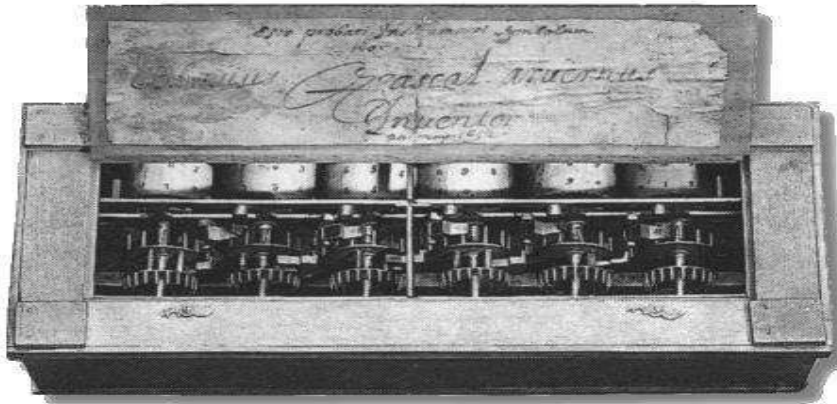


UNIT 1

History of Computers

Mechanical calculator

- 1 Wilhelm Schickard invented first known mechanical calculator, capable of simple arithmetic.
 - o Similar mechanical adding machine made in 1640's by Blaise Pascal, Still on display in Paris.
- The "Pascaline," from the History of Computing Project



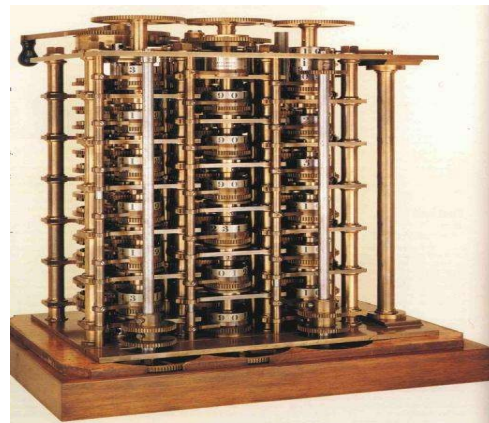
- 2 More advanced mechanical calculator by German mathematician Gottfried Leibniz Capable of multiplication and division Purely mechanical with no source of power. The "Step Reckoner," from maxmon.com

- 3. Charles Babbage begins work on Difference Engine

- o He designed, but it was completed by a Swedish inventor in 1854.

Charles Babbage begins Analytical Engine ,
Never completed.

- o Important concept: a general-purpose machine capable of performing difference functions based programming.



OR

- 4. Ada Byron, Lady Lovelace impressed with the concept of the Analytical Engine at a dinner party.

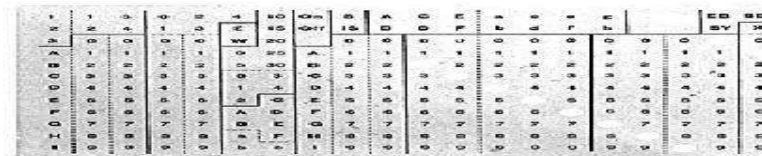
- o Created plans for how the machine could calculate Bernoulli numbers. This is regarded as the first "computer program," and she is the first "programmer."

- 5. punched cards used by Herman Hollerith to automate Census

- o Concept of programming the machine to perform different tasks with punched cards was from Babbage.

- o Punch cards based on Joseph Marie Jacquard's device to automate weaving looms.

- o Hollerith founded a company that became International Business Machines (IBM) to market the technology.



6. Prototype of the first electronic computer

- o Assembled by John Atansoff and Clifford Barry.
- o John Atansoff came up with the concept of using binary numbers.
- o Completed in 1942 using 300 vacuum tubes.
- o Could solve small systems of linear equations

Generations of computers

The history of computer development is often referred to in reference to the different generations of computing devices. Each generation of computer is characterized by a major technological development that fundamentally changed the way computers operate, resulting in increasingly smaller, cheaper, and more powerful, and more efficient and reliable devices.

First Generation of Computers (1942-1955)

The beginning of commercial computer age is from **UNIVAC (Universal Automatic Computer)**. It was developed by two scientists **Mauchly** and **Echert** at the Census Department of United States in 1947. They were based on vacuum tubes. Examples of first generation computers are **ENIVAC** and **UNIVAC-1**.

Advantages

- Vacuum tubes were the only electronic component available during those days.
- Vacuum tube technology made possible to make electronic digital computers.
- These computers could calculate data in millisecond.

Disadvantages

- The computers were very large in size. They consumed a large amount of energy.
- They heated very soon due to thousands of vacuum tubes. They were not very reliable.
- Air conditioning was required. Constant maintenance was required.
- Non-portable. Costly commercial production. Limited commercial use.
- Very slow speed. Limited programming capabilities. Used machine language only.
- Used magnetic drums which provide very less data storage. Used punch cards for input.
- Not versatile and very faulty.

Second Generation Computers (1955-1964)

The **second generation computers** used transistors. The scientists at Bell laboratories developed transistor in 1947. These scientists include John Barden, William Brattain and William Shockley. The size of the computers was decreased by replacing vacuum tubes with transistors. The examples of second generation computers are **IBM 7094 series**, **IBM 1400 series** and **CDC 164** etc.

Advantages

- Smaller in size as compared to the first generation computers.
- The 2nd generation Computers were more reliable
- Used less energy and were not heated. Wider commercial use
- Better portability as compared to the first generation computers.
- Better speed and could calculate data in microseconds
- Used faster peripherals like tape drives, magnetic disks, printer etc.

- Used Assembly language instead of Machine language. Accuracy improved.

Disadvantages

- Cooling system was required Constant maintenance was required
- Commercial production was difficult Only used for specific purposes
- Costly and not versatile Puch cards were used for input.

Third Generation Computers (1964-1975)

The **Third generation computers** used the integrated circuits (IC). Jack Kilby developed the concept of integrated circuit in 1958. It was an important invention in the computer field. The first IC was invented and used in 1961. The size of an IC is about ¼ square inch. A single IC chip may contain thousands of transistors. The computer became smaller in size, faster, more reliable and less expensive. The examples of third generation computers are **IBM 370, IBM System/360, UNIVAC 1108 and UNIVAC AC 9000** etc.

Advantages

- Smaller in size as compared to previous generations. More reliable. Used less energy
- Produced less heat as compared to the previous two generations of computers.
- Better speed and could calculate data in nanoseconds.
- Used fan for heat discharge to prevent damage.
- Maintenance cost was low because hardware failure is reare. Totally general purpose
- Could be used for high-level languages. Good storage Versatile to an extent
- Less expensive Better accuracy Commercial production increased.
- Used mouse and keyboard for input.

Disadvantages

- Air conditioning was required.
- Highly sophisticated technology required for the manufacturing of IC chips.

Fourth Generation Computers (1975-Present)

The fourth generation computers started with the invention of Microprocessor. Microprocessor contains thousands of ICs. **Ted Hoff** produced the first microprocessor in 1971 for **Intel**. It was known as Intel 4004. The technology of integrated circuits improved rapidly. The LSI (Large Scale Integration) circuit and VLSI (Very Large Scale Integration) circuit was designed. It greatly reduced the size of computer. The size of modern Microprocessors is usually one square inch. It can contain millions of electronic circuits. The examples of fourth generation computers are **Apple Macintosh & IBM PC**.

Advantages

- More powerful and reliable than previous generations. Small in size
- Fast processing power with less power consumption
- Fan for heat discharging and thus to keep cold.
- No air conditioning required. Totally general purpose Commercial production
- Less need of repair. Cheapest among all generations
- All types of High level languages can be used in this type of computers

Disadvantages

- The latest technology is required for manufacturing of Microprocessors.

Fifth Generation Computers (Present & Beyond)

Scientists are working hard on the 5th generation computers with quite a few breakthroughs. It is based on the technique of **Artificial Intelligence (AI)**. Computers can understand spoken words & imitate human reasoning. Can respond to its surroundings using different types of sensors. Scientists are constantly working to increase the processing power of computers. They are trying to create a computer with real IQ with the help of advanced programming and technologies. **IBM Watson** computers one example that outsmarts Harvard University **Students**. The advancement in modern technologies will revolutionize the computer in future.

The goal of fifth-generation computing is to develop devices that respond to natural language input and are capable of learning and self-organization. Some applications, such as voice recognition, use of parallel processing and superconductors, the goal of fifth-generation computing is to develop devices that respond to natural language input and are capable of learning and self-organization.

AI includes:

□ Robotics □ Neural networks □ Game Playing □ Development of expert systems to make decisions in real life situations. □ Natural language understanding and generation.

Subject	1st generation	2nd generation	3rd generation	4th generation	5th generation
Period	1940-1956	1956-1963	1964-1971	1971-present	present & beyond
Circuitry	Vacuum tube	Transistor	Integrated chips (IC)	Microprocessor (VLSI)	ULSI (Ultra Large Scale Integration) technology
Memory Capacity	20 KB	128KB	1MB	Magnetic core memory, LSI and VLSI. High Capacity	ULSI
Processing Speed	300 IPS instructions Per sec.	300 IPS	1MIPS (1 million inst. Per sec.)	Faster than 3rd generation	Very fast
Programming Language	Machine, Language	Assembly language & early high-level languages(FORTRAN, COBOL, ALGOL)	C, C++	Higher level languages, C, C++, Java	All the Higher level languages, Neural networks,
Example of computers	UNIVAC, EDVAC	IBM 1401, IBM 7094, CDC 3600, UNIVAC 1108	IBM 360 series, 1900 series	Pentium series, Multimedia,	Artificial Intelligence, Robotics

PARAMETERS.	SIZE	ENERGY	COST	SPEED & Accuracy	CAPABILITY AND EFFECTS	STORAGE	TECHNOLOGY	EXAMPLE
1ST GEN: VACUUM TUBES	They consumed a large amount of space, and air conditioning.	Nonsumed large amount of energy and produced alot of heat.	Costly commercial production.	Very slow, costly. Faulty	Constant maintenance required. Assembly was used for interconnection.	Used punch cards for input and magnetic	Vacuum tubes were the only electronic component available during those days	IBM 650-magnetic drum calculator
(ENIVAC-1942-1955)								
2ND GEN: TRANSISTORS	the size was reduced as compared to 1 st gen.	Used less energy and produced lesser heat as compared to 1 st gen.	mostly commercial production.	accuracy and speed was increased with better performance.	Less maintenance required. Assembly was used for interconnection.	Punch cards were used for input.	Vacuum tubes were replaced by transistors which increased speed.	"MOS" series, IBM 1401 series and MDC 164
3RD GEN: Integrated Circuit.	the size was decreased and system improved then 2 nd gen.	These systems used less energy and were more power efficient.	The system production cost was decreased.	the systems were versatile and were able to calculate in Nanoseconds.	System became more reliable and maintenance decreased, interconnection was done by HIGH LEVEL languages.	Used punch cards were used, the storage capability increased and system became more reliable.	3 rd gen used ICs which were 1/4" of an inch and contained thousands of transistors on a single IC chip.	BA 1101 system/360, "NVA010, A UNIVAC 9000
4TH GEN: Micro Processors.	the size was greatly reduced and didn't require a room for storage purpose.	The energy consumption was greatly efficient.	The overall system production cost was greatly reduced for commercial use.	the systems were smaller and have the tendency to calculate with a greater performance.	The computers used LSI & VLSI technology and were more advanced than ever before with increased processing in nanoseconds.	The input was given using high level languages and the systems can be used for all types of high level programming languages.	These gen systems worked on microprocessors with LSI and VLSI models of integrated circuit chips which provided more power and processing.	IBM PC
5TH GEN: SMART DEVICES	the system size has been reduced to micro level.	Devices have become smarter and efficient.	Devices are to be available commonly.	Systems are too made with self thinking capabilities such as AI.	Systems will work on the process of automation and will be capable of self computing.	Devices have the tendency to store TEL BYTES of data just in place of an inch.	System uses Artificial intelligence capabilities with 5ml system capabilities	IBM PC, Compaq

Types of computer

The computers that process analog signals are known as Analog Computers. The Analog signal is a continuous signal. For example, sine wave is an analog signal. The analog quantities are based on decimal number systems. Examples of Analog computers are the slide rule, ABACUS Computers that process digital signals are known as Digital Computers. The Digital signal is a discrete signal with two states 0 and 1. In practice, the digital computers are used and not analog.

1. Mainframe Computers 2. Mini Computers 3. Micro Computers 4. Super Computers

Now let's have an overview of general characteristics of each category.

1. Mainframe Computers.

- H They are big computer systems sensitive to temperature, humidity, dust etc.
- H Qualified & trained operators are required to operate them.
- P They have wide range of peripherals attached.
- H They have large storage capacity.
- H They can use wide variety of software.
- H They are not user friendly.
- H They can be used for more mathematical calculations.
- H They are installed in large commercial places or government organizations.

2. Mini Computers.

- H They have less memory & storage capacity than mainframe computers.
- H They offer limited range of peripherals.
- H Limited range of software can be used by them.
- H The end users can directly operate it.
- H They are not very sensitive to the external environment and hence are more generalized.
- P They are used for data processing.

3. Micro Computers.

A PC can be defined as a small, relatively inexpensive computer designed for an individual user. PCs are based on the microprocessor technology that enables manufacturers to put an entire CPU on one chip. Businesses use personal computers for word processing, accounting, desktop publishing, and for running spreadsheet and database management applications. At home, the most popular use for personal computers is playing games and surfing Internet.

