access-dates to each account by each customer, we cannot assume a relationship for each access. We can use a multivalued attribute though.
- Must consider the mapping cardinality of the relationship set when deciding the what are the candidate keys.
- Need to consider semantics of relationship set in selecting the *primary key* in case of more than one candidate key.

Following is an example of an ER Diagram:



Entity- Relationship (E-R) Diagram

The overall logical structure of a database can be expressed graphically by an E-R diagram. The diagram consists of the following major components.

- Rectangles: represent entity set.
- Ellipses: represent attributes.
- Diamonds: represents relationship sets.
- Lines: links attribute set to entity set and entity set to relationship set.
- Double ellipses: represent multi-valued attributes.
- Dashed ellipses: denote derived attributes.
- Double lines: represent total participation of an entity in a relationship set.
- Double rectangles: represent weak entity sets.

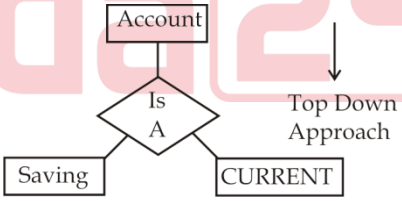
3.3 Specialization, Generalization and Aggregation

Generalization is a bottom-up approach in which two lower level entities combine to form a higher-level entity. In generalization, the higher-level entity can also combine with other lower level entity to make further higher-level entity. Specialization is opposite to Generalization. It is a top-down approach in which one higher level entity can be broken down into two lower level entities.

Top-down design process; we designate subgroupings within an entity set that are distinctive from other entities in the set.

- These subgroupings become lower-level entity sets that have attributes or participate in relationships that do not apply to the higher-level entity set.
- Depicted by a *triangle* component labelled ISA (E.g. *customer* "is a" *person*).
- **Attribute inheritance** – a lower-level entity set inherits all the attributes and relationship participation of the higher-level entity set to which it is linked.

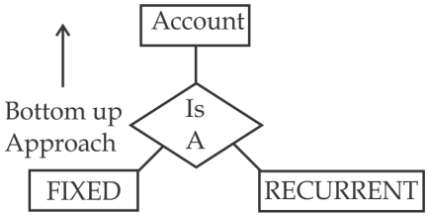
Specialization Example



Generalization

- A bottom-up design process – combine a number of entity sets that share the same features into a higher-level entity set.
- Specialization and generalization are simple inversions of each other; they are represented in an E-R diagram in the same way.
- The terms specialization and generalization are used interchangeably.

Generalization Example



Specialization and Generalization

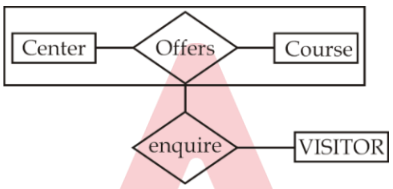
- Can have multiple specializations of an entity set based on different features.
- E.g. *permanent-employee* vs. *temporary-employee*, in addition to *officer* vs. *secretary* vs. *teller*
- Each particular employee would be a member of one of *permanent-employee* or *temporary-employee*, and also a member of one of *officer*, *secretary*, or *teller*
- The IS-A relationship also referred to as **superclass - subclass** relationship.

Aggregation

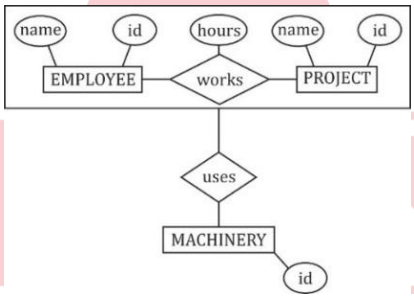
Aggregation is a process when relation between two entities is treated as a single entity. It is an abstraction that treats relationships as entities.

- Eliminate this redundancy via *aggregation*
- Treat relationship as an abstract entity
- Allows relationships between relationships
- Abstraction of relationship into new entity

Aggregation Example

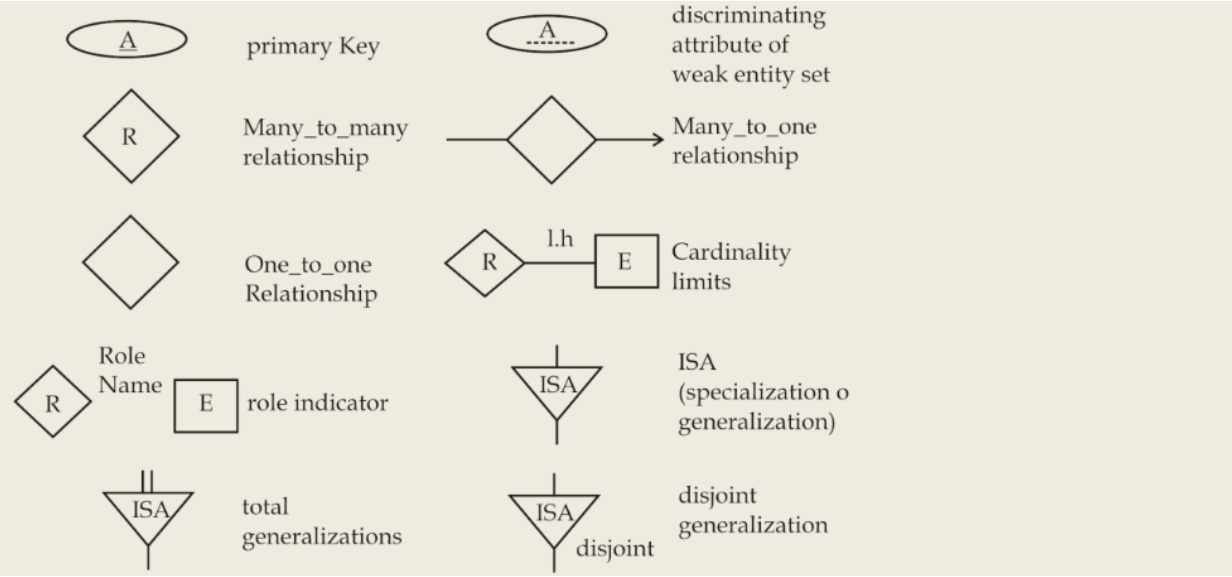


ER Diagram with Aggregation



Summary of Symbols Used in E-R Notation

E	Entity set		attribute
E	Weak entity set		Multivalued attribute
R	relationship set	A	Derived attribute
R	Identifying relationship set for weak entity set	R — E	total participation of entity set in relationship



2. Relational Database Management System

The relational model for database management is a data model based on predicate logic and set theory. It was invented by Edgar Codd. The fundamental assumption of the relational model is that all data are represented as mathematical n-ary **relations**, an n-ary relation being a subset of the Cartesian product of n sets.

n-ary Relationship
When there are n entities set participating in a relation, the relationship is called as n-ary relationship.

1) **Relation -** The fundamental organizational structure for data in the relational model is the relation. A relation is a two-dimensional table made up of rows and columns. Each relation also called a table, stores data about entities.
2) **Tuples -** The rows in a relation are called tuples. They represent specific occurrences (or records) of an entity. Each row consists of a sequence of values, one for each column in the table. In addition, each row (or record) in a table must be unique. A tuple variable is a variable that stand for a tuple.
3) **Attributes** – The column in a relation is called attribute. The attributes represent characteristics of an entity.
4) **Domain** – For each attribute there is a set of permitted values called domain of that attribute. For all relations 'r', the domain of all attributes of 'r' should be atomic. A domain is said to be **atomic** if elements of the domain are considered to be indivisible units.

Database Schema – Logical design of the database is termed as database schema.
Database instance – Database instance is a snapshot of the data in a database at a given instant of time.
Relation schema – The concept of relation schema corresponds to the programming notion of type definition. It can be considered as the definition of a domain of values. The database schema is the collection of relation schemas that define a database.
Relation instance – The concept of a relation instance corresponds to the programming language notion of a value of a variable. For relation instance, we actually mean the "relation" itself.

4.1 Database Keys

1. **Primary Key:** Which uniquely identifies a record in a table. Student_ID is the primary key in this STUDENT Table.
2. **Candidate Key:** A candidate key is a single field or the least combination of fields that uniquely identifies each record in the table. Every table must have at least one candidate key but at the same time can have several. For Example in the table STUDENT, Student_ID and Roll_No. Are Candidate keys.

Roll_No.	Student_ID
001	11093100
002	11093101
003	11093126
004	11093127

3. **Foreign Key:** A foreign key is generally a primary key from one table that appears as a field in another. For Example let us consider these two table STUDENT and LIBRARY_RECORD.

STUDENT

Roll_No.	Student_ID	Student_Name	Student_Class
001	11093100	Ravi Kumar	3
002	11093101	Nihal Sharma	4
003	11093126	Astha Mathur	3
004	11093127	Nishi Arora	5

LIBRARY_RECORD

Lib_CardNo	Student_ID	Student_Name	Address
AX120	11093101	Nihal Sharma	12th Avenue Street, Delhi
AX121	11093126	Astha Mathur	XYZ Lane,Delhi
BL101	11093127	Nishi Arora	5-D, Z Block, Delhi

In the table LIBRARY_RECORD Lib_CardNo. Is the Primary key and Student_ID is the foreign key as it is the primary key of the table STUDENT.

4. **Alternate Key:** The candidate key other than primary key is called as alternate key.
5. **Super Key:** The set of attributes which can uniquely identify a tuple is known as Super Key. For Example, Student_Enroll_No, (Student_ID, Student_Name) etc.

Non-key attributes are attributes other than candidate key attributes in a table. And Non-prime Attributes are attributes other than Primary attribute.

4.2 Relational Query Languages

Relational query languages use relational algebra to break the user requests and instruct the DBMS to execute the requests. It is the language by which user communicates with the database. These relational query languages can be procedural or non-procedural.

- In a procedural language, the user instructs the system to perform a sequence of operations on the database to compute the desired result.

- In a nonprocedural language, the user describes the desired information without giving a specific procedure for obtaining that information.

4.3 Relational Algebra

Relational algebra is a procedural query language. It takes one or more relations / tables and performs the operation and produce the result. This result is also considered as a new table or relation. Specifically, since the result of a relational query is itself a relation, relational operations can be applied to the results of queries as well as to the given set of relations.

An operator can be either unary or binary. Following are some operations of relational algebra:

1. **Selection operator (σ):** Selection operator is used to select tuples from a relation based on some condition.
   Syntax: $\sigma_{(Cond)}$(Relation Name)

   Example

   Extract employees whose age is greater than 30 from EMPLOYEES relation

   $\sigma_{(AGE>30)}$(EMPLOYEES)

2. **Project Operation (∏) :** It projects column(s) that satisfy a given predicate.
   Syntax: $\prod_{(Column\ 1,Column\ 2....Column\ n)}$(Relation Name)

   Example

   Extract EMP_ID and NAME from EMPLOYEE relation.

   $\prod_{(EMP\_ID,NAME)}$(EMPLOYEE)

3. **Union Operation (∪):** It performs binary union between two given relations. Union on two relations R1 and R2 can only be computed if R1 and R2 are union compatible (These two relation should have same number of attributes and corresponding attributes in two relations have same domain) . Duplicate tuples are automatically eliminated in union operation.
   Syntax: Relation1 U Relation2
   r ∪ s = { t | t ∈ r or t ∈ s}
   Note: r, and s must have the same number of attributes.

   Example

   Projects the names of th Employees who are Managers in IT_Dept or Managers in FUNC_Dept or Both

   ∏ Managers (IT_Dept) ∪ ∏ Managers(FUNCT_Dept)

4. **Minus (-):** Minus on two relations R1 and R2 can only be computed if R1 and R2 are union compatible. Minus operator when applied on two relations as R1-R2 will give a relation with tuples which are in R1 but not in R2.
   Syntax: Relation1 - Relation2

   Example

   Find person who are student but not employee, we can use minus operator like:

   ∏ Name (STUDENTS) – ∏ Name (EMPLOYEE)

5. **Rename(ρ):** Rename operator is used to give another name to a relation.
Syntax: ρ(Relation2, Relation1)

Example

To rename STUDENT relation to STUDENT1, we can use rename operator like:
ρ(STUDENT1, STUDENT)

6. **Cartesian Product (X):** The cartesian product of two tables combines each row in one table with each row in the other table. It combines tuples from two relations, but unlike the join operation, its result contains all pairs of tuples from the two relations, regardless of whether their attribute values match.
Syntax: r X s
Where r and s are relations and their output will be defined as –
r X s = { q t | q ∈ r and t ∈ s}

Tuple Relational Calculus

Relational calculus is a non-procedural query language. It uses mathematical predicate calculus instead of algebra. It provides the description about the query to get the result whereas relational algebra gives the method to get the result.

A query in the tuple relational calculus is expressed as: {t | P(t)}
i.e. the set of tuples for which predicate is true.

{t | EMPLOYEE (t) and t.SALARY>20000} - implies that it selects the tuples from EMPLOYEE relation such that resulting employee tuples will have salary greater than 20000. It is example of selecting a range of values.

Domain Relational Calculus

In the tuple relational calculus, you have use variables that have series of tuples in a relation. In the domain relational calculus, you will also use variables but in this case the variables take their values from domains of attributes rather than tuples of relations. An domain relational calculus expression has the following general format –

{d1, d2, . . . , dn | F(d1, d2, . . . , dm)} m ≥ n
where d1, d2, . . . , dn, . . . , dm stand for domain variables and F(d1, d2, . . . , dm) stands for a formula composed of atoms.

For example, select EMP_ID and EMP_NAME of employees who work for department ID 415

{<EMP_ID, EMP_NAME> | <EMP_ID, EMP_NAME> ? EMPLOYEE ∧ DEPT_ID = 415}

3. Normalization

Normalization is a process of organizing the data in database to avoid data redundancy, insertion anomaly, update anomaly & deletion anomaly. Thus, database normalization is a database schema design technique, by which an existing schema is modified to minimize redundancy and dependency of data.

What are Anomalies in Database Management?

Anomalies are inconvenient or error-prone situation arising when we process the tables. There are three types of anomalies:

1. **Update Anomalies:** Incorrect data may have to be changed, which could involve many records having to be changed, leading to the possibility of some changes being made incorrectly.
2. **Delete Anomalies:** A record of data can legitimately be deleted from a database, and the deletion can result in the deletion of the only instance of other, required data, E.g. Deleting a book loan from a library member can remove all details of the particular book from the database such as the author, book title etc

Insert Anomalies: The nature of a database may be such that it is not possible to add a required piece of data unless another piece of unavailable data is also added. E.g. A library database that cannot store the details of a new member until that member has taken out a book.

Shortcut Keys

Frequently used short cut keys

To do this	Press
Go to "Tell me what you want to do"	Alt+Q
Open	Ctrl+O
Save	Ctrl+S
Close	Ctrl+W
Cut	Ctrl+X
Copy	Ctrl+C
Paste	Ctrl+V
Select all	Ctrl+A
Bold	Ctrl+B
Italic	Ctrl+I
Underline	Ctrl+U
Decrease font size 1 point	Ctrl+[
Increase font size 1 point	Ctrl+]
Centre text	Ctrl+E
Left align text	Ctrl+L
Right align text	Ctrl+R
Justify align text	Ctrl+J
Cancel	Esc
Undo	Ctrl+Z
Re-do	Ctrl+Y
Zoom	Alt+W, Q, then tab in Zoom dialog box to the value you want.
Copy formatting from text.	Ctrl+Shift+C
Apply copied formatting to text.	Ctrl+Shift+V

Create and edit documents

To do this	Press
Split the document window.	Alt+Ctrl+S
Remove the document window split.	Alt+Shift+C or Alt+Ctrl+S
Save a document.	Ctrl+S

Delete text and graphics

To do this	Press
Delete one character to the left.	Backspace
Delete one word to the left.	Ctrl+Backspace
Delete one character to the right.	Delete
Delete one word to the right.	Ctrl+Delete
Cut selected text to the Office Clipboard.	Ctrl+X
Undo the last action.	Ctrl+Z

Cut to the Spike. (Spike is a feature that allows you to collect groups of text from different locations and paste them in another location).	Ctrl+F3

Find, replace and go to specific items in the document

To do this	Press
Open the search box in the **Navigation** task pane.	Ctrl+F
Replace text, specific formatting, and special items.	Ctrl+H
Go to a page, bookmark, footnote, table, comment, graphic, or other location.	Ctrl+G
Switch between the last four places that you have edited.	Alt+Ctrl+Z

Work with documents in different views

To do this	Press
Switch to Read Mode view	Alt+W, F
Switch to Print Layout view.	Alt+Ctrl+P
Switch to Outline view.	Alt+Ctrl+O
Switch to Draft view.	Alt+Ctrl+N

Change Paragraph Alignment

To do this	Press
Remove a paragraph indent from the left.	Ctrl+Shift+M
Create a hanging indent.	Ctrl+T
Reduce a hanging indent.	Ctrl+Shift+T
Remove paragraph formatting.	Ctrl+Q

Insert Special Characters

To insert this	Press
A field	Ctrl+F9
A line break	Shift+Enter
A page break	Ctrl+Enter
A column break	Ctrl+Shift+Enter
An em dash	Alt+Ctrl+Minus Sign (on the numeric keypad)
An en dash	Ctrl+Minus Sign (on the numeric keypad)
An optional hyphen	Ctrl+Hyphen
A nonbreaking hyphen	Ctrl+Shift+Hyphen
A nonbreaking space	Ctrl+Shift+Spacebar
The copyright symbol	Alt+Ctrl+C
The registered trademark symbol	Alt+Ctrl+R
The trademark symbol	Alt+Ctrl+T
An ellipsis	Alt+Ctrl+Period
A single opening quotation mark	Ctrl+`(single quotation mark), `(single quotation mark)
A single closing quotation mark	Ctrl+' (single quotation mark), ' (single quotation mark)
Double opening quotation marks	Ctrl+` (single quotation mark), Shift+' (single quotation mark)
Double closing quotation marks	Ctrl+' (single quotation mark), Shift+' (single quotation mark)
An AutoText entry	Enter (after you type the first few characters of the AutoText entry name and when the ScreenTip appears)

MS Power Point Short cut Keys

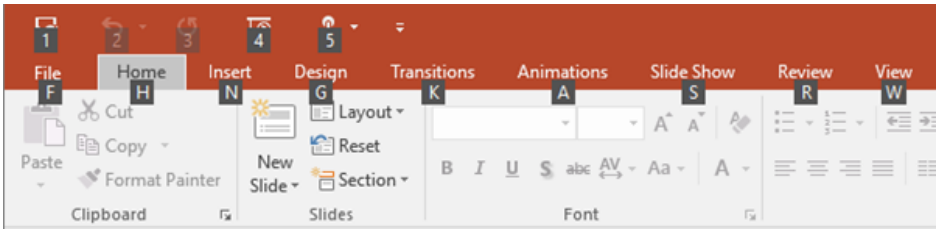
Frequently used shortcuts

The following table itemizes the most frequently used shortcuts in PowerPoint.

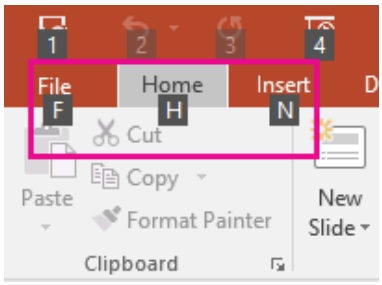
To do this	Press
Make selected text bold.	Ctrl+B
Change the font size for selected text.	Alt+H, F, and then S
Change the zoom for the slide.	Alt+W, Q
Cut selected text, object, or slide.	Ctrl+X
Copy selected text, object, or slide.	Ctrl+C
Paste cut or copied text, object, or slide.	Ctrl+V
Undo the last action.	Ctrl+Z
Save the presentation.	Ctrl+S
Insert a picture.	Alt+N, P
Insert a shape.	Alt+H, S, and then H
Select a theme.	Alt+G, H
Select a slide layout.	Alt+H, L
Go to the next slide.	Page Down
Go to the previous slide.	Page Up
Go to the Home tab.	Alt+H
Move to the Insert tab.	Alt+N
Start the slide show.	Alt+S,B
End the slide show.	Esc
Close PowerPoint.	Alt+F, X

Use access keys when you can see the Key Tips

In PowerPoint 2016, you can use Key Tips to get to things on the ribbon. You can display Key Tips, which are the letters used to access commands, and then use them to navigate in the ribbon.



1. Press Alt. The Key Tips appear in small squares by each ribbon command.
2. To select a command, press the letter shown in the square Key Tip that appears by it. For example, press F to open the **File** Tab; H to open the **Home** Tab; N to open the **Insert** Tab, and so on.



Depending on which letter you press, you may be shown additional Key Tips. For example, if you press Alt+F, Backstage view opens on the **Info** page, which has a different set of Key Tips.

Work with shapes, pictures, boxes, objects, and WordArt

Insert a shape

1. To select **Shapes**, press Alt+N, S, and then H.
2. Use the arrow keys to move through the categories of shapes, and select the shape you want.
3. Press Ctrl+Enter to insert the shape.

Insert a text box

1. Press Alt+N, X.
2. Press Ctrl+Enter to insert the text box.

Insert an object

1. To select **Object**, press Alt+N, and J .
2. To move the focus to the **Object type** list, press Tab.
3. Press Ctrl+Enter to insert the object.

Insert WordArt

1. To select **WordArt**, press Alt+N, W .
2. Use the arrow keys to select the WordArt style you want, and press Enter.
3. Type your text.

Select a shape

NOTE: If your cursor is within text, press Esc before using this shortcut.

- To select a single shape, press the Tab key to cycle forward (or Shift+Tab to cycle backward) through the objects until sizing handles appear on the object you want.

Group or ungroup shapes, pictures, and WordArt objects

- To group shapes, pictures, or WordArt objects, select the items that you want to group, and press Ctrl+G.
- To ungroup a group, select the group, and press Ctrl+Shift+G.

Copy the attributes of a shape

1. Select the shape with the attributes you want to copy.

NOTE: If you select a shape with text, you copy the look and style of the text in addition to the attributes of the shape.

2. To copy the object attributes, press Ctrl+Shift+C.
3. To select the object you want to copy the attributes to, press the Tab key or Shift+Tab.
4. To paste the attributes of the shape to the selected object, press Ctrl+Shift+V.

Select and edit text and objects

To do this	Press
Select one character to the right.	Shift+Right Arrow
Select one character to the left.	Shift+Left Arrow
Select to the end of a word.	Ctrl+Shift+Right Arrow
Select to the beginning of a word.	Ctrl+Shift+Left Arrow
Select one line up (with the cursor at the beginning of a line).	Shift+Up Arrow
Select one line down (with the cursor at the beginning of a line).	Shift+Down Arrow

Select an object (when the text inside the object is selected).	ESC
Select another object (when one object is selected).	Tab or Shift+Tab until the object you want is selected
Send object back one position.	Ctrl+[
Send object forward one position.	Ctrl+]
Send object to back.	Ctrl+Shift+[
Send object to front.	Ctrl+Shift+]
Select text within an object (with an object selected).	Enter
Select all objects.	Ctrl+A (on the **Slides** tab)
Play or pause media.	Ctrl+SPACE
Select all slides.	Ctrl+A (in **Slide Sorter** view)
Select all text.	Ctrl+A (on the **Outline** tab)

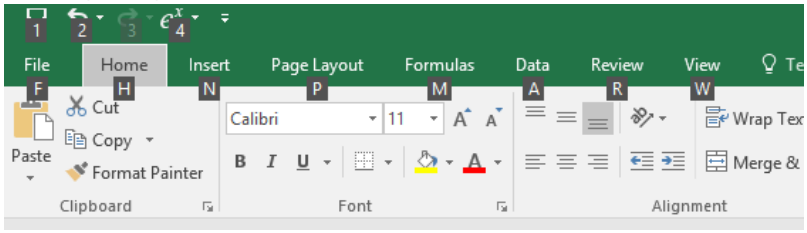
Excel Shortcut Keys

Frequently used shortcuts Keys

To do this	Press
Close a spreadsheet	Ctrl+W
Open a spreadsheet	Ctrl+O
Go to the **Home** tab	Alt+H
Save a spreadsheet	Ctrl+S
Copy	Ctrl+C
Paste	Ctrl+V
Undo	Ctrl+Z
Remove cell contents	Delete key
Choose a fill color	Alt+H, H
Cut	Ctrl+X
Go to **Insert** tab	Alt+N
Bold	Ctrl+B
Center align cell contents	Alt+H, A, then C
Go to **Page Layout** tab	Alt+P
Go to **Data** tab	Alt+A
Go to **View** tab	Alt+W
Open context menu	Shift+F10, or Context key
Add borders	Alt+H, B
Delete column	Alt+H,D, then C
Go to **Formula** tab	Alt+M
Hide the selected rows	Ctrl+9
Hide the selected columns	Ctrl+0

Ribbon keyboard shortcuts

When you press the Alt key, letters appear in small images, called KeyTips, next to tabs and commands on the ribbon, as shown in the following image.



(Key Tip badges appearing on ribbon)

You can combine these letters with Alt to make shortcuts called Access Keys for ribbon commands. For example, Alt+H opens the Home tab, and Alt+Q goes to the Tell me box. Press Alt again to see KeyTips for the commands on any tab.

To do this	Press
Open the **Tell me** box on the Ribbon and type a search term for assistance or Help content.	Alt+Q, and then enter the search term.
Open the File page and use Backstage view.	Alt+F
Open the Home tab and format text and numbers and use the Find tool.	Alt+H

Open the Insert tab and insert PivotTables, charts, add-ins, Sparklines, pictures, shapes, headers, or text boxes.	Alt+N
Open the Page Layout tab and work with themes, page setup, scale, and alignment.	Alt+P
Open the Formulas tab and insert, trace, and customize functions and calculations.	Alt+M
Open the Data tab and connect to, sort, filter, analyze, and work with data.	Alt+A
Open the Review tab and check spelling, add comments, and protect sheets and workbooks.	Alt+R
Open the View tab and preview page breaks and layouts, show and hide gridlines and headings, set zoom magnification, manage windows and panes, and view macros.	Alt+W

Format in cells: keyboard shortcuts

To do this	Press
Move to the previous cell in a worksheet or the previous option in a dialog box.	Shift+Tab
Move one cell up in a worksheet.	Up Arrow key
Move one cell down in a worksheet.	Down Arrow key
Move one cell left in a worksheet.	Left Arrow key
Move one cell right in a worksheet.	Right Arrow key
Move to the edge of the current data region in a worksheet.	Ctrl+arrow key
Enter End mode, move to the next nonblank cell in the same column or row as the active cell, and turn off End mode. If the cells are blank, move to the last cell in the row or column.	End, arrow key
Move to the last cell on a worksheet, to the lowest used row of the rightmost used column.	Ctrl+End
Extend the selection of cells to the last used cell on the worksheet (lower-right corner).	Ctrl+Shift+End
Move to the cell in the upper-left corner of the window when Scroll Lock is turned on.	Home+Scroll Lock
Move to the beginning of a worksheet.	Ctrl+Home
Move one screen down in a worksheet.	Page Down
Move to the next sheet in a workbook.	Ctrl+Page Down
Move one screen to the right in a worksheet.	Alt+Page Down
Move one screen up in a worksheet.	Page Up
Move one screen to the left in a worksheet.	Alt+Page Up
Move to the previous sheet in a workbook.	Ctrl+Page Up
Move one cell to the right in a worksheet. Or, in a protected worksheet, move between unlocked cells.	Tab

Format in cells: keyboard shortcuts

To do this	Press
Open the Format Cells dialog box.	Ctrl+1
Format fonts in the Format Cells dialog box.	Ctrl+Shift+F or Ctrl+Shift+P
Edit the active cell and put the insertion point at the end of its contents. Or, if editing is turned off for the cell, move the insertion point into the formula bar. If editing a formula, toggle Point mode off or on so you can use arrow keys to create a reference.	F2
Add or edit a cell comment.	Shift+F2

Open the Insert dialog to insert blank cells.	Ctrl+Shift+Plus (+)
Open the Delete dialog box to delete selected cells.	Ctrl+Minus (-)
Enter the current time.	Ctrl+Shift+colon (:)
Enter the current date.	Ctrl+semi-colon (;)
Switch between displaying cell values or formulas in the worksheet.	Ctrl+grave accent (`)
Copy a formula from the cell above the active cell into the cell or the Formula Bar.	Ctrl+apostrophe (')
Move the selected cells.	Ctrl+X
Copy the selected cells.	Ctrl+C
Paste content at the insertion point, replacing any selection.	Ctrl+V
Open the Paste Special dialog box.	Ctrl+Alt+V
Italicize text or remove italic formatting.	Ctrl+I or Ctrl+3
Bold text or remove bold formatting.	Ctrl+B or Ctrl+2
Underline text or remove underline.	Ctrl+U or Ctrl+4
Apply or remove strikethrough formatting.	Ctrl+5
Switch between hiding objects, displaying objects, and displaying placeholders for objects.	Ctrl+6
Apply an outline border to the selected cells.	Ctrl+Shift+ampersand (&)
Remove the outline border from the selected cells.	Ctrl+Shift+underline (_)
Display or hide the outline symbols.	Ctrl+8

Work with data, functions, and the formula bar: keyboard shortcuts

To do this	Press
Select an entire PivotTable report.	Ctrl+Shift+asterisk (*)
Edit the active cell and put the insertion point at the end of its contents. Or, if editing is turned off for the cell, move the insertion point into the formula bar. If editing a formula, toggle Point mode off or on so you can use arrow keys to create a reference.	F2
Expand or collapse the formula bar.	Ctrl+Shift+U
Cancel an entry in the cell or Formula Bar.	Esc
Complete an entry in the formula bar and select the cell below.	Enter
Move the cursor to the end of the text when in the formula bar.	Ctrl+End
Select all text in the formula bar from the cursor position to the end.	Ctrl+Shift+End
Calculate all worksheets in all open workbooks.	F9
Calculate the active worksheet.	Shift+F9
Display the Function Arguments dialog box when the insertion point is to the right of a function name in a formula.	Ctrl+A
Insert argument names and parentheses when the insertion point is to the right of a function name in a formula.	Ctrl+Shift+A
Invoke Flash Fill to automatically recognize patterns in adjacent columns and fill the current column	Ctrl+E
Cycle through all combinations of absolute and relative references in a formula if a	F4

cell reference or range is selected.	
Insert a function.	Shift+F3
Create a chart of the data in the current range in a separate Chart sheet.	F11
Define a name to use in references.	Alt+M, M, D
Paste a name from the Paste Name dialog box (if names have been defined in the workbook.	F3
Move to the first field in the next record of a data form.	Enter
Create, run, edit, or delete a macro.	Alt+F8

FILE EXTENSIONS

Windows file names have two parts; the file's name, then a period followed by the extension (suffix). The extension is a three- or four-letter abbreviation that signifies the file type. For example, in application.docx the filename is application and the extension is docx. The file extension helps an operating system, like Windows, determine which program on your computer the file is associated with.

Starting with the 2007 Microsoft Office system, Microsoft Office uses the XML-based file formats, such as .docx, .xlsx, and .pptx. These formats and file name extensions apply to Microsoft Word, Microsoft Excel, and Microsoft PowerPoint.

Word

XML file type	Extension
Document	.docx
Macro-enabled document	.docm
Template	.dotx
Macro-enabled template	.dotm

Excel

XML file type	Extension
Workbook	.xlsx
Macro-enabled workbook	.xlsm
Template	.xltx
Macro-enabled template	.xltm
Non-XML binary workbook	.xlsb
Macro-enabled add-in	.xlam

PowerPoint

XML file type	Extension
Presentation	.pptx
Macro-enabled presentation	.pptm
Template	.potx
Macro-enabled template	.potm
Macro-enabled add-in	.ppam
Show	.ppsx
Macro-enabled show	.ppsm
Slide	.sldx
Macro-enabled slide	.sldm
Office theme	.thmx

CHAPTE – 04

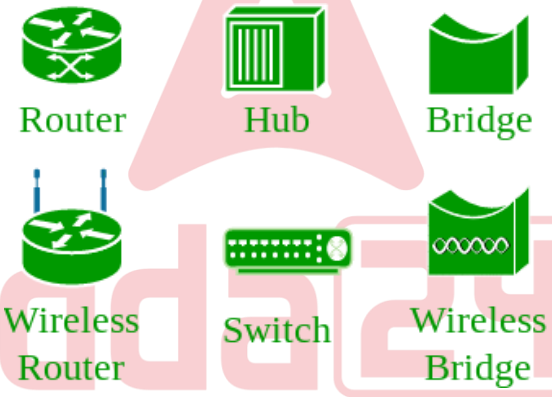
BASIC OF NETWORKING AND CYBER SECURITY

Basics of Computer Networking

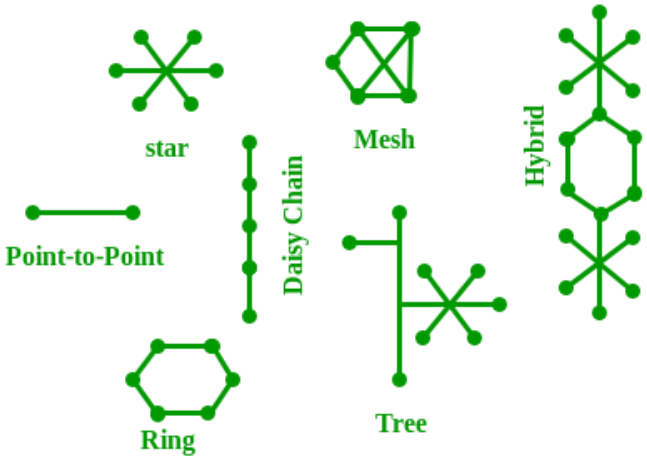
Open system:
A system which is connected to the network and is ready for communication.

Closed system:
A system which is not connected to the network and can't be communicated with.

Computer Network:
An interconnection of multiple devices, also known as hosts, that are connected using multiple paths for the purpose of sending/receiving data or media. Computer networks can also include multiple devices/mediums which help in the communication between two different devices; these are known as **Network devices** and include things such as routers, switches, hubs, and bridges.



Network Topology:
The layout arrangement of the different devices in a network. Common examples include: Bus, Star, Mesh, Ring, and Daisy chain.



OSI:

OSI stands for **Open Systems Interconnection**. It is a reference model that specifies standards for communications protocols and also the functionalities of each layer.

Protocol:

A protocol is the set of rules or algorithms which define the way how two entities can communicate across the network and there exists different protocol defined at each layer of the OSI model. Few of such protocols are TCP, IP, UDP, ARP, DHCP, FTP and so on.

Cyber Security

Cyber Security is the practice of Protecting computers, mobile devices, Servers, electronic Systems, networks, and data from malicious attacks. It's also known as Information Security (INFOSEC), Information Assurance (IA), or System Security. Cyber Security is important because the government, Corporate, medical organizations collect, military, financial, process, and store the unprecedented amount of data on a computer and other property, personal information, or exposure could have negative consequences.

Cyber Security proper began in 1972 with a research project on ARPANET (The Advanced Research Projects Agency Network), a precursor to the internet. ARPANET developed protocols for remote computer networking. Example – If we shop from any online shopping website and share information like email id, address, and credit card details as well as saved on that website to enable a faster and hassle-free shopping experience, then the required information is stored on a server one day we receive an email which state that the eligibility for a special discount voucher from XXXXX (hacker use famous website Name like Flipkart, Amazon, etc.) website to receive the coupon code, and we will be asked to fill the details then we will use saved card account credentials. Then our data will be shared because we think it was just an account for the verification step, then they can wipe a substantial amount of money from our account.

That is why Cyber Security provides services as a Security Gate-Way to make information more Secure; in today's time, hackers are advanced. We can't surely say whether the data stored in my Devices is safe from outside threats. With Cybercrime increasing rapidly, it's crucial to have Cyber Security in place in our personal life and our Business.

Cyber-attack :

A cyber-attack is a deliberate attempt by external or internal threats or attackers to exploit and compromise the integrity and confidentiality of the information system of a target organization.

Cyber-attacks come in a wide variety, and the following list highlights some of the important ones that criminals and attackers use to exploit software:

1. Malware
2. Ransomware
3. Injection attacks
4. Session management and Man-in-the-Middle attacks
5. Phishing
6. Denial of service
7. Privilege escalations
8. Unpatched/Vulnerable software

Types of Network Protocols

There are three main types of network protocols. These include network management protocols, network communication protocols and network security protocols:

- **Communication protocols** include basic data communication tools like *TCP/IP* and *HTTP*.
- **Management protocols** maintain and govern the network through protocols such as *ICMP* and *SNMP*.
- **Security protocols** include *HTTPS*, *SFTP*, and *SSL*.

Network Communication Protocols

Communication protocols are vital to the functioning of a network. In fact, computer networks can't exist without these protocols. These protocols formally describe the formats and rules by which data is transferred over the network. This is a must-have for exchanging messages between your computing systems and in telecommunications, applying to both hardware and software. Communication protocols also handle authentication and error detection as well as the syntax, synchronization and semantics that both analog and digital communications must abide by to function.

- **HTTP** – One of the most familiar protocols, *hyper text transfer protocol (HTTP)* is often referred to as the protocol of the internet. HTTP is an application layer protocol that allows the browser and server to communicate.
- **TCP** – *Transmission Control Protocol (TCP)* separates data into packets that can be shared over a network. These packets can then be sent by devices like switches and routers to the designated targets.
- **UDP** – *User Datagram Protocol (UDP)* works in a similar way to TCP, sending packets of data over the network. The key difference between the two is that TCP ensures a connection is made between the application and server, but UDP does not.
- **IRC** – *Internet Relay Chat (IRC)* is a text-based communication protocol. Software clients are used to communicate with servers and send messages to other clients. This protocol works well on networks with a large number of distributed machines.

Network Management Protocols

Network management protocols help define the policies and procedures used to monitor, manage and maintain your computer network, and help communicate these needs across the network to ensure stable communication and optimal performance across the board.

Generally, network managers can use a management protocol to troubleshoot connections between host and client devices. Management protocols provide network managers with the host connection's status, availability, packet or data loss, and other related information about the health of the network connection.

The policies managed by management protocols can be applied to all devices on the network, including computers, switches, routers and even servers.

Two of the most common types of network management protocols include *Simple Network Management Protocol (SNMP)* and *Internet Control Message Protocol (ICMP)*.

- **SNMP** – *Simple Network Management Protocol (SNMP)* is used to monitor and manage network devices. This TCP-based protocol allows administrators to view and modify endpoint information to alter behavior of devices across the network. SNMP relies on the use of agents to collect and send data to an overarching SMNP manager, which in turn queries agents and gets their responses.
- **ICMP** – *Internet Control Message Protocol (ICMP)* is primarily used for diagnostic purposes. Managed devices on the network can use this protocol to send error messages, providing information regarding network connectivity issues between devices.

Network Security Protocols

Network security protocols work to ensure that data in transit over the network's connections stays safe and secure. These protocols also define how the network secures data from any attempts to review or extract said data by illegitimate means. This helps ensure that no unauthorized users, services, or devices access your network data, and this works across all data types and network mediums being used.

Usually, network security protocols rely on encryption and cryptography to secure data so that only special algorithms, formulas and logical keys can make this data accessible. Some of the most popular protocols for network security include Secure Socket Layer (SSL), Secure File Transfer Protocol (SFTP) and Secure Hypertext Transfer Protocol (HTTPS).

- **SSL** – A *Secure Socket Layer (SSL)* is a network security protocol primarily used for ensuring secure internet connections and protecting sensitive data. This protocol can allow for server/client communication as well as server/server communication. Data transferred with SSL is encrypted to prevent it from being readable.
- **SFTP** – *Secure File Transfer Protocol (SFTP)*, as its name might suggest, is used to securely transfer files across a network. Data is encrypted and the client and server are authenticated.
- **HTTPS** – *Secure Hypertext Transfer Protocol* is the secure version of HTTP. Data sent between the browser and server are encrypted to ensure protection.

1. **Repeater** – A repeater operates at the physical layer. Its job is to regenerate the signal over the same network before the signal becomes too weak or corrupted so as to extend the length to which the signal can be transmitted over the same network. An important point to be noted about repeaters is that they do not amplify the signal. When the signal becomes weak, they copy the signal bit by bit and regenerate it at the original strength. It is a 2 port device.
2. **Hub** – A hub is basically a multiport repeater. A hub connects multiple wires coming from different branches, for example, the connector in star topology which connects different stations. Hubs cannot filter data, so data packets are sent to all connected devices. In other words, the collision domain of all hosts connected through Hub remains one. Also, they do not have the intelligence to find out the best path for data packets which leads to inefficiencies and wastage.
3. **Bridge** – A bridge operates at the data link layer. A bridge is a repeater, with add on the functionality of filtering content by reading the MAC addresses of source and destination. It is also used for interconnecting two LANs working on the same protocol. It has a single input and single output port, thus making it a 2 port device.
4. **Switch** – A switch is a multiport bridge with a buffer and a design that can boost its efficiency (a large number of ports imply less traffic) and performance. A switch is a data link layer device. The switch can perform error checking before forwarding data, which makes it very efficient as it does not forward packets that have errors and forward good packets selectively to the correct port only. In other words, the switch divides the collision domain of hosts, but broadcast domain remains the same.
5. **Routers** – A router is a device like a switch that routes data packets based on their IP addresses. The router is mainly a Network Layer device. Routers normally connect LANs and WANs together and have a dynamically updating routing table based on which they make decisions on routing the data packets. Router divide broadcast domains of hosts connected through it.
6. **Gateway** – A gateway, as the name suggests, is a passage to connect two networks together that may work upon different networking models. They basically work as the messenger agents that take data from one system, interpret it, and transfer it to another system. Gateways are also called protocol converters and can operate at any network layer. Gateways are generally more complex than switches or routers. Gateway is also called a protocol converter.
7. **NIC** – NIC or network interface card is a network adapter that is used to connect the computer to the network. It is installed in the computer to establish a LAN. It has a unique id that is written on the chip, and it has a connector to connect the cable to it. The cable acts as an interface between the computer and router or modem. NIC card is a layer 2 device which means that it works on both physical and data link layer of the network model.

Threats to Information Security

Information Security threats can be many like Software attacks, theft of intellectual property, identity theft, theft of equipment or information, sabotage, and information extortion.

Threat can be anything that can take advantage of a vulnerability to breach security and negatively alter, erase, harm object or objects of interest.

Software attacks means attack by Viruses, Worms, Trojan Horses etc. Many users believe that malware, virus, worms, bots are all same things. But they are not same, only similarity is that they all are malicious software that behaves differently.

Malware is a combination of 2 terms- Malicious and Software. So Malware basically means malicious software that can be an intrusive program code or anything that is designed to perform malicious operations on system. Malware can be divided in 2 categories:

1. Infection Methods
2. Malware Actions

Malware on the **basis of Infection**

1. **Virus –** They have the ability to replicate themselves by hooking them to the program on the host computer like songs, videos etc and then they travel all over the Internet. The Creeper Virus was first detected on ARPANET. Examples include File Virus, Macro Virus, Boot Sector Virus, Stealth Virus etc.
2. **Worms –** Worms are also self-replicating in nature but they don't hook themselves to the program on host computer. Biggest difference between virus and worms is that worms are network-aware. They can easily travel from one computer to another if network is available and on the target machine they will not do much harm, they will, for example, consume hard disk space thus slowing down the computer.
3. **Trojan –** The Concept of Trojan is completely different from the viruses and worms. The name Trojan is derived from the 'Trojan Horse' tale in Greek mythology, which explains how the Greeks were able to enter the fortified city of Troy by hiding their soldiers in a big wooden horse given to the Trojans as a gift. The Trojans were very fond of horses and trusted the gift blindly. In the night, the soldiers emerged and attacked the city from the inside.
   Their purpose is to conceal themselves inside the software that seem legitimate and when that software is executed they will do their task of either stealing information or any other purpose for which they are designed.
   They often provide backdoor gateway for malicious programs or malevolent users to enter your system and steal your valuable data without your knowledge and permission. Examples include FTP Trojans, Proxy Trojans, Remote Access Trojans etc.
4. **Bots –**: can be seen as advanced form of worms. They are automated processes that are designed to interact over the internet without the need for human interaction. They can be good or bad. Malicious bot can infect one host and after infecting will create connection to the central server which will provide commands to all infected hosts attached to that network called **Botnet.**

Malware on the **basis of Actions:**

1. **Adware –** Adware is not exactly malicious but they do breach privacy of the users. They display ads on a computer's desktop or inside individual programs. They come attached with free-to-use software, thus main source of revenue for such developers. They monitor your interests and display relevant ads. An attacker can embed malicious code inside the software and adware can monitor your system activities and can even compromise your machine.
2. **Spyware –** It is a program or we can say software that monitors your activities on computer and reveal collected information to an interested party. Spyware are generally dropped by Trojans, viruses or worms. Once dropped they install themselves and sits silently to avoid detection.
3. One of the most common examples of spyware is KEYLOGGER. The basic job of keylogger is to record user keystrokes with timestamp. Thus capturing interesting information like username, passwords, credit card details etc.
4. **Ransomware –** It is type of malware that will either encrypt your files or will lock your computer making it inaccessible either partially or wholly. Then a screen will be displayed asking for money i.e. ransom in exchange.

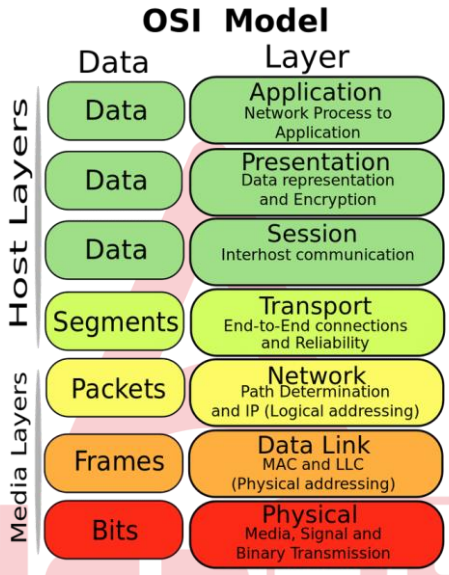
5. **Scareware –** It masquerades as a tool to help fix your system but when the software is executed it will infect your system or completely destroy it. The software will display a message to frighten you and force to take some action like pay them to fix your system.
6. **Rootkits –** are designed to gain root access or we can say administrative privileges in the user system. Once gained the root access, the exploiter can do anything from stealing private files to private data.
7. **Zombies –** They work similar to Spyware. Infection mechanism is same but they don't spy and steal information rather they wait for the command from hackers.

OSI Model:

OSI (Open System Interconnection) Model was developed by International Standards Organisation (ISO) to standardize the network architecture internationally.

The purpose of the OSI Model is to show how facilitate communication between different system without requiring changes to the logic of the underlying hardware and software. OSI model is not a protocol; it is a model for understanding and designing a network architecture that is flexible, robust and interoperable.

It is a layered framework having seven layers. The layers communicate with each other in a hierarchical manner where control is passed from one layer to another in the hierarchy beginning from the application layer at one computer, then to the bottom layer of that computer. From here the control passes to the bottom layer of the next computer and then back up in the hierarchy.



Layers in the OSI Model:

Layer 1-Physical layer:

Physical layer coordinates the function required to carry a bit stream over a physical medium.

It defines the mechanical, electrical & physical specifications of the interface & the transmission medium used for communication. It determines how a cable is attached with LAN card & is responsible for transmitting bit stream from one computer to another. Fast Ethernet, ATM etc are some of the protocols that exist here.

The Physical Layer is responsible for movements of individual bits from one hop(node) to the next.

Functions of Physical Layer:

- Physical Characteristics of interface and medium: It defines the characteristics of the interface between the device and the transmission medium.
- Representation of bits: Data in this layer consists of stream of bits. The bits must be encoded into signals for transmission. It defines the type of encoding i.e. how 0's and 1's are changed to signal.
- Data Rate:This layer defines the rate of transmission which is the number of bits per second.
- Synchronization of bits: It deals with the synchronization of the transmitter and receiver. The sender and receiver are synchronized at bit level.
- Line Configuration:The Physical layer is concerned with the connection of devices to the media. It connect the device in Point-to-Point and Multipoint configuration.
- Physical Topology:The Physical topology defines how devices are connected to make a network.

- Transmission Mode: The physical layer also defines the direction of transmission between two device: simplex, half duplex or full duplex.

Layer 2-Data Link Layer:

Data link layer is most reliable node to node delivery of data. It forms frames from the packets that are received from network layer and gives it to physical layer. It also synchronizes the information which is to be transmitted over the data. Error controlling is easily done. The encoded data are then passed to physical.

Error detection bits are used by the data link layer. It also corrects the errors. Outgoing messages are assembled into frames. Then the system waits for the acknowledgement to be received after the transmission. It is reliable to send message.

Data link layer has two sub-layers:

Logical Link Control: It deals with protocols, flow-control, and error control
Media Access Control: It deals with actual control of media

Responsibility of the data link layer:

- **Framing:** The datalink layer divides the stream of bits receive from the network layer into manageable data units called frames.
- **Physical addressing:**The Data Link layer adds a header to the frame in order to define physical address of the sender or receiver of the frame, if the frames are to be distributed to different systems on the network.
- **Flow control:** If the rate at which the data are absorbed by the receiver is less than the rate at which data are produced in the sender, the data link layer imposes a flow control mechanism to avoid overwhelming the receiver.
- **Error control:** The data link layer adds reliability to the physical layer by adding mechanisms to detect and retransmit damaged or lost frames.It also uses a mechanism to recognize duplicate frames.
- **Access control:**When two or more devices are connected to the same link, data link layer protocols are necessary to determine which device has control over the link at any given time.

Layer 3-Network Layer:

The network layer is responsible for the source-to-destination delivery of a packet, possibly across multiple networks(links). The function of network layer called routing.

Responsibility of network layer:

- **Logical addressing**: It translates logical network address into physical address. Concerned with circuit, message or packet switching.
- **Routing**: When independent networks or links are connected to create internetworks (networks of networks) or a large networks, the connecting device(called routers or switches) routes or switch the packets to their final destinations.

Layer 4-Transport Layer:

The transport layer is responsible for process-to-process delivery of the entire message. A process is an application program running on a host. whereas the network layer oversees source-to-destination delivery of individual packets, it does not recognize any relationship between those packets.
The transport layer on the other hand, ensure that the whole message arrives intact and in order, overseeing both error control and flow control at the source-to-destination level.

Responsibility of the transport layer:

- **service-point addressing:**Transport Layer header includes service point address which is port address. This layer gets the message to the correct process on the computer unlike Network Layer, which gets each packet to the correct computer.

- **Segmentation and reassembly:**A message is divided into segments; each segment contains sequence number, which enables this layer in reassembling the message. Message is reassembled correctly upon arrival at the destination and replaces packets which were lost in transmission.
- **Connection Control:** The transport layer can be either connectionless or connection-oriented. A connectionless transport layer treats each segments as an independent packet and delivers it to the transport layer at the destination mechine. A connection-oriented transport layer makes a connection with the transport layer at the destination machnine first before delivering the packets. After all the data are transfer, the connection is terminated.
- **Flow control:**In this layer, flow control is performed end to end.
- **Error control**:Error Control is performed end to end in this layer to ensure that the complete message arrives at the receiving transport layer without any error. Error Correction is done through retransmission.

Layer 5-Session Layer:

The session layer is the network dialog controller. It establishes, maintains and synchronizes the interaction among communicating system.

Responsibilities of the session layer:

- **Dialog Control:** The session layer allows two systems to enter into dialog. It allows the communication between two process to take place in either half-dulex or full duplex mode.
- **Synchronization:** The session layer allows a process to add checkpoints, or synchronization points, to a stream of data.

Layer 6-Presentation Layer:

The presentation layer is concerned with the syntax and semantics of the information exchange between two systems.

Responsibilities of Presentation layer:

- **Translation:** Before being transmitted, information in the form of characters and numbers should be changed to bit streams. The presentation layer is responsible for interoperability between encoding methods as different computers use different encoding methods. It translates data between the formats the network requires and the format the computer.
- **Encryption:** To carry sensitive information, a system must be able to ensure privacy. Encryption means that the sender transforms the original information to another form and sends the resulting message out over the network. Decryption reverse the original process to transform the message back to its original form.
- **Compression:** Data compression reduce the number of bits contained in the information. Data compression becomes particularly important in the transmission of multimedia such as text, audio and video.

Layer 7-Application Layer:

The application layer enables the user, whether human or software, to access the network. It provides user interface and support for services such as electronic mail, remote file access and transfer, a shared database management,and other type of distributed information services.

Services provided by application layer:

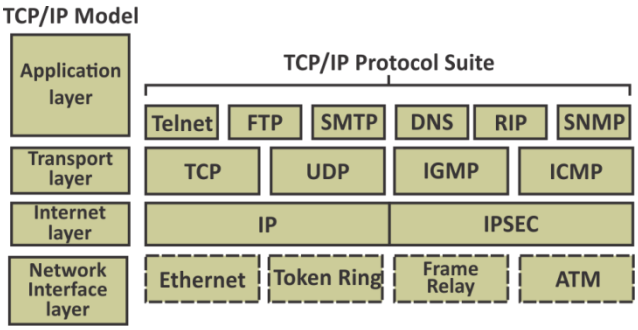
- **Network Virtual terminal:**It allows a user to log on to a remote host. The application creates software emulation of a terminal at the remote host. User's computer talks to the software terminal which in turn talks to the host and vice versa. Then the remote host believes it is communicating with one of its own terminals and allows user to log on.
- **File transfer, access, and management:**It is a standard mechanism to access files and manages it. Users can access files in a remote computer and manage it. They can also retrieve files from a remote computer.
- **Mail Services:** This layer provides the basis for E-mail forwarding and storage.
  Directory Services : This layer provides access for global information about various services.

5.2.TCP/IP Model:

TCP/IP means Transmission Control Protocol and Internet Protocol. The TCP/IP protocol suite was developed prior to the OSI model.

The layers of the TCP/IP protocol suite contain relatively independent protocol that can be mixed and matched depending on the needs of the system.

TCP/IP is a layered framework having four layers:-



Layer 1- Network Interface Layer:

It is responsible for breaking down the data packets from Internet layer into frames which are then converted into bits for transmission across the physical media. Here, Ethernet, FDDI, Token ring etc. Some of the standards that are defined for data transmission. The Network Interface layer encompasses the Data Link and Physical layers of the OSI model.

Institute of Electrical and Electronics Engineers (IEEE)

The Institute of Electrical and Electronics Engineers is an organization which was formed in 1963 in USA. The Institute of Electrical and Electronics Engineers (IEEE) is the world's largest association for Electrical and Electronics Engineers. Institute of Electrical and Electronics Engineers (IEEE) was formed by the merger of two other technical organizations, American Institute of Electrical Engineers and Institute of Radio Engineers in 1st January, 1963. Today, IEEE has about 500,000 members, from different countries in the world.

The IEEE is best known for developing standards for the computer and electronics industry. In particular, the IEEE 802 standards for local-area networks are widely followed.

LIST OF SOME IMPORTANT IEEE 802 standards:

IEEE 802 Standard	
802.1	Bridging & Management
802.2	Logical Link Control
802.3	Ethernet – CSMA/CD Access Method
802.4	Token Passing Bus Access Method
802.5	Token Ring Access Method
802.6	Distribute Queue Dual Bus Access Method
802.7	Broadband LAN
802.8	Fiber Optic
802.9	Integrated Services LAN
802.10	Security
802.11	Wireless LAN
802.12	Demand Priority Access
802.14	Medium Access Control
802.15	Wireless Personal Area Network
802.16	Broadband Wireless Metro Area Network
802.17	Resilient Packet Ring

Ethernet

Ethernet is the most popular physical layer LAN technology in use today. Other LAN types include Token Ring, Fast Ethernet, Fiber Distributed Data Interface (FDDI), Asynchronous Transfer Mode (ATM) and LocalTalk. Ethernet is popular because it strikes a good balance between speed, cost and ease of installation. These benefits, combined with wide acceptance in the computer marketplace and the ability to support virtually all popular network protocols, make Ethernet an ideal networking technology for most computer users today. The Institute for Electrical and Electronic Engineers (IEEE) defines the Ethernet standard as IEEE Standard 802.3. This standard defines rules for configuring an Ethernet network as well as specifying how elements in an Ethernet network interact with one another. By adhering to the IEEE standard, network equipment and network protocols can communicate efficiently.

Fast Ethernet

For Ethernet networks that need higher transmission speeds, the Fast Ethernet standard (IEEE 802.3u) has been established. This standard raises the Ethernet speed limit from 10 Megabits per second (Mbps) to 100 Mbps with only minimal changes to the existing cable structure. There are three types of Fast Ethernet: 100BASE-TX for use with level 5 UTP cable, 100BASE-FX for use with fiber-optic cable, and 100BASE-T4 which utilizes an extra two wires for use with level 3 UTP cable. The 100BASE-TX standard has become the most popular due to its close compatibility with the 10BASE-T Ethernet standard. For the network manager, the incorporation of Fast Ethernet into an existing configuration presents a host of decisions. Managers must determine the number of users in each site on the network that need the higher throughput, decide which segments of the backbone need to be reconfigured specifically for 100BASE-T and then choose the necessary hardware to connect the 100BASE-T segments with existing 10BASE-T segments. Gigabit Ethernet is a future technology that promises a migration path beyond Fast Ethernet so the next generation of networks will support even higher data transfer speeds.

Speed (Mbit/s)	Distance (m)	Name	Standard/ Year	Description
10	100 (nominally)	10BASE-T	802.3i 1990	Runs over four wires (two twisted pairs) on a Category 3 or Category 5 cable. Star topology with an active hub or switch sits in the middle and has a port for each node. This is also the configuration used for 100BASE-T and gigabit Ethernet. Manchester coded signaling.
100	100	100BASE-TX	802.3u 1995	4B5B MLT-3 coded signaling, Category 5 cable copper cabling with two twisted pairs.
1000	100	1000BASE-T	802.3ab 1999	PAM-5 coded signaling. At least Category 5 cable with four twisted pairs copper cabling. Category 5 cable has since been deprecated and new installations use Category 5e. Each pair is used in both directions simultaneously.
	100	10GBASE-T	802.3an 2006	THP PAM-16 coding. Uses category 6a cable.
	≥30	40GBASE-T	802.3bq	Under development, uses encoding from 10GBASE-T on proposed Cat 8.1.2 shielded cable.

Token Ring

Token Ring is another form of network configuration which differs from Ethernet in that all messages are transferred in a unidirectional manner along the ring at all times. Data is transmitted in tokens, which are passed along the ring and viewed by each device. When a device sees a message addressed to it, that device copies the message and then marks that message as being read. As the message makes its way along the ring, it eventually gets back to the sender who now notes that the message was received by the intended device. The sender can then remove the message and free that token for use by others.

FDDI

FDDI (Fiber-Distributed Data Interface) is a standard for data transmission on fiber optic lines in a local area network that can extend in range up to 200 km (124 miles). The FDDI protocol is based on the token ring protocol. In addition to being large geographically, an FDDI local area network can support thousands of users.

Layer 2-Internet Layer:

The **Internet layer** is responsible for addressing, packaging, and routing functions. The core protocols of the **Internet layer** are **IP**, ARP, ICMP, and IGMP. The **Internet** Protocol (**IP**) is a routable protocol responsible for **IP** addressing, routing, and the fragmentation and reassembly of packets.

- The Internet Protocol (IP) is a routable protocol responsible for IP addressing, routing, and the fragmentation and reassembly of packets.
- The Address Resolution Protocol (ARP) is responsible for the resolution of the Internet layer address to the Network Interface layer address such as a hardware address.
- The Internet Control Message Protocol (ICMP) is responsible for providing diagnostic functions and reporting errors due to the unsuccessful delivery of IP packets.
- The Internet Group Management Protocol (IGMP) is responsible for the management of IP multicast groups.

Addressing

To send a packet from a source node to a destination node correctly through a network,the packet must contain enough information about the destination address. It is also common to include the source address, so that retransmission can be done, if necessary.The addressing scheme used for this purpose has considerable effect on routing.

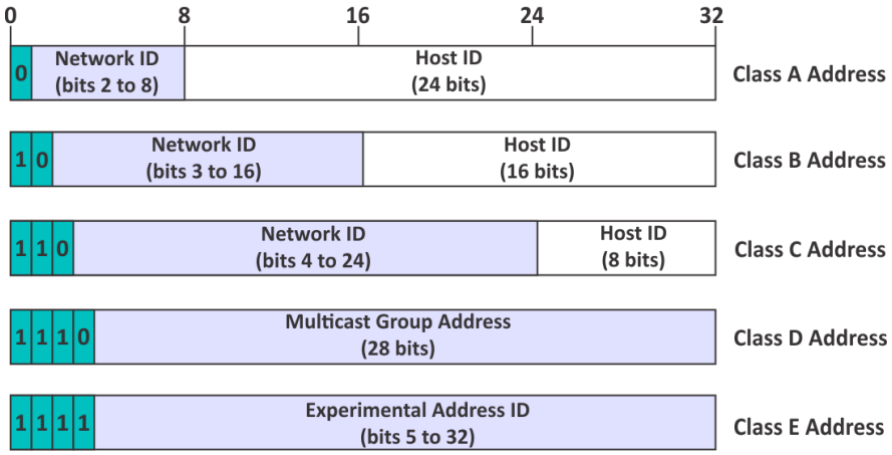
IP Addressing

Every host and router on the internet is provided with a unique standard form of network address, which encodes its network number and host number. The combination is unique; no two nodes have the same IP addresses.

IPv4 Addressing:

The IPv4 addresses are 32-bit long. The main address formats are assigned with network addresses (net id) and host address (host id) fields of different sizes. The class A format allows up to 126 networks with 16 million hosts each. Class B allows up to 16,382 networks with up to 64 K hosts each. Class C allows 2 million networks with up to 254 hosts each. The Class D is used for multicasting in which a datagram is directed to multiple hosts.

there are two prevalent notations to show an IPv4 address: binary notation and dotted decimal notation.
IPv4 addressing, at its inception, used the concept of classes. This architecture is called classful addressing. In classful addressing, the address space is divided into five classes: A,B,C,D,E.



The netid determines the network address while the hostid determines the host connected to that network.

Range of Host Addresses:

Class A 1.0.0.0 to 126.255.255.255
Class B 128.0.0.0 to 191.255.255.255
Class C 192.0.0.0 to 223.255.255.255
Class D 224.0.0.0 to 239.255.255.255
Class E 240.0.0.0 to 254.255.255.255

Class D address reserved for multicast groups and Class E address reserved for future use, or Research and Development process.

Subnetting:
Subnetting is the strategy used to partition a single physical network into more than one smaller logical sub-networks (subnets). An IP address includes a network segment and a host segment. Subnets are designed by accepting bits from the IP address's host part and using these bits to assign a number of smaller sub-networks inside the original network.

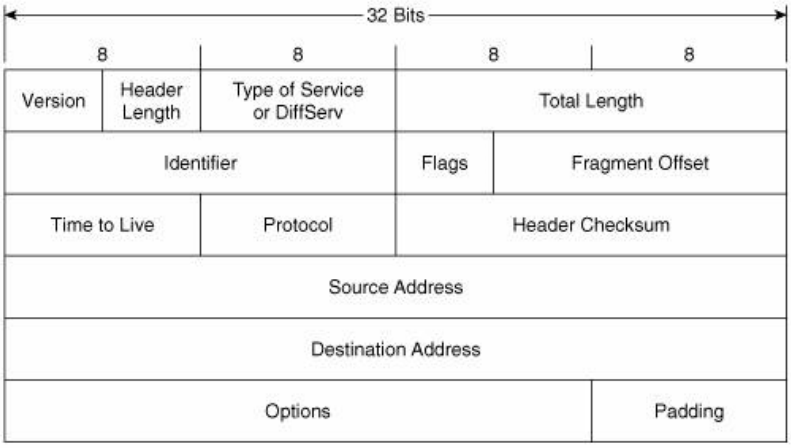
Subnet mask: A Subnet mask is a 32-bit number that masks an IP address, and divides the IP address into network address and host address.

Supernetting: It is the process of combining several IP networks with a common network prefix. Supernetting was introduced as a solution to the problem of increasing size in routing tables. Supernetting also simplifies the routing process. For example, the subnetworks 192.60.2.0/24 and 192.60.3.0/24 can be combined in to the supernetwork denoted by 192.60.2.0/23.
In the supernet, the first 23 bits are the network part of the address and the other 9 bits are used as the host identifier. So, one address will represent several small networks and this would reduce the number of entries that should be included in the routing table. Typically, supernetting is used for class C IP addresses (addresses beginning with 192 to 223 in decimal), and most of the routing protocols support supernetting.

Difference between Subnetting and Supernetting:
Subnetting is the process of dividing an IP network in to sub divisions called subnets whereas, Supernetting is the process of combining several IP networks with a common network prefix.
Supernetting will reduce the number of entries in a routing table and also will simplify the routing process. In subnetting, host ID bits (for IP addresses from a single network ID) are borrowed to be used as a subnet ID, while in supernetting, bits from the network ID are borrowed to be used as the host ID.

Classless Inter-Domain Routing:
Short for Classless Inter-Domain Routing, an IP addressing scheme that replaces the older system based on classes A, B, and C. With CIDR, a single IP address can be used to designate many unique IP addresses.
A CIDR IP address looks like a normal IP address except that it ends with a slash followed by a number, called the IP network prefix.
For example: 172.200.0.0/16
CIDR addresses reduce the size of routing tables and make more IP addresses available within organizations. CIDR is also called supernetting

IPv4 header:



The fields in the IP header and their descriptions are

Version—A 4-bit field that identifies the IP version being used. The current version is 4, and this version is referred to as IPv4.

Length—A 4-bit field containing the length of the IP header in 32-bit increments. The minimum length of an IP header is 20 bytes, or five 32-bit increments. The maximum length of an IP header is 24 bytes, or six 32-bit increments. Therefore, the header length field should contain either 5 or 6.

Type of Service (ToS)—The 8-bit ToS uses 3 bits for IP Precedence, 4 bits for ToS with the last bit not being used. The 4-bit ToS field, although defined, has never been used.

IP Precedence— A 3-bit field used to identify the level of service a packet receives in the network.

Differentiated Services Code Point (DSCP)—A 6-bit field used to identify the level of service a packet receives in the network. DSCP is a 3-bit expansion of IP precedence with the elimination of the ToS bits.

Total Length—Specifies the length of the IP packet that includes the IP header and the user data. The length field is 2 bytes, so the maximum size of an IP packet is 216 – 1 or 65,535 bytes.

Identifier, Flags, and Fragment Offset—As an IP packet moves through the Internet, it might need to cross a route that cannot handle the size of the packet. The packet will be divided, or fragmented, into smaller packets and reassembled later. These fields are used to fragment and reassemble packets.

Time to Live (TTL)—It is possible for an IP packet to roam aimlessly around the Internet. If there is a routing problem or a routing loop, then you don't want packets to be forwarded forever. A routing loop is when a packet is continually routed through the same routers over and over. The TTL field is initially set to a number and decremented by every router that is passed through. When TTL reaches 0 the packet is discarded.

Protocol—In the layered protocol model, the layer that determines which application the data is from or which application the data is for is indicated using the Protocol field. This field does not identify the application, but identifies a protocol that sits above the IP layer that is used for application identification.
Header Checksum—A value calculated based on the contents of the IP header. Used to determine if any errors have been introduced during transmission.

Source IP Address—32-bit IP address of the sender.

Destination IP Address—32-bit IP address of the intended recipient.

Options and Padding—A field that varies in length from 0 to a multiple of 32-bits. If the option values are not a multiple of 32-bits, 0s are added or padded to ensure this field contains a multiple of 32 bits.

IPv6:
IPv6 is of 128 bits represented in 8 combinations of 4 hexa decimal numbers each, separated by a colon.
An example of an IPv6 address is: 2001:0db8:85a3:0000:0000:8a2e:0370:7334.

Categories of IPv6 address:

- **Unicast:** Unicast represents a single interface. A packet sent to a unicast address is delivered to the interface identified by that address.
- **Multicast:** Multicast represents a group of interfaces. A packet sent to a multicast address is delivered to all interfaces identified by that address.
- **Anycast:** Anycast identifies one or more interface. A packet sent to an anycast address is delivered to the closest member of a group, according to the routing protocols' measure of distance.

Routing:
Routing is the act of moving information across an inter-network from a source to a
destination. Along the way, at least one intermediate node typically is encountered. It's also referred to as the process of choosing a path over which to send the packets. Routing is often contrasted with bridging, which might seem to accomplish precisely the same thing to the casual observer. The primary difference between the two is that bridging occurs at Layer 2 (the data link layer) of the OSI reference model, whereas routing occurs at Layer 3 (the network layer).
Routing protocols use metrics to evaluate what path will be the best for a packet to travel. A metric is a standard of measurement; such as path bandwidth, reliability, delay, current load on that path etc.; that is used by routing algorithms to determine the optimal path to a destination.

Routing algorithms can be classified based on the following criteria:

- Static versus Adaptive
- Single-path versus multi-path
- Intra-domain versus inter-domain
- Flat versus hierarchical
- Link-state versus distance vector
- Host-intelligent versus router-intelligent

IPsec:
IPsec short for IP security, a set of protocol developed by the Internet Engineering Task Force(IETF) to support secure exchange of packets at the IP layer. IPsec has been deployed widely to implement Virtual Private Networks(VPNs).
IPsec support two encryption modes: Transport and Tunnel. Transport mode encrypts only the data portion(payload) of each packets, but leaves the header untouched. The more secure Tunnel mode encrypts both the header and the payload.

Layer 3 – Transport Layer
It encapsulates raw data received from application layer into data segments and performs error control and flow control. It is represented by the two protocols i.e. TCP & UDP.
TCP(Transmission Control Protocol)- It is a connection oriented protocol. First a connection is established between the sender and the receiver and then data is sent across the network. It gives the data segments proper sequence numbers for reordering at the destination side and also the acknowledgment nos. Are given for the data packets received. So it is a reliable protocol.
UDP(User Datagram Protocol)It is an unreliable, connectionless protocol i.e. no reliable connection is established between sender & receiver before data transmission. It is used for client- server type requests where prompt delivery of requests-replies is more important than accurate delivery.

Application Layer
It enables network access to the user. Following are some of the protocols defined here:-

File Transfer Protocol (FTP)
File Transfer Protocol (FTP) is a TCP/IP client-server application for transfer filesbetween two remote machines through internet. A TCP connection is set up before file transfer and it persists throughout the session. It is possible to send more than one file before disconnecting the link. A control connection is established first with a remote host before any file can be transferred.

HTTP (Hyper Text Transfer Protocol)
It permits the user to upload and upload webpages through browser. It is a connection less protocol.

Telnet
Telnet is a simple remote terminal protocol that provides a remote log-on capability,which enables a user to log on to a remote computer and behaves as if it is directlyconnected to it. The following three basic services are offered by TELNET:o It defines a network virtual terminal that provides a standard interface toremote systemso It includes a mechanism that allows the client and server to negotiate optionsfrom a standard seto It treats both ends symmetrically

Simple Network Management Protocol (SNMP)
Network managers use network management software that help them to locate, diagnose and rectify problems. Simple Network Management Protocol (SMTP) provides a systematic way for managing network resources. It uses transport layer protocol for communication. It allows them to monitor switches, routers and hosts. There are four components of the protocol:

- Management of systems
- Management of nodes; hosts, routers, switches
- Management of Information Base; specifies data items a host or a router must keep and the operations allowed on each (eight categories)
- Management of Protocol; specifies communication between network managementclient program a manager invokes and a network management server running on ahost or router

Internet

The Internet is generally defined as a global network connecting millions of computers. Many countries are linked into exchanges of data, news, opinions etc.
The Internet contains billions of web pages created by people and companies from around the world, making it a limitless place to locate information and entertainment. The Internet also has thousands of services that help make life more convenient. For example, many financial institutions offer online banking that enables a user to manage and view their account online.

History of internet:
The internet was developed in the United States by the "United States Department of Defense Advanced Research Projects Agency" (DARPA). It was first connected in October, 1969, and was called ARPANET. The World Wide Web was created at CERN in Switzerland in 1990 by a British (UK) man named Tim Berners-Lee.

IMPORTANT ORGANIZATION:
Internet service provider:
An Internet service provider (ISP) is a company that provides customers with Internet access. Data may be transmitted using several technologies, including dial-up, DSL, cable modem, wireless or dedicated high-speed interconnects.

W3C:
Short for World Wide Web Consortium, W3C is an organization founded by Tim Berners-Lee in 1994 to help with the development of common protocols for the unified evolution of the Web.

Internet Architecture Board (IAB):
Internet Architecture Board defines the architecture for the Internet. The Internet Architecture Board (IAB) purpose is to provide oversight of the architecture for the protocols and other procedures used by the Internet.

Internet Society (ISOC):
The Internet Society (ISOC) is mainly involved in policy, governance, technology, education & training and development of internet.

Internet Corporation for Assigned Names and Numbers (ICANN) & Internet Assigned Numbers Authority (IANA):
The Internet Corporation for Assigned Names and Numbers is an international non-profit corporation which is in charge of Internet Protocol (IP) address allocation (IPv4 and IPv6), Domain Names allocation (examples, omnisecu.com, msn.com, google.com) Global public Domain Name System management, DNS Root Server maintenance, Port Number allocation etc.

Institute of Electrical and Electronics Engineers (IEEE):
The Institute of Electrical and Electronics Engineers (IEEE) develop and maintain standards in every technology field related with electricity. The Institute of Electrical and Electronics Engineers (IEEE) develop and maintain Local Area Network (LAN) networking standards including Ethernet (IEEE 802.3 family standards) and Wireless LAN (IEEE 802.11 family standards).

Internet Research Task Force (IRTF) & Internet Engineering Task Force (IETF):
The Internet Research Task Force is a technology research organization which is working on focused long-term research on technical topics related to standard Internet protocols, applications, architecture and technology.
Internet Engineering Task Force is working to develop the short-term issues of network engineering protocols and standards.
Internet Engineering Task Force (IETF) develop the maintain high quality relevant technical standards, mainly network protocols. The network protocol standards are developed under a platform, called as Request for Comments (RFCs).

A Request for Comments (RFC) is a technical publication of the Internet Engineering Task Force (IETF) and the Internet Society. Request for Comments (RFCs) are mainly used to develop a network protocol, a function of a network protocol or any feature which is related with network communication. All the standard network protocols (like, HTTP, FTP, SMTP, TCP, UDP, IP etc) are defined as RFSs.

VPN (Virtual Private Network):

There are different technologies available for Wide Area Network (WAN) connectivity. But the main drawback of many Wide Area Network (WAN) connectivity solutions is "Cost". Think about an organization which has 100 offices all over the world. Providing Wide Area Network (WAN) connectivity using Leased Lines, for all these offices will be too costly.

If broadband internet access is available at all these 100 offices, linking all these offices using broadband internet is the most budget friendly Wide Area Network (WAN) connectivity solution. But we have a very serious problem related with security if we use public internet to connect all our 100 offices using broadband internet. Security!
Internet is a public network consisting of thousands of service providers and your organization's private Data is not much secure in a public network. We need protection for our private data against eavesdropping, tampering and we must make sure we are sending the data to exact recipient (mutual authentication).

A Virtual Private Network (VPN) is a Network Security Technology, which is used to secure private network traffic over a public network such as the Internet. A VPN ensures Data Confidentiality (privacy) and Data Integrity for network data in its journey from the source device to destination device using network security protocols like IPSec (Internet Protocol Security). IPSec (Internet Protocol Security) VPN provide Data Confidentiality by encrypting the data at the sending device and decrypting the data at receiving end. IPSec (Internet Protocol Security) VPN also provides Data Integrity (making sure that the Data is not changed while its journey) by using Hashing Algorithms like MD5 (Message Digest) and SHA (Secure Hashing Algorithm).

User Datagram protocol (UDP)

UDP is responsible for differentiating among multiple source and destination processes within one host. Multiplexing and demultiplexing operations are performed using the port mechanism.

UDP Datagram:

A brief description of different fields of the datagram are given below:

- Source port (16 bits): It defines the port number of the application program in the host of the sender
- Destination port (16 bits): It defines the port number of the application program in the host of the receiver
- Length: It provides a count of octets in the UDP datagram, minimum length = 8
- Checksum: It is optional, 0 in case it is not in use Characteristics of the UDP Key characteristics of UDP are given below:
- UDP provides an unreliable connectionless delivery service using IP to transport messages between two processes
- UDP messages can be lost, duplicated, delayed and can be delivered out of order
- UDP is a thin protocol, which does not add significantly to the functionality of IP
- It cannot provide reliable stream transport service

Transmission Control Protocol (TCP)

TCP provides a connection-oriented, full-duplex, reliable, streamed delivery service using IP to transport messages between two processes. Reliability is ensured by:

- Connection-oriented service
- Flow control using sliding window protocol
- Error detection using checksum
- Error control using go-back-N ARQ technique
- Congestion avoidance algorithms; multiplicative decrease and slow-start

TCP Datagram

A brief explanation of the functions of different fields are given below:

- Source port (16 bits): It defines the port number of the application program in the host of the sender
- Destination port (16 bits): It defines the port number of the application program in the host of the receiver
- Sequence number (32 bits): It conveys the receiving host which octet in this sequence comprises the first byte in the segment
- Acknowledgement number (32 bits): This specifies the sequence number of the next octet that receiver expects to receive
- HLEN (4 bits): This field specifies the number of 32-bit words present in the TCP header
- Control flag bits (6 bits): URG: Urgent pointer
- ACK: Indicates whether acknowledge field is valid
- PSH: Push the data without buffering
- RST: Resent the connection
- SYN: Synchronize sequence numbers during connection establishment
- FIN: Terminate the connection
- Window (16 bits): Specifies the size of window
- Checksum (16 bits): Checksum used for error detection.
- User pointer (16 bits): Used only when URG flag is valid
- Options: Optional 40 bytes of information

Domain Name System

Although IP addresses are convenient and compact way for identifying machines and are fundamental in TCP/IP, it is unsuitable for human user. Meaningful high-level symbolic names are more convenient for hum Application software permits users to use symbolic names, but the underlying network protocols require addresses. This

requires the use of names with proper syntax with efficient translation mechanism. A concept known as Domain Name System (DNS) was invented for this purpose. DNS is a naming scheme that uses a hierarchical, domain-based naming scheme on a distributed database system. The basic approach is to divide the internet into several hundred top-level domains, which come in two flavors - generic and countries.

HTTP protocol:
The Hypertext Transfer Protocol (HTTP) is an application-level protocol for distributed, collaborative, hypermedia information systems. This is the foundation for data communication for the World Wide Web (i.e. internet) since Standards port number of http connection is port 80.

HTTPS
Short for Hypertext Transfer Protocol Secure, HTTPS is a protocol which uses HTTP on a connection encrypted by transport-layer security. HTTPS is used to protect transmitted data from eavesdropping. It is the default protocol for conducting financial transactions on the web, and can protect a website's users from censorship by a government or an ISP. HTTPS port use port 443.

Voice over IP (VoIP)
VoIP technology allows telephone calls to be made over digital computer networks including the Internet. VoIP converts analog voice signals into digital data packets and supports real-time, two-way transmission of conversations using Internet Protocol (IP).

Open Shortest Path First (OSPF)
It is Interior Gateway Protocol. It is a routing protocol developed for Internet Protocol (IP) networks by the Interior Gateway Protocol (IGP) working group of the Internet Engineering Task Force (IETF). The working group was formed in 1988 to design an IGP based on the Shortest Path First (SPF) algorithm for use in the Internet.

Routing Information Protocol (RIP)
It is one of the most commonly used Interior Gateway Protocol on internal networks which helps a router dynamically adapt to changes of network connections by communicating information about which networks each router can reach and how far away those networks are. Although RIP is still actively used, it is generally considered to have been obsolete by Link-state routing protocol such as OSPF.

Border Gateway Protocol (BGP)
BGP is used to exchange routing information for the Internet and is the protocol used between Internet service providers (ISP). One of the most important characteristics of BGP is its flexibility. The protocol can connect together any internetwork of autonomous systems using an arbitrary topology

ARP:
Address Resolution Protocol (ARP) is one of the major protocol in the TCP/IP suit and the purpose of Address Resolution Protocol (ARP) is to resolve an IPv4 address (32 bit Logical Address) to the physical address (48 bit MAC Address). Network Applications at the Application Layer use IPv4 Address to communicate with another device. But at the Datalink layer, the addressing is MAC address (48 bit Physical Address), and this address is burned into the network card permanently. You can view your network card's hardware address by typing the command "ipconfig /all" at the command prompt (Without double quotes using Windows Operating Systems).

The purpose of Address Resolution Protocol (ARP) is to find out the MAC address of a device in your Local Area Network (LAN), for the corresponding IPv4 address, which network application is trying to communicate.

RARP:
The Reverse Address Resolution Protocol (RARP) is the earliest and simplest protocol designed to allow a device to obtain an IP address for use on a TCP/IP network. It is based directly on ARP and works in basically the same way, but in reverse: a device sends a request containing its hardware address and a device set up as an RARP server responds back with the device's assigned IP address.

SIP:
Session Initiation Protocol (SIP) is one of the most common protocols used in VoIP technology. It is an application layer protocol that works in conjunction with other application layer protocols to control multimedia communication sessions over the Internet.

DHCP:
Dynamic Host Configuration Protocol (DHCP) is used to dynamically (automatically) assign TCP/IP configuration parameters to network devices (IP address, Subnet Mask, Default Gateway, DNS server etc). Dynamic Host Configuration Protocol (DHCP) is described in RFC 1531. Other RFCs related with Dynamic Host Configuration Protocol (DHCP) are RFC 1534, RFC 1541, RFC 2131, and RFC 2132. DHCP is an IETF standard based on the BOOTP protocol. A computer that gets its configuration information by using Dynamic Host Configuration Protocol (DHCP) is known as a Dynamic Host Configuration Protocol (DHCP) client. DHCP clients communicate with a DHCP server to obtain IP addresses and related TCP/IP configuration information. DHCP server should be configured properly by the DHCP administrator.

Using Dynamic Host Configuration Protocol (DHCP), DHCP Clients can be configured with TCP/IP configuration values like IP Address, Subnet Mask, Default Gateway, DNS Server, DNS suffix etc.

Stop and Wait protocol:
This is the simplest form of flow control where a sender transmits a data frame. After receiving the frame, the receiver indicates its willingness to accept another frame by sending back an ACK frame acknowledging the frame just received. The sender must wait until it receives the ACK frame before sending the next data frame. This is sometimes referred to as ping-pong behavior, request/reply is simple to understand and easy to implement, but not very efficient. In LAN environment with fast links, this isn't much of a concern, but WAN links will spend most of their time idle, especially if several hops are required. Major drawback of Stop-and-Wait Flow Control is that only one frame can be in transmission at a time, this leads to inefficiency if propagation delay is much longer than the transmission delay. Some protocols pretty much require stop-and-wait behavior. For example, Internet's Remote Procedure Call (RPC) Protocol is used to implement subroutine calls from a program on one machine to library routines on another machine. Since most programs are single threaded, the sender has little choice but to wait for a reply before continuing the program and possibly sending another request. Error correction in Stop-and-Wait ARQ is done by keeping a copy of the sent frame and retransmitting of the frame when the timer expires.

Sliding Window Protocol:
In sliding window method, multiple frames are sent by sender at a time before needing an acknowledgment. Multiple frames sent by source are acknowledged by receiver using a single ACK frame. In sliding window protocols, the sender's data link layer maintains a 'sending window' which consists of a set of sequence numbers corresponding to the frames it is permitted to send. Similarly, the receiver maintains a 'receiving window' corresponding to the set of frames it is permitted to accept. The window size is dependent on the retransmission policy and it may differ in values for the receiver's and the sender's window. The sequence numbers within the sender's window represent the frames sent but as yet not acknowledged. Whenever a new packet arrives from the network layer, the upper edge of the window is advanced by one. When an acknowledgement arrives from the receiver the lower edge is advanced by one. The receiver's window corresponds to the frames that the receiver's data link layer may accept. When a frame with sequence number equal to the lower edge of the window is received, it is passed to the network layer, an acknowledgement is generated and the window is rotated by one. If however, a frame falling outside the window is received, the receiver's data link layer has two options. It may either discard this frame and all subsequent frames until the desired frame is received or it may accept these frames or buffer them until the appropriate frame is received and then pass the frames to the network layer in sequence.

GO-back-N ARQ:
The most popular ARQ protocol is the go-back-N ARQ, where the sender sends the frames continuously without waiting for acknowledgement. That is why it is also called as continuous ARQ. As the receiver receives the frames, it keeps on sending ACKs or a NACK, in case a frame is incorrectly received. When the sender receives a NACK, it

retransmits the frame in error plus all the succeeding frames. Hence, the name of the protocol is go-back-N ARQ. If a frame is lost, the receiver sends NAK after receiving the next frame. In case there is long delay before sending the NAK, the sender will resend the lost frame after its timer times out. If the ACK frame sent by the receiver is lost, the sender resends the frames after its timer times out.

Piggybacking:

In practice, the link between receiver and transmitter is full duplex and usually both transmitter and receiver stations send data to each over. So, instead of sending separate acknowledgement packets, a portion (few bits) of the data frames can be used for acknowledgement. This phenomenon is known as piggybacking. The piggybacking helps in better channel utilization. Further, multi-frame acknowledgement can be done.

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MULTIPLE CHOICE QUESTIONS

SET-1

1. **Something which has easily understood instruction is said to be-**
   (a) Information (b) user friendly
   (c) word (d) icon

2. **Blaise Pascal was introduced-**
   (a)Adding machine (b) Abacus
   (c) Calculator (d) difference engine

3. **Difference engine is the machine introduced by-**
   (a)Blaze Pascal (b) Napier
   (c) Charles Babbage (d) Newman

4. **Vacuum Tube is the invention ……generation.**
   (a)1st generation (b) 2nd gen
   (c) 3rd gen (d) 4th gen

5. **Micro-programming introduced by-**
   (a) John Mauchley (b) Maurice Wilkies
   (c) William Shockley (d) Blaisepascal

6. **A port is a connector located on the-**
   (a) Motherboard (b) RAM
   (c) CPU (d) ROM

7. **The ALU and the CU of a computer jointly known as-**
   (a) CPU (b) System board
   (c) Circuit board (d) Computer

8. **Full form of PSU which is an internal component used to supply the power.**
   (a) Power supply unit
   (b) Permanent supply unit
   (c) Placement supply unit
   (d) Programmable supply unit

9. **In which generation microprocessor was introduced-**
   (a) 1st generation (b) 2nd gen
   (c) 3rd gen (d) 4th gen

10. **Convert the octal number 347 into binary number**
    (a) 111000101 (b) 011100111
    (c) 101110101 (d) 100000111

11. **The _____ specifies the operation to be performed and the operands provide the data on which the operation is to be performed**
    (a) source code (b) opcode
    (c) object code (d)program code

12. **_____ is responsible for overall control and co-ordination of instruction execution.**
    (a)CPU (b) ALU
    (c) RAM (d) Control UNIT

13. **_____ is a highspeed memory, that can be used in between CPU and main memory**
    (a)CPU (b) buffer
    (c) Spooling (d) Cache

14. **Storage capacity are frequently measured in-**
    (a) Hz (b) Byte
    (c) MIPS (d) bps

15. **$(1024)^3$ is equivalent to-**
    (a) approx I million (b) Approx 1 billion
    (c) approx 10 thousand (d) 3096

16. **PROM is a is a _____ memory i.e. the stored information remain even if power is switched off.**
    (a) Volatile memory (b) Buffer memory
    (c) Spooling (d) Non-volatile

17. **_____ is the example of magnetic disk.**
    (a) Hard-disk (b) DVD
    (c) RAM (d) Pen drive

18. **Format command is used to create.**
    (a) Sector (b) memory
    (c) Tracks (d) Tracks and sector

19. **Time required by a sector to reach below the head is known as-**
    (a) seek time (b) Latency time
    (c) Access time (d) Disk time

20. **Disk access time is-**
    (a) seek time
    (b) Latency time
    (c) Seek time +Latency time
    (d) Disk time

21. **A set of corresponding track in all surface of a disk pack is known as-**
    (a) Surface (b) Cylinder
    (c) Track (d) platter

22. **In DVD, V stands for-**
    (a) Video (b) Versatile
    (c) both a and b (d) Volatile

23. ____ transmits one bit of a byte, one at a time as a single bit stream of bit.
(a) Serial port (b) USB port
(c) Parallel port (d) Address bus

24. A ____ port is primarily used to connect printers to a computer.
(a) Serial port (b) USB port
(c) Parallel port (d) address bus

25. ____ port are the interfaces through which computer communicate with external devices such as printer, modem, joystick, terminal etc.
(a) Serial port (b) USB port
(c) Parallel port (d) I/O port

26. Function keys, control keys, arrow keys, modifier keys, toggle keys are known as……..
(a) Special keys (b) Alpha keys
(c) Esc keys (d) Multimedia key

27. ____ mouse uses laser rays for the movement of curser.
(a) Mechanical mouse (b) Optical mous
(c) Magnetic mouse (d) Normal mouse

28. _____ can be used with any CRT monitor but not with the LCD monitor
(a) Joystick (b) Lighten
(c) Trackball (d) Mouse

29. The primary goal of a computer is to turn data into-
(a) Report (b) information
(c) table (d) Address

30. ____ technologies is used by banks for faster processing of large volumes of cheques.
(a) OCR (b) OMR
(c) MICR (d) Bar code

31. The operating system is also called the _____ between the user and the computer.
(a) interface (b) interrelate
(c) interference (d) intermediate

32. When installing a peripheral you also usually need to install a _____.
(a) port (b) server
(c) password (d) driver

33. Computers use which of the following number systems to store information?
(a) base 2 (b) base 4
(c) base 8 (d) base 10

34. The shortcut keys for undo are
(a) win button + E (b) CTRL+ X
(c) Win button+ R (d) CTRL +z

35. What are the four key functions of a computer system?
(a) input, processing, output, and storage
(b) keyboard, display, memory, and disk drive
(c) word processing, spreadsheets, database
(d) bits, bytes, words, and OSI

36. Clock speed is a speed at which ____ executes instruction.
(a) RAM (b) ROM
(c) Processor (d) Printer

37. This component is required to process data into information and consists of integrated circuit.
(a) RAM (b) CPU
(c) Processor (d) Printer

38. Which of the following is not hardware of a computer?
(a) Monitor (b) Windows
(c) Processor (d) Printer

39. To print a document, press ____ then press enter.
(a) shift+p (b) Ctrl+P
(c) Alt+P (d) Esc+P

40. The smallest unit of information a computer can understand and process is known as a.
(a) K.B (b) M.B
(c) bit (d) Byte

41. What is the main folder on a storage device called?
(a)Platform (b) interface
(c) Root-Directory (d) Home-Page

42. Which of these keys is not on the number keypad?
(a) Ctrl (b) Del
(c) Enter (d) Num Lock

43. Which device can understand the difference between data and programs?
(a) Input device (b) Output device
(c) Memory (d) Microprocessor

44. The……..tells the computer how to use its components.
(a) Utility
(b) Network
(c) Operating system
(d) Application software

45. The central processing unit contains which of the following as components?
(a) ALU (b) ROM
(c) Processor (d) RAM

46. Ctrl, shift and del are known as-
(a) Modifier Keys (b) Control Keys
(c) Toggle keys (d) Function keys

47. When you start your computer from the off position then it is known as-

(a) Hard booting (b) Processing
(c) Storage (d) Soft-booting

48. Data is stored in computer as-

(a) File (b) Floppies
(c) Dir (d) Root dir

49. Various application and documents are represented on the windows by-

(a) Icon (b) Lables
(c) Graphs (d) Symbols

50. Fax machines and imaging systems are example of

(a) Bar-code reader (b) Imaging Systems
(c) Scanning device (d) Plotter

Solution

ANSWER SHEET

Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.
1	b	11	b	21	d	31	a	41	c
2	a	12	d	22	c	32	d	42	a
3	c	13	d	23	a	33	a	43	d
4	a	14	b	24	c	34	d	44	c
5	b	15	b	25	b	35	a	45	a
6	a	16	d	26	a	36	c	46	a
7	a	17	a	27	b	37	c	47	d
8	a	18	d	28	b	38	b	48	a
9	d	19	b	29	b	39	b	49	a
10	b	20	c	30	c	40	c	50	c

SET-2

1. **A repair for a known software bug, usually available at no change on the internet is called-**
   (a) Version (b) patch
   (c) Tutorial (d) FAQ

2. **The code for web pages is written using-**
   (a) Fifth generation language
   (b) HTML
   (c) WInZIp
   (d) C++

3. **Small application programs that run on a web page and may ensure a form is completed properly or provide animation are known as-**
   (a) Flash (b) spiders
   (c) Cookies (d) Applets

4. **Which of the following is the example of connectivity?**
   (a) Internet (b) floppy disk
   (c) Power cord (d) data

5. **When sending email, the ____ line describes the contents of the message**
   (a) to (b) subjects
   (c) contents (d) CC

6. **A chat is -**
   (a) An internet standard that allows users to upload and download files
   (b) A typed conversation that takes place on a computer
   (c) An area in which users conduct written discussions about a particular subjects.
   (d) The transmission of messages and files via a computer network.

7. **Which is the slowest internet connection?**
   (a) Digital subscriber line (b) TI
   (c) Cable modem (d) Dial-up service

8. **Outlook express is a-**
   (a) Email-client (b) scheduler
   (c) Address book (d) Address book

9. **What kind of data you can send by email?**
   (a) Audio (b) Video
   (c) Pictures (d) All of the above

10. **When a user subscribe to a news group?**
    (a) All new posts are emailed to the user automatically
    (b) The user must agree with everything said in the newsgroup
    (c) The user is billed annually for the subscription
    (d) The user is barraged with spam

11. **A home page is-**
    (a) A web page is created by an individual home user, as opposed to one created by a corporation
    (b) The web page you like to visit the most
    (c) The entry page of most websites
    (d) A web page you eventually reach by clicking a series of hyperlinks

12. **The transmission mode which allow both communicating devices to transmit and receive data simultaneously is**
    (a) Simplex (b) full-duplex
    (c) half-duplex (d) duplex

13. **Which media does not come under the guided media?**
    (a) Fiber optics (b) two wire open line
    (c) Microwave (d) coaxial cable

14. **The network topology in which devices are not linked to each other and where hub act as central controller is**
    (a) Mesh (b) star
    (c) bus (d) Ring

15. **Which of the cable support the highest bandwidth and faster transmission rate?**
    (a) Fiber optics (b) two wire open line
    (c) Microwave (d) coaxial cable

16. **The E-commerce domain that involves business activity initiated by the consumer and targeted to businesses is known as:**
    (a) Business to business
    (b) consumer to business
    (c) Client to business
    (d) business to consumer

17. **____ is the encompassing term that involves the use of electronic platforms - intranets, extranets and the Internet - to conduct a company's business.**
    (a) e-commerce (b) e-business
    (c) e-governance (d) e-payment

18. **Which Layer is not present in TCP/IP model?**
    (a) Presentation layer (b) transport layer
    (c) Network layer (d) session layer

19. **IP-Address 192.5.48.3 belongs to-**
    (a) Class A (b) Class B
    (c) Class C (d) Class D

20. In IP addressing scheme, class used for multicasting is:
(a) class A (b) Class B
(c) Class C (d) Class D

21. The total number of class of IP address are
(a) 3 (b) 4
(c) 5 (d) 9

22. Which type of web document is run at the client site
(a) Static (b) Dynamic
(c) Active (d) All of the above

23. ATM is an example of
(a) Ring topology (b) Star topology
(c) bus topology (d) all

24. UDP (User Diagram Protocol) is-
(a) Connectionless (b) Message Oriented
(c) Connection oriented (d) a & b

25. Quick time, Real One, and Shockwave are among the most popular Web browser
(a) Plug-ins
(b) Cookies
(c) Cascading style sheets
(d) Search engines

26. Which of the following is NOT a Microsoft Internet tool or technology?
(a) Dreamweaver (b) Silver light
(c) Internet Explorer (d) Expression Web

27. A protocol used to control the secure sending of data on the internet is
(a) SMTP (b) HTTP
(c) HTTPS (d) TCP/IP

28. Which piece of hardware protects the resources of a private network from users from other networks?
(a) Cache server (b) proxy server
(c) Firewall (d) Router

29. A tool for locating information on the Internet by matching search terms with indexed pages is called a(n)...
(a) Database (b) Search Engine
(c) web page (d) web server

30. A huge collection of information arranged for quick retrieval by a computer is known as a(n)...
(a) Database (b) Search Engine
(c) web page (d) Web server

31. Determining whether an Internet site is a commercial (.com) or governmental (gov) site helps determine its-
(a) purpose (b) objective
(c) accurate (d) timely

32. Electronic junk mail is known as-
(a) site (b) spam
(c) worm (d) virus

33. ____ are used by companies for marketing purpose.
(a) Spyware (b) adware
(c) Liveware (d) freeware

34. HTML introduced by-
(a)Tim burners lee (b) Vinton Cerf
(c) Bob willies (d) Steve jobs

35. Ethical hacker known as-
(a) White hat (b) black hat
(c) Grey hat (d) elite

36. A person new in the hacking world known as…….
(a) Neophyte (b) black hat
(c) grey hat (d) elite

37. ____spreads on network.
(a) WORM (b) Virus
(c) Trojan Horse (d) Computer virus

38. The Internet was originally a project for this government agency.
(a) ARPA (b) NSF
(c) NSA (d) PCC

39. A word in a web page that, when clicked, opens another document.
(a) Anchor (b) URL
(c) Hyperlink (d) Reference

40. A network's ____ is the central structure that connects other portions of the network.
(a) trunk (b) backbone
(c) protocol (d) server

41. ____ is the protocol that supports linking from one web page to another page.
(a) HTML (b) IP
(c) HTTP (d) FTP

42. The first part of a complete URL is the ____ needed to access the web resource.
(a) address (b) name
(c) location (d) protocol

43. You can organize your bookmarks using-
(a) structures (b) containers
(c) folders (d) menus

44. The browser's _____ keeps a list of web pages you have visited during the current session.
(a) history (b) cache
(c) favorites (d) trail

45. A _____ organizes the web into categories.
(a) search engine (b) encyclopedia
(c) archive (d) directory

46. E-mail addresses separate the user name from the ISP using the _____ symbol.
(a) & (b) @
(c) % (d) *

47. The mail server as defined in the text uses the _____ protocol.
(a) HTTP (b) FTP
(c) POP (d) SMTP

48. To send email to a large group at one time, a _____ can be use-
(a) listserv (b) group
(c) alias (d) mail server

49. Discussion groups may have a _____ who monitors the postings and enforces the site's rules.
(a) Judge (b) Sysop
(c) narrator (d) censor

50. A message with replies on a newsgroup is often called a-
(a) post (b) list
(c) thread (d) comment

Solution

ANSWER SHEET

Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.
1	b	11	c	21	c	31	a	41	c
2	b	12	b	22	a	32	b	42	d
3	a	13	c	23	b	33	b	43	c
4	a	14	b	24	d	34	a	44	a
5	c	15	a	25	a	35	a	45	d
6	b	16	b	26	a	36	a	46	b
7	d	17	a	27	c	37	a	47	c
8	a	18	a	28	c	38	a	48	a
9	d	19	c	29	b	39	c	49	b
10	a	20	d	30	a	40	b	50	c

SET-3

1. **Which is not a language processor?**
   (a) compiler (b) interpreter
   (c) processor (d) assembler

2. **Combination of more than one program known as-**
   (a) Software (b) Hardware
   (c) processor (d) Driver

3. **Special purpose software known as -**
   (a) compiler (b) Customized software
   (c) translator (d) word

4. **Translator for low level programming language were termed as**
   (a) Assembler (b) Compiler
   (c) Linker (d) Loader

5. **An assembler is**
   (a) Programming language dependent.
   (b) Syntax dependant
   (c) Machine dependant
   (d) Data dependant

6. **In latest generation computers, the instructions are executed**
   (a) Parallel only
   (b) Sequentially only
   (c) Both sequentially and parallel
   (d) All of above

7. **A computer program that translates one program instructions at a time into machine language is called**
   (a) Interpreter (b) CPU
   (c) Compiler (d) Simulator

8. **A computer program that converts an entire program into machine language is called a/an**
   (a) Interpreter (b) Simulator
   (c) Compiler (d) Commander

9. **The system unit of a personal computer typically contains all of the following except:**
   (a) Microprocessor (b) Disk controller
   (c) Serial interface (d) Modem

10. **Instructions and memory address are represented by**
    (a) Character code (b) Binary codes
    (c) Binary word (d) Parity bit

11. **____is a technique of temporarily removing inactive programs from the memory of computer system.**
    (a) Swapping (b) Spooling
    (c) Semaphore (d) Scheduler

12. **A grammar for a programming language is a formal description of**
    (a) Syntax (b) Semantics
    (c) Structure (d) Code

13. **Which of the following loader is executed when a system is first turned on or restarted**
    (a) Boot loader (b) Compile
    (c) Bootstrap loader (d) Relating loader

14. **Poor response time is usually caused by**
    (a) Process busy (b) High I/O rates
    (c) High paging rates (d) Any of the above

15. **An assembler is-**
    (a) A programming language dependent
    (b) Syntax dependant
    (c) machine dependant
    (d) Data dependant

16. **Minimum zoom percentage supported by MS Word is-**
    (a)10% (b) 15%
    (c) 25% (d) 4%

17. **Which is closed source software package?**
    (a) VLC (b) LINUX
    (c) Open office (d) MS-Word

18. **You can break the column by**
    (a) Pressing Ctrl + Shift + Enter
    (b) Pressing Ctrl + Enter
    (c) Pressing Shift + Enter
    (d) Pressing Alt + Enter

19. **The red wave underline in MS Word document indicates-**
    (a) Spelling error (b) Grammar errors
    (c) Address block (d) Word not in dictionary

20. **Which bar is usually located below the title bar that provides categorized options**
    (a) Menu Bar (b) Tool Bar
    (c) Status Bar (d) Scroll Bar

21. **Which input device is not suitable to work with MS Word?**
    (a) Keyboard (b) Mouse
    (c) Light Pen (d) Joystick

22. What is extension of Word-pad?
(a) .txt (b) .doc
(c) .xls (d) rtf

23. background of window screen is called as
(a) Desktop (b) window application
(c) GUI (d) CUI

24. The process of software development is called-.
(a) Programming (b) Analyzing
(c) Testing (d) Networking

25. ____ is problem - oriented languages?
(a)HLL (b) database
(c) Low level language (d) SQL

26. Outlook express known as-
(a) email-client (b) Word processor
(c) Spreadsheet (d)database

27. Language processor known as-
(a) translator (b) HLL
(c) Processor (d) Low level

28. fault in a system known as -
(a) bug (b) error
(c) Glitch (d) interrupt

29. ____ controls the way in which the computer system functions and provides a means by which used can interact with the computers
(a) The platform (b) operating system
(c) Application system (d) Utility

30. System software is the set of programs that enables your computer's hardware devices and ____ software to work together.
(a) Management (b) processing
(c) Utility (d) application

31. Windows and Macintosh are example of two different-
(a) Operating system (b) storage device
(c) Programs (d) suite

32. Manipulating data to create information is known as-
(a) Feedback (b) programming
(c) Processing (d) analysis

33. The type of software that controls the internal operation in the computer, and control how the computer works with all its part, is which of the following-
(a) Shareware
(b) Operating system software
(c) Application software d public domain software
(d) Public domain software

34. In addition to keying data directly into a database, data entry can be done from a-
(a) input form (b) table
(c) field (d) data dictionary

35. What is correcting errors in a program called-
(a) interpreting (b) translating
(c) debugging (d) compiling

36. A word processor would most likely be used to do which of the following-
(a) keep an account of money spent
(b) maintain an inventory
(c) type a biography
(d) do a computer search in the media centre

37. A hard copy of a file created on a computer refers to data-
(a) saved on floppy disk
(b) printed on paper
(c) backed up on a tape drive
(d) sent as email

38. A ____ is an organized collection of data about a single entity
(a) file (b) library
(c) database (d) dictionary

39. Something which has easily- understood instruction is said to be-
(a) user-friendly (b) information
(c) word processing (d) icon

40. Digital photos and scanned images are typically stored as____ graphic with extensions such as bmp. Png, jpg, tif or gif.
(a) vector
(b) bitmap
(c) either vector nor bitmap
(d) neither vector nor bitmap

41. After a user has saved and deleted many files, many scattered areas of stored data remain that are too small to be used efficiently, causing-
(a) disorder (b) turmoil
(c) disarray (d) fragmentation

42. Which of the following convert all the statement in a program in a single batch and the resulting collection of instructions is placed in a new file-
(a) compiler (b) interpreter
(c) converter (d) instruction

43. A program that generally has more user-friendly interface then a DBMS is called a-
(a) front end (b) repository
(c) back end (d) form

44. When you install a new program on your computer, it is typically added to the _____ menu.
(a) all programs (b) select programs
(c) start programs (d) desktop programs

45. Which of the following contains information about a single "entity" in the database like a person, place, event, or thing
(a) query (b) form
(c) record (d) table

46. The database administrator's function in an organization is
(a) to be responsible for the technical aspect of managing the information contained in organization databases.
(b) to be responsible for the executive-level aspect of decision regarding information management.
(c) to shown the relationship among entity classes in a data warehouse.
(d) to define which data mining tools must be used to extract data

47. Control in design of an information system is used to-
(a) inspect the system and check that it is built as per specifications.
(b) ensure that system processes data as it was designed to and that the result are reliable.
(c) ensure privacy of data processed by it.
(d) None of these.

48. Which of the following is the first step in the transaction processing cycle, which captures business data through various modes such as optical scanning or at an electronic commerce website-
(a) document and report generation
(b) database maintenance
(c) transaction processing
(d) data entry

49. When you save a presentation-
(a) All sides in a presentation are saved in same file.
(b) Two file are created one for graphics and one for content.
(c) a file is created for each slide.
(d) a file is created for each animation or graphic.

50. Computers manipulate data in many ways, and this manipulation is called-
(a) utilizing (b) batching
(c) upgrading (d) processing

Solution

ANSWER SHEET

Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.
1	c	11	b	21	d	31	a	41	d
2	a	12	c	22	d	32	c	42	a
3	b	13	c	23	a	33	b	43	d
4	a	14	d	24	a	34	a	44	a
5	c	15	c	25	a	35	c	45	c
6	c	16	a	26	a	36	c	46	b
7	a	17	d	27	a	37	b	47	b
8	c	18	b	28	c	38	a	48	a
9	d	19	a	29	b	39	a	49	a
10	b	20	a	30	c	40	B	50	d

SET-4

1. **Ethernet is the example of-**
   (a) LAN (b) MAN
   (c) WAN (d) Wi-FI

2. **In CSMA/CD, CD means-**
   (a) Communication device
   (b) Collision Detection
   (c) Collision device
   (d) Communication Detection

3. **____is when more power hungry components, such as the monitor and the hard drive, are put in idle.**
   (a) Hibernation (b) Power down
   (c) Standby mode (d) shutdown

4. **A ____ is a combination of hardware and software that facilities the sharing of information between computing devices.**
   (a) network (b) peripheral
   (c) expansion board (d) digital device

5. **____ are device used to transmit data over telecommunication lines.**
   (a) Drives (b) Drive bays
   (c) Modems (d) Platforms

6. **Servers are computers that provide resources to other computers connected to a -**
   (a) Network (b) mainframe
   (c) Supercomputer (d) client

7. **Network components are connected to the same cable in the ____ topology.**
   (a) Star (b) Ring
   (c) Bus (d) Mesh

8. **Office LANs that are spread geographically apart on a large scale can be connected using a corporate-**
   (a) LAN (b) MAN
   (c) CAN (d) WAN

9. **The most powerful computer in a typical network-**
   (a) desktop (b) network client
   (c) server (d) network station

10. **A flow in a program that causes it to produce incorrect or inappropriate results is called a-**
    (a) bug (b) byte
    (c) case (d) stylus

11. **Personal computer can be connected together to form a-**
    (a) server (b) super computer
    (c) network (d) enterprise

12. **The process of computer receiving information from a server in the internet is known as-**
    (a) Pulling (b) pushing
    (c) Downloading (d) transferring

13. **Which is the network operating system?**
    (a) Unix (b) DOS
    (c) WIN95 (d) WIN98

14. **The network connecting several computers all over the world is -**
    (a) Arpanet (b) Internet
    (c) Network (d) Intranet

15. **What are the most commonly used transmission speeds in BPS used in data communication?**
    (a) 300 (b) 9600
    (c) 1200 (d)2600

16. **What is the start range of class C network?**
    (a) 127.0.0.1 (b) 192.202.10.51
    (c) 228.202.10.51 (d) 0.0.0.0

17. **Which of the following is used for modulation and demodulation?**
    (a) Modem (b) protocols
    (c) gateway (d) multiplexer

18. **Which of the following is not a disadvantage of wireless LAN?**
    (a) Slower data transmission
    (b) Higher error rate
    (c) Interference of transmissions from different computers
    (d) All of the above

19. **Which of the following code used in present day computing was developed by IBM Corporation?**
    (a) ASCII (b) EBCDIC code
    (c) Hollerith code (d) binary code

20. **Which of the following TCP/IP protocol is used for transferring electronic mail messages from one machine to another?**
    (a) SMTP (b) FTP
    (c) POP (d) HTTP

21. **Which of the following device is used to connect two systems, especially if the systems use different protocols?**
    (a) Hub (b) Bridges
    (c) Gateway (d) Repeater

22. A distributed network configuration in which all data/information pass through a central computer is-
(a) bus (b) star
(c) ring (d) point to point

23. A remote batch-processing operation in which data is solely input to a central computer would require a-
(a) telegraph line (b) simplex line
(c) mixband channel (d) all of the above

24. The slowest transmission speeds are of____ cable
(a) Fibre Optics cable (b) two wire open line
(c) fibre optics (d) Microwave

25. To connect a computer with a device in the same room, you might be likely to use-
(a) Coaxial cable (b) coaxial cable
(c) dedicated line (d) microwave

26. Internet-like networks within an enterprise known as-
(a) Intranet (b) Internet
(c) Extranet (d) Network

27. How many bits internet address is assigned to each host on a TCP/IP internet which is used in all communications with the host?
(a) 32 bit (b) 64 bit
(c) 128 bit (d) 256 bit

28. Which of the following types of channels moves data relatively slowly?
(a) wideband channel (b) voice-band channel
(c) narrowband channel (d) broadband channel

29. Which of the following is required to communicate between two computers?
(a) communications software
(b) protocol
(c) communications hardware
(d) All of the above

30. ____ devices is used to connect two similar LAN with same protocols
(a) Bridges (b) Router
(c) Gateway (d) switch

31. DSL is an example of a(n) ____connection.
(a) network (b) wireless
(c) slow (d) broadband

32. FTP is-
(a) used to send email
(b) used to browse the Web
(c) is part of Netscape
(d) is a protocol for the transfer of files between computers

33. Telnet is-
(a) used to send email
(b) uses telephone lines
(c) is part of Netscape
(d) is a protocol that allows for remote login

34. A firewall is-
(a) used to protect a computer from unauthorized user
(b) a form of virus
(c) a screen saver program
(d) all of the above

35. A proxy server is-
(a) a backup server (b) an email server
(c) a poor file server (d) all of the above

36. A nanosecond is -
(a) 10^{-6} sec (b) 10^{-3} sec
(c) 10^{-12} sec (d) 10^{-9}sec

37. The resolution of an SVGA screen is -
(a) 1024 x 768 (b) 512 x 512
(c) 640 x 480 (d)800 x 800

38. What is the name of the software package that allows people to send electronic mail along a network of computers and workstations?
(a) Memory resident package
(b) Project management package
(c) Data communication package
(d) Electronic mail package

39. The communication mode that supports two-way traffic but only one direction at a time is-
(a) simplex (b) duplex
(c) half duplex (d) all

40. To connect a computer with a device in the same room, you might be likely to use-
(a) A coaxial cable (b) a dedicated line
(c) fibre optics (d) Microwave

41. An example of an analog communication method is-
(a) laser beam (b) microwave
(c) Telephone line (d) all of the above

42. Which of the following layer protocols are responsible for user and the application program support such as passwords, resource sharing, file transfer and network management?
(a) 7 layer protocols (b) 4 layer protocols
(c) 2 layer protocol (d) 5 layer protocols

43. What frequency range is used for FM radio transmission?
(a) Very Low Frequency: 3 kHz to 30. kHz
(b) Low Frequency: 30 kHz to 300 kHz
(c) High Frequency: 3 MHz to 30 MHz
(d) Very High Frequency: 30 MHz to 300 MHz

44. Transmission of computerized data from one location to another is called
(a) Data transfer (b) data flow
(c) Data communication (d) Data management

45. Compared to analog signals, digital signals-
(a) allow faster transmission (b) are more accurate
(c) both (a) and (b) (d) all of the above

46. FDDI is a-
(a) Ring network (b) star network
(c) mesh network (d) bus based network

47. A central computer surrounded by one or more satellite computers is called a-
(a) bus network (b) ring network
(c) star network (d) All of the above

48. The layer that handles error detection and error correction is
(a) Presentation layer (b) transport layer
(c) Network layer (d) session layer

49. Devices interconnected by the LAN should include
(a) Computers and terminals
(b) mass storage device, printers and plotters
(c) bridges and gateways
(d) All of the above

50. ____ is required to convert data packets from one protocols to another before forwarding it, as it connect two dissimilar networks.
(a) Gateway (b) switch
(c) bridges (d) Router

Solution

ANSWER SHEET

Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.
1	a	11	c	21	c	31	d	41	d
2	b	12	c	22	b	32	d	42	a
3	c	13	a	23	b	33	d	43	d
4	a	14	b	24	b	34	a	44	c
5	c	15	b	25	b	35	a	45	c
6	a	16	b	26	a	36	a	46	a
7	c	17	a	27	a	37	a	47	c
8	d	18	d	28	c	38	c	48	b
9	c	19	b	29	d	39	c	49	d
10	a	20	a	30	a	40	a	50	a

SET-5

1. **The ability of an OS to run more than one applications at a time is called -**
   (a) Multitasking
   (b) Object-oriented programming
   (c) Multi-user computing
   (d) Time-sharing

2. **The name given to a document by user is called-**
   (a) file name (b) program
   (c) data (d) record

3. **What is output?**
   (a) Processor takes from users
   (b) User gives to processor
   (c) Processor gets from users
   (d) Processor gives to users

4. **In a spreadsheet ,a cell is defined as the-**
   (a) Intersection of a table and a tuple
   (b) Intersection of a file and a database
   (c) Intersection of a row and column
   (d) Intersection of a field and a record

5. **= sum(B1:B8) is an example of a-**
   (a) Function (b) formula
   (c) Cell address (d) value

6. **A ____ is a named location on a disk where files are store(d)**
   (a) folder (b) Pod
   (c) Version (d) Bag

7. **The ____ allows you to choose where to go and is located below the Standards Buttons toolbar.**
   (a) System menu (b) Address bar
   (c) Menu bar (d) tool bar

8. **A ____ is a set of computer instructions that carry out a task on the computer.**
   (a) Program (b) Database
   (c) memory file (d) Folder

9. **An operating system version designed for home use is Microsoft Windows XP-**
   (a) Home Edition (b) Media Center Edition
   (c) Tablet PC Edition (d) All of the above

10. **A user-interface that is easy to use is considered to be -**
    (a) user-happy (b) user-simple
    (c) user-friendly (d) Interface

11. **When you press and release the secondary mouse button you are -**
    (a) Right-clicking (b) Left-clicking
    (c) either b or b (d) All of the above

12. **Another term for hyperlink is-**
    (a) link (b) source
    (c) bar (d) All of the above

13. **A graphical user interface displays-**
    (a) graphics (b) text
    (c) both (a) and (b) (d) neither (a) nor (b)

14. **Underlined text, such as text and folder names is referred to as a-**
    (a) hyperlink (b) menu
    (c) source drive (d) All of the above

15. **The ____ program compresses larger files into a smaller file.**
    (a) WinZip (b) WinShrink
    (c) WinStyle (d) Win small

16. **The ____ displays the name of every computer user on the computer.**
    (a) Wish list screen (b) Command screen
    (c) Welcome screen (d) Start button

17. **The ____ contains commands associated with the My computer window.**
    (a) Standards menu (b) Start menu
    (c) System menu (d) Tool bar

18. **Press the ____ button to have the window fill the entire screen.**
    (a) Close (b) Maximize
    (c) Minimize (d) Fill

19. **The ____ is the drive containing the files to be copied.**
    (a) source drive (b) destination drive
    (c) USB drive (d) Pen drive

20. **A ____ allows you to write on screen with a digital pen and convert that writing into characters that the PC can process.**
    (a) monitor RS (b) tablet PC
    (c) database manager (d) media center

21. **Which command displays all the files having the same name but different extensions?**
    (a) Dir filename (b) Dir filename .ext
    (c) Dir *.sys (d) Dir .ext

22. **MS-DOS developed in-**
    (a) 1991 (b) 1984
    (c) 1971 (d) 1961

23. Generally, the DATE is entered in the form
(a) DD-YY-MM (b) YY-DD-MM
(c) MM-YY-DD (d) MM-DD-YY

24. Which function will you use to enter current time in a worksheet cell?
(a) =today() (b) =now()
(c) =time() (d) none

25. If you press _____, the cell accepts your typing as its contents.
(a) Enter (b) Ctrl + Enter
(c) TAB (d) Insert

26. You can edit existing Excel data by pressing the
(a) F1 key (b) F2 key
(c) F3 key (d) F4 key

27. Excel is a-
(a) Graphic program (b) Presentation program
(c) Word processor (d) A spreadsheet

28. Which of the following is an absolute cell reference?
(a) !A!1 (b) A1
(c) #a#1 (d) A1

29. Which of the following formulas is not entered correctly?
(a) =10+50 (b) =B7*B1
(c) =B7+14 (d) 10+50

30. How many characters can be typed in a single cell in Excel?
(a) 256 (b) 1024
(c) 32,000 (d) 65,535

31. How are data organized in a spreadsheet?
(a) Lines and spaces (b) Layers and planes
(c) Rows and columns (d) Height and width

32. Which file starts MS Word?
(a) Winword. exe (b) Word .exe
(c) Msword .exe (d) Word2003.exe

33. Which of the following is not a font style?
(a) Bold (b) Italics
(c) Regular (d) Superscript

34. What is the shortcut key you can press to create a copyright symbol?
(a) Alt+Ctrl+C (b) Alt + C
(c) Ctrl + C (d) Ctrl + Shift + C

35. What is the shortcut key you can press to create a copyright symbol?
(a) Alt+Ctrl+C (b) Alt + C
(c) Ctrl + C (d) Ctrl + Shift + C

36. A word processor would most likely be used to do
(a) Keep an account of money spent
(b) Do a computer search in media center
(c) Maintain an inventory
(d) Type a biography

37. You can use the horizontal and vertical scroll bars to-
(a) Split a worksheet into two panes
(b) View different rows and columns
(c) Edit the contents of a cell
(d) View different worksheets

38. A terminal that cannot process any information is called-
(a) Direct access terminal
(b) intelligent terminal
(c) smart terminal
(d) Dumb terminal

39. The operating system manages-
(a) memory
(b) Processes
(c) Disks and I/O devices
(d) all of the above

40. Compilers and translators are one form of-
(a) language processor (b) hardware
(c) magnetic tape (d) CPU

41. Which process checks to ensure the components of the computer are operating and connected properly?
(a) Booting (b) Processing
(c) Saving (d) Editing

42. A___ is collection of data that is stored electronically as a series of records in a table
(a) spreadsheet (b) presentation
(c) database (d) web page

43. An error in program which causes wrong result is called a-
(a) Bug (b) Byte
(c) Attributes (d) Unit problem

44. Main purpose of software is convert the data into-
(a) Web site (b) Information (c) Program (d) Object

45. _____ is process of searching bugs in software.
(a) Compiling (b) Testing
(c) Running (d) Debugging

46. What is backup?
(a) Connect his network to more component
(b) Copy to save a data from original source to other destination

(c) Filter an old data from new data
(d) Access data from tape

47. Program which controls different component of computer and allows user to intact with computer?
(a) Utility software
(b) Operating system
(c) Word processing software
(d) Database program

48. Group of programs, which controls the smooth running of computer and processes to information is called
(a) Operating system (b) Computer
(c) Office (d) Compiler

49. Physical structure of computer is called a-
(a) Hardware (b) Software
(c) Keyboard (d) Memory

50. Original program written in programming language is called-
(a) Youth program (b) Source program
(c) Firm program (d) Loop program

Solution

ANSWER SHEET

Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.
1	a	11	a	21	a	31	c	41	a
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5	b	15	a	25	a	35	a	45	b
6	a	16	c	26	b	36	d	46	b
7	b	17	c	27	d	37	b	47	b
8	a	18	b	28	b	38	d	48	a
9	a	19	a	29	d	39	d	49	a
10	c	20	b	30	d	40	a	50	b

SET-6

1. **Which one is a random Access Memory .....**
   (a) RAM (b) ROM
   (c) CPU (d) PROM

2. **CD is an.....memory?**
   (a) Internal (b) External
   (c) Auxiliary (d) A and b

3. **Hard disc drive considered .....storage.**
   (a) Flash (b) Non Volatile
   (c)Temp (d) Non-permanent

4. **What part of memory in which data and program are stored is called.....**
   (a) Processor (b) Memory
   (c) Software (d) Hardware

5. **In which memory data is lost by power off?**
   (a) ROM (b) Flash
   (c) RAM (d) CD

6. **A Scanner scans .....**
   (a) Picture (b) Text
   (c) Both pic and text (d) Program

7. **A printer is .....kind of device?**
   (a) Input (b) External
   (c) CPU (d) Output

8. **What is standard Layout of keyboard?**
   (a) QWERTY (b) DVORAK
   (c) AZERTY (d) A and b

9. **The most common method use of entering text and numerical data into a computer system is through the use of a.....**
   (a) Keyboard (b) Scanner
   (c) Printer (d) Plotter

10. **In motherboard information between components travels by.....**
    (a) Flash memory (b) Bus
    (c) CPU (d) Port

11. **What is full form of UPS?**
    (a) Unique power supply
    (b) Union power supply
    (c) Universal power supply
    (d) Unintrupted power supply

12. **All of the following are examples of input devices EXCEPT a:**
    (a) scanner. (b) mouse
    (c) Keyboard (d) printer.

13. **Which of the following is an example of an input device?**
    (a) scanner (b) Speaker
    (c) CD (d) Printer

14. **_____ bits equal one byte**
    (a) Eight (b) Two
    (c) One thousand (d) One million

15. **The binary language consists of _____ digit(s).**
    (a) 8 (b) 2
    (c) 1,000 (d) 1

16. **A byte can hold one _____ of data**
    (a) bit (b) binary digit
    (c) Character (d) Kilobyte

17. **The metal or plastic case that holds all the physical parts of the computer is the:**
    (a) system unit (b) CPU
    (c) mainframe (d) platform

18. **In the binary language each letter of the alphabet, each number and each special character is made up of a unique combination of:**
    (a) eight bytes (b) eight kilobytes
    (c) eight characters (d) eight bits

19. **The term bit is short for:**
    (a) megabyte (b) binary language
    (c) binary digit (d) binary number

20. **A string of eight 0s and 1s is called a:**
    (a) megabyte (b) byte
    (c) kilobyte (d) gigabyte

21. **A _____ is approximately one billion bytes.**
    (a) kilobyte (b) Bit
    (c) Gigabyte (d) Megabyte

22. **A _____ is approximately a million bytes.**
    (a) gigabyte (b) Kilobyte
    (c) Megabyte (d) Terabyte

23. **Which of the following is valid size of a Floppy Disk?**
    (a) 7” (b) 2 1/4
    (c) 3 1/2 (d) 3 ¼

24. Where would you find a magnetic strip?
(a) Credit card (b) Speakers
(c) Smart card (d) Printer

25. What input device can be used for marking a multiple choice test?
(a) Mouse (b) Bar code reader
(c) Optical mark reader (d) Hard disk

26. A daisy wheel is a type of...?
(a) Printer (b) Storage device
(c) Pointing device (d) Light Pen

27. All of the following are examples of storage devices EXCEPT:
(a) hard disk drives. (b) printers.
(c) floppy disk drives. (d) CD drives.

28. The _____, also called the "brains" of the computer, is responsible for processing data
(a) motherboard
(b) Memory
(c) RAM
(d) central processing unit (CPU)

29. The CPU and memory are located on the:
(a) expansion board (b) motherboard
(c) storage device (d) output device

30. The PC (personal computer) and the Apple Macintosh are examples of two different:
(a) platforms. (b) applications.
(c) programs. (d) storage devices.

31. BIOS stands for----------
(a) Basic Input Output system
(b) Binary Input output system
(c) Basic Input Off system
(d) all the above

32. Father of 'C' programming language
(a) Dennis Ritchie (b) Prof JhonKemeny
(c) Thomas Kurtz (d) Bill Gates

33. When vacuum tube was invented?
(a) 1st gen (b) 2nd Gen
(c) 3rd gen (d) 4th gen

34. by default, your document print in -------mode
(a) Landscape (b) Portrait
(c) Page setup (d) Print View

35. After a picture has been taken with a digital camera and processed appropriately, the actual print of the picture is considered:
(a) data (b) output
(c) input (d) the process

36. Computers use the _____ language to process data.
(a) processing (b) Kilobyte
(c) Binary (d) Representational

37. Computers process data into information by working exclusively with:
(a) multimedia (b) words
(c) characters (d) numbers

38. The binary system uses powers of
(a) 2 (b) 10
(c) 8 (d) 16

39. The tracks on a disk which can be accused without repositioning the R/W heads is
(a) Surface (b) Cylinder
(c) Cluster (d) All of the above

40. CAD stands for
(a) Computer aided design
(b) Computer algorithm for design
(c) Computer application in design
(d) All of the above

41. Which access method is used for obtaining a record from a cassette tape?
(a) Direct (b) Sequenital
(c) Random (d) All of the above

42. An optical input device that interprets pencil marks on paper media is
(a) OMR (b) Punch card reader
(c) Optical scanner (d) Magnetic tape

43. The section of the CPU that selects, interprets and sees to the execution of program instructions
(a) Memory (b) Register
(c) Control unit (d) Alu

44. A common boundary between two systems is called
(a) inter direction (b) Interface
(c) Surface (d) All of the above

45. The basic input/output system (BIOS) is stored in:
(a) RAM. (b) ROM.
(c) the CPU (d) the hard drive

46. The arranging of data in a logical sequence is called:
(a) sorting (b) Classifying
(c)reproducing (d) Summerizing

47. The father of Modern Computer is
(a) Charles Babbage (b) Von-nuumann
(c) DaniesRitchel (d) Blaise Pascal

48. ____Helps in capturing row data and entering into computer system.

(a) CPU (b) integrated circuit
(c) input device (d) mother board

49. A CPU contains _____

(a) A card-reader and a printing device
(b) Analytical engine and a control unit
(c) A control unit and an arithmetic logic unit
(d) An arithmetic logic unit and a card reader

50. Computations and logical operations are performed by the _____

(a) RAM (b) ALU
(c) Register (d) Control unit

Solution

ANSWER SHEET

Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.
1	a	11	d	21	c	31	a	41	b
2	c	12	d	22	c	32	a	42	a
3	b	13	a	23	c	33	a	43	c
4	b	14	c	24	a	34	a	44	b
5	c	15	b	25	c	35	b	45	b
6	c	16	c	26	a	36	c	46	a
7	d	17	a	27	b	37	d	47	a
8	a	18	d	28	d	38	a	48	c
9	a	19	d	29	b	39	b	49	c
10	b	20	b	30	a	40	a	50	b

SET-7

1. **The transmission mode which allow both communicating devices to transmit and receive data simultaneously is**
   (a) Simplex (b) Full-duplex
   (c) Half- duplex (d) Quarter-duplex

2. **Which media does not come under the guided media?**
   (a) Fiber optics (b) Coaxial cable
   (c) Microwave (d) Twisted pair

3. **A public switched telephone network (PSTN) uses____ switching technique.**
   (a) Packet (b) Massage
   (c) Circuit (d) Transport

4. **The network topology in which devices are not linked to each other and where hub acts as central controller is-**
   (a)Mesh topology (b) Star topology
   (c) Ring topology (d)Tree topology

5. **Which of the following cables support the highest bandwidth and faster transmission rate?**
   (a)Twisted pair cable (b) Coaxial cable
   (c) Open wire cable (d) Fire optical cable

6. **The layer that handles error detection and error correction is**
   (a) Presentation layer (b) Network layer
   (c) Transport layer (d) None of these

7. **The communication mode that supports data in one directions is known as-**
   (a) Simplex (b) half-simplex
   (c) full-duplex (d) Multiplex

8. **Which of the following is used for modulation and demodulation?**
   (a) Modem (b) Protocol
   (c) Gateway (d) Multiplexer

9. **In a ring topology, the computer in possession of the ___ can transmit data.**
   (a) Packet (b) Data
   (c) Access method (d) Token

10. **The OSI model is divided into ____ processes called layers.**
    (a) five (b) six
    (c) seven (d) eight

11. **Which of the following languages is a mathematically oriented language used for scientific problems?**
    (a) COBOL (b) FORTRAN
    (c) LISP (d) PROLOG

12. **____ are specially designed computers that perform complex calculations extremely rapidly?**
    (a) Servers (b) Supercomputers
    (c) Laptops (d) Mainframes

13. **URL stands for ……..**
    (a) Universal Research List
    (b) Universal Resource List
    (c) Uniform Resource Locator
    (d) Uniform Research Locator

14. **Servers are computers that provide resources to other computers connected to a-**
    (a) mainframe (b) network
    (c) supercomputer (d)) client

15. **____ describes what is database fields.**
    (a) Structures (b) Field markers
    (c) Field definition (d) Field names

16. **The design of the network is called the network:**
    (a) architecture (b) server
    (c) transmission (d) type

17. **The most frequently used instructions of a computer program are likely to be fetched from:**
    (a) the hard disk (b) cache memory
    (c) RAM (d) registers

18. **The ____ contains data descriptions and defines the name, data type, and length of each field in the database.**
    (a) data dictionary (b) data table
    (c) data record (d) data field

19. **Which of the following places the common data elements in order from smallest to largest**
    (a) character, file, record, field, database
    (b) character, record, field, database, file
    (c) character, field, record, file, database
    (d) Bit, byte, character, record, field, file, database,

20. **Data are ____ in client/server computing.**
    (a) never sent to the client machine
    (b) sent in very large sections to save processing time
    (c) sent only upon the client's request
    (d) sent in complete copies for the client to filter and sort

21. To create a _____ personal computer can connect together.
(a) server (b) Super computer
(c) Enterprise (d) Network

22. Most powerful computer in a typical network is-
(a) desktop (b) Network client
(c) Network server (d) Network

23. A combination of hardware and software, which provides facilities of sending and rationing of information between computer and devices.
(a) Network (b) Peripheral
(c) Expansion Slot (d) Digital device

24. Servers is a computer which provides resources other computers commuted in a-
(a) network (b) Mainframe
(c) Supercomputer (d) client

25. One benefit of dialup internet access is-
(a) It uses broad band tech.
(b) It uses present telephone service
(c) It uses router for security
(d) Modem speed is very fast

26. In a ____ topology, network component are connected by only one cable.
(a) Star (b) Ring
(c) bus (d) Tree

27. Which of the following us a small single site network?
(a) LAN (b) DSL
(c) MAN (d) WAN

28. Computer connected with LAN.....
(a) Work fast
(b) Go Online
(c) Send e-mail
(d) Share information or device

29. Pager is an example of ____ transmission.
(a) simplex (b) Half duplex
(c) Full duplex (d) Automatic

30. Telephone broadcast is an example of ____ transmission.
(a) simplex (b) Half duplex
(c) Full duplex (d) Automatic

31. Which of the following internet connection uses broadcast technique?
(a) Leased line connection
(b) Dial up connection
(c) A and B
(d) ISDN connection

32. First computer network of world is-
(a) I-net (b) VNet
(c) ArpaNet (d) Both a and b

33. Who is given the concept of WWW?
(a) Ray Tomlinson (b) Tim Berners Lee
(c) Charles babbage (d) Larry page

34. Who developed Hotmail?
(a) sabeer Bhatia (b) javedKarim
(c) David Filo (d) Chad hurley

35. Which communication channel is used in Remote control?
(a) Bluetooth (b) Infrared rays
(c) Fibre optics (d) A and C

36. When more computers are connected at one place, it is called?
(a) LAN (b) WAN
(c) MAN (d) Tree

37. A ____ is an application which that capture data packets, which can be used to capture passwords and other data over the network.
(a) rootkit (b) Virus
(c) Packet sniffer (d) Anti virus

38. ____ virus known as Pakistani virus and also developed by Pakistani brothers.
(a) score virus (b) Brain virus
(c) Lehigh virus (d) All of the above

39. ____ is a mobile operating system?
(a) android (b) Win-xp
(c) DOS (d) WIN-7

40. IPV4 uses ____ to define IP address.
(a) 64 bits (b) 16 bit
(c) 128bit (d) 32 bit

41. The ____ enables your computer to connect to other computers-
(a) video card
(b) Sound card
(c) Network interface card
(d) Controller

42. Dumb terminal have terminals and-
(a) mouse (b) Speaker
(c) keyboard (d) Joystick

43. To access a mainframe or supercomputer, users use a -
(a) Terminal (b) Node
(c) Desktop (d) PC

44. A word in a web page that, when clicked, open another document.
(a) Anchor (b) URL

(c) Hyperlink (d) Reference

45. _____ are used to connect two LANs with same protocol over a wide area.

(a) LAN (b) WAN
(c) CAN (d) MAN

46. LAN is useful for-

(a) Railway (b) Bank
(c) Businessman (d) All of the above

47. Banks ATM facility is an example of-

(a) LAN (b) WAN
(c) CAN (d) MAN

48. What is the Transmission rate of fibre optics cable?

(a) 10mbps (b) 1000mbps
(c) 100 mbps (d) 1000bps

49. HTTP, FTP and SMTP are involved in _____ layer.

(a) Application (b) session
(c) Transport (d) All of the above

50. _____ is a set of rules which is used to perform specific action.

(a) HTTP (b) SMTP
(c) FTP (d) Protocol

Solution

ANSWER SHEET

Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.
1	b	11	b	21	d	31	b	41	c
2	c	12	b	22	c	32	c	42	c
3	c	13	c	23	a	33	b	43	a
4	b	14	b	24	a	34	a	44	c
5	d	15	d	25	b	35	b	45	a
6	d	16	a	26	c	36	a	46	d
7	a	17	b	27	a	37	c	47	b
8	a	18	a	28	d	38	b	48	b
9	d	19	c	29	a	39	a	49	a
10	c	20	c	30	c	40	d	50	d

SET-8

1. **____ is a search engine introduced by MICROSOFT.**
   (a) Google (b) Khoj.com
   (c) Bing (d) Yahoo

2. **When sending an email, the ____ line describes the contents of the message.**
   (a) subject (b) To
   (c) Content (d) CC

3. **What does the URL http://www.uni.edu tell you about the source?**
   (a) it is associated with an educational institutions.
   (b) It is associated with an military.
   (c) It is associated with an commercial organization.
   (d) It is associated with an commercial organization.

4. **What kind of data can you send by E-mail?**
   (a) Audio (b) picture
   (c) video (d) All

5. **When a user subscribes to a news group?**
   (a)All new post are E-mailed to the user automatically
   (b)The user must agree with everything said in the newsgroup
   (c)The user is billed annually for the subscription
   (d)The user is barraged with spam

6. **The internet is owned by**
   (a)The US government
   (b) A consortium of telecommunications companies
   (c) The IETF
   (d) None of these

7. **A home page is-**
   (a) A web page created by an individual home user, as opposed to one created by a corporation
   (b)The web page you like to visit the most
   (c)The entry page of most Web sites
   (d) A web page is eventually reach by clicking a series of hyperlinks

8. **Which of the following is a search engine?**
   (a) Macromedia flash
   (b) Google
   (c) Netscape
   (d) Librarians' index to the internet

9. **_____ Viruses are often transmitted by a floppy disk left in the floppy drive**
   (a) Trojan horse (b) Boot sector
   (c) Script (d) Logic bomb

10. **A Proxy server is used for which of the following?**
    (a) To provide security against unauthorized users
    (b) To process client requests for web pages
    (c) To process client requests for database access
    (d) To provide TCP/IP

11. **You must install a (n) _____ on a network if you want to share a broadband Internet connection.**
    (a) router (b) modem
    (c) node (d) cable

12. **Granting an outside organization access to internet web pages is often implemented using a (n)____**
    (a) extranet (b) intranet
    (c) internet (d) hacker

13. **____ is a device that connects that connect two or more networks.**
    (a) gateway (b) pathway
    (c) Bus (d) Ring

14. **____ uses HTTP.**
    (a) Workbook (b) Server
    (c) Worksheet (d) Webpage

15. **WWW uses ____ protocol.**
    (a) FTP (b) HTTP
    (c) TelNet (d) SMTP

16. **Web site is a collection of -**
    (a) HTML doc (b) Graphics files
    (c) Operating system (d) word doc

17. **____ helps to connect a computer from network.**
    (a) browser (b) Netfit
    (c) Win-98 (d) Fiber optics

18. **.com is related to-**
    (a) personal site
    (b) Art
    (c) Organization
    (d) Commercial organisation

19. **Internet starts in India at-**
    (a) 15 aug 1995 (b) 20 aug 1995
    (c) 15 aug 1996 (d) 8 aug 1995

20. **Unsolicited mail is known as-**
    (a) Newsgroup (b) Site
    (c) spam (d) Web page

21. **XML is-**
    (a) Xtreamemarkup language

(b) Xtensivemarkup language
(c) X- markup language
(d) Xpensivemarkup language

22. SMTP stands for
(a) Simple markup transport protocol
(b) Simple mail transfer protocol
(c) Single mail transfer protocol
(d) Simple mail transmission protocol

23. When pointer points ____ then pointer appears like hand
(a) grammer error (b) Hyperlink
(c) Screen tips (d) Spelling error

24. Full form of EDI
(a) Erasable data information
(b) Extra delivery info
(c) Electronics data interchange
(d) electronics delivery info

25. AltaVIsta, Google and Bing are the example of-
(a) search engine
(b) Brand name
(c) Virus name
(d) Antivirus program

26. address of a website known as
(a) User ID (b) URL
(c) Session time (d) All

27. Which term identifies a specific computer on the web and the main page of the entire site
(a) URL
(b) Web site address
(c) Hyperlink
(d) Domain name

28. ____is a first browser.
(a) Netscape (b) Google chrome
(c) Mozilla (d) Mosaic

29. Malicious Hacker known as-
(a) White hat hacker (b) Hacker
(c) Cracker (d) Ethical

30. _____is a combination of black hat and white hat hacker.
(a) white hat (b) Grey hat
(c) Blue hat (d) Red hat

31. Which is not a antivirus program
(a) score virus (b) AVG
(c) Norton (d) AVAST

32. Who is the founder of Yahoo?
(a) David Filo and Jerry Yang
(b) Steve job and chad hurley
(c) JavedKarim
(d) Ray Tomlinson

33. Pandora is what?
(a) Internet video (b) Internet chat
(c) Internet Radio (d) Games

34. Personal logs or journal entries posted on the Web are known as:
(a) listservs (b) Webcasts
(c) blogs (d) subject directories

35. Orkut was officially launched-
(a) 20 jan 2004 (b) 15 jan 2004
(c) 26 jan 2006 (d) 24 jan 2004

36. ____started in jan 94 by Jerry Yang and David Filo
(a) MSN (b) Google
(c) Bing (d) Yahoo

37. ____protocol for communication between browser and server.
(a) FTP (b) HTTP
(c) SMTP (d) DNS

38. Which is not a browser?
(a) Safari (b) Google
(c) Google Chrome (d) Netscape

39. Microsoft introduced ____ browser in 1995.
(a) Mozilla (b) Mosaic
(c) Internet Explorer (d) Chrome

40. A human being who writes programs, operate and maintain computer known as
(a) liveware (b) Freeware
(c) Spyware (d) Shareware

41. Lycos is known as-
(a) website (b) internet radio
(c) Search engine (d) Messenger

42. Who introduced internet email?
(a) Jerry yang (b) David filo
(c) Ray Tomlinson (d) Sergey brinn

43. The internet is-
(a) a large network of networks
(b) an internal communication system for a business
(c) a communication system for the Indian government
(d) All of these

44. Firewalls are used to protect against___.
(a) Unauthorized Attacks
(b) Virus Attacks

(c) Data Driven Attacks
(d) Fire Attacks

45. _____ given first service provider to offer email facility.
(a) Gmail (b) Hotmail
(c) Compuserve (d) Yahoo

46. _____ is network operating system
(a) DOS (b) Win-95
(c) Win-98 (d) WIN-2000 server

47. BCC stands for-
(a) Blind carbon copy
(b) Bold carbon copy
(c) Blue carbon copy
(d) Bold care copy

48. _____ is known as network Virus.
(a) Trojan horse (b) Brain virus
(c) WORM (d) ALL

49. Facebook introduced by-
(a) Jimmy wales (b) Mark Zuckerburg
(c) David Filo (d) Sabeer Bhatia

50. _____ is known as cleaver programmer.
(a) programmer (b) System analyst
(c) Tester (d) Hacker

Solution

ANSWER SHEET

Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.
1	c	11	a	21	b	31	a	41	c
2	a	12	a	22	b	32	a	42	c
3	a	13	a	23	b	33	c	43	d
4	d	14	d	24	c	34	c	44	a
5	a	15	b	25	a	35	d	45	c
6	d	16	a	26	b	36	d	46	d
7	c	17	a	27	a	37	b	47	a
8	b	18	d	28	d	38	b	48	c
9	b	19	a	29	c	39	c	49	b
10	b	20	c	30	c	40	a	50	d

SET-9

1. **Slide Sorter view can be selected under which of the following categories?**
   (a) Home (b) File
   (c) Edit (d) View

2. **The combination of which keyboard keys can be used as a shortcut to add a new slide in MS PowerPoint?**
   (a) Ctrl + S (b) Ctrl + L
   (c) Ctrl + M (d) Ctrl + N

3. **Header and Footer option is available under which of the following categories?**
   (a) Insert (b) Design
   (c) Review (d) View

4. **Which of the following is not included in the "Insert" category in MS PowerPoint?**
   (a) Shapes (b) Table
   (c) Equation (d) Animation

5. **Microsoft Office is a _____.**
   (a) Shareware
   (b) Public-domain software
   (c) Opensource software
   (d) An application suite

6. **The valid format of MSWord is _____.**
   (a) .jpeg (b) B).png
   (c) .doc (d) D).exe

7. **Which file starts MS Word?**
   (a) Word.exe (b) Winword.exe
   (c) Msword.exe (d) Word2003.exe

8. **What is the default font used in MS Word 2016 document or above?**
   (a) Times New Roman (b) Arial
   (c) Calibri (d) Perpetua

9. **What is the default font size in MS Word 2016 or above?**
   (a) 10 pt (b) 11 pt
   (c) 12 pt (d) 9 pt

10. **What is the shortcut key to open the Open dialog box?**
    (a) F12 (b) Shift + F12
    (c) Alt + F12 (d) Ctrl + F12

11. **What is the smallest and largest font size available in formatting toolbar of MS Word?**
    (a) 8 and 64 (b) 8 and 72
    (c) 9 and 72 (d) 9 and 64

12. **What is the shortcut key to check Spelling in MS Word?**
    (a) Shift + F7 (b) Ctrl + F7
    (c) F7 (d) F8

13. **Portrait and Landscape are _____?**
    (a) Page Layout (b) Page Orientation
    (c) Page Formatting (d) Page Design

14. **What is the maximum number of columns that can be inserted in MS Word Table?**
    (a) 64 (b) 48
    (c) 72 (d) 63

15. **What is the shortcut key for 'Find and Replace' in MS Word?**
    (a) Ctrl + F (b) Ctrl + R
    (c) Ctrl + G (d) Ctrl + M

16. **When a hyperlink is created, Word formats the web address as which colour?**
    (a) Underlined and coloured Blue
    (b) Underlined and coloured Green
    (c) Underlined and coloured Red
    (d) Underlined and coloured Purple

17 **In a spreadsheet, a _____ is a number you will use in a calculation.**
    (a) Label (b) Cell
    (c) Field (d) Value

18. **The default extension of Excel file is?**
    (a) .xlw (b) .xlsx
    (c) .wk (d) .exl

19. **Excel workbook is a collection of _____?**
    (a) Worksheets
    (b) Sheets
    (c) Charts
    (d) Worksheets and Charts

20. **Which symbol must all formula begin with?**
    (a) : (b) =
    (c) == (d) +

21. **Where a row and column meet is called ___?**
    (a) Block (b) Box
    (c) Cell (d) Space

22. **First cell in MS excel worksheet is labeled as _____?**
    (a) aA (b) Aa
    (c) A0 (d) A1

23. In order to perform calculation in MS Excel, what will you need to use?
(a) Field (b) Table
(c) Variable (d) Formula

24. Which of the following is not available in the Page setup dialog box?
(a) Page Orientation (b) Header & Footer
(c) Page Break Preview (d) Margins

25. You can open the Sort dialog box by choosing sort from __?
(a) Data (b) View
(c) Format (d) Tools

26. Hyperlink can be __?
(a) Drawing Objects (b) Images
(c) Texts (d) All of the Above

27. 'New Comments' options can be found under which tab?
(a) Review (b) Data
(c) Insert (d) View

28. In MS Excel, by default numeric values appears in which alignment?
(a) Left Aligned (b) Centre Aligned
(c) Right Aligned (d) Justify Aligned

29. What is the shortcut key to replace a data within sheet?
(a) Ctrl + R (b) Ctrl + H
(c) Ctrl + F (d) Ctrl + G

30. Data can be arranged in a worksheet in a easy to understand manner using ___?
(a) Applying Styles (b) Auto Formatting
(c) Changing Fonts (d) All of the Above

31. Which of the following option is not used to cut the data in MS Excel?
(a) Ctrl + C
(b) Clicking the Cut button on Home Tab
(c) Ctrl + X
(d) Selecting Cut from Quick Access Toolbar

32. Which setting you must modify to print a worksheet using letterhead?
(a) Layout (b) Margin
(c) Paper (d) Orientation

33. Which command can be used to restore the previous action?
(a) Undo (b) Redo
(c) Copy (d) Replace

34. What is the shortcut key to insert new sheet in current workbook?
(a) Shift + F11 (b) Ctrl + F11
(c) Shift + F10 (d) Ctrl + F10

35. You can use drag and drop method to ___?
(a) Move Cell Contents (b) Copy Cell Contents
(c) Add Cell Contents (d) Only a and b

36. To insert columns between D and E, you would select which columns?
(a) Select E (b) Select E and F
(c) Select E, F & G (d) Select D, E & F

37. Which Bar in MS Excel allows entering Values and Formulas?
(a) Formula Bar (b) Menu Bar
(c) Title Bar (d) Standard Toolbar

38. Which shortcut key can be used to insert a new slide in current presentation?
(a) Ctrl + N (b) Ctrl + M
(c) Ctrl + R (d) Ctrl + L

39. Which button can be used to stop a slide show?
(a) Left Arrow (b) Right Arrow
(c) Press Escape (Esc) (d) Down Arrow

40. Which of the following section does not exist in a slide layout?
(a) Animations (b) Charts
(c) Titles (d) Lists

41. Which of the following pane is not available in Task Pane?
(a) Word Art (b) Clip Art
(c) Search Result (d) Getting Started

42. The selected design template can be used to ___?
(a) To All Slides
(b) To Current Slide Only
(c) To All New Presentations
(d) All of the Above

43. To open the existing presentation, press ___
(a) Ctrl + L (b) Ctrl + A
(c) Ctrl + O (d) Ctrl + N

44. From which menu, you can insert Picture, Text Box, Chart?
(a) Insert (b) Design
(c) New (d) File

45. Which of the following is not a slide design?
(a) Colour Scheme (b) Design Template
(c) Slide Layout (d) Animation Scheme

46. Which of the following can be used to insert a hyperlink in slide?

(a) Insert -> Hyperlink (b) Press Ctrl + K
(c) Press Shift + H (d) Both a and b

47. Which file format can be added to a power point show?

(a) .jpg (b) .gif
(c) .wav (d) All of the Above

48. To select more that one slide in the presentation _____

(a) Ctrl + Click on the Slide
(b) Alt + Click on the Slide
(c) Shift + Click on the Slide
(d) Ctrl + Shift + Click on the Slide

49. Which of the following can be used to add a slide to an existing presentation?

(a) File, New (b) New, Open
(c) Insert, New Slide (d) File, Add New Slide

50. Objects on the slide that hold texts are known as _____

(a) Place holders (b) Object holders
(c) Text Layouts (d) Auto Layouts

Solution

ANSWER SHEET

Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.
1	d	11	b	21	c	31	c	41	a
2	c	12	c	22	d	32	b	42	d
3	a	13	b	23	d	33	a	43	c
4	d	14	d	24	c	34	a	44	a
5	d	15	c	25	a	35	d	45	c
6	c	16	a	26	d	36	c	46	d
7	b	17	d	27	a	37	a	47	d
8	c	18	b	28	c	38	b	48	a
9	b	19	d	29	b	39	c	49	c
10	d	20	b	30	d	40	a	50	a

SET-10

1. **Which of the following function is used to return the number of days between two dates?**
   (a) CHOOSE function (b) DATE function
   (c) DAYS function (d) MATCH function

2. **For which of the following function, ^ sign is used in MS Excel?**
   (a) Summation (b) Exponential
   (c) Differential (d) Percentage

3. **Which of the following is/are not an example of magnetic memory?**
   (a) Magnetic tapes (b) Floppy disk
   (c) Hard disk (d) RAM

4. **Storage capacity of primary memory is _____?**
   (a) Higher (b) Smaller
   (c) Very high (d) Very small

5. **What is the full form of R in 'RAM'?**
   (a) Read (b) Random
   (c) Run (d) Both (a) and (b)

6. **Which of the following is/ are the function of main frame computer?**
   (a) Large scale transection
   (b) Censuses
   (c) Industry and consumer statistics
   (d) All of the above

7. **What does CSA stand for?**
   (a) Computer Service Architecture
   (b) Computer Speed Addition
   (c) Carry Save Addition
   (d) None of the mentioned

8. **How an embedded system communicates with the outside world?**
   (a) Memory (b) Output
   (c) Peripherals (d) Input

9. **Which Unix command is used for changing the current directory?**
   (a) pwd (b) rm
   (c) cd (d) cp

10. **echo command is used for _____**
    (a) displaying diagnostic messages
    (b) displaying date and time
    (c) displaying errors
    (d) displaying operating system details

11. **The device on a laptop computer that takes the place of a mouse is knows as _____?**
    (a) Telnet (b) Track
    (c) Trash (d) Touchpad

12. **What is the decimal number system conversion of the Binary Code "0110" and "1110"?**
    (a) 2 & 14 (b) 4 &12
    (c) 6 & 14 (d) 11 & 8

13. **A group of 4 bits is called as _____?**
    (a) Byte (b) Octet
    (c) Nibble (d) Megabyte

14. **_____ is the term for a collection of tools that collect and interpret information regarding the earth surface?**
    (a) Graphics Interchange Format
    (b) Geographical Information System
    (c) Graphics Information Format
    (d) Geographical Interchange Format

15. **What is the range of Bluetooth connection (approximately)?**
    (a) 30 m (b) Up to 30 feet
    (c) 10 m (d) both (b) and (c)

16. **Match the following:**

Column- A	Column- B
(j) .com	(p) Organization
(k) .edu	(q) Military
(l) .org	(r) education
(m) .mil	(s) commercial

    (a) j-p, k-s, l-r, m-q (b) j-s, k-r, l-p, m-q
    (c) j-q, k-s, l-r, m-p, (d) j-p, k-s, l-q, m-r

17. **Which of the following key is required in to handle the data when the encryption is applied to the data so that the unauthorised user cannot access the data?**
    (a) Primary key (b) Authorised key
    (c) Encryption key (d) Decryption key

18. **What is the full form of BASIC?**
    (a) Beginner's All Purpose Symbolic Instruction Code
    (b) Beginner's All Purpose Symbolic Information Code
    (c) Beginner's All Purpose Systematic Information Code
    (d) Beginner's All Purpose Symbolic Instruction Call

19. What is an example of iteration in C?
(a) do-while (b) while
(c) for (d) All of the above

20. Who invented object-oriented programing (OOP)?
(a) Andrea Ferro (b) Adele Goldberg
(c) Alan Kay (d) Dennis Ritchie

21. DHTML stand for?
(a) Dynamic Hyper Text Markup Language
(b) Dynamic Hyper Text Machine Language
(c) Dynamic Hyper Types Markup Language
(d) Dynamic High Text Markup Language

22. In html coding ……. tag is used to-
(a) Change the format (b) Save the data
(c) Delete the data (d) Display a paragraph

23. By _____, data is stored in several disk units by breaking them into smaller pieces and storing each piece in separate disk
(a) RAID technique
(b) Redundant Array of Inexpensive Disks technique
(c) READ technique
(d) Both (a) and (b)

24. _____ types of heading are available in HTML?
(a) Two (b) Three
(c) Six (d) Five

25. Transmission media are usually categorized as _____
(a) Guided (b) Unguided
(c) Neutral (d) Both (a) and (b)

26. In MS-Word the keyboard shortcut _____ used for spelling and Grammar check?
(a) F3 (b) F4
(c) F7 (d) F5

27. A device operating at the _____ is called a repeater
(a) Physical layer (b) Data link layer
(c) Transport layer (d) Network layer

28. If we want to convert the text which is in small letters to capital letters then select which of the following shortcut key?
(a) Shift + F2 (b) Shift + F3
(c) Shift + F4 (d) Shift + F1

29. Who designed the Lotus 1-2-3 spreadsheet?
(a) Mitchell Kapor (b) Steve Wozniak
(c) Alan Turing (d) Linus Torvalds

30. _____ code identifies a floppy drive problem?
(a) 604 error (b) 603 error
(c) 602 error (d) 601 error

31. Given the following URL - http://www.example.com:80/path/to/myfile.html
Here - 'www.example.com', ':80' and stand for _____ and _____ respectively.
(a) IP and source
(b) Domain Name and Port
(c) File name and Path
(d) Path and Port

32. Which among the following term is used for: Unauthorized copying of software to be used for personal gain instead of personal backups?
(a) Program thievery (b) Data snatching
(c) Software piracy (d) Program looting

33. In an Excel table, what uses a single formula that adjusts for each row?
(a) Calculated column (b) Formula bar
(c) New column (d) Array

34. Which of the following is an expansion card which generates a feed of output images to a display?
(a) Bus (b) Motherboard
(c) Play station (d) Video card

35. Which of the function in Computers is the one that control processes and accept data in continuous pattern?
(a) Data traffic pattern (b) Data highway
(c) Highway loop (d) Feedback loop

36. What does the LOOKUP function do?
(a) Looks up text that contain 'UP'
(b) Used to look in a single row or column and find a value from the same position in a second row or column
(c) Finds irrelevant records
(d) All of above

37. The number of pixels displayed on a screen is known as the screen _____?
(a) resolution (b) colour depth
(c) refresh rate (d) viewing size

38. Which of the following is a collection of programs that controls how your computer system runs and processes information?
(a) operating system (b) computer
(c) office (d) compiler

39. The _____ folder retains copies of messages that you have started but are not yet ready to send.
(a) Drafts (b) Outbox
(c) Address Book (d) Sent Items

40. Which of the following is a software that, once installed on your computer, tracks your internet browsing habits and sends you popups containing advertisements related to the sites and topics you've visited?
(a) Ransomware (b) Adware
(c) Malware (d) Phishing

41. Which is considered a direct entry input device?
(a) Optical scanner (b) Mouse
(c) Light pen (d) All of the above

42. The most common binary code in use today is the 8-bit ASCII code. What do the letters ASCII stand for?
(a) American Standard Code for International Interchange
(b) American Standard Code for Information Interchange
(c) American Standard Code for Intelligence interchange
(d) American Scientific Code for Information Interchange

43. Reusable optical storage will typically have the acronym ___.
(a) CD (b) RW
(c) DVD (d) ROM

44. Software instruction intended to satisfy a user's specific processing needs are called
(a) System software (b) A microcomputer
(c) Documentation (d) Applications software

45. When you link one database table to another database table, what are you creating?
(a) Primary link (b) Secondary link
(c) Relation (d) Referential integrity

46. What database tool would you use to find answers to your questions about data stored in your database?
(a) Queries (b) Tables
(c) Show (d) Q&A

47. What type of graphical model is used to define a database?
(a) Flowchart (b) E-R diagram
(c) Organizational model (d) Programming model

48. The rules of a language are called its _____.
(a) structure (b) code
(c) syntax (d) rigidity

49. JavaScript was developed by _____ to run inside of web pages.
(a) Microsoft (b) Sun
(c) Oracle (d) Netscape

50. A(n) _____ converts all the source code into machine code, creating an executable file.
(a) linker (b) compiler
(c) assembler (d) interpreter

Solution

1. (c): DAYS function is used to return the number of days between two dates.

2. (b): For exponential function, ^ sign is used in MS Excel.

3. (d): RAM is not an example of magnetic memory.

4. (b): Storage capacity of primary memory is smaller.

5. (b): Full form of R in Random-access memory (RAM) is Random.

6. (d): Large scale transection, Censuses, Industry and consumer statistics all these are the function of mainframe computer

7. (b): CSA stand for Computer Speed Addition.

8. (c): An embedded system communicates with the outside world through Peripherals.

9. (c): Command is used for changing the current directory is cd.

10. (a): echo command is used for displaying diagnostic messages.

11. (d): The device on a laptop computer that takes the place of a mouse is knows as touchpad.

12. (c): The decimal number system conversion of the Binary Code "0110" is 6 and "1110" is 14

13. (c): A group of 4 bits is called as nibble.

14. (b): Geographical Information System is the term for a collection of tools that collect and interpret information regarding the earth surface.

15. (d): the range of Bluetooth connection (approximately) Up to 30 feet and 10 m.

16. (b):

(J) .com	(s) commercial
(k) .edu	(r) education
(l) .org	(p) Organization
(m).mil	(q) Military

Hence option (b) is correct

17. (d): Decryption key is required in to handle the data when the encryption is applied to the data so that the unauthorised user cannot access the data.

18. (a): The full form of BASIC is Beginner's All Purpose Symbolic Instruction Code.

19. (d): All of the above are an example of iteration in C.

20. (c): OOP invented by Alan Kay.

21. (a): DHTML stand for Dynamic hyper text markup language.

22. (d): In html coding ……. tag is used to Display a paragraph.

23. (d): By Redundant Array of Inexpensive Disks (RAID technique), data is stored in several disk units by breaking them into smaller pieces and storing each piece in separate disk

24. (c): 6 types of heading are available in HTML.

25. (d): Transmission media are usually categorized as Both Guided or Unguided.

26. (c): In MS-Word the keyboard shortcut F7 used for spelling and Grammar check

27. (a): A device operating at the Physical layer is called a repeater.

28. (b): When we want to convert the text which is in small letters to capital letters then select the require Shift + F3.

29. (a): Lotus 1-2-3 was a popular command line spreadsheet program in the 1980s designed by Mitchell Kapor and released on January 26, 1983, by Lotus Software, which is now part of IBM.

30. (d): 601 error code identifies a floppy drive problem.

31. (b): www.example.com is domain name and :80 is the port number in the given URL.

32. (c): Software piracy is the illegal copying, distribution, or use of software.

33. (a): A calculated column uses a single formula that adjusts for each row. It automatically expands to include additional rows so that the formula is immediately extended to those rows

34. (d): Video Card is an expansion card which generates a feed of output images to a display

35. (d): Feedback occurs when outputs of a system are routed back as inputs as part of a chain of cause-and-effect that forms a circuit or loop. The system can then be said to feed back into itself.

36. (b): LOOKUP function is used to look in a single row or column and find a value from the same position in a second row or column.

37. (a): Resolution is the number of pixels (individual points of color) contained on a display monitor, expressed in terms of the number of pixels on the horizontal axis and the number on the vertical axis. The sharpness of the image on a display depends on the resolution and the size of the monitor.

38. (a): An operating system (OS) is system software that manages computer hardware and software resources and provides common services for computer programs.

39. (a): Draft document is a type of technical report that is a work in progress, a preliminary form of a possible future document

40. (b): Some adware has keyloggers and spyware built into the program, leading to greater damage to your computer and possible invasion of your private data.

41. (d): Optical scanner, Mouse, Light pen, Digitizer all are direct entry input device.

42. (b): ASCII stand for American Standard Code for Information Interchange.

43. (b): Reusable optical storage will typically have the acronym RW.

44. (d): Software instruction intended to satisfy a user's specific processing needs are called Applications software.

45. (c): When we link one database table to another database table, we are creating Relationships.

46. (a): Queries tool we use to find answers of our questions about data stored in our database.

47. (b): E-R diagram graphical model is used to define a database.

48. (c): The rules of a language are called its syntax.

49. (d): JavaScript was developed by Netscape to run inside of web pages.

50. (b): A complier converts all the source code into machine code, creating an executable file.

SET-11

1. **A series of steps that always results in an answer is the definition of _____.**
   (a) Heuristic (b) Flowchart
   (c) Algorithm (d) Pseudo code

2. **The color of an object is an example of a(n) _____.**
   (a) attribute (b) detail
   (c) listing (d) specification

3. **Match the followings:**

Column 'A'	Column 'B'
(J) F1	(W) Quit program
(K) Alt + F4	(X) Close the current tab
(L) Windows logo + E	(y) Help
(M) CTRL + W	(Z) Windows explorer

   (a) J-Y, K-W, L-Z, M-X (b) J-Y, K-X, L-Z, M-W
   (c) J-X, K-W, L-Z, M-Y (d) J-Y, K-Z, L-X, M-W

4. **What was the first general purpose and first commercial purpose computer respectively?**
   (a) ENIAC and EDVAC (b) EDSAG and UNIVAC
   (c) ENIAC and EDSAS (d) ENIAC and UNIVAC

5. **_____ is a program that takes one or more object file code generated by a compiler and combine them into a single executable program.**
   (a) Linker (b) Link editor
   (c) Loader (d) Both (a) and (b)

6. **A table consist of _____ and _____, which are referred as field and record in DBMS term.**
   (a) Columns & Rows (b) Lines & Points
   (c) Columns & Lines (d) Rows & Points

7. **Antivirus program perform which of the following function?**
   (a) Detection (b) Prevention
   (c) Damage control (d) All of the above

8. **Which following Internet service provider (ISP) is free?**
   (a) CompuServe (b) AOL
   (c) NetZero (d) MSN

9. **_____ launched by jawed karim, Chad hurely and Steve chen in feb 14, 2005?**
   (a) Wikipedia (b) Bing
   (c) Orkut (d) YouTube

10. **What is the full form of CUI?**
    (a) Character User Interface
    (b) Character Used Interface
    (c) Character User Imagine
    (d) Computer User Interface

11. **Hybrid computer used the combined feature of _____ and _____ machine.**
    (a) analog, digital (b) super, sub
    (c) client, server (d) warehouse, mining

12. **Which of the following is a type of cloud computing service?**
    (a) Service-as-a-Software (SaaS)
    (b) Software-and-a-Server (SaaS)
    (c) Software-as-a-Service (SaaS)
    (d) Software-as-a-Server (SaaS)

13. **Why Java is Partially OOP language?**
    (a) It allows code to be written outside classes
    (b) It supports usual declaration of primitive data types
    (c) It does not support pointers
    (d) It doesn't support all types of inheritance

14. **The feature by which one object can interact with another object is _____**
    (a) Message reading (b) Message Passing
    (c) Data transfer (d) Data Binding

15. **How many types of access specifiers are provided in OOP (C++)?**
    (a) Four (b) Three
    (c) Two (d) One

16. **_____ is a violent act using internet, which either threatens any technology user or leads to loss of life or otherwise harms anyone in order to accomplish political gain.**
    (a) Cyber attack (b) Cyber-warfare
    (c) Cyber campaign (d) Cyber-terrorism

17. **Which of the following is the first neural network computer?**
    (a) ENIAC (b) Abacus
    (c) RFD (d) SNARC

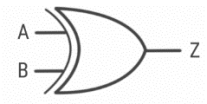
18. **RAID stands for _____**
    (a) Redundant array of independent disks
    (b) Redundant array of individual disks
    (c) Reusable Array of independent disks
    (d) Reusable array of individual disks

19. **The first practical form of Random Access Memory was the _____**
    (a) SSEM (b) Cathode Ray Tube
    (c) William's Tube (d) Thomas's Tube

20. There are five universal gates.
(a) True (b) False
(c) Either (a) or (b) (d) More than 5

21. The following figure shows a _____ gate respectively?

(M)



(N)

(a) NOR & XOR logic gate
(b) NAND & XOR logic gate
(c) XOR & NOR logic gate
(d) OR & NOT logic gate

22. Which of the following is the most important area of concern in cloud computing?
(a) Scalability (b) Storage
(c) Security (d) All of the mentioned

23. _____ addressing mode is most suitable to change the normal sequence of execution of instructions.
(a) Relative (b) Indirect
(c) Index with Offset (d) Immediate

24. Match the following Column A and Column B.

Column "A"	Column "B"
(i) Vacuum tube	(v) 2nd generation
(j) Integrated chips (IC)	(w) 4th generation
(k) Transistor	(x) 5th generation
(l) ULSI	(y) 1ST generation
(m) Microprocessor	(z) 3rd generation

(a) i-y, j-z, k-v, l-x, m-w (b) i-w, j-z, k-v, l-x, m-y
(c) i-y, j-x, k-v, l-z, m-w (d) i-y, j-z, k-w, l-x, m-v

25. Which of the following shortcut key is/are used to perform the next animation for advance to the next slide in Microsoft power point?
(a) PAGE DOWN (b) SPACEBAR
(c) DOWN ARROW (d) All of the above

26. For which of the following function, "%" and "/" signs respectively used in MS Excel?
(a) Addition and division
(b) Division and Percent
(c) Percent and Exponential
(d) Percent and division

27. Unauthorized access of information from a wireless device through a Bluetooth connection is called _____
(a) Bluemaking (b) Bluesnarfing
(c) Bluestring (d) Bluescoping

28. For a 10Mbps Ethernet link, if the length of the packet is 32bits, the transmission delay is _____ (in microseconds)
(a) 3.2 (b) 32
(c) 0.32 (d) 320

29. Which tag is used to create a blank line in HTML?
(a) <b> (b)
(c) (d) <a>

30. _____ are the data that is sent to your computer when you have visited a website
(a) Temp (b) Cracker
(c) Cookie (d) Crash

31. Which of the following is/are not the function of distributed database in DBMS?
(a) Keeping track data
(b) Query Processing by a communication network
(c) Security management
(d) Control data redundancy

32. _____ is knows as Formula translation and also used for scientific application?
(a) COBOL (b) PASCAL
(c) BASIC (d) Fortran

33. A protocol is a set of rules to perform specific task or actions, example of protocol _____?
(a) Http (b) ftp
(c) SMTP (d) All of the above

34. In EBCDIC, what represents third and sixth "C" respectively?
(a) Code, coded (b) Coded, code
(c) Common, coded (d) Complete, code

35. Loader is a set of _____ that loads the machine language translated by translator into the main memory and makes it ready for execution.
(a) Linker (b) Server
(c) Language (d) Program

36. Which of the following statement is correct?
I. Print server is used to manage multiple print request for multiple printers.
II. Mail server used to manage and transfers electronics mail message.
III. web server is used is used for hosting websites.
(a) Only I (b) Only II
(c) Both I, II (d) All I, II & III

37. In operating system, Which of the following is/are not an example of single user operating system?

(a) MS-DOS (b) Windows 95
(c) PLAM OS (d) Windows XP

38. Match the followings Columns?

Column "A"	Column "B"
(1) Hub	(i) Bidirectional
(2) Switch	(ii) Network layer
(3) Router	(iii) Data Link layer
(4) Half duplex	(iv) Physical layer

(a) 1-iii, 2-iv, 3-ii, 4-i (b) 1-iv, 2-iii, 3-ii, 4-i
(c) 1-iv, 2-iii, 3-i, 4-ii (d) 1-iv, 2-ii, 3-iii, 4-i

39. A high-quality CAD system uses digital plotter for which of the following(s)?

(a) Printing (b) Drawing
(c) Graphs (d) (a), (b) & (c)

40. What is the full form of MOUSE in computer system?

(a) Manually Operated User Section Equipment
(b) Manually Operated Under Selection Equipment
(c) Manually Operated User Selection Equipment
(d) Manually Operated User Selection Equivalent

41. A group of individuals with common interests, who frequently exchange ideas on the internet is known as _____?

(a) Interface (b) Internet
(c) Intranet (d) Internet community

42. _____ refers to a magazine published in a electronic format it is also knows as webzine.

(a) Gopher (b) Hacker
(c) E-zine (d) Pulling

43. Which of the following is not valid version of MS Office?

(a) Office 2010 (b) Office 2007
(c) Office XP (d) Office vista

44. Which of the following statement(s) is/are correct about UNIVAC?

I. It was first commercial purpose computer developed by J. Presper Eckert and John Mauchly.
II. It was also the first computer to handle both numeric and text data.
III. Full form of UNIVAC is Unique Advance Calculator

(a) Only I & III (b) Only II & III
(c) Both I & II (d) All are incorrect

45. What is an Offline device?

(a) A device which is not connected to CPU
(b) A device which is connected to CPU
(c) A direct access storage device
(d) A system software

46. Codes consisting of varying widths and spacing of parallel lines, which may be optically read, is known as _____.

(a) mnemonic (b) Bar code
(c) Decoder (d) All of the above

47. Which of the following is a server that saves Web pages that users have requested so that successive requests for these pages do not require the use of the Internet?

(a) Dedicated server (b) Virtual server
(c) Off-Line Services (d) Cache server

48. In a silicon chip of complete electronic circuit with transistors and other the electronic devices is called—

(a) Work station (b) CPU
(c) Integrated circuit (d) Magnetic disk

49. Which of the following is true about Assembly language?

(a) It is an Object-Oriented Programming Language
(b) It is a High-level programming language
(c) It is a low-level programming language
(d) It is a language for assembling computers

50. Which type of virus is generally scripted into common application programs like Excel and Word to infect the other documents and spreads to the other parts when the application is running?

(a) Macro Viruses (b) File infector virus
(c) Resident Viruses (d) Boot virus

Solution

1. (c): A series of steps that always results in an answer is the definition of Algorithm.

2. (a): The color of an object is an example of an attribute.

3. (a): Correct match is:

A	B
(J) F1	(y) Help
(K) Alt + F4	(W) Quit program
(L) Windows logo + E	(Z) Windows explorer
(M) CTRL + W	(X) Close the current tab

Hence option (a) is correct

4. (d): ENIAC and UNIVAC was the first general purpose and first commercial purpose computer respectively.

5. (d): Linker or Link editor is a program that takes one or more object file code generated by a compiler and combine them into a single executable program.

6. (a): A table consist of columns and rows, which are referred as field and record in DBMS term.

7. (d): Antivirus program perform the following function Detection, Prevention, Damage control. Hence option (d) is correct.

8. (c): NetZero Internet service provider (ISP) is free.

9. (d): YouTube launched by jawed karim, Chad hurely and Steve chen in feb 14, 2005.

10. (a): Full form of CUI is Character User Interface.

11. (a): Hybrid computers are computers that exhibit features of analog computers and digital computers. The digital component normally serves as the controller and provides logical and numerical operations, while the analog component often serves as a solver of differential equations and other mathematically complex equations.

12. (c): Software as a Service, is the most widely used choice for enterprises. SaaS makes use of the internet to offer apps to consumers that are controlled by a third-party vendor.

13. (b): Java is Partially OOP language because it supports usual declaration of primitive data types.

14. (b): The feature by which one object can interact with another object is message Passing.

15. (b): there is Three types of access specifiers are provided in OOP (C++).

16. (d): Cyber-terrorism is a violent act using internet, which either threatens any technology user or leads to loss of life or otherwise harms anyone in order to accomplish political gain.

17. (d): SNARC is the first neural network computer.

18. (a): RAID stands for Redundant array of independent disks. RAID is a multiple-disk database design which is viewed as a single logical disk by the operating system. Data are distributed across the physical drives of the array. It guarantees the recovery of data in case of data failure.

19. (c): The first practical form of RAM was William's Tube made in 1947. It stored data as electrically charged spots on the face of a Cathode Ray Tube.

20. (b): There are only 2 main universal gates: NAND and NOR.
A NAND gate as well as the NOR gate can be used to implement any other Boolean expression thus it is called as a universal gate.

21. (a): The following figure shows a NOR & XOR logic gate respectively

22. (c): When your data goes to and is stored on systems that are no longer under your control, you run the risk of it being intercepted or misused by outsiders. Only an authorized user can access the save data.

23. (a): Relative addressing mode is most suitable to change the normal sequence of execution of instructions.

24. (a):

Column "A"	Column "B"
(i) Vacuum tube	(y)1st generation
(j) Integrated chips (IC)	(z)3rd generation
(k) Transistor	(v)2nd generation
(l) ULSI	(x)5th generation
(m) Microprocessor	(w)4th generation

25. (d): PAGE DOWN, RIGHT, ARROW, UP ARROW all of the above are used to perform the next animation for advance to the next slide in Microsoft power point.

26. (d): In MS Excel "%" and "/" signs used for Percent and division respectively.

27. (b): Unauthorized access of information from a wireless device through a Bluetooth connection is called Bluesnarfing.

28. (a): Transmission rate = length / transmission rate = 32/10 = 3.2 microseconds.
For a 10Mbps Ethernet link, if the length of the packet is 32bits, the transmission delay is 3.2 (in microseconds)

29. (b): In HTML, <br> tag is used to create a blank line. <b> tag is used to specify the bold text. tag is used to define the emphasized text.

30. (c): Cookie are the data that is sent to your computer when you have visited a website.

31. (d): Control data redundancy is not the function of distributed database in DBMS.

32. (d): Fortran is known as Formula translation and also used for scientific application.

33. (d): A protocol is a set of rules to perform specific task or actions, example of protocol is Http, ftp and SMTP.

34. (b): Extended Binary Coded Decimal Interchange Code, hence 3rd and 6th "C" represent Coded, code respectively.

35. (d): Loader is a set of programs that loads the machine language translated by translator into the main memory and makes it ready for execution.

36. (d): All I, II & III is correct.

37. DOS, Windows 95, Windows 98 are an example of single user operating system, hence Windows XP is correct ans.

38. (b):

Column "A"	**Column "B"**
(1) Hub	(iv) Physical layer
(2) Switch	(iii) Data Link layer
(3) Router	(ii) Network layer
(4) Half duplex	(i) Bidirectional

Hence option (b) is correct

39. (d): A high-quality CAD system uses digital plotter for Printing, Drawing, Graphs.

40. (c): Full form of MOUSE is Manually Operated User Selection Equipment.

41. (d): A group of individuals with common interests, who frequently exchange ideas on the internet is known as Internet community.

42. (c): E-zine refers to a magazine published in a electronic format it is also knows as webzine.

43. (d): Office vista is not valid version of MS Office.

44. (c): Both I & II are correct statement.

45. (a): The terms "online" and "offline" have specific meanings in regard to computer technology in which "online" indicates a state of connectivity, while "offline" indicates a disconnected state.

46. (b): A barcode is a machine-readable representation of data relating to the object to which it is attached.

47. (d): A cache server is a dedicated network server or service acting as a server that saves Web pages or other Internet content locally.

48. (c): An integrated circuit, or IC, is small chip that can function as an amplifier, oscillator, timer, microprocessor, or even computer memory. An IC is a small wafer, usually made of silicon, that can hold anywhere from hundreds to millions of transistors, resistors, and capacitors.

49. (c): An assembly (or assembler) language, is a low-level programming language for a computer, or other programmable device.

50. (a): A macro virus is a computer virus that "infects" a Microsoft Word or similar application and causes a sequence of actions to be performed automatically when the application is started or something else triggers it.

SET-12

1. **What are those programs collectively called which are created for performing particular tasks in the computer system?**
   (a) System software (b) Application software
   (c) Utility software (d) Operating system

2. **A small portable magnetic disk that used to store and transport computer data is known as floppy disk or diskette, is made by _____?**
   (a) Quanta computer (b) Dell
   (c) Hewlett - Packard (d) IBM

3. **_____ is usually used for Computer aided design (CAD) to produce high quality, accurate and bigger drawings**
   (a) Pen drive (b) Printer
   (c) Plotter (d) Digitizer

4. **Personal logs or journal entries posted on the web are known as?**
   (a) Webcasts (b) Blogs
   (c) SMS (d) MMS

5. **In a network, computers are connected with server or main computer known as _____?**
   (a) Workstation (b) Terminal
   (c) Slave (d) Client

6. **Which of the following is/are not Microsoft operating system?**
   (a) Windows XP (b) 2000
   (c) 98 (d) Google chrome

7. **What is the extension name of NotePad and MS word are respectively?**
   (a) .txt & docx (b) .ttx & docx
   (c) .txt & doc (d) .ntxt & docxm

8. **_____ is used to connect two LANs that use identical protocols over a wide area**
   (a) Server (b) Switch
   (c) Gateway (d) Bridges

9. **In computer security, Viruses are classified on the basis of their mode of existence and there are _____ categories of viruses?**
   (a) Four (b) Five
   (c) Three (d) Two

10. **The bottom section of the screen, on which we can find START button is called?**
    (a) Taskbar (b) Toolbar
    (c) Insert menu (d) Status bar

11. **What is the full form of abbreviation ISDN?**
    (a) Integrated Services Digital Networking
    (b) Integrated Services Digital Network
    (c) Internet Services Digital Network
    (d) Integrated System Digital Network

12. **In computing, a _____ is a computer connected to the Internet that has been compromised by a hacker via a computer virus, computer worm, or trojan horse program and can be used to perform malicious tasks under the remote direction of the hacker**
    (a) Black hat (b) Blue hat
    (c) zombie (d) Script kiddie

13. **In MS Excel, when we type text that is too long to fit the cell, the text overlap the next cell and we do not want it to overlap the next cell we use _____?**
    (a) Enter data (b) Select cell
    (c) Wrap text (d) Formula window

14. **_____ indicates where the next typed character will appear on the display screen**
    (a) Mouse (b) Enter
    (c) Double click (d) Cursor

15. **In MS word, which of the following is correct step to start MS-WORD:**
    (a) Click on Start button → All program → Microsoft Word → Microsoft Office
    (b) Click on Start button → New Program → Microsoft Office → Microsoft Word
    (c) Click on Start button → All program → Microsoft Excel → Microsoft Word
    (d) Click on Start button → All program → Microsoft Office → Microsoft Word

16. **Walkie- Talkie is an example of which mode of communication?**
    (a) Simple (b) Duplex
    (c) Half- duplex (d) Full- duplex

17. **Which of the following is a collection of programs that controls how your computer system runs and processes information?**
    (a) operating system (b) computer
    (c) office (d) compiler

18. Which of the following cable technologies covert electrical signals into optical signals?
(a) Coaxial (b) STP
(c) UTP (d) Fiber optic

19. Which among the following computer network usually spans a city or a large campus?
(a) LAN (b) DAN
(c) MAN (d) WAN

20. Which program, installed on the user's computer help him to communicate or send request on the network?
(a) Paint (b) File Manager
(c) Browser (d) Word

21. The fourth-generation computers use which technology for both CPU and memory that allows millions of transistors on a single chip?
(a) Vacuum Tubes (b) VLSI Technology
(c) Cloud Computing (d) Generic Algorithm

22. Match the following column?

Column "A"	**Column "B"**
Decimal	Hexadecimal
(1) 13	(i) 6
(2) 15	(ii) E
(3) 11	(iii) D
(4) 6	(iv) F
(5) 14	(v) B

(a) 1-iii, 2-iv, 3-v, 4-i, 5-ii (b) 1-ii, 2-iv, 3-v, 4-iii, 5-i
(c) 1-iii, 2-iv, 3-v, 4-ii, 5-i (d) 1-iii, 2-v, 3-iv, 4-ii, 5-i

23. In which storage device, recording is done by burning tiny pits on a circular disk?
(a) punched cards (b) floppy disk
(c) magnetic tape (d) optical disk

24. Which of the following statements is wrong
(a) magnetic core memory, RAMs and ROMs have constant access time
(b) magnetic tape is non-volatile
(c) semiconductor memories are used as mass memory medium
(d) An EPROM can be programmed, erased and reprogrammed by the user with an EPROM programming instrument

25. Which of the following is the ascending order of data hierarchy?
(a) bit - byte - record - field - data base - file
(b) bit - byte - field - record - file - database
(c) bit - byte - file - field - record – database
(d) bit - record - byte - field - file – database

26. When changes occur in a data item, if every file which contains that field should not be updated then, it leads to
(a) data redundancy (b) data inconsistency
(c) data security (d) data loss

27. The OSI reference model defines the function for seven layers of protocols
(a) including the user and communication medium.
(b) not including the user or communication medium
(c) including the communication medium but not the user
(d) including the user but not the communication medium

28. Which of the following is used as storage locations both in the ALU and in the control section of a computer?
(a) accumulator (b) register
(c) adder (d) decoder

29. The binary representation 100110 is numerically equivalent to
(a) the decimal representation 46
(b) the octal representation 46
(c) the hexadecimal representation 46
(d) the binary representation 26

30. The register which keeps track of the execution of a program and which contains the memory address of the next instruction to be executed is known as
(a) index register
(b) instruction register
(c) memory address register
(d) program counter

31. Which of the following technique provides dedicated communication channel between two stations.
(a) switch network (b) circuit switching
(c) packet switching (d) network switching

32. Modulation is the process of
(a) sending a file from one computer to another computer
(b) converting digital signals to analog signals
(c) converting analog signals to digital signals
(d) echoing every character that is received

33. Data security threats include
(a) privacy invasion
(b) hardware failure
(c) fraudulent manipulation of data
(d) all of the above

34. Super computers are mainly useful for
(a) mathematical intensive scientific applications
(b) data-retrieval operations
(c) input-output intensive processing
(d) Printing related work

35. For each instruction of program in memory the CPU goes through a
(a) decode - fetch - execute sequence
(b) execute - store - decode sequence
(c) fetch - decode - execute sequence
(d) fetch - execute - decode sequence

36. The database environment has all of the following components except-
(a) users
(b) separate files
(c) database
(d) database administrator

37. The term 'memory' applies to which one of the following?
(a) logic (b) storage
(c) input device (d) output device

38. The binary representation of hexadecimal 'C3' is
(a) 1111 (b) 110011
(c) 110001 (d) 11000011

39. Memories in which any location can be reached in a fixed and short amount of time after specifying its address is called
(a) sequential access memory
(b) random access memory
(c) secondary memory
(d) mass storage

40. A source program is the program written in _____ language.
(a) English (b) symbolic
(c) high level (d) object

41. A typical modern computer uses
(a) magnetic cores for secondary storage
(b) LSI chips
(c) magnetic tape for primary memory
(d) more than 10,000 vacuum tubes

42. General purpose computers are those that can be adopted to countless uses simply by changing its
(a) output device (b) input device
(c) processor (d) program

43.Which of the following HTML elements is the starting element in all HTML document?
(a) Root (b) Metadata
(c) Section (d)Heading

44 Which of the following is not a level of Database implementation?
(a) Physical level (b) External level
(c) Related level (d) Conceptual level

45. BSNL, Reliance, Shaw cable, AOL, Tata indicom all can be kept in which one of the following groups?
(a) ISDN (b) IRC
(c) ISP (d) Icons

46. Which of the following is not the part of standard office suite?
(a) Database (b) File manager
(c) Image editor (d) Word processor

47. ARPANET stands for:
(a) Advanced Recollect Projects Agency Network
(b) Advanced Research Protects Agency Newark
(c) Advanced Reharse Projects Agency Network
(d) Advanced Research Projects Agency Network

48. When you click on File menu in Word 2010, it opens
(a) File menu (b) File commands
(c) Backstage View (d) File Ribbon

49.In which generation did multi-programming start?
(a) First generation (b) Second generation
(c) Third generation (d) Fourth generation

50.Which of the following entities is called a strong entity?
(a) Entity having foreign key
(b) Entity having primary key
(c) Entity having alternate key
(d) Entity having candidate key

Solution

1. **(b):** Applications are software or computer programs that are built to execute or allow the execution of special tasks on a computer, such as a music application that enables users to play, learn or even create music.

2. **(d):** A small portable magnetic disk that used to store and transport computer data is known as floppy disk or diskette, is made by International Business Machines Corporation (IBM)

3. **(c):** Plotter is usually used for Computer aided design (CAD) to produce high quality, accurate and bigger drawings.

4. **(b):** Personal logs or journal entries posted on the web are known as blogs.

5. **(d):** In a network, computers are connected with server or main computer known as workstation/Terminal/Slave/ Client.

6. **(d):** Google chrome is not Microsoft operating system.

7. **(a):** The extension name of Notepad and MS word are .txt & docx respectively.

8. **(d):** Bridges is used to connect two LANs that use identical protocols over a wide area.

9. **(c):** In computer security, Viruses are classified on the basis of their mode of existence and there are Three categories of viruses.

10. **(a):** The bottom section of the screen, on which we can find START button is called taskbar.

11. **(b):** Full form of abbreviation ISDN is Integrated Services Digital Network.

12. **(c):** In computing, a zombie is a computer connected to the Internet that has been compromised by a hacker via a computer virus, computer worm, or trojan horse program and can be used to perform malicious tasks under the remote direction of the hacker.

13. **(c):** In MS Excel, when we type text that is too long to fit the cell, the text overlap the next cell and we do not want it to overlap the next cell we used Wrap text.

14. **(d):** Cursor is a special character that indicates where the next typed character will appear on the display screen

15. **(d):** Click on start button → All program → Microsoft Office → Microsoft Word is correct step to start MS-WORD.

16. **(c):** Walkie- Talkie is an example of Half- duplex mode of communication.

17. **(a):** An operating system (OS) is system software that manages computer hardware and software resources and provides common services for computer programs.

18. **(d):** Fiber optic cables transmit signals in the form of optical signals over a narrow glass fiber stand.

19. **(c):** MAN is abbreviation for Metropolitan Area Network and is a computer network that usually spans a city or a large campus.

20. **(c):** A web browser (commonly referred to as a browser) is a software application for retrieving, presenting and traversing information resources on the World Wide Web.

21. **(b):** Very-large-scale integration (VLSI) is the process of creating an integrated circuit (IC) by combining thousands of transistors into a single chip.

22. **(a):**

Column "A"	**Column "B"**
Decimal	**Hexadecimal**
(1) 13	(iii) D
(2) 15	(iv) F
(3) 11	(v) B
(4) 6	(i) 6
(5) 14	(ii) E

Hence option (a) is correct matched.

23. **(d):** In optical disk recording is done by burning tiny pits on a circular disk.

24. **(c):** semiconductor memories are used as mass memory medium is wrong statement.

25. **(b):** bit - byte - field - record - file – database is the ascending order of data hierarchy.

26. (b): When changes occur in a data item, if every file which contains that field should not be updated then, it leads to data inconsistency

27. (b): The OSI reference model defines the function for seven layers of protocols not including the user or communication medium.

28. (b): Register is used as storage locations both in the ALU and in the control section of a computer.

29. (b): The binary representation 100110 is numerically equivalent to the octal representation 46

30. (d): The register which keeps track of the execution of a program and which contains the memory address of the next instruction to be executed is known as program counter.

31. (b): circuit switching technique provides dedicated communication channel between two stations.

32. (b): Modulation is the process of converting digital signals to analog signals.

33. (d): Data security threats include privacy invasion, hardware failure, fraudulent manipulation of data.

34. (a): Super computers are mainly useful for mathematical intensive scientific applications.

35. (c): For each instruction of program in memory the CPU goes through a fetch - decode - execute sequence.

36. (b): The database environment has all of the following components except separate files.

37. (b): The term 'memory' applies to storage

38. (d): The binary representation of hexadecimal 'C3' is 11000011.

39. (b): Memories in which any location can be reached in a fixed and short amount of time after specifying its address is called random access memory.

40. (c): A source program is the program written in high level language.

41. (b): A typical modern computer uses LSI chips.

42. (d): General purpose computers are those that can be adopted to countless uses simply by changing its program.

43. (a): The Root element is the starting element in an HTML document, and it is present in all HTML documents.

44. (c) : Related level is not a level of Database implementation.

45. (c): BSNL, Reliance, Shaw cable, AOL, Tata indicom all can be kept in ISP group.

46. (b): File manager is not the part of standard office suite

47. (d): ARPANET stands for Advanced Research Projects Agency Network.

48. (c): When you click on File menu in Word 2010, it opens backstage View

49. (c): Multi-programming started in third generation.

50. (b): An entity set containing a primary key is called a strong entity set. A strong entity set has key attributes.

SET-13

1. **Which of the following is a correct format of an Email address?**
   (a) Website@name.info (b) Website.name.info
   (c) name@website.info (d) website@name@info

2. **Which among the following is the first web-based email service?**
   (a) ProtonMail (b) Hushmail
   (c) Yahoo (d) Hotmail

3. **MIME has allowed Internet email, which was once an ASCII text-only communication tool, to transport attachments with multimedia content and text in various character sets. What does E stand for in MIME?**
   (a) Excerption (b) Extensions
   (c) Enabling (d) Ethernet

4. **What was the name of the programmer who created email, a way to transmit messages between computer systems on the ARPANET?**
   (a) James Gosling (b) Guido van Rossum
   (c) Tim Berners-Lee (d) Ray Tomlinson

5. **Ray Tomlinson is universally credited as the creator of email as part of a program for ARPANET in 1971. What does R stand for in ARPANET?**
   (a) Reward (b) Research
   (c) Restart (d) Response

6. **In which year SMTP was first introduced on ARPANET?**
   (a) 1970 (b) 1975
   (c) 1971 (d) 1983

7. **Mail servers and other message transfer agents use SMTP to send and receive mail messages. What does S stand for in SMTP?**
   (a) Standard (b) Syntex
   (c) Simple (d) Starting

8. **E-mail address is made up of _____?**
   (a) One Part (b) Two Parts
   (c) Three Parts (d) Four Parts

9. **What was the name of the first web browser in history?**
   (a) Netscape (b) Microsoft Edge
   (c) WorldWideWeb (d) GreenBrow

10. **What was the name of the developer of the web browser WorldWideWeb?**
    (a) Tim Berners-Lee (b) Presper Eckert
    (c) Grace Hopper (d) Jean Bartik

11. **Which among the following was a text-based browser, which was invented in 1992 and was not able to display graphical content?**
    (a) iCab (b) Camino
    (c) Blisk (d) Lynx Browser

12. **Internet Explorer was the first web browser developed by Microsoft. In which year it was developed?**
    (a) 1990 (b) 1985
    (c) 1992 (d) 1995

13. **Safari is a graphical web browser primarily based on open-source software, and mainly WebKit. It was developed by _____?**
    (a) Microsoft (b) Polypan
    (c) Apple (d) Blisk

14. **Google Chrome is a cross-platform web browser developed by Google. In which year it was first released?**
    (a) 2000 (b) 2003
    (c) 2005 (d) 2008

15. **A web browser is application software for accessing the World Wide Web or a local website. Which among the following is not a feature of a web browser?**
    (a) Zoom (b) Address Bar
    (c) Dockable Tabs (d) Print

16. **CSS is used for styling different types of websites and for adding colors and fonts to text or images on a webpage. What does first 'S' stand for in CSS?**
    (a) Standard (b) Style
    (c) Special (d) Secure

17. **Safari is a graphical web browser developed by Apple. It is primarily based on open-source software, and mainly WebKit. Which among the following was the launch year of Safari?**
    (a) 2002 (b) 2003
    (c) 2001 (d) 2005

18. **The Internet was originally a project of which agency?**
    (a) IBM (b) Microsoft
    (c) ARPA (d) NSA

19. **.HTML is used to create-**
(a) Web Page
(b) Web Server
(c) Machine Language Programme
(d) None of the above

20. **What is the name of the process of transferring files from a computer on the Internet to your computer?**
(a) Downloading (b) Forwarding
(c) Uploading (d) FTP

21. **_____ is a programming language that is one of the core technologies of the World Wide Web, alongside HTML and CSS.**
(a) Java (b) Javascript
(c) Python (d) Cobol

22. **What is the full form of GIF?**
(a) Graphics Internet Format
(b) Graphics Interchange Format
(c) Graphics Interchange Formula
(d) Graphics Internet Formula

23. **A Web site's front page /main page is called _____?**
(a) Browser Page (b) Bookmark
(c) Search Page (d) Home Page

24. **Which among the following is not a search engine?**
(a) Baidu (b) Yahoo
(c) Bing (d) Protocol

25. **The second part of an email address identifies which among the following?**
(a) Name of the laptop operator
(b) Name of the Individual User
(c) Name of the email server
(d) None of the above

26. **SMTP stands for-**
(a) Short mail transmission protocol
(b) Small mail transmission protocol
(c) Server Mail Transfer Protocol
(d) Simple Mail Transfer Protocol

27. **A software program that is used to explore, retrieve, and display the information available on the World Wide Web is called _____?**
(a) Microsoft Word
(b) Photoshop
(c) Web Browser
(d) Windows Media Player

28. **EDI is a technology that is restricted to business transactions and used to improve operational efficiency and reduce transaction costs. What does 'I' stand for in EDI?**
(a) Interconnection (b) Interchange
(c) Inter-transmission (d) Internet

29. **NEFT is a nation-wide payment system facilitating one-to-one funds transfer. What does N stand for in NEFT?**
(a) National (b) Native
(c) New (d) Narrow

30. **Among the following which is a collection of related files and subfolders?**
(a) Menu (b) Status Bar
(c) Folder (d) Operating System

31. **What is the name of the process of removing the file from the original location and moving it to the Recycle Bin?**
(a) Moving (b) Deleting
(c) Copying (d) Sharing

32. **Which among the following is used to store or organise your files?**
(a) Memory (b) Software
(c) Folder (d) None of the above

33. **MFD stands for?**
(a) Main File Directory (b) Memory File Directory
(c) Master File Directory (d) Master Format Directory

34. **_____ is created when a user opens an account in the computer system.**
(a) Subdirectory (b) Processing
(c) Files (d) None of the above

35. **What are the files called that maintain the hierarchical structure of the file system?**
(a) Directories (b) Modifiers
(c) Ordinary Files (d) Relative Files

36. **Which among the following allows us to copy, move and delete files and folders?**
(a) Windows Explorer (b) Programmes
(c) Search Engine (d) Web Browser

37. **The ____ on the Start menu offers an alternate method to start applications or open data files.**
(a) Find Command (b) Search Command
(c) Run Command (d) Task command

38. When you delete a file, it is moved to the _____.
(a) Desktop (b) Hard Disk
(c) Recycle Bin (d) Program

39. File Explorer was previously known as _____?
(a) Microsoft Explorer (b) Google Explorer
(c) Windows Explorer (d) Folder Explorer

40. Which of the following is the smallest unit of data in a computer?
(a) Byte (b) Nibble
(c) KB (d) Bit

41. Daisy wheel printer is a type of
(a) Matrix primer (b) Impact printer
(c) Laser printer (d) Manual printer

42. Which of the following memories must be refreshed many times per second?
(a) Static RAM (b) Dynamic RAM
(c) EPROM (d) ROM

43. The memory which is programmed at the time it is manufactured
(a) ROM (b) RAM
(c) PROM (d) EPROM

44. Which of the following memory medium is not used as main memory system?
(a) Magnetic core (b) Semiconductor
(c) Magnetic tape (d) Both a and b

45. The first microprocessor built by the Intel Corporation was called
(a) 8008 (b) 8080
(c) 4004 (d) 8800

46. The term gigabyte refers to
(a) 1024 bytes (b) 1024 kilobytes
(c) 1024 mb (d) 1024 gb

47. In DVD, V stand for.....
(a) video (b) Versatile
(c) Valuable (d) A and b

48. Fax machine and imaging system are example of
(a) bar code readers (b) Imaging systems
(c) Scanning device (d) Pen drive

49. .....is known as POS scanner.
(a) bar code reader
(b) Magnetic stripe reader
(c) MICR
(d) OCR

50. .....is the result produced by a computer
(a) data (b) Memory
(c) Output (d) Input

Solution

ANSWER SHEET

Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.
1	c	11	d	21	b	31	b	41	b
2	d	12	d	22	b	32	c	42	b
3	b	13	c	23	d	33	c	43	c
4	d	14	d	24	d	34	a	44	a
5	b	15	c	25	c	35	a	45	c
6	d	16	b	26	d	36	a	46	c
7	c	17	b	27	c	37	c	47	d
8	b	18	c	28	b	38	c	48	b
9	c	19	c	29	a	39	c	49	b
10	a	20	a	30	c	40	d	50	b

SET-14

1. **What is the main folder on a storage device called?**
   (a) Platform (b) Interface
   (c) Root directory (d) Homepage

2. Caps lock, num-lock are known as...
   (a) Modifier key (b) Toggle key
   (c) Function key (d) Numeric key

3. **Convert binary number 11001100 into octal number**
   (a) 314 (b) 766
   (c) 187 (d) 325

4. **The smallest unit of information a computer can understand and process is known as a**
   (a) digit (b) kilo byte
   (c) Bit (d) Byte

5. **The general term peripheral equipment is used for-**
   (a) Any device that attached to a computer system
   (b) Large sacle computer system
   (c)A program collection
   (d) Other office equipment

6. **Which device can understand the difference between data and programs?**
   (a) Input device (b) Output device
   (c) Memory (d) Processor

7. **The simultaneous execution of two or more instructions is called.....**
   (a) Sequential access
   (b) Reduced instruction set
   (c) Multiprocessing
   (d) disk mirroring

8. **The Width of a processor's data path is measured in bits. Which of the following are common data paths?**
   (a) 8 bits (b) 12 bits
   (c) 16 bits (d) 32 bits

9. **Which is the type of memory for information that does not change on your computer?**
   (a) RAM (b) ROM
   (c) ERAM (d) RW / RAM

10. **Before a disk can be used to store data. It must be…….**
    (a) Formatted (b) Reformatted
    (c) Addressed (d) Readdressed

11. **The original ASCII code used…bits of each byte, reserving that last bit for error checking**
    (a) 5 (b) 6
    (c) 7 (d) 8

12. **Which company is the biggest player in the microprocessor industry?**
    (a)Motorola (b) IBM
    (c) Intel (d) AMD

13. **What is required when more than one person uses a central computer at the same time?**
    (a) Light pen (b) Mouse
    (c) Digitizer (d) Terminal

14. **A high quality CAD system uses the following for printing drawing and graphs**
    (a) Dot matrix printer (b) Digital plotter
    (c) Line printer (d) All of the above

15. **Which is not an item of hardware?**
    (a) driver (b) Keyboard
    (c) Scanner (d) Plotter

16. **.....terminal (cash register) are often connected to complex inventory and sales computer system**
    (a) data (b) Point of sale(pos)
    (c) Sales (d) Querry

17. **What is the use of digitizer as an input device?**
    (a) to convert graphic and pictorial data into binary inputs
    (b) to convert graphic and pictorial data into analog inputs
    (c) Debugging
    (d) Testing

18. **What do we call a storage device where the access time is efficiently independent of the location of the data?**
    (a) direct access storage device
    (b) Secondary storage device
    (c) Primary storage device
    (d) gateway device

19. **How is power supplied to a low-power USB device?**
    (a) Through a power cable
    (b) From an external power supply
    (c) Directly from the computer's power supply
    (d) Through the USB cable

20. .....is the name of 1st commercial computer ?
(a) ENIAC (b) EDVAC
(c) UNIVAC (d) EDSAC

21. What are the three decisions making operations performed by the ALU of a computer?
(a) Grater than (b) Less than
(c) Equal to (d) All of the above

22. Which part of the computer is used for calculating and comparing?
(a) Disk unit (b) Control unit
(c) ALU (d) Modem

23. Can you tell what passes into and out from the computer via its ports?
(a) Data (b) Bytes
(c) Graphics (d) Pictures

24. The difference between memory and storage is that memory is …. and storage is …
(a) Temporary, permanent
(b) Permanent, temporary
(c) Slow, fast
(d) All of above

25. A floppy disk contains
(a) Circular tracks only
(b) Sectors only
(c) Both circular tracks and sectors
(d) All of the above

26. The octal equivalence of 111110 is
(a) 81 (b) 72
(c) 71 (d) 76

27. The first electronic computer in the world was
(a) UNIVAC (b) EDVAC
(c) ENIAC (d) All of above

28. Which was the computer conceived by Babbage?
(a) Analytical engine (b) Arithmetic machine
(c) Donald Knuth (d) All of above

29. Offline device is
(a) A device which is not connected to CPU
(b) A device which is connected to CPU
(c) A direct access storage device
(d) An I/O device

30. Which of the following registers is used to keep track of address of the memory location where the next instruction is located?
(a) Memory address register
(b) Memory data register
(c) Instruction register
(d) Program counter

Solution

ANSWER SHEET

Qns.	Ans.	Qns.	Ans.	Qns.	Ans.	Qns.	Ans.
1	c	11	d	21	d	31	b
2	b	12	c	22	c	32	b
3	a	13	d	23	a	33	c
4	c	14	b	24	a	34	a
5	a	15	b	25	c	35	c
6	d	16	a	26	d	36	c
7	c	17	a	27	c	37	d
8	a	18	a	28	a	38	b
9	b	19	d	29	a	39	a
10	a	20	a	30	d	40	c

SET-15

1. What is back up?
(a) Adding more components to your network
(b) Protecting data from copying it from original source to different destination
(c) Filtering old data from the new data
(d) Accessing data on tape
Ans: (b)

2. Anurag is a supercomputer developed in?
(a) China (b) USA
(c) India (d) England
Ans: (c)

3. Which operation is not performed by computer?
(a) Inputting (b) Processing
(c) Controlling (d) Understanding
Ans: (d)

4. The process of retrieving data from memory is called?
(a) Read out (b) Read from
(c) Read (d) All of the above
Ans: (d)

5. A computer program which converts an entire program into machine language is called an .....?
(a) Interpreter (b) Simulator
(c) Compiler (d) Changer
Ans: (c)

6. What kind of software would you most likely use to keep track of billing account?
(a) Word Processing (b) Electronic Publishing
(c) Spreadsheet (d) Web authoring
Ans: (c)

7. A set of instructions telling computer what to do is ?
(a) Instructor (b) Compiler
(c) Mentor (d) Program
Ans: (d)

8. Arranging of data in a logical sequence is known as?
(a) Classifying (b) Searching
(c) Sorting (d) Reproducing
Ans: (c)

9. One advantage of dial up internet access is?
(a) It utilizes broadband technology
(b) It utilizes existing telephone service
(c) It uses a router for security
(d) Modem speed is very fast
Ans: (b)

10. The _____ states that a foreign key must either match a primary key value in another relation or it must be null.
(a) entity integrity rule
(b) referential integrity constraint
(c) action assertion
(d) composite attribute
Ans:- a

11. An octal number 255 is equal to the binary number
(a) 010 011 111 (b) 010 101 101
(c) 011 101 101 (d) 011 000 001
Ans (b)

12. A _____ sometimes called a boot sector virus, executes when a computer boots up because it resides in the boot sector of a floppy disk or the master boot record of a hard disk.
(a) system virus (b) Trojan horse virus
(c) file virus (d) None of these
Ans: (d)

13. Which error detection method uses one's complement arithmetic?
(a) Simply parity check
(b) Checksum
(c) Two-dimensional parity check
(d) CRC
Ans: (b)

14. A result of a computer virus can not lead to ___.
(a) Disk Crash
(b) Mother Board Crash
(c) Corruption of program
(d) Deletion of files
Ans: (b)

15. The network interface card of LAN is related to following layer of OSI Model-
(a) Transport (b) Network
(c) Data Link (d) All of these
Ans: (d)

16. Which of the following does not describe a data warehouse?
(a) Subject-oriented (b) Integrated
(c) Time-variant (d) Updateable
Ans: (d)

17. Which of the following is true ?
(a) Logical design is software-dependent
(b) In a distributed database, database is stored in one physical location
(c) Conceptual design translates the logical design into internal model

(d) Logical design is software independent
Ans: (a)

18. A range check _____
(a) ensures that only the correct data type is entered into a field
(b) verifies that all required data is present
(c) determines whether a number is within a specified limit
(d) tests if the data in two or more associated fields is logical
Ans: (c)

19. The total set of interlinked hypertext documents worldwide is-
(a) HTTP (b) Browser
(c) WWW (d) B2B
Ans: (a)

20. With the object-oriented (OO) approach, an object encapsulates, or_____ a programmer.
(a) carries out, the details of an object for
(b) hides, the details of an object from
(c) reveals, the details of an object to
(d) extends, the details of an object beyond
Ans: (b)

21. Every computer connected to an intranet or extranet must have a distinct_____
(a) firewall (b) proxy server
(c) IP address (d) domain name
Ans: (c)

22. A _____ is a named location on a disk where files are stored.
(a) folder
(b) pod
(c) version
(d) notebook
Ans: (a)

23. The degree of detail that should be incorporated into a database depends on what?
(a) Data integrity
(b) The type of database
(c) The user's perspective
(d) The business practices and policies
Ans: (b)

24. The ___.converts digital signals to analog signals for the purpose of transmitting data over telephone lines.
(a) Modem (b) Router
(c) Gateway (d) Bridge
Ans: (a)

25. Before a package can be used in a java program it must be___.
(a) executed (b) referenced
(c) imported (d) declared
Ans: (c)

26. Choose the correct way to indicate that a line in a C++ program is a comment line, that is, a line the will not be executed as an instruction___.
(a) begin the line with a # sign
(b) begin the line with double slashes (/ /)
(c) begin and end the line with double hyphens (-_-)
(d) indent the line
Ans: (b)

27. Programming language built into user programs such as Word and Excel are known as_____
(a) 4GLs
(b) macro languages
(c) object-oriented languages
(d) visual programming languages
Ans: (d)

28. Firewalls are used to protect against___.
(a) Unauthorized Attacks
(b) Virus Attacks
(c) Data Driven Attacks
(d) Fire Attacks
Ans: (a)

29. This is a standard way for a Web server to pass a Web user's request to an application program and to receive data back to forward to the user-
(a) Interrupt request
(b) Forward DNS lookup
(c) Data-Link layer
(d) Common gateway interface
Ans: (d)

30. Three SQL, DDL, CREATE commands are__.
(a) Schema, Base and Table
(b) Base, Table and Schema
(c) Key, Base and Table
(d) Schema, Table and View
Ans: (d)

31. Data are _____ in client/server computing.
(a) never sent to the client machine
(b) sent in very large sections to save processing time
(c) sent only upon the client's request
(d) sent in complete copies for the client to filter and sort
Ans: (c)

32. Which of the following will not eliminates the ambiguities of a null value?
(a) Define the attribute as required
(b) Define subtypes
(c) Define each attribute as having an initial value that is recognized as blank
(d) Define super types
Ans: (d)

33. The_____ directory is mandatory for every disk.
(a) Root (b) Base
(c) Sub (d) Case
Ans: (c)

34. This is a group of servers that share work and may be able to back each other up if one server fails.
(a) Channel bank (b) Cluster
(c) Tiger team (d) Server less backup
Ans: (b)

35. All of the following are examples of real security and privacy risks EXCEPT:
(a) hackers. (b) spam.
(c) viruses. (d) identity theft.
Ans: (b)

36. A process known as _____ is used by large retailers to study trends.
(a) data mining (b) data selection
(c) POS (d) data conversion
Ans: (a)

37. _____terminals (formerly known as cash registers) are often connected to complex inventory and sales computer systems.
(a) Data (b) Point-of-sale (POS)
(c) Sales (d) Query
Ans: (b)

38. A(n)_____ system is a small, wireless handheld computer that scans an items tag and pulls up the current price (and any special offers) as you shop.
(a) PSS (b) POS
(c) Inventory (d) data mining
Ans: (a)

39. The ability to recover and read deleted or damaged files from a criminals computer is an example of a law enforcement specialty called:
(a) robotics. (b) simulation.
(c) computer forensics (d) animation.
Ans: (c)

40. Which of the following is NOT one of the four major data processing functions of a computer?
(a) gathering data
(b) processing data into information
(c) analyzing the data or information
(d) storing the data or information
Ans: (c)

41. _____ tags, when placed on an animal, can be used to record and track in a database all of the animals movements.
(a) POS (b) RFID
(c) PPS (d) GPS
Ans: (b)

42. Surgeons can perform delicate operations by manipulating devices through computers instead of manually. This technology is known as:
(a) robotics. (b) computer forensics.
(c) simulation. (d) forecasting.
Ans: (a)

43. Technology no longer protected by copyright, available to everyone, is considered to be:
(a) proprietary.
(b) open.
(c) experimental.
(d) in the public domain.
Ans: (a)

44. _____ is the study of molecules and structures whose size ranges from 1 to 100 nano-meters.
(a) Nano-science (b) Microelectrodes
(c) Computer forensics (d) Artificial intelligence
Ans: (a)

45. _____ is the science that attempts to produce machines that display the same type of intelligence that humans do.
(a) Nano-science
(b) Nanotechnology
(c) Simulation
(d) Artificial intelligence (AI)
Ans: (d)

46. _____ is data that has been organized or presented in a meaningful fashion.
(a) A process (b) Software
(c) Storage (d) Information
Ans: (d)

47. The name for the way that computers manipulate data into information is called:
(a) programming. (b) processing.
(c) storing. (d) organizing.
Ans: (b)

48. Computers gather data, which means that they allow users to _____ data.

(a) Present (b) Input
(c) Output (d) Store

Ans: (b)

49. After a picture has been taken with a digital camera and processed appropriately, the actual print of the picture is considered:

(a) data (b) output.
(c) input. (d) the process.

Ans: (b)

50. Computers use the _____ language to process data.

(a) Processing (b) Kilobyte
(c) Binary (d) Representational

Ans: (c)

SET-16

1. Computers process data into information by working exclusively with:
(a) multimedia (b) words.
(c) characters. (d) numbers.
Ans: (d)

2. In the binary language each letter of the alphabet, each number and each special character is made up of a unique combination of:
(a) eight bytes. (b) eight kilobytes.
(c) eight characters. (d) eight bits.
Ans: (d)

3. The term bit is short for:
(a) megabyte (b) binary language
(c) binary digit. (d) binary number.
Ans: (c)

4. A string of eight 0s and 1s is caled a:
(a) megabyte (b) byte
(c) kilobyte (d) gigabyte
Ans: (b)

5. A _____ is approximately one billion bytes.
(a) Kilobyte (b) Bit
(c) Gigabyte (d) Megabyte
Ans: (c)

6. A _____ is approximately a million bytes.
(a) Gigabyte (b) Kilobyte
(c) Megabyte (d) Terabyte
Ans: (c)

7. _____ is any part of the computer that you can physically touch.
(a) Hardware (b) A device
(c) A peripheral (d) An application
Ans: (a)

8. The components that process data are located in the:
(a) input devices. (b) output devices.
(c) system unit. (d) storage component.
Ans: (c)

9. All of the following are examples of input devices EXCEPT a:
(a) scanner. (b) mouse
(c) keyboard (d) printer.
Ans: (d)

10. Which of the following is an example of an input device?
(a) Scanner (b) Speaker
(c) CD (d) Printer
Ans: (a)

11. All of the following are examples of storage devices EXCEPT:
(a) hard disk drives. (b) printers.
(c) floppy disk drives. (d) CD drives.
Ans: (b)

12. The _____, also called the brain of the computer, is responsible for processing data.
(a) Motherboard
(b) Memory
(c) RAM
(d) central processing unit (CPU)
Ans: (d)

13. The CPU and memory are located on the:
(a) expansion board (b) motherboard
(c) storage device (d) output device
Ans: (b)

14. Word processing, spreadsheet, and photo-editing are examples of:
(a) application software
(b) system software
(c) operating system software
(d) platform software.
Ans: (a)

15. _____ is a set of computer programs used on a computer to help perform tasks.
(a) An instruction (b) Software
(c) Memory (d) A processor
Ans: (b)

16. System software is the set of programs that enables your computers hardware devices and _____ software to work together.
(a) Management (b) Processing
(c) Utility (d) Application
Ans: (d)

17. The PC (personal computer) and the Apple Macintosh are examples of two different:
(a) platforms. (b) applications.
(c) programs. (d) storage devices.
Ans: (a)

18. Apple Macintoshes (Macs) and PCs use different _____ to process data and different operating systems.
(a) Languages (b) Methods
(c) CPUs (d) storage devices
Ans: (c)

19. Servers are computers that provide resources to other computers connected to a:
(a) Network (b) Mainframe
(c) Supercomputer (d) client.
Ans: (a)

20. Smaller and less expensive PC-based servers are replacing _____ in many businesses.
(a) Supercomputers (b) Clients
(c) Laptops (d) Mainframes
Ans: (d)

21. _____ are specially designed computers that perform complex calculations extremely rapidly.
(a) Servers (b) Supercomputers
(c) Laptops (d) Mainframes
Ans: (b)

22. DSL is an example of a(n)_____ connection.
(a) Network (b) Wireless
(c) Slow (d) Broadband
Ans: (d)

23. The difference between people with access to computers and the Internet and those without this access is known as the:
(a) digital divide (b) Internet divide
(c) Web divide (d) broadband divide
Ans: (a)

24. _____ is the science revolving around the use of nanostructures to build devices on an extremely small scale.
(a) Nanotechnology (b) Micro-technology
(c) Computer forensics (d) Artificial intelligence
Ans: (a)

25. Which of the following is the correct order of the four major functions of a computer?
(a) Process Output Input Storage
(b) Input Output Process Storage
(c) Process Storage Input Output
(d) Input Process Output Storage
Ans: (d)

26. _____ bits equal one byte.
(a) Eight (b) Two
(c) One thousand (d) One million
Ans: (a)

27. The binary language consists of _____ digit(s).
(a) 8 (b) 2
(c) 1,000 (d) 1
Ans: (b)

28. A byte can hold one _____ of data.
(a) Bit (b) binary digit
(c) Character (d) Kilobyte
Ans: (c)

29. _____ controls the way in which the computer system functions and provides a means by which users can interact with the computer.
(a) The platform
(b) The operating system
(c) Application software
(d) The motherboard
Ans: (b)

30. The operating system is the most common type of _____ software.
(a) Communication
(b) Application
(c) System
(d) word-processing software
Ans: (c)

31. _____ are specially designed computer chips that reside inside other devices, such as your car or your electronic thermostat.
(a) Servers (b) Embedded computers
(c) Robotic computers (d) Mainframes
Ans: (b)

32. The steps and tasks needed to process data, such as responses to questions or clicking an icon, are called:
(a) instructions. (b) the operating system
(c) application software (d) the system unit.
Ans: (a)

33. The two broad categories of software are:
(a) word processing and spreadsheet.
(b) transaction and application.
(c) Windows and Mac OS.
(d) system and application.
Ans: (d)

34. The metal or plastic case that holds all the physical parts of the computer is the:
(a) system unit. (b) CPU.
(c) Mainframe (d) platform.
Ans: (a)

35. An email account includes a storage area, often called a(n) __
(a) attachment (b) hyperlink
(c) mailbox (d) IP address
Ans: (c)

36. Data becomes __ when it is presented in a format that people can understand and use.
(a) processed (b) graphs
(c) information (d) presentation
Ans: (c)

37. A set of computer programs that helps a computer monitor itself and function more efficiently is an _

(a) Windows (b) System Software
(c) DBMS (d) Application Software
Ans: (b)

38. An area of a computer that temporarily holds data waiting to be processed is __
(a) CPU (b) Memory
(c) Storage (d) File
Ans: (b)

39. A __ is a microprocessor-based computing device.
(a) personal computer (b) mainframe
(c) workstation (d) server
Ans: (a)

40. You use a(n) __ , such as a keyboard or mouse, to input information.
(a) output device (b) input device
(c) storage device (d) processing device
Ans: (b)

41. The term __ designates equipment that might be added to a computer system to enhance its functionality.
(a) digital device (b) system add-on
(c) disk pack (d) peripheral device
Ans: (d)

42. The instructions that tell a computer how to carry out the processing tasks are referred to as computer __
(a) programs (b) processors
(c) input devices (d) memory modules
Ans: (a)

43. RAM can be thought of as the __ for the computer's processor.
(a) factory (b) operating room
(c) waiting room (d) planning room
Ans: (c)

44. C, BASIC, COBOL, and Java are examples of __ languages.
(a) low-level
(b) computer
(c) system programming
(d) high-level

Ans: (d)

45. __ is the ability of a device to "jump" directly to the requested data.
(a) Sequential access (b) Random access
(c) Quick access (d) All of the above
Ans: (b)

46. The __ is the amount of data that a storage device can move from the storage medium to the Computer per second.
(a) data migration rate (b) data digitizing rate
(c) data transfer rate (d) data access rate
Ans: (c)

47. A __ converts all the statements in a program in a single batch and the resulting collection of instructions is placed in a new file.
(a) converter (b) compiler
(c) interpreter (d) instruction
Ans: (b)

48. One thousand bytes is a __
(a) kilobyte (b) megabyte
(c) gigabyte (d) terabyte
Ans: (a)

49. 'Benchmark' means __
(a) Benches for customers to sit
(b) Benches for salesmen to sit
(c) Products displayed on a bench
(d) Set standards
Ans: (d)

50. __ provides process and memory management services that allow two or more tasks, jobs, or programs to run simultaneously.
(a) Multi tasking (b) Multi threading
(c) Multi processing (d) Multi computing
Ans: (c)

SET-17

1. Between PCs and Macs, the _____ is the platform of choice for graphic design and animation.
Ans: Mac

2. The _____ is the program that manages the hardware of the computer system, including the CPU, memory, storage devices, and input/output devices.
Ans: operating system

3. The type of operating system software you use depends on your computers _____.
Ans: platform

4. _____software helps you carry out tasks, such as typing a document or creating a spreadsheet.
Ans: Application

5. _____are the fastest and most expensive computers.
Ans: Supercomputers

6. A _____ is approximately 1,000 bytes.
Ans: kilobyte

7. Input devices are used to provide the steps and tasks the computer needs to process data, and these steps and tasks are called _____.
Ans: instructions

8. A computer gathers data, processes it, outputs the data or information, and _____ the data or information.
Ans: stores

9. The binary language consists of two digits: _____ and _____.
Ans: 0 and 1

10. A string of _____ 0s and 1s is called a byte.
Ans: eight (8)

11. The devices you use to enter data into a computer system are known as _____ devices.
Ans: input

12. The devices on a computer system that let you see the processed information are known as _____ devices.
Ans: output

13. _____ is the set of computer instructions or programs that enables the hardware to perform different tasks.
Ans: Software

14. When you connect to the _____, your computer is communicating with a server at your Internet service provider (ISP).
Ans: Internet

15. _____ are computers that excel at executing many different computer programs at the same time.
Ans: Mainframes

16. _____is the application of computer systems and techniques to gather legal evidence.
Ans: Computer forensics

17. _____ is the science that attempts to create machines that will emulate the human thought process.
Ans: Artificial intelligence (AI)

18. Macintosh computers use the Macintosh operating system (Mac OS), whereas PCs generally run _____ as an operating system.
Ans: Microsoft Windows

19. A process known as _____ tracks trends and allows retailers to respond to consumer buying patterns.
Ans: data mining

20. Hard disk drives and CD drives are examples of _____ devices
Ans: storage device

21. You would use _____ software to create spreadsheets, type documents, and edit photos.
Ans: application

22. _____ are computers that support hundreds or thousands of users simultaneously.
Ans: Mainframes

23. _____ is the term given to the act of stealing someone's identity and ruining their credit rating.
Ans: Identity theft

24. Surgeons are using _____ to guide robots to perform delicate surgery.
Ans: computers

25. Patient _____ are life-sized mannequins that have a pulse and a heartbeat and respond to procedures just like humans.
Ans: simulators