

## What is Computer?

### DEFINITION NO 1:

Computer is an electronic device which takes some *input*, *process it*, and *produce output*.

### DEFINITION NO 2:

Electronic machine operating under the control of instructions stored in its own memory

- Accepts data
- Manipulates data
- Produces results
- Stores results



### PARTS OF COMPUTER:

According to above definition we can divide computer functionality in to three main parts

- Input
- Output
- Process



### INPUT

Input is any data or instructions entered to the computer. Input can be in the form of audio, video, graphics and animations and instructions. Instructions can be

- Programs
- Commands
- User response

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## **Programs**

Program tells a computer what to do and how to do? These are written instructions in some specific language

## **Commands**

Command causes a program to perform a specific action. Like Ctrl+S for saving an Ms.Word Document

## **User Response**

A user response is an action which is or can be done by answering any question from computer like You want to save that file? User have two options Yes or No, that is depend on the user what to response

## **PROCESS**

Computer data processing is any process that uses a computer program to enter data and summarize, analyze or otherwise convert data into usable information. The process may be automated and run on a computer. It involves recording, analyzing, sorting, summarizing, calculating, disseminating and storing data. Because data is most useful when well-presented and actually *informative*, data-processing systems are often referred to as information systems. In computer processing is done by CPU (Central Processing Unit)

## **OUTPUT**

Output is the data that has been processed in to useful form. The computer takes the input from user process it and produced output. Output also can be text, Audio, Video, graphics and animations. Output can be in two forms

- Soft Copy
- Hard Copy

### **Soft Copy:**

When you are writing a document, playing a game, watching a video clip, or reading the latest news. Soft copy is what you see on the monitor (Screen). Soft copy is temporary; after you have finished with it, there is nothing solid to hold. You can, however, transfer soft copy to a disk to transport it

### **Hard Copy:**

Hard copy can be touched and carried. Hard copy is usually some form of paper output. It is especially helpful if you need to have a colleague look at your work or you need to give your work to a supervisor or teacher.

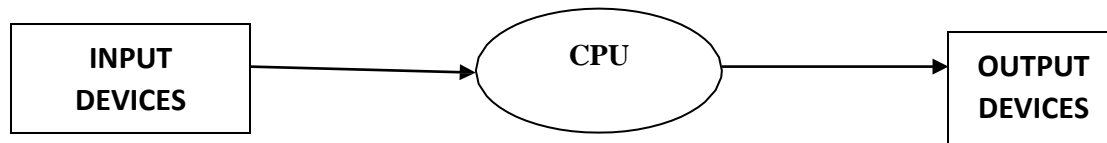
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## COMPONENTS OF COMPUTER

There are three main Components of computer.

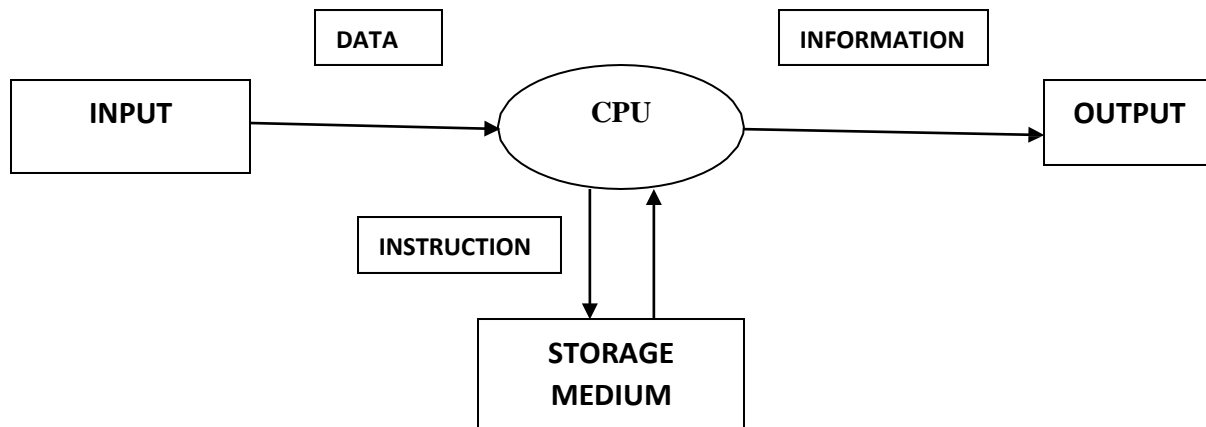
1. Input devices
2. CPU
3. Output Devices



## INFORMATION PROCESS CYCLE

Computer process data (input) into information (output). A Computer often holds data, information, and instruction in storage for future use.

The series of input, process, output and storage activities as the information process cycle.



## WHAT IS DATA?

**Definition:** –Raw facts, figures, events and transactions are called data||

**Example:**

- Researchers who conduct market research survey might ask member of the public to complete questionnaires about a product or a service. These completed questionnaires are data.

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- NADRA prepared CNIC of Pakistanis by collecting data of people who belongs to Pakistan.
- Some candidates want to take admission in university they will fill admission forms.

Above all are unprocessed and unprepared which is needed to process and work more.

## WHY WE NEED DATA

- Facts, statistics used for reference or analysis.
- Numbers, characters, symbols, images etc., which can be processed by a computer.
- Data must be interpreted, by a human or machine, to derive meaning
- "Data is a representation of information" \*

## WHAT IS INFORMATION?

### DEFINATION:

- -Meaning full data is called information ||
- -Processed data is called information ||

## WHY WE NEED INFORMATION

- Knowledge derived from study, experience (by the senses), or instruction.
- Communication of intelligence.
- "Information is any kind of knowledge that is exchangeable amongst people, about things, facts, concepts, etc., in some context."
- "Information is interpreted data"



# COMPONENTS OF COMPUTER

## INPUT DEVICES

### WHAT IS INPUT?

Input is any data or instructions entered to the computer. Input can be in the form of audio, video, graphics and animations and instructions

### WHAT ARE INPUT DEVICES?

Any *hardware component* used to enter data, programs, commands, and user responses into a computer

#### Examples

- Key Board
- Mouse
- Digital Camera
- Webcam
- Scanner etc



### WHAT IS HARDWARE?

The term *hardware* refers to the physical parts of the computer. Computer hardware is versatile- what it does depends on the computer program you use. All components which are tangible (touchable) are called Hardware

Examples: Mic, Keyboard, Hard Disk, Scanner, Printer etc

### WHAT