- H They brought revolution in the history of computers.
- H They are also known as Personal Computers.
- H They are cheap and user friendly.
- H The main components are Monitor, CPU, Keyboard, Mouse, speakers, Modem and Printer.
- H They are having limited peripherals attached to them.
- H This type of computers can use wide range of software.
- H They are used as desktops either in offices or even homes.
- H Their operation can be easily learnt by anyone having logical aptitude.
- H Children enjoy playing games & watching movies in these computers.
- H Most popular micro computer's processing chip manufacturing company is Intel.

4. Super Computers. Supercomputers are one of the **fastest** computers currently available. Supercomputers are very expensive and are employed for specialized applications that require immense amount of mathematical calculations (number crunching). For example, weather forecasting, scientific simulations, (animated) graphics, fluid dynamic calculations, nuclear energy research, electronic design, and analysis of geological data (e.g. in petrochemical prospecting).

- H They are huge computers installed in space centers, nuclear power stations etc.
- S They are used for performing complex mathematical calculations.

S Only scientists and mathematicians can operate them.

H They are having huge memories & tremendous processing speed.

S They are used for weather forecasting, animation graphics etc.

Hardware, represents the physical components of a computer like its electronics parts. For example, CPU, Memory, Hard Disk, Monitor, Printer, Mouse, etc.

Software, represents the program(s) which perform different tasks on a computer system. It is a programming code which is executed by CPU, which can take instructions from input devices like keyboard, mouse, and can show output on output devices like monitor, printer etc. Examples are MS Word, Google Chrome, and Photoshop etc.

Following are the important difference between Hardware and Software.

Sr. No.	Key	Hardware	Software
1	Type	Hardware is a set of physical parts of computers which actually executes the instruction.	Software is a program or set of instructions which are to be executed by CPU to do the intended task.
2	Development	A Hardware is manufactured in factories.	A software is developed, engineered by software development companies.
3	Dependency	A hardware cannot do any task with a software instructing it.	A software cannot execute if underlying hardware is not present.
4	Tangible	A hardware can be touched being a physical electronic device.	Software being digital can be seen but cannot be touched.
5	Categories	Hardware categories: Input Devices, Output Devices, Storage Devices, Internal components of CPU and motherboard.	Software categories: Programming Softwares, Application Softwares, Operating Systems.
6	Vulnerability	Hardware remain unaffected by viruses.	Software is affected by virus being primary target.
7	Digital Transfer	A hardware can be only physically transferred.	Software can be transferred electronically.
8	Replacement	If hardware gets damaged, it is replaced with new one.	If Software gets damaged, it is reinstalled.

What is Software: *Computer software*, or only software, is a kind of program that enables a user to perform some specific task or used to operate a computer. It directs all the peripheral devices on the computer system - what to do and how to perform a task. PC Software plays the role of

mediator between the user and computer hardware. Without software, a user can't perform any task on a digital computer.

System Software

A system software aids the user and the hardware to function and interact with each other. Basically, it is a software to manage computer hardware behavior so as to provide basic functionalities that are required by the user. In simple words, we can say that system software is an intermediary or a middle layer between the user and the hardware. This computer software provides a platform or environment for the other software to work in. This is the reason why system software is very important in managing the entire computer system. When you first turn on the computer, it is the system software that gets initialized and gets loaded in the memory of the system. The system software runs in the background and is not used by the end-users. This is the reason why system software is also known as 'low-level software'.

- **Operating System:** It is the most prominent example of System Software. It is a collection of software that handles resources and provides general services for the other applications that run over them. Although each Operating System is different, most of them provide a Graphical User Interface through which a user can manage the files and folders and perform other tasks. Every device, whether a desktop, laptop or mobile phone requires an operating system to provide the basic functionality to it. As an OS essentially determines how a user interacts with the system, therefore many users prefer to use one specific OS for their device. There are various types of operating system such as real-time, embedded, distributed, multiuser, single-user, internet, mobile, and many more. It is important to consider the hardware specifications before choosing an operating system. Some examples of Operating systems given below:
 - Android Linux Mac OS MS Windows Unix
- **Device Drivers:** It is a type of software that controls particular hardware which is attached to the system. Hardware devices that need a driver to connect to a system include displays, sound cards, printers, mice and hard disks. Further, there are two types of device drivers: Kernel Device Drivers and User Device Driver. Some examples of device drivers are:
 - BIOS Driver Display Drivers Motherboard Drivers Printer Drivers
 - ROM Drivers Sound card Driver USB Drivers VGA Drivers
- **Firmware:** Firmware is the permanent software that is embedded into a read-only memory. It is a set of instructions permanently stored on a hardware device. It provides essential information regarding how the device interacts with other hardware. Firmware can be considered as 'semi-permanent' as it remains permanent unless it is updated using a firmware updater. Some examples of firmware are:
 - BIOS
 - Computer Peripherals
 - Consumer Applications
 - Embedded Systems
 - UEFI
- **Programming Language Translators:** These are mediator programs on which software programs rely to translate high-level language code to simpler machine-level code. Besides simplifying the code, the translators also do the following :
 - Examples of Programming Language Translators are Interpreter, Compiler and Assemblers.
- **Utility:** Utility software is designed to aid in analyzing, optimizing, configuring and maintaining a computer system. It supports the computer infrastructure. This software focuses on how an OS functions and then accordingly it decides its

trajectory to smoothen the functioning of the system. Softwares like ant viruses, disk cleanup & management tools, compression tools, defragmenters, etc are all utility tools. Some examples of utility tools are:

- Avast Antivirus Directory Opus McAfee Antivirus Windows File Explorer
WinRAR WinZip

2. Application Software

Application Software, also known as end-user programs or productivity programs are software that helps the user in completing tasks such as doing online research, jotting down notes, setting an alarm, designing graphics, keeping an account log, doing calculations or even playing games. They lie above the system software. Unlike system software, they are used by the end-user and are specific in their functionality or tasks and do the job that they are designed to do. For example, a browser is an application designed specifically for browsing the internet or MS Powerpoint is an application used specifically for making presentations. Application Software or simply apps can also be referred to as non-essential software as their requirement is highly subjective and their absence does not affect the functioning of the system. All the apps that we see on our mobile phones are also examples of Application Software. There is certain software that is exclusively made for app development like Meteor and Flutter. These are examples of Application software too.

There are various types of application software:

- Word Processors: These applications for documentation. Along with that it also helps in storing, formatting and printing of these documents. Some examples of word processors are:
- Database Software: This software is used to create and manage a database. It is also known as the Database Management System or DBMS. They help with the organization of data. Some examples of DBMS are:
- Multimedia Software: It is the software that is able to play, create or record images, audio or video files. They are used for video editing, animation, graphics, and image editing. Some examples of Multimedia Software are:
- Education and Reference Software: These types of software are specifically designed to facilitate learning on a particular subject. There are various kinds of tutorial software that fall under this category. They are also termed as academic software. Some examples are:
- Graphics Software: As the name suggests, Graphics Software has been devised to work with graphics as it helps the user to edit or make changes in visual data or images. It comprises of picture editors and illustration software. Some examples are:
- Web Browsers: These applications are used to browse the internet. They help the user in locating and retrieving data across the web. Some examples of web browsers are:

UNIT 2

Block diagram of computer

A computer can be defined as an electronic device that accepts data from an input device, processes it, stores it in a disk and finally displays it on an output device such as monitor.

To understand the basic rudiments of the functioning of the computer refer to the basic block diagram of a computer as shown in Fig. This flow of information holds true for all types of computers such as Personal Computers, Laptops, and Palmtops etc. In other words, the fundamental principle of working is the same.

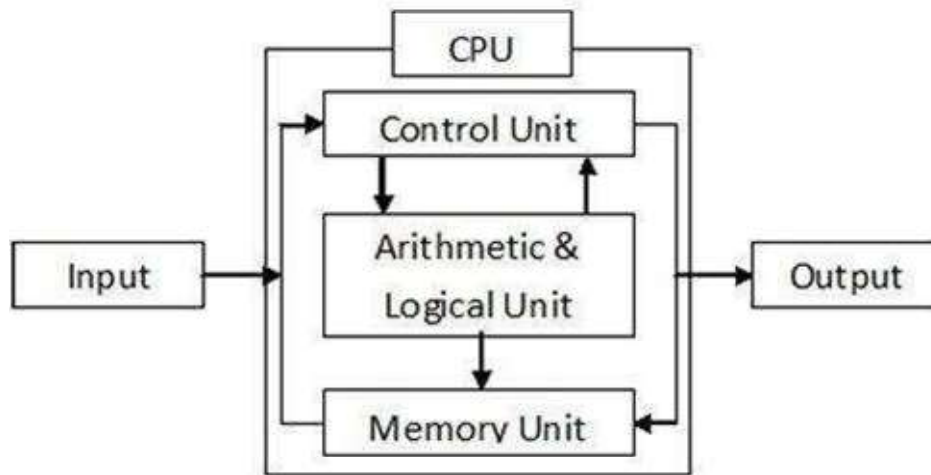


Fig. Block Diagram of Computer

Input unit: The input unit consists of different input devices. The role of an input unit is to give data to the computer. A Computer takes input from input devices in the form of clicks, drags and drops, pointing, alphanumeric characters etc depending upon the device used. Input can be either a data or an instruction. The Keyboard is a type of input device that gives data as input to the computer whereas mouse usually gives instructions through clicks.

Processing Unit:

Processing unit consists of various parts like CU, ALU, Registers and is often referred to as an electronic brain of a computer system. This unit is responsible for performing overall operations of a computer system. After the input device provides raw data to the computer system, CPU performs specific operations like, addition, subtraction, division etc and produces a result which we call an output. CPU can also access data from secondary storage of computer via primary memory. To carry out any operations the CPU assigns tasks to its component

Components of a processing unit.

- **Arithmetic Logical Unit (ALU):**

ALU is a logical unit of CPU. This unit is responsible for the processing of the data and instructions. When the CU encounters instructions which are related to performing logical or arithmetic operation on data, it passes that instruction to ALU. It carries out arithmetic operations like additions, multiplication, divisions etc. The comparison operations that arithmetic logical unit performs are comparison like less than, greater than, less than or equal to, greater than or equal to, not equal to etc. Logical operations includes OR, AND, NOT etc. The data on which ALU performs operations are fetched from memory unit. After the processing completes, the information or result is sent back to the storage or an output device.

▪ **Control Unit (CU):**

Control unit is another part of CPU. It supervises the overall operations of other units of the computer. The CU acts as the central nervous system and controls the processing of data according to the instruction given to the computer. It fetches instructions and data from the memory unit and executes the instructions one at a time using time signal. Control unit also determines the sequences of program and instruction's execution

Output Unit:

The output unit of a computer system are the collections of hardware components that show output to the user either in hardcopy or a softcopy format. After CPU completes the processing on the data, the outcome of processing also known as output or a result is passed to this unit. The output unit is responsible for translating the result in human understandable format and displaying it.

Memory unit:

The Memory unit of a computer system is what provides the data that CPU needs for processing. There is a primary and secondary memory in the computer system. Primary memory holds the data so that CPU can process it. The data that CPU process should be pulled to primary memory (RAM) from secondary storage device.

the computer. *Functions of memory unit are:*

- ☐ It stores all the data and the instructions required for processing.
- ☐ It stores intermediate results of processing.
- ☐ It stores final results of processing before these results are released to an output device.
- ☐ All inputs and outputs are transmitted through main memory.

Control Unit

Storage Unit:

The Storage unit is also a part of a block diagram of computer. Storage unit or secondary storage unit is a non-volatile device that holds programs, files, documents. It provides facilities to store a large volume of data. CPU executes the data stored on storage devices indirectly. The data are transferred to RAM first and after an execution, the data can be again written to Storage unit.

Functions of this unit are:

- ☐ It is responsible for controlling the transfer of data and instructions among other units of a computer.
- ☐ It manages and coordinates all the units of the computer.
- ☐ It obtains the instructions from the memory, interprets them, and directs the operation of the computer.
- ☐ It communicates with Input/Output devices for transfer of data or results from storage.
- ☐ It does not process or store data.

Input/output Devices

The computer will be of no use unless it is able to communicate with the outside world. Input/Output devices are required for users to communicate with the computer. In simple terms, input devices bring information INTO the computer and output devices bring information OUT of a computer system. These input/output devices are also known as peripherals since they surround the CPU and memory of a computer system.

Some commonly used Input/Output devices are listed in table below.

(1) **Keyboard** : Keyboard is used in the input phase of a computer-based [information](#) system. Keyboard is most common input device is used today. The data and instructions are input by

typing on the keyboard. The message typed on the keyboard reaches the memory unit of a computer. It's connected to a computer via a cable. Apart from alphabet and numeral keys, it has other function keys for performing different functions.

(2) **Mouse** : It's a pointing device. The mouse is rolled over the mouse pad, which in turn controls the movement of the cursor in the screen. We can click, double click or drag the mouse. Most of the mouse's have a ball beneath them, which rotates when the mouse is moved. The ball has 2 wheels of the sides, which in turn mouse with the movement of the ball. The sensor notifies the speed of its movements to the computer, which in turn moves the cursor/pointer on the screen.

(3) **Scanner** : Scanners are used to enter information directly in to the computers memory. This device works like a Xerox machine. The scanner converts any type of printed or written information including photographs into digital pulses, which can be manipulated by the computer.

(4) **Track Ball**: Track ball is similar to the upside- down design of the mouse. The user moves the ball directly, while the device itself remains stationary. The user spins the ball in various directions to effect the screen movements.

(5) **Joystick**

The joystick is a vertical stick which moves the graphic cursor in a direction the stick is moved. It typically has a button on top that is used to select the option pointed by the cursor. Joystick is used as an input device primarily used with video games, training simulators and controlling robots.



(6) **Light Pen**

It is a pen shaped device used to select objects on a display screen. It is quite like the mouse (in its functionality) but uses a light pen to move the pointer and select any object on the screen by pointing to the object. Users of Computer Aided Design (CAD) applications commonly use the light pens to directly draw on screen.

(a) **The Display (Monitor)**

The computer monitor or screen display was also called the "CRT", which stands for "cathode ray tube". "LCD" or liquid crystal display monitors are also in more common use, particularly in laptop computers. LCD monitors are thinner, lighter and use less power than the traditional CRT monitor. Current software requires color monitors. Screen size is measured on the diagonal. For desktop machines large (wide) sizes are available; laptop screen sizes can be more limited, though wider screens have become more common. Screen resolution refers to the number of *pixels* that can be displayed. A is one of the many tiny dots that make up the representation of a picture in a computer's memory. Usually the dots are so small and so numerous that, when printed on paper or displayed on a computer monitor, they appear to merge into a smooth image. The color and intensity of each dot is chosen individually by the computer to represent a small area of the picture. For example, a resolution of 640 x 640 indicates that the screen can be covered by 640 dots wide and 640 dots high. Resolution determines the quality of graphic display on the screen, and also on the printed page.

(b) Printer

Printers are used to produce paper (commonly known as hardcopy) output. Based on the technology used, they can be classified as Impact or Non-impact printers.

Impact printers use the typewriting printing mechanism wherein a hammer strikes the paper through a ribbon in order to produce output. Dot-matrix and Character printers fall under this category.

Non-impact printers do not touch the paper while printing. They use chemical, heat or electrical signals to etch the symbols on paper. Inkjet, DeskJet, Laser, Thermal printers fall under this category of printers.

When we talk about printers we refer to two basic qualities associated with printer's resolution, and speed. Print resolution is measured in terms of number of dots per inch (dpi). Print speed is measured in terms of number of characters printed in a unit of time and is represented as characters-per-second (cps), lines-per-minute (lpm), or pages-per-minute (ppm).

A dot matrix printer forms characters and graphics on the paper by producing pattern of dots. Dot matrix printers are relatively cheap and so is the stationery that they use. Dot-matrix printers are generally noisy. Slow, with speeds usually ranging between 30 to 600 characters per second.

Inkjet Printers

Inkjet printers transfer an image via magnetic charge. High quality graphics and a large variety of fonts are available. Inkjet printers tend to be relatively inexpensive to purchase, but more costly to maintain (*ink cartridges are pricey!*). High quality color graphics and photo printing are available. Inkjet printers are often a good choice for home use. Print speeds are moderate, and color photo printing options are an advantage. Inexpensive printers that include a scanner/copier are also available.

Laser Printer

On a laser printer, the image is produced by scanning a laser beam across an electronically charged drum. Toner, or ink, having an opposite charge and stuck to the drum, is then transferred to the paper by pressure and heat. High quality graphics and multiple font printing are readily available. Laser printers tend to be more expensive to purchase and relatively expensive to maintain. These are the best choice for high speed and large volume printing. Color laser printers are also available and in more common use – again, these tend to be costly

The mechanism of how a laser printer works is similar to a photocopier. Laser printers are also known as *page printers* because they process and store the entire page before they actually print it. Laser printers can print text at speeds of four to over thirty pages per minute.

The cost per page of toner cartridges is lower than other printers. Laser printers are quiet and fast

(c) Plotter

Plotters are used to print graphical output on paper. It is capable of producing graphs, drawings, charts, maps etc. Computer Aided Engineering (CAE) applications like CAD (Computer Aided Design) and CAM (Computer Aided Manufacturing) are typical usage areas for plotters. A plotter is a large printer that generates high-quality documents by moving ink pens over the surface of a page. Plotters are particularly useful to engineers and architects, as they produce high-quality blueprints, maps, and floor plans. Plotters are expensive.

(d) Sound Cards and Speakers:

The Audio output is the ability of the computer to output sound. Two components are needed: Sound card – Plays contents of digitized recordings, Speakers – Attached to sound card.

A speaker or speaker system converts an electrical signal to sound. The term loudspeaker can refer to individual transducers (known as drivers), or to complete systems consisting of an enclosure incorporating one or more drivers and electrical filter components. Loudspeakers are the most variable elements in an audio system and are responsible for the greatest degree of audible differences between sound systems.

Computer's memory

The Term Computer Memory is defined as one or more sets of chips those store Data/program instructions, either temporarily or permanently.

Characteristics of Main Memory

1. Primary memory is also known as Main memory or Internal memory
2. In primary memory, data is directly accessed by the processing unit.
3. Semi conductor chips are used to store information in primary memory.
4. Information stored is temporary and it can be lost when there is a sudden power cut.
5. Data operated and stored in uniform manner.
6. Primary memory devices are more expensive than secondary storage devices.
7. Nature of Parts of Primary memory varies. RAM- volatile in nature. ROM- Non-volatile
8. It is very fast in interacting with micro processor.
9. Primary memory has limited storage capacity.
10. Examples: RAM, ROM, Cache memory, PROM, EPROM, Registers etc

• Secondary Memory/Auxiliary Memory

1. Secondary memory is also known as External memory or Auxiliary memory
2. In secondary memory, data is first transferred to main memory and then routed to processing unit.
3. Magnetic disk, optical disks are used to store information in secondary memory.
4. Information stored is permanent unless one deletes it intentionally.
5. Data stored is not uniform in secondary memory.
6. Secondary memory devices are less expensive when compare to primary memory devices.
7. It's always Non-volatile in nature.
8. It is little slow in interacting with micro processor.
9. Whereas secondary memory can store bulk amounts of data in a single unit.
10. Examples: Magnetic Tapes, Optical Disc, Floppy Disks, Flash memory [USB drives], Paper Tape, Punched cards etc.

BASIS FOR COMPARISON	PRIMARY MEMORY	SECONDARY MEMORY
Basic	Primary memory is directly accessible by Processor/CPU.	Secondary memory is not directly accessible by CPU.
Altered Name	Main memory.	Auxiliary memory.
Data	Instructions or data to be currently executed are copied to main memory.	Data to be permanently stored is kept in secondary memory.
Volatility	Primary memory is usually volatile.	Secondary memory is non-volatile.
Formation	Primary memories are made of semiconductors.	Secondary memories are made of magnetic and optical material.
Access Speed	Accessing data from primary memory is faster.	Accessing data from secondary memory is slower.
Access	Primary memory is accessed by the data bus.	Secondary memory is accessed by input-output channels.
Size	The computer has a small primary memory.	The computer has a larger secondary memory.
Expense	Primary memory is costlier than secondary memory.	Secondary memory is cheaper than primary memory

Main Memory can be classified into two types – RAM and ROM.

1. RAM, or random access memory
2. ROM, or read-only memory

1) RAM Computer Memory

The most important things to understand about RAM are that RAM memory is very fast, it can be written to as well as read, it is volatile (so all data stored in RAM memory is lost when it loses power) and, finally, it is very expensive compared to all types of secondary memory in terms of cost per gigabyte. It is because of the relative high cost of RAM compared to secondary memory types that most computer systems use both primary and secondary memory.

Types of RAM

- **DRAM:** DRAM stands for Dynamic RAM, and it is the most common type of RAM used in computers. The oldest type is known as single data rate (SDR) DRAM, but newer computers use faster dual data rate (DDR) DRAM. DDR comes in several versions including DDR2, DDR3, and DDR4, which offer better performance and are more energy efficient than SDR. DRAM consists of a transistor and a capacitor in each cell.
- **SRAM:** SRAM stands for Static RAM, and it is a particular type of RAM which is faster than DRAM, but more expensive and bulkier, having six transistors in each cell. For those reasons SRAM is generally only used as a data cache within a CPU itself or as RAM in very high-end server systems. A small SRAM cache of the most imminently-needed data can result in significant speed improvements in a system

The [key differences](#) between DRAM and SRAM is that SRAM is faster than DRAM - perhaps two to three times faster - but more expensive and bulkier. SRAM is usually available in megabytes, while DRAM is purchased in gigabytes.

DRAM uses more energy than SRAM because it constantly needs to be refreshed to maintain data integrity, while SRAM - though volatile - does not need constant refreshing when it is powered up.

2) ROM Computer Memory

ROM stands for read-only memory, and the name stems from the fact that while data can be read from this type of computer memory, data cannot normally be written to it. It is a very fast type of computer memory which is usually installed close to the CPU on the motherboard.

ROM is a type of non-volatile memory, which means that the data stored in ROM persists in the memory even when it receives no power - for example when the computer is turned off. In that sense it is similar to secondary memory, which is used for long term storage.

When a computer is turned on, the CPU can begin reading information stored in ROM without the need for drivers or other complex software to help it communicate. The ROM usually contains "bootstrap code" which is the basic set of instructions a computer needs to carry out to become aware of the operating system stored in secondary memory, and to load parts of the operating system into primary memory so that it can start up and become ready to use.

Types of ROM

ROM is available in several different types, including PROM, EPROM, and EEPROM.

- **PROM** PROM stands for Programmable Read-Only Memory, and it is different from true ROM in that while a ROM is programmed (i.e. has data written to it) during the manufacturing process, a PROM is manufactured in an empty state and then programmed later using a PROM programmer or burner.

- **EPROM** EPROM stands for Erasable Programmable Read-Only Memory, and as the name suggests, data stored in an EPROM can be erased and the EPROM reprogrammed. Erasing an EPROM involves removing it from the computer and exposing it to ultraviolet light before re-burning it.
- **EEPROM** EEPROM stands for Electrically Erasable Programmable Read-Only Memory, and the distinction between EPROM and EEPROM is that the latter can be erased and written to by the computer system it is installed in. In that sense EEPROM is not strictly read-only. However in many cases the write process is slow, so it is normally only done to update program code such as firmware or BIOS code on an occasional basis

Sr. No.	Key	RAM	ROM
1	Definition	RAM stands for Random Access Memory.	ROM stands for Read Only Memory.
2	Data Retention	RAM data is volatile. Data is present till power supply is present.	ROM data is permanent. Data remains even after power supply is not present.
3	Data Access	RAM data can be read, erased or modified.	ROM data is read only.
4	Usage	RAM is used to store data that CPU needs for current instruction processing.	ROM is used to store data that is needed to bootstrap the computer.
5	Speed	RAM is quite high speed.	ROM is slower than RAM.
6	CPU Access	CPU can access data stored on RAM.	Data to be copied from ROM to RAM so that CPU can access its data.
7	Capacity	RAM is large and has high capacity.	ROM is generally small and of low capacity.
8	Usage	RAM is used as CPU Cache, Primary Memory.	ROM is used as firmware by microcontrollers.
9	Cost	RAM is costly.	ROM is cheap.

Auxiliary Storage Devices-Magnetic Tape, Floppy Disk, Hard Disk.

The Magnetic Storage Exploits duality of magnetism and electricity. It convert electrical signals into magnetic charges, captures magnetic charge on a storage medium and then later regenerates electrical current from stored magnetic charge. Polarity of magnetic charge represents bit values zero and one.

Magnetic Disk

The Magnetic Disk is Flat, circular platter with metallic coating that is rotated beneath read/write heads. It is a Random access device; read/write head can be moved to any location on the platter.

Floppy Disk

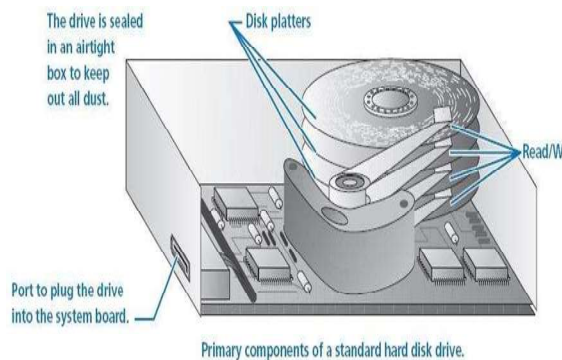
These are small removable disks that are plastic coated with magnetic recording material. Floppy disks are typically 3.5" in size (diameter) and can hold 1.44 MB of data. This portable storage device is a rewritable media and can be reused a number of times. Floppy disks are commonly used to move files between different computers. The main disadvantage of floppy disks is that they can be damaged easily and, therefore, are not very reliable. The following figure shows an example of the floppy disk.



HARD DISK

Another form of auxiliary storage is a hard disk. A hard disk consists of one or more rigid metal plates coated with a metal oxide material that allows data to be magnetically recorded on the surface of the platters. The hard disk platters spin at a high rate of speed, typically 5400 to 7200 revolutions per minute (RPM). Storage capacities of hard disks for personal computers range from 10 GB to TB

A disk is divided into tracks, cylinders, and sectors. A track is that portion of a disk which passes under a single stationary head during a disk rotation, a ring 1 bit wide. A cylinder is comprised of the set of tracks described by all the heads (on separate platters) at a single seek position. Each cylinder is equidistant from the center of the disk. A track is divided into segments of sectors, which is the basic unit of storage



Optical Memory

Optical memory uses light beam for its operation. It is developed in fourth generation of computer. It is mainly used for storing audio/video, backup as well as for carrying data. It requires optical drive for its operation. Its read/write speed is slower compared to hard disk and flash memories.

Example: CD, DVD, BD

CD It stands for Compact Disk. It has storage capacity of 700 MB or approximately 90 minutes of standard audio. CD contains hard circular plastic, single side of this plastic is coated by aluminum alloy. This alloy stores data. It is protected by additional thin plastic covering. CD required CD drive for its operation. Types of CD are:

CD-R is a blank CD in which data can be stored once. After storing data it is converted into CD-ROM. CD-ROM It cannot be erased or updated

CD-RW it can be erased and used for multiple times.

DVD

It stands for Digital Versatile Disk. It has the storage capacity of 4.7GB to 17GB. Its shape and size is similar to CD but the difference in storage capacity is due to different chemical component and data is compressed before storing. It requires DVD drive for its operation. Read/write speed of DVD is slower than that of CD. Types of DVD are:

DVD-R DVD-ROM DVD-RW

DVD can also be classified as:

- v Single sided single layered DVD (4.7GB)
- v Single sided dual layered DVD (7-8GB)
- v Dual sided single layered DVD (9GB)
- v Dual sided dual layered DVD (17GB)

BD

It stands for Bluray disk. It has the storage capacity of 25GB-50GB. It requires BD drive for its operation. Its shape and size is similar to CD and DVD. Types of BD are:

BD-R BD-ROM BD-RW

Working mechanism of CD

The surface of the CD contains land and pit. Land represents binary 1 and pit represents binary 0. During CD reading process a beam of light is emitted which strikes the surface of CD and gets reflected. The reflection is captured by lens in the CD drive. Difference in reflection from land and pit is identified to determine 1 and 0. Land is actually in a crystalline form and pit is in amorphous form. The size of land and pit is smaller in DVD compared to CD.

Flash memory (Known as Flash Storage) is a type of non-volatile storage memory that can be written or programmed in units called “Sector” or a “Block.” Flash Memory is **EEPROM** (*Electrically Erasable Programmable Read-Only Memory*) means that it can retain its contents when the power supply removed, but whose contents can be quickly erased and rewritten at the byte level by applying a short pulse of higher voltage. This is called flash erasure, hence the name. Flash memory is currently both too expensive and too slow to serve as main memory.

Flash memory is the most economical non-volatile, rewritable storage chip on the market. Comprised of cells that hold a charge without power, flash memory is extremely durable and used in just about every electronic device, including cameras, smartphones, tablets, music players and USB drives.

UNIT 3

Importance and use of OS

An OS is a program that acts an intermediary between the user of a computer and computer hardware. An operating system (OS) is a software program that manages the hardware and software resources of a computer. The OS performs basic tasks, such as controlling and allocating memory, prioritizing the processing of instructions, controlling input and output devices, facilitating networking, and managing files.

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

Objectives of Operating System

- To make a computer system convenient to use in an efficient manner
- To hide the details of the hardware resources from the users
 - To provide users a convenient interface to use the computer system
- To act as an intermediary between the hardware and its users and making it easier for the users to access and use other resources
 - To manage the resources of a computer system
- To keep track of who is using which resource, granting resource requests, according resource using and mediating conflicting requests from different programs and users
- To provide efficient and fair sharing of resources among users and programs

Functions of Operating System



4.

1. **Process management:-** Process management helps OS to create and delete processes. It also provides mechanisms for synchronization and communication among processes.
2. **Memory management:-** Memory management module performs the task of allocation and de-allocation of memory space to programs in need of this resources.
3. **Secondary Storage Management:-** Systems have several levels of storage which includes primary storage, secondary storage, and cache storage. Instructions and data must be stored in primary storage or cache so that a running program can reference it.
4. **File management:-** It manages all the file-related activities such as organization, storage, retrieval, naming, sharing, and protection of files.
5. **Device Management:-** Device management keeps tracks of all devices. This module also responsible for this task is known as the I/O controller. It also performs the task of allocation and de-allocation of the devices.
6. **Security:-** Security module protects the data and information of a computer system against malware threat and authorized access.
7. **Command Interpretation:-** This module is interpreting commands given by the user and acting on them.
8. **I/O System Management:-** One of the main objects of any OS is to hide the peculiarities of that hardware devices from the user.

9.**Networking:** A distributed system is a group of processors which do not share memory, hardware devices, or a clock. The processors communicate with one another through the network.

10. **Job accounting:** Keeping track of time & resource used by various job and users.

11. **Communication management:** Coordination and assignment of compilers, interpreters, and another software resource of the various users of the computer systems

The advantage of using Operating System

- Allows you to hide details of hardware by creating an abstraction
- Easy to use with a GUI
- Offers an environment in which a user may execute programs/applications
- The operating system must make sure that the computer system convenient to use
- Operating System acts as an intermediary among applications and the hardware components
- It provides the computer system resources with easy to use format
- Acts as an intermediate between all hardware's and software's of the system

Difference between 32-Bit vs. 64 Bit Operating System

Parameters	32. Bit	64. Bit
Architecture and Software	Allow 32 bit of data processing simultaneously	Allow 64 bit of data processing simultaneously
Compatibility	32-bit applications require 32-bit OS and CPUs.	64-bit applications require a 64-bit OS and CPU.
Systems Available	All versions of Windows 8, Windows 7, Windows Vista, and Windows XP, Linux, etc.	Windows XP Professional, Vista, 7, Mac OS X and Linux.
Memory Limits	32-bit systems are limited to 3.2 GB of RAM.	64-bit systems allow a maximum 17 Billion GB of RAM.

Disk operating system

Disk Operating System (specifically) and disk operating system (generically), most often abbreviated as DOS refer to operating system software used in most computers that provides the abstraction and management of secondary storage devices and the information on them (e.g., file systems for organizing files of all sorts). Such software is referred to as a disk operating system when the storage devices it manages are made of rotating platters (such as hard disks or floppy disks).

DOS works as an interpreter between user and computer. We give English like commands and it converts it into machine language and after the computer has processed the information, returns

the results to you in English. Ms. Dos consist of four essential programs and a set of additional utilities.

Components of MS-DOS

Four main Programs are

□ Boot Record □ IO.SYS □ MSDOS.SYST □ COMMAND.COM

Bootting: Process that starts up a computer is called bootting. It checks for proper functioning of all the peripheral devices attached with the system. It searches for the operating system and, when located, loads it into the main memory.

Cold Booting is done by turning on the computer.

Warm Booting is performed by pressing **Ctrl+Alt+Del** keys simultaneously.

Unix

The name "Unix" is a trademark of The Open Group which licenses it for use to any operating system that has been shown to conform to the definitions that they have cooperatively developed. The name is commonly used to refer to the large set of operating systems which resemble the original UNIX. UNIX systems run on a wide variety of machine architectures. They are used heavily as server systems in business, as well as workstations in academic and engineering environments. Free software Unix variants, such as Linux and BSD, are increasingly popular. They are used in the desktop market. Unix was designed to be portable, multi-tasking and multi-user in a time-sharing configuration.

Microsoft Windows

Windows OS, developed by Microsoft Corporation to run personal computers (PCs). Featuring the first graphical user interface (GUI) for IBM-compatible PCs, the Windows OS soon dominated the PC market. Approximately 90 percent of PCs run some version of Windows.

In 1985 Microsoft came out with its Windows operating system, which gave PC compatibles some of the same capabilities as the Macintosh.

The first version of Windows, released in 1985, was simply a GUI offered as an extension of Microsoft's existing disk operating system, or MS-DOS. Based in part on licensed concepts that Apple Inc. had used for its Macintosh System Software, Windows for the first time allowed DOS users to visually navigate a virtual desktop, opening graphical "windows" displaying the contents of electronic folders and files with the click of a mouse button, rather than typing commands and directory paths at a text prompt.

Subsequent versions introduced greater functionality, including native Windows File Manager, Program Manager, and Print Manager programs, and a more dynamic interface. Microsoft also developed specialized Windows packages, including the networkable Windows for Workgroups and the high-powered Windows NT, aimed at businesses. The 1995 consumer release Windows 95 fully integrated Windows and DOS and offered built-in Internet support, including the World Wide Web browser Internet Explorer.

Advertisement

With the 2001 release of Windows XP, Microsoft united its various Windows packages under a single banner, offering multiple editions for consumers, businesses, multimedia developers, and others. Windows XP abandoned the long-used Windows 95 kernel (core software code) for a more powerful code base and offered a more practical interface and improved application and memory management. The highly successful XP standard was succeeded in late 2006 by Windows Vista, which experienced a troubled rollout and met with considerable marketplace resistance, quickly acquiring a reputation for being a large, slow, and resource-consuming system. Responding to Vista's disappointing adoption rate, Microsoft in 2009 released Windows 7, an OS

whose interface was similar to that of Vista but was met with enthusiasm for its noticeable speed improvement and its modest system requirements.

Windows 8 in 2012 offered a start screen with applications appearing as tiles on a grid and the ability to synchronize settings so users could log on to another Windows 8 machine and use their preferred settings. In 2015 Microsoft released Windows 10, which came with Cortana, a digital personal assistant like Apple's Siri, and the Web browser Microsoft Edge, which replaced Internet Explorer. Microsoft also announced that Windows 10 would be the last version of Windows, meaning that users would receive regular updates to the OS but that no more large-scale revisions would be done

Memory Management Functions

The Operating System is responsible for the following memory management functions:

- ☐ Keep track of which segment of memory is in use and by whom.
- ☐ deciding which processes are to be loaded into memory when space becomes available. In multiprogramming environment it decides which process gets the available memory, when it gets it, where does it get it, and how much.
- ☐ Allocation or de-allocation the contents of memory when the process request for it otherwise reclaim the memory when the process does not require it or has been terminated.

File Management Functions

- ☐ Keeps track of the information, its location, its usage, status, etc. The module called a file system provides these facilities.
- ☐ Decides who gets hold of information, enforce protection mechanism, and provides for information access mechanism, etc.
- ☐ Allocate the information to a requesting process, e.g., open a file.
- ☐ De-allocate the resource, e.g., close a file.

I/O Device Management Functions

An Operating System will have device drivers to facilitate I/O functions involving I/O devices. These device drivers are software routines that control respective I/O devices through their controllers.

- ☐ Keep track of the I/O devices, I/O channels, etc. This module is typically called I/O traffic controller.
- ☐ Decide what is an efficient way to allocate the I/O resource. If it is to be shared, then decide who gets it, how much of it is to be allocated, and for how long. This is called I/O scheduling.
- ☐ allocate the I/O device and initiate the I/O operation.
- ☐ Reclaim device as and when its use is through. In most cases I/O terminates automatically.

AUTOEXEC.BAT

AUTOEXEC.BAT is a special batch file name that, if found in the root directory of the boot disk, will automatically run before control of the computer is turned over to you. You might want to always load particular files on starting the computer and the commands to do this would be in AUTOEXEC.BAT. Typically, the AUTOEXEC.BAT file is used to set the system up to your particular needs. This includes setting the PATH to define where DOS will look for commands, defining various variables in the DOS environment and setting the PROMPT to look like you want it to. If you want to terminate the AUTOEXEC.BAT file (or any other batch file)

CONFIG.SYS

CONFIG.SYS is the primary configuration file for the MS-DOS and OS/2 operating systems. It is a special file that contains setup or configuration instructions for the computer system. The commands in this file configure DOS for use with devices and applications in the system. The

commands also set up the memory managers in the system. After processing the CONFIG.SYS file, DOS proceeds to load and execute the command shell specified in the shell= line of CONFIG.SYS, or COMMAND.COM if there is no such

COMMAND.COM

The command processor performs three tasks: It handles critical interrupts...that is, COMMAND.COM takes care of all demands for attention by parts of the computer. The user typing the Control-Break program break command is an example of an interrupt.

- It handles critical errors...that is, COMMAND.COM takes care of problems.
- It performs end-of-program housekeeping, that is, COMMAND.COM takes care of making the computer's memory available for other programs and reloading parts of itself if the program wrote over them.

COMMAND.COM also places the C> prompt on the screen and interprets any command(s) you might type. In short, the command processor tells the rest of DOS what to do.

Internal Commands : These commands enter into the computer memory during computer booting. These commands are not in the form of any file; so neither they can be viewed nor can be edited or deleted. For example : MD, CD, TIME, DATE, COPY, COPY CON, TYPE ETC.

External Commands : These commands are stored in the computer list in the form of files. These Commands can be viewed, copied, changed or deleted. For example : FORMAT, COPY, PRINT, SYS, EDIT, TREE, SORT, PROMPT etc.

Important Internal DOS Commands

(i) **MD (Make Directory) :** We use this commands to make a new directory or sub directory.

Syntax : C:\>MD DIRECTORY NAME

Example : MD STUDENT

(ii) **CD (Change Directory) :** This commands is used to move from one directory to another.

Syntax : C:\> CD Directory name

Example : > CD Student

Exit to Directory :

CD... The command move the subdirectory to parent directory.

CD The command is used to move directly to the root directory.

(iii) **RD (Remove Directory) :** If a Directory which was earlier is ;not required than such directory can be removed by using

Syntax : C:\> RD Directory name

Example : >RD student

(iv) **Copy Con :** Its command is used to create a file. The name of the file, which is to be created, is written after the copy Con leaving one space in between

Syntax : Copy Con file name

To created a file, the following steps are :

(i) Type Copy Con Monu and press Enter.

(ii) Type whatever is to be typed in the file.

(iii) Press F6 function key or CTRL + Z keys "?Z" will be displayed on the screen, which indicates that the file is complete.

(iv) Press Enter and after that the DOS will save the file and will display the message '1 File(s) copied.

(v) **Del** : This command is used to erase the files which are no longer required.

Syntax : C:\> Del < File name >

Example : >Del Monu

(vi) **Type** : This command is used to view the contents of text file.

Syntax : Type <file name>

(vii) **Copy** : This command is used to copy of file from one place to another place. A copy of file is another file with the same contents.

Syntax : C:\> copy <source> < destination path>

(viii) **Ren** : This command is used to rename the file. In REN command two parameters are used. The first is the file we want to rename and the second is the new name for the file.

Syntax : > Ren <old file name> <New file name>

(ix) **DIR** : This command is used to display of directory and files.

Syntax : C:\> DIR ?

(x) **CLS** : This command is used to clear the screen.

Syntax : C:\> CLS

S.NO	DOS	WINDOW
1	DOS is single tasking operating system.	While windows are multitasking operating systems.
2	It consumes low power.	While windows consume high power.
3	It consumes less memory in comparison of windows.	While it consumes more memory.
4	DOS does not support networking.	While window supports networking.
5	DOS is complex in terms of using.	Whereas it is simple for using.
6	DOS does not share time.	While window can share time.
7	DOS is a command line operating system.	Whereas windows are the graphical operating systems.
8	DOS operating system is less preferred than windows.	While windows are more preferred by the users in comparison of DOS.
9	In DOS operating system multimedia is not supported such as: Games, movies,songs etc.	While windows support multimedia such as: Games, movies,songs etc.
10	In DOS operation systems, operation are performed speedily than windows OS.	While in windows OS, operation are performed slowly than DOS OS.
11	There is only one window opened at a time in DOS.	While in windows, multiple windows can be opened at a time

GUI

Stands for “Graphical User Interface” .It are a user interface that includes graphical elements, such as windows, icons and buttons. GUIs were controlled exclusively by a mouse and a keyboard. Because there are now many types of digital devices available, GUIs must be designed for the appropriate type of input. For example, a desktop operating system includes a menu bar and windows with small icons that can be easily navigated using a mouse. Regardless of the type of input, each of these interfaces is considered GUIs since they include graphical elements.

It can use graphical images to executes commands, easy to access, easy to understand, works in windows, its slow compare to dos, more memory requirement, expensive, high speed ,components required, it can use keyboard, mouse, more than one task can run at a time, it's based on graphics, user controls the flow of actions, e.g. Windows...

CUI

Short for **character user interface** or **command-line user interface**, **CUI** is a prompt used to interact with computer programs. It works by allowing the user to issue commands as one or more lines of text (referred to as command lines) to a program. user requires commands, its difficult to remember all commands, its only in black and white machine, works in Dos, dos is fast compare to windows, memory requirementless, its cheap compare to gui, it can only use keyboard, it can linked directly, one task can run at a time, its totally based on text, programmer controls the flow of actions, eg. Dos

Sr. No.	Key	GUI	CUI
1	Interaction	User interacts with computer using Graphics like images, icons.	User interacts with computer using commands like text.
2	Navigation	Navigation is easy.	Navigation is difficult.
3	Peripherals used	Keyboard, mouse or any other pointing device.	Only keyboard
4	Precision	GUI has low precision.	CUI has high precision
5	Speed	GUIs of low speed	CUIs of high speed
6	Usage	Usage is easy.	Usage is difficult, requires expertise.
7	Memory requirement	High memory requirement	Low memory requirement
8	Flexibility	Highly flexible user interface.	Little flexible user interface.
9	Customize	GUIs highly customizable.	CUI appearance is not easily changable.

UNIT 4

Microsoft Office Word

Microsoft Word 2003 is a powerful word processing program that is primarily used for text-intensive types of documents. With Microsoft Word 2003 you can create general types of word processing including, business letters, newsletters, proposals, contracts, and manuscripts.

MAIN FEATURES OF WORD PROCESSING

The main features are:

- You can create professional documents fast, using built-in and custom templates.
- You can easily manage large documents using various features like the ability to create table of contents, index, and cross-references.
- You can work on multiple documents simultaneously
- With the help of mail merge, you can quickly create merge documents like mass mailings or mailing labels.
- AutoCorrect and AutoFormat features catch typographical errors automatically and allow you to use predefined shortcuts and typing patterns to quickly format your documents.
- The print zoom facility scales a document on different paper sizes, and allows you to print out multiple pages on a single sheet of paper.
- The nested tables feature supports putting one table inside another table.
- You can export and save your word documents in PDF and XPS file format.

The word processor has many unique features as follows : -

1) Typing easy : In MS WORD typing is so easy because

- a. We need not click enter button after end of the line as the type writer. The word processor itself takes matter to the next line of the document. This facility is called word wrapping
- b. There is no limit for typing the matter
- c. You can easily correct mistakes as the typing matter appears on the screen

2) Saving: The document type can be stored for future use. We can preserve the document for any number of years in word processing

3) Adding, removing and applying text : Documents can be modified easily in MS office we can easily place a new word in place of existing one. The new words will automatically be adjusted in the place of deleted or modified text. We can also copy a part or whole of the matter from one document to another document

4) Spell check of words : The spelling of the words in the document can be rectified automatically we can also find alternative words to our typed words. The grammatical errors

6) Bullets and Numbering :

Bullets are special symbols which can be put for different points, paragraphs and documents where as numbers are ascending figure while 1,2,3 etc.

7) Headers and footers : A header is the text appearing above the documents and footer is the text appearing below the documents

8) Creation of tables : If you give directions for required number of rows and columns word provides a ready made table to work

9) Inserting pictures and objects : In the word processor we can insert the pictures in the document to make it more attractive. These pictures can be obtain from clip art which is available in word processor

10) Preview facility : Before getting a print out of our document we can get a preview of document if mistakes are there we can change the document

11) Mail merge facility : If you want to send information to different persons there is a facility in word processor known as mail merge the main body of the letters can be typed once and we can send the same to different addresses

12) Macros : With the help of macros we can avoid certain type of repetitive works. This saves our time and efforts.

Advantages :

1) Quality: Word produces error free documents. The spell and grammar check in word processing makes the document to be error free.

2) Storage of text: We can take any number of copies with word processor. If we need this same document with slight changes we need not type the same letter again just by making some slight changes we can obtain a modified copy easily.

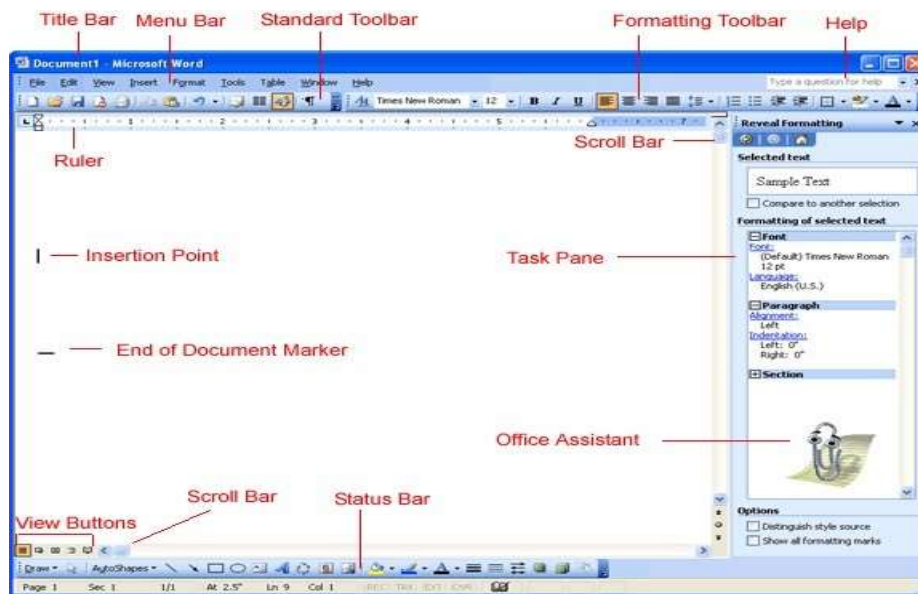
3) Time saving : We can get any number of copies of documents in future without re typing

4) Securities: We can protect the documents of word by giving pass word.

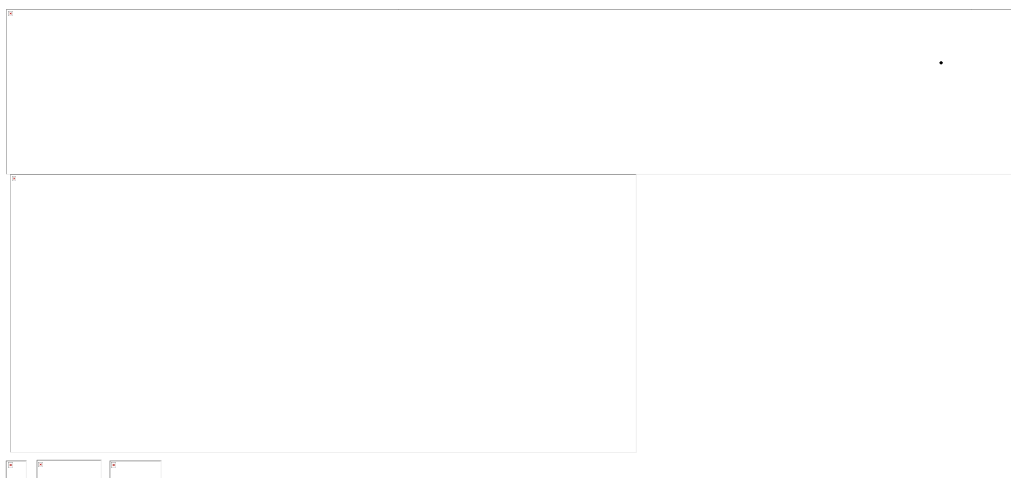
5) Dynamic exchange of data: We can have dynamic exchange of objects and pictures from other documents into word processing document. The documents can be linked each other.

To Start Microsoft Word 2003

 to **Programs**, then trace to **Microsoft Office** and select



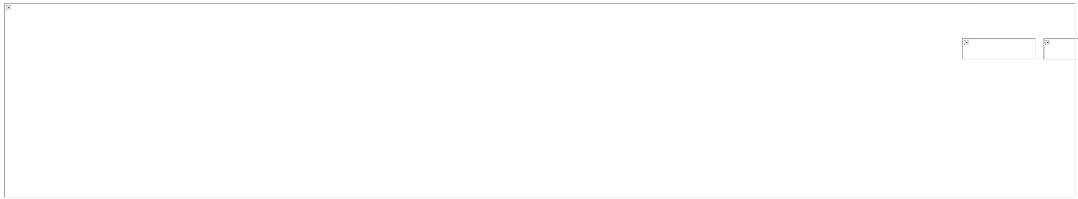
Title Bar	Displays the document name followed by a program name.
Menu Bar	Contains a list of options to manage and customize documents.
Standard Toolbar	Contains shortcut buttons for the most popular commands.
Formatting Toolbar	Contains buttons used for formatting.
Ruler	Used to set margins, indents, and tabs.
Insertion Point	The location where the next character appears.
End-of-Document Marker	.
Scroll bars	Used to view parts of the document.
Status Bar	Displays position of the insertion point and working mode buttons.



arrowsto

Format Text

A font is a set of all characters available in one typeface and size, including uppercase letters, lowercase letters, punctuation, and numerals. To change the appearance of text, you may change the font as well as the font style (bold, italic, underline). Be sure to choose a font that is legible and practical.

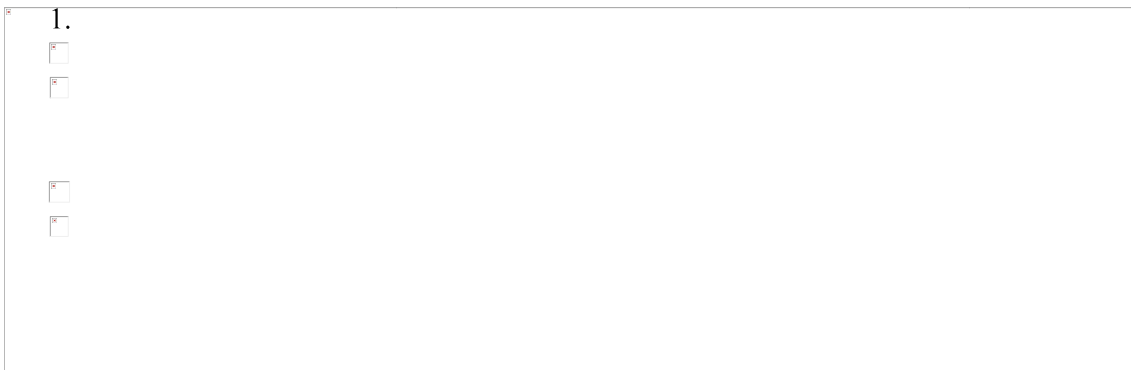
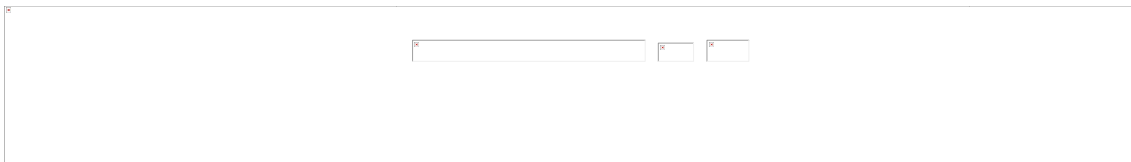


Font Color

1. Highlight the text that is to be modified.
2. Click the **Font Color** button in the formatting toolbar.
3. Click to select the desired color.

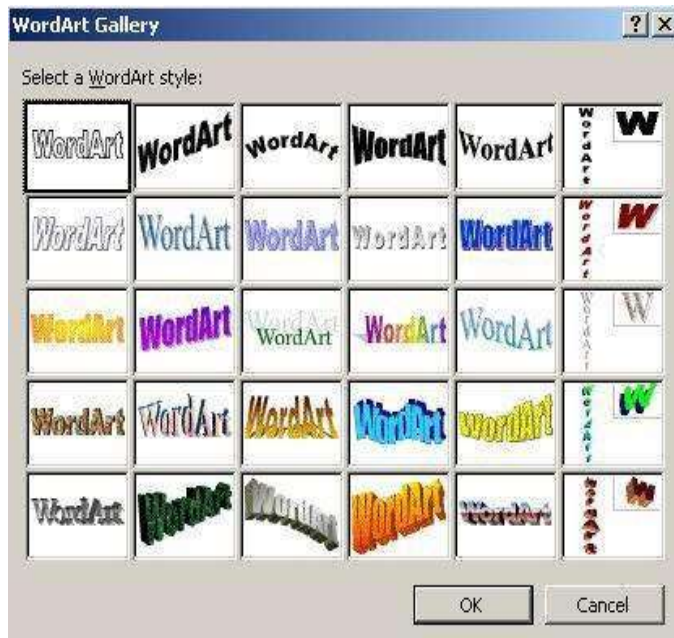
Text Effects

1. Highlight the text that is to be modified.
2. From the **Format** menu, select **Font**.
3. Click to select the *Text Effects* tab.
4. Click to select the desired Animation.



Insert WordArt to Enhance Text

1. From the **Insert** menu, trace to **Picture** and select **WordArt**.



2. Click to select the desired WordArt style and click **OK**.

3. Specify the desired **Font** and **Size**.

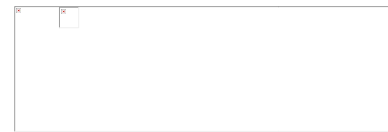
4. Click to select **Bold** or **Italic**.

5. In the Text window, type the text you want to appear in decorative WordArt style.

6. Click **OK**.

Change Line Spacing

1. Highlight the text that is to be modified.



4. Click to select the desired line spacing option (Single, 1.5 Lines, Double, etc.).

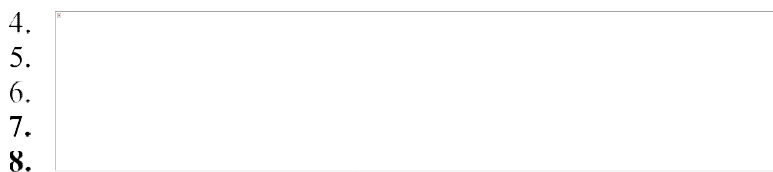
5. _____

Format Columns

1. Highlight the text that is to be formatted in columns.
2. From the **Format** menu, select **Columns**.
3. Click to select the desired **Number of columns** or enter the number of columns.
4. Enter the desired column **Width** and **Spacing** between columns.
6. If you want a line between the columns, click the **Line between** checkbox.
6. Click **OK**.

Apply Borders and Shading

1. Highlight the text you want to put a border around.
2. From the **Format** menu, select **Borders and Shading**.
3. Click to select the Borders tab.



Create Headers and Footers

A header or footer is text or graphics such as your document's title, your name, date, or any information that you want printed at the top or bottom of each page in the document. A header is printed in the top margin; footer is printed in the bottom margin.

1. From the **View** menu, select **Header and Footer**.
2. To create a header, enter text that you want to appear at the top of every page. You may insert page numbers, date, and time by clicking the corresponding button in the header and footer toolbar.
3. To create footer, click the **Switch Between Header and Footer** button. The insertion point will move to the footer area where you may enter text that you want to appear at the bottom of every page.

4. Highlight and format all header/footer text as desired (font, font style, size, etc.).
5. Click the **Close** button on the header and footer toolbar.

Insert Page Numbers

1. From the **Insert** menu, select **Page Numbers**.
2. Click the *Position* down arrow and specify whether to print page numbers in the **Top of Page (Header)** or in the **Bottom of Page (Footer)**.
3. Click the *Alignment* down arrow and specify the desired alignment (Left, Right, Center, Inside, or Outside)
4. If you want the first page number to display on the first page of the document, click the **Show number on first page** checkbox.
5. If you need to begin your document with a page number other than # 1, click the **Format** button. Click to select the *Start at* radio button and enter the page number you want your document to start with.
6. Click **OK**.

Insert a Symbol (example: TM or ©)

1. Click to place the insertion point where you want to insert the symbol.
2. From the **Insert** menu, select **Symbol**.
3. Click to select the desired symbol. *If you don't see the symbol you want, choose a different Font.*
4. Click **Insert**.
5. Click **Close**.



Click **INSERT** and then select **PICTURE**. From the sub-menu, select the option **CLIPART** which opens a pane to the right of the application window. Now you can search for a clip art by typing the keyword associated with the clip art into the **Search Box** and clicking **SEARCH**.

Tables

1. From the **Table** menu, trace to **Insert** and select **Table**.
2. Specify the *Number of columns* and *Number of rows*.
3. Click **OK**.

Insert a Row or Column

1. Click to place your insertion point where you want to insert a row.
2. From the **Table** menu trace to **Insert** and select **Rows Above** or **Rows Below** (*Columns to the Left* or *Columns to the Right*).

Delete a Row or Column

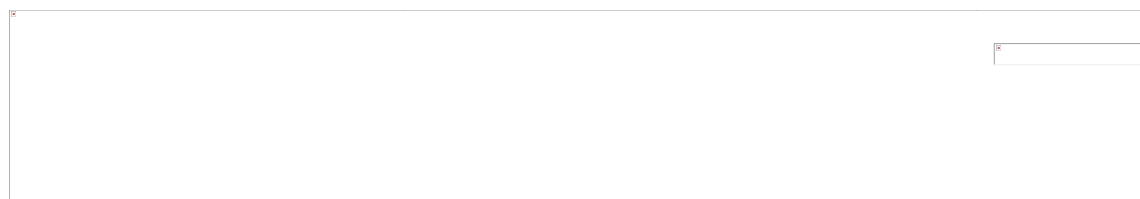
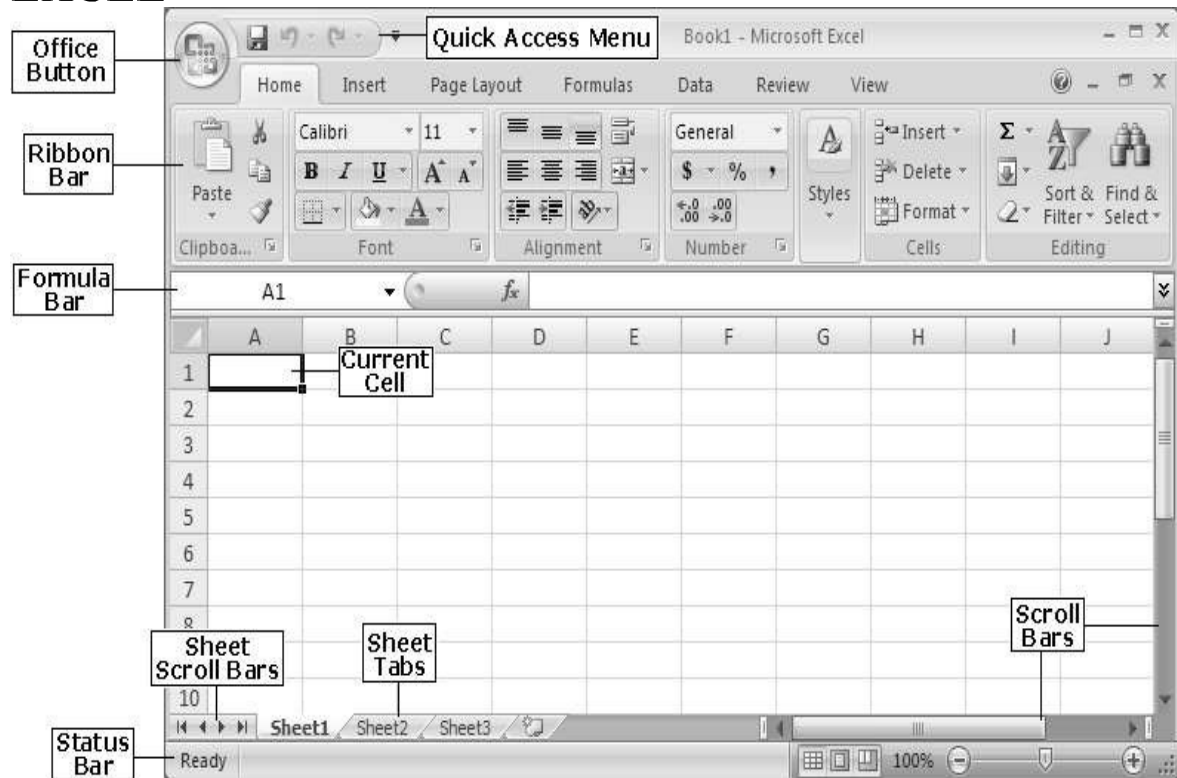
1. Click to place your insertion point the row or column you want to delete.
2. From the **Table** menu, trace to **Delete** and select one of the following (*Table*, *Columns*, *Rows*, or *Cells*).

Merging Cells

The merge cells command will combine multiple cells into one cell.

1. Select the cells you want to merge together.
2. From the **Table** menu, select **Merge Cells**.

EXCEL





End of the row

CTRL+right arrow key

End of the column

CTRL+down arrow key

Adding Worksheets, Rows, Columns, and Cells

Worksheets: Add a worksheet to a workbook by selecting **Insert > Worksheet** from the **Menu** bar.

Row: To add a row to a worksheet, select **Insert > Rows** from the **Menu** bar, or highlight the row by clicking on the **row** label, right-click with the mouse, and choose **Insert**.

Column: Add a column by selecting **Insert > Columns** from the **Menu** bar, or highlight the column by clicking on the **column** label, right-click with the mouse, and choose **Insert**.

Cells: Add a cell by selecting the cells where you want to insert the new cells, Click **Insert > Cells >** Click an option to shift the surrounding cells to the right or down to make room for the new cells.

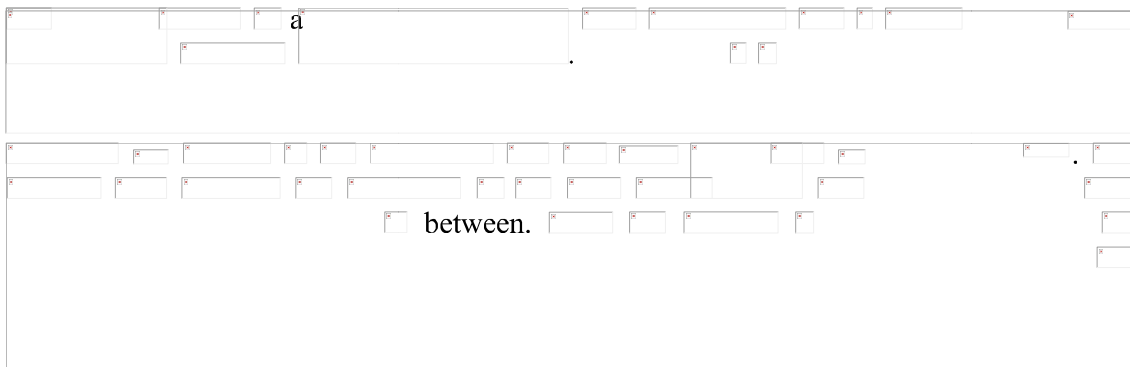
Deleting Rows, Columns, and Cells

Rows: select the row by clicking its number, Click **Edit > Delete**

Columns: select the column by clicking its letter, Click **Edit > Delete**

Cells: select the cells you want to delete, Click **Edit > Delete**

Formulas and Functions



=SQRT(D10) finds the square root of the value in cell D10

=TODAY() returns the current date (leave the parentheses empty)

Microsoft Excel - Book1

File Edit View Insert Format Tools Data Window Help

Arial 10 B I U

C7
$$=((C2*B2)+(C3*B3)+(C4*B4)+(C5*B5))$$

	A	B	C	D	E	F
1	Textbook	Quantity	Price			
2	Biology	4	\$ 99.95			
3	Chemistry	2	\$ 79.95			
4	Calculus	7	\$ 65.95			
5	English	12	\$ 49.95			
6						
7		Sub total	\$1,620.75			
8		Sales Tax	6%			
9		Total	\$1,718.00			
10						

Create Chart.

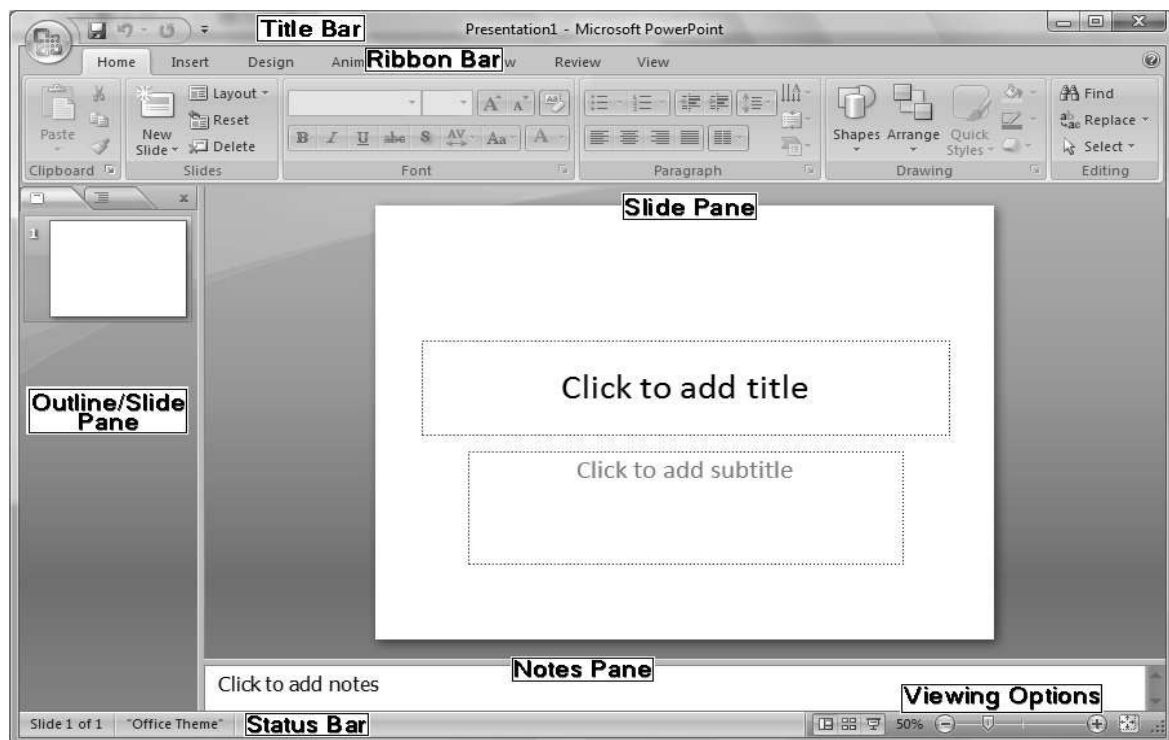
I FT OWE I T

PowerPoint is an extremely useful and a helpful tool for communication, expression, training and entertainment. PowerPoint till recently has been commonly used for corporate sales, marketing, finance, training presentations, and creating e-greeting cards. However, there are many other innovative and creative uses of PowerPoint that are evolving each day. The fact that the software is easy-to-use, familiar since ages now, and can be converted into more web

friendly and content safe formats, such as flash and PDF, makes it one of the most preferred tools globally. The ease with which one can create complex presentations using audio, video, animations and graphic makes it extremely user friendly.

Uses of PowerPoint in today's context:

1. E-Brochures
2. Storyboard Tool
3. E-direct Mailers for Product Promotions
4. Corporate Policies on the Intranet
5. E-recipes on Gourmet and Culinary portals
6. Orthopedic, Physiotherapy exercises and Yoga asana
7. Customer Education
8. Project Prototypes
9. Personal Portfolio
10. Online Photo Album



ADDING A NEW SLIDE:

☐ _____.

DELETING A SLIDE

- ☐ Make sure the slide to be deleted is currently displayed.
- ☐ Click on this button (located within the **Slides** section of the Home Ribbon)

1) INSERTING SHAPES

- INSERTING CLIPART
- STARTING A NEW PRESENTATION
 - a. Select New from the Office menu.
- CHANGING FONTS
- CHANGING FONTS SIZE
- CHANGING FILL COLORS

What is a Database?

A database is a collection of related data which represents some aspect of the real world. A database system is designed to be built and populated with data for a certain task.

What is DBMS?

[illegible]

Application of DBMS

1. Data job loss
2. Data irregularity
3. Data Sharing
- .4. Data Searching
5. Data Security
- .6. Data Concurrency
7. Data combination
8. Data Access
9. Decision making
10. Data Backup and Recovery
11. Data relocation
12. Data change
13. Low Maintenance Cost
14. Data Loss is almost eliminated
15. Data Atomicity

UNIT 5

What is a ‘Virus’?

A computer virus is a program or piece of code that operates by attaching itself to some other program or downloaded file. When this program starts, the virus code unintentionally runs, replicates itself and infects other programs or documents on the PC. A computer virus spreads mainly via e-mail attachments, downloadable files from the Internet or floppy disks. Virus infection can be prevented by installing (and maintaining) anti-virus software, among other strategies, some of which are outlined in this advice sheet. A computer virus can seriously damage or completely destroy files or software on a computer. The result is that files may be lost permanently, educational programs may not function correctly or the overall performance of a computer may be slowed down. The process involved in repairing the damage can be time consuming and expensive.

-
- **Types of Computer Viruses**
- A computer virus is one type of malware that inserts its virus code to multiply itself by altering the programs and applications. The computer gets infected through the replication of malicious code. Computer viruses come in different forms to infect the system in different ways. Some of the most common viruses are,
- Boot Sector Virus
- Direct Action Virus
- Resident Virus
- Multipartite Virus
- Polymorphic Virus
- Overwrite Virus
- Spacefiller Virus

Boot Sector Virus – This type of virus infects the master boot record and it is challenging and a complex task to remove this virus and often requires the system to be formatted. Mostly it spreads through removable media.

Direct Action Virus – This is also called non-resident virus, it gets installed or stays hidden in the computer memory. It stays attached to the specific type of files that it infect. It does not affect the user experience and system’s performance.

Resident Virus – Unlike direct action viruses, resident viruses get installed on the computer. It is difficult to identify the virus and it is even difficult to remove a resident virus.

Multipartite Virus – This type of virus spreads through multiple ways. It infects both the boot sector and executable files at the same time.

Polymorphic Virus – These type of viruses are difficult to identify with a traditional anti-virus program. This is because the polymorphic viruses alter its signature pattern whenever it replicates.

Overwrite Virus – This type of virus deletes all the files that it infects. The only possible mechanism to remove is to delete the infected files and the end-user has to lose all the contents in it. Identifying the overwrite virus is difficult as it spreads through emails.

Space filler Virus – This is also called “Cavity Viruses”. This is called so as they fill up the empty spaces between the code and hence does not cause any damage to the file

How do you know that your computer is infected by a virus?

- You notice strange files or programs on your computer.
- Music or other strange sounds start playing for no reason.

- Some important files and even programs vanish.
- Applications and programs that worked before suddenly don't.
- Your operating system doesn't open or shuts down unexpectedly and routinely.

How To Be Safe From Viruses And Worms

Do's

1. Use a professional, email service such as Runbox.
2. Make sure that your Runbox virus filter is activated.
3. Use the Webmail interface at www.runbox.com to read your email, or don't download all your email to an email client unseen.
4. Make sure your computer has updated anti-virus software running locally.
5. Disable message preview in your email client, especially on Windows platforms.
6. Ignore messages with attachments appearing to be sent from official email addresses..
7. Take carefulness when opening graphics and media attachments,
8. Maintain several independent email accounts.
9. If any valid message headers of a virus-email indicate what server the message was sent from, contact the service in question and file a formal complaint.

Don'ts

1. Do not open an email attachment unless you were expecting it and know whom it's from.
2. Do not open any unsolicited executable files, documents, spreadsheets, etc.
3. Avoid downloading executable or documents from the internet, as these are often used to spreadviruses.
4. Never open files with a double file extension, e.g. filename.txt.vbs.
5. Do not send or forward any files that you haven't virus-checked first.

Firewall

A **firewall** enacts the role of a security guard. There are of two types of firewalls: a software firewall and hardware firewall. Each serves similar, but different purposes. A firewall is the first step to provide security to the computer. It creates a barrier between the computer and any unauthorized program trying to come in through the Internet. If you are using a system at home, turn on the firewall permanently. It makes you aware if there are any unauthorized efforts to use your system.

Preventing Virus Infection

- Install antivirus software.
- Make sure updates are current: No more than one week old.
- Scan your system regularly.
- Don't install new programs without first notifying IT.
- Don't visit unauthorized Web sites.
- Don't open e-mail attachments.
- Don't use file-sharing software.
- Install a firewall on your workstation. (XP's firewall blocks intruders but doesn't block already install viruses from going out. Good software firewall: Zone Alarm has a free version)
- Keep your Windows XP system files up to date with all of the current security updates.
- Check with IT when error messages or warning windows pop up.

Purchasing Anti-Virus Software

Commercial Programs: Anti-virus software can be purchased on the Internet or from reputable software retailers.

How Does Anti-virus Software Work?

- It scans the computer for viruses and deletes infected files.
- It monitors all incoming files and deletes any viruses contained in these files.
- It places suspect files in quarantine.
- Updates to the software are produced by the program developers in order to address new viruses as they emerge. The software can be set to check for updates at regular intervals.

Famous Computer Viruses

1. CryptoLocker
2. ILOVEYOU
3. MyDoom
4. Storm Worm
5. Sasser & Netsky
6. Anna Kournikova
7. Slammer
8. Stuxnet

List of antivirus softwares

Avast Antivirus. Norton Antivirus. McAfee Antivirus. Eset Antivirus.
TrendMicro Antivirus. Bitdefender Antivirus. Webroot Antivirus.
Avira Antivirus

Multimedia

The word 'Multimedia' is a combination of two words, 'Multi' and 'Media'. Multi means many and media means material through which something can be transmitted or send. Multimedia combined all the media elements like text and graphics to make the information more effective and attractive. A Multimedia Application is an application which uses a collection of multiple media sources e.g. text, graphics, images, sound/audio, animation and/or video.

Examples of Multimedia Applications include:

- _ World Wide Web
- _ Multimedia Authoring, e.g. Adobe/Macromedia Director
- _ Hypermedia courseware
- _ Video-on-demand
- _ Interactive TV
- _ Computer Games
- _ Virtual reality
- _ Digital video editing and production systems
- _ Multimedia Database systems

Components of a Multimedia System

The various components of multimedia are **Text, Audio, Graphics, Video and Animation**. All these components work together to represent information in an effective and easy manner.

- 1) Text: Text is the most common medium of representing the information. In multimedia, text is mostly use for titles, headlines, menu etc. The most commonly used software for viewing text files are *Microsoft Word, Notepad, Wordpad etc. .*
- 2) Audio: In multimedia audio means related with recording, playing etc. Audio is an important component of multimedia because this component increase the understandability and improves the clarity of the concept. Audio includes speech, music etc.
- 3) Graphics: Every multimedia presentation is based on graphics. The used of graphics in multimedia makes the concept more effective and presentable.

4) Video: Video means moving pictures with sound. It is the best way to communicate with each other. In multimedia it is used to make the information more

5) Animation: In computer animation is used to make changes to the images so that the sequence of the images appears to be moving pictures

Application of multimedia

1) Multimedia in Education: Multimedia is becoming popular in the field of education. It is commonly used to prepare study material for the students and also provide them proper understanding of different subjects.

2) Multimedia in Entertainment: Computer graphics techniques are now commonly use in making movies and games.

i) Movies: Multimedia used in movies gives a special audio and video effect. Today multimedia has totally changed the art of making movies in the world.

ii) Games: Multimedia used in games by using computer graphics, animation, videos have changed the gaming experience. Presently, games provides fast action, 3-

3) Multimedia in Business: Today multimedia is used in every aspect of business

i) Videoconferencing: This system enables to communicate using audio and video between two different locations through their computers. When the information is sent across the world, this technology provides cost benefits to the business which saves their time, energy and money.

ii) Marketing and advertisement: Nowadays different advertisement and marketing ideas about any product on television and internet is possible with multimedia.

Hardware and Software required for a multimedia system:

Capture devices — Video Camera, Video Recorder, Audio Microphone, Keyboards, mice, graphics tablets, 3D input devices, tactile sensors, VR devices. Digitizing Hardware

Storage Devices — Hard disks, CD-ROMs, DVD-ROM, etc

Communication Networks — Local Networks, Intranets, Internet, Multimedia or other special high speed networks.

Computer Systems — Multimedia Desktop machines, Workstations, MPEG/VIDEO/DSP Hardware

Display Devices — CD-quality speakers, HDTV, SVGA, Hi-Res monitors, Color printers etc.

UNIT 6

A **computer network** is a set of connected computers. Computers on a network are called **nodes**. The connection between computers can be done via cabling, most commonly the Ethernet cable, or wirelessly through radio waves. Connected computers can share resources, like access to the Internet, printers, file servers, and others. A network is a multipurpose connection, which allows a single computer to do more.

- Facilitate communication via email, video conferencing, instant messaging, etc.
- Enable multiple users to share a single hardware device like a printer or scanner.
- Enable file sharing across the network.
- Allow for the sharing of software or operating programs on remote systems.
- Networks are used to make information easier to access and maintain among network users.

LAN (Local Area Networks)

local

Is a group of computers and associated devices that share a common communications line or wireless link and typically share the resources of a single processor or server within a small geographic area (for example, within an office building). Usually, the server has applications and data storage that are shared in common by multiple computer users. A area network may serve as few as two or three users (for example, in a home network) or many as thousands of users.

A local area network, that transmits over the air typically in an unlicensed frequency such as the network band. A local area network connects computers together using communication instead of radio waves.

MAN stands for Metropolitan Area Network. It is a network that connects computers and other devices over a large geographic area, such as a city or a metropolitan area. It is a type of network that is used to connect computers and other devices over a large geographic area, such as a city or a metropolitan area. It is a type of network that is used to connect computers and other devices over a large geographic area, such as a city or a metropolitan area.

Media: Devices can be connected by twisted-pair wire, coaxial cables, or fiber optic cables. Some WAN stands for Wide Area Network. It covers the large area than LAN as well as MAN such as: Country/Continent etc. WAN is expensive and should or might not be owned by one organization. PSTN or Satellite medium is used for wide area network.

BASIS OF COMPARISON	LAN	MAN	WAN
Expands to	Local Area Network	Metropolitan Area Network	Wide Area Network
Meaning	A network that connects a group of computers in a small geographical area.	It covers relatively large region such as cities, towns.	It spans large locality and connects countries together. Example Internet.
Ownership of Network	Private	Private or Public	Private or Public
Design and maintenance	Easy	Difficult	Difficult
Propagation Delay	Short	Moderate	Long

Speed	High	Moderate	Low
Fault Tolerance	More Tolerant	Less Tolerant	

Applications

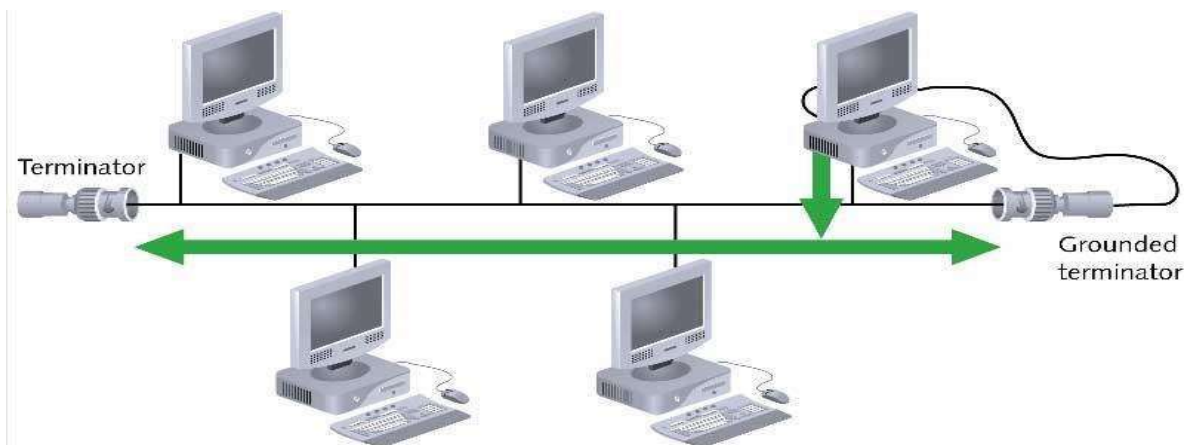
- Electronic Banking
- Electronic Bulletin Boards
- Teleconferencing
- Electronic Mail
- Online information services

- Telecommuting
- Internet

LANs Topology types

Bus

- Single cable connects all network nodes without intervening connectivity devices
-
- Difficult to troubleshoot, not fault-tolerant



n -I by : A Yadav

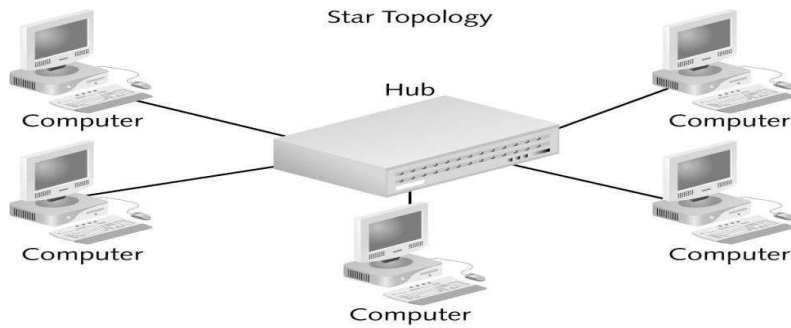


Figure 2-3 Star topology

Switches

traffic patterns and

network manager.

Switches are
install and
components that are

. This is a very efficient way

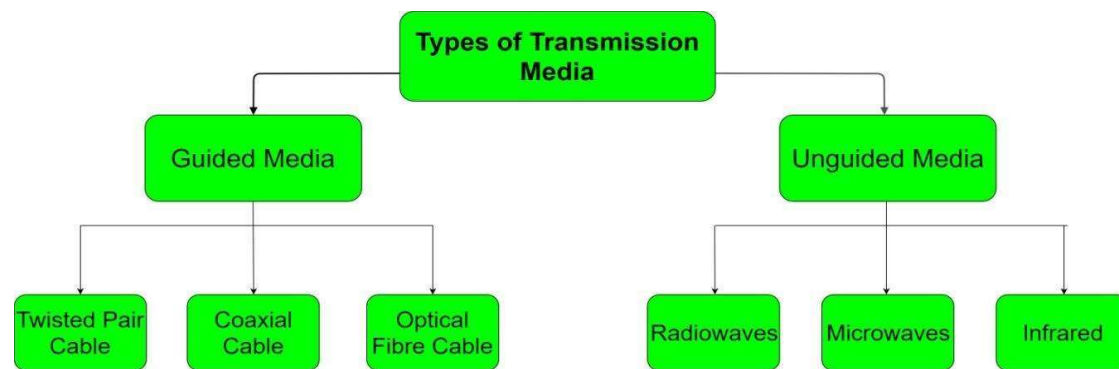
Most motherboards nowadays come with NIC's built into them, and most of the time they work well.

- The network interface card (NIC) provides the physical connection between the network and the computer workstation.
- Most NICs are internal with the card fitting into an expansion slot in the computer.

Modems

"modem"

In data communication terminology, a transmission medium is a physical path between the transmitter and the receiver i.e it is the channel through which data is sent from one place to another. Transmission Media is broadly classified into the following types



1

It is also referred to as Wired or Bounded transmission media. Signals being transmitted are directed and confined in a narrow pathway by using physical links.

Features:

- High Speed
- Secure

•

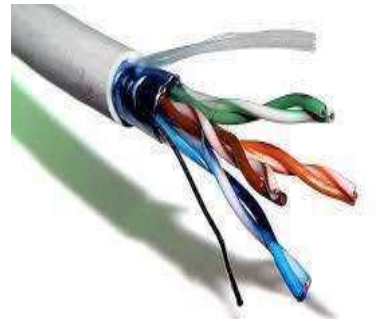
•
•
•

- Susceptible to external interference
- Lower capacity and performance in comparison to STP
- Short distance transmission due to attenuation

2. **Shielded Twisted Pair (STP):**

This type of cable consists of a special jacket to block external interference. It is used in fast-data-rate Ethernet and

- Better performance at a higher data rate in comparison to UTP
- Eliminates crosstalk



-

-
-
-

-
-
-
-

-

- Increased capacity and bandwidth
- Light weight
- Less signal attenuation
- Immunity to electromagnetic interference
- Resistance to corrosive materials

Disadvantages:

- Difficult to install and maintain

-
-
-

is

- Signal is broadcasted through air
- Less Secure

•

Network Operating system

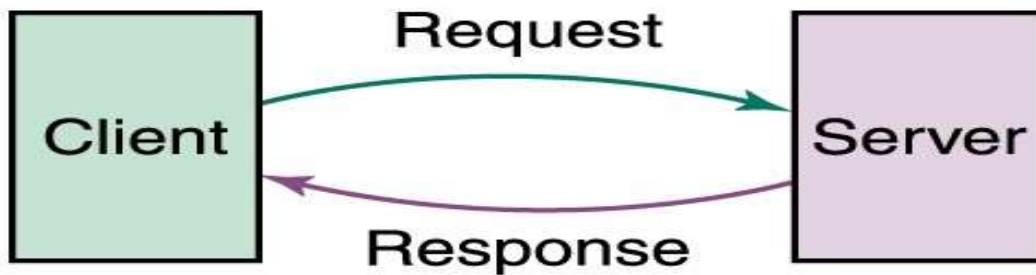
Network their functions over a number of networked to shared resources by a number of users

-

- Some systems are equipped with more than one processor, called multiprocessing systems.
- tasks in parallel by assigning each task to a
- server can perform in a given time is greatly
- - Management and monitoring tools
 - Security
 - Scalability
 - Robustness/fault tolerance

Client/server

Computer networks have opened up an entire frontier in the world of computing called the **client/server model**



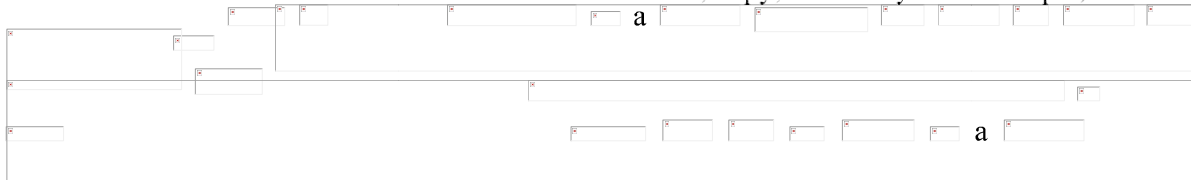
– Server

A very fast computer with a large amount of RAM and storage space along with a fast network interface card, the network operating system software resides on this computer

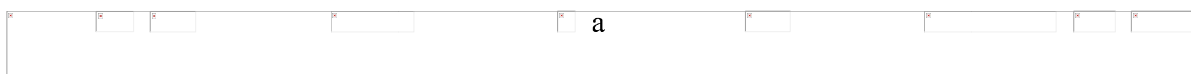
- ☐ A *server* is a process - not a machine!
- ☐ A server waits for a request from a client.
- ☐ A client is a process that sends a request to an existing server and waits for a reply.
- ☐ Server returns the time-of-day.
- ☐ Server returns a document.
- ☐ Server prints a file for client.
- ☐ Server does a disk read or writes.
- ☐ Server records a transaction

File and Printer Sharing Overview

File and printer sharing is the ability of a computer running Windows to share a folder or attached printer with other computers on a network. File sharing allows you to make files and folders in a shared folder accessible to others on the network to view, copy, or modify. For example, with file



Printer sharing allows you to make an attached printer available to other computer users on the network.



hosting. An ISP has the equipment and the telecommunication line access required to have a point-of-presence on the Internet for the geographic area served. The larger ISPs have their own high-speed leased lines so that they are less dependent on the telecommunication providers and can provide better service to their customers.



Internet hubs that distribute data to other locations, such as web

In order to connect to the

-
-
-

and

- Online gaming – games that allow people to play with and against each other over the Internet

-

10) News, of all kinds is available almost instantaneously. Commentary, on that news, from every conceivable viewpoint is also available.

Disadvantages:

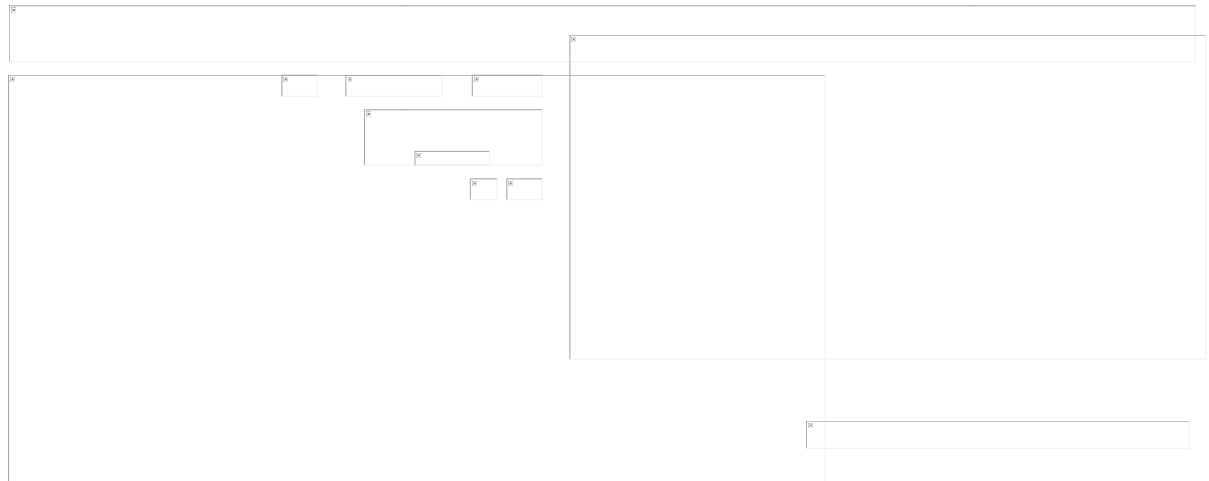
- 1) There is a lot of wrong information on the internet. Anyone can post anything, and much of it is garbage.
- 2) There are predators that hang out on the internet waiting to get unsuspecting people in dangerous situations.
- 3) Some people are getting addicted to the internet and thus causing problems with their interactions of friends and loved ones.
- 4) Pornography that can get in the hands of young children too easily.
- 5) Easy to waste a lot of time on the internet.
- 6) Internet has a lot of “cheater” sites. People can buy essays and pass them off as their own far more easily than they used to be able to do.
- 7) There are a lot of unscrupulous businesses that have sprung up on the internet to take advantage of people.
- 8) Hackers can create viruses that can get into your personal computer and ruin valuable data.
- 9) Hackers can use the internet for identity theft.

E-mail

Email, short for "electronic mail," is one of the most widely used features of the Internet, along with the web. It allows you to send and receive messages to and from anyone with an email address, anywhere in the world.

Email uses multiple protocols within the TCP/IP suite. For example, SMTP is used to send messages, while the POP or IMAP protocols are used to retrieve messages from a mail server. When you configure an email account, you must define your email address, password, and the mail servers used to send and receive messages. Fortunately, most webmail services configure your account automatically, so you only need to enter your email address and password. However, if you use an email client like Microsoft Outlook or Apple Mail, you may need to manually configure each account. Besides the email address and password, you may also have to enter the incoming and outgoing mail servers and enter the correct port numbers for each one.

What is World Wide Web?



1. Transmission Control Protocol (TCP): TCP is a popular communication protocol which is used for communicating over a network. It divides any message into series of packets that are sent from source to destination and there it gets reassembled at the destination.

2.

3.

4. Post office Protocol (POP): POP3 is designed for receiving incoming E-mails.

5. Simple mail transport Protocol (SMTP): SMTP is designed to send and distribute - Mail.

6.

7. Protocol

a in by : A Yada request. The server

Google.com has become the most widely used search engine on the internet. Other top engines include:

- Bing.com Baidu.com Yahoo.com Ask.com

Web Browsers

A web browser is a software program that allows a user to locate, access, and display web pages. In common usage, a web browser is usually shortened to "browser." Browsers are used primarily for displaying and accessing websites on the internet, as well as other content created using languages such as Hypertext Markup Language (HTML) and Extensible Markup Language (XML).

Mozilla Firefox Opera Web Browser Internet Explorer Netscape Browser
UC Browser

Internet Explorer After you find a computer with internet connection, first start the right program. On most computers this is Microsoft®Internet Explorer or Netscape®Navigator. For this Guide, we will use Internet Explorer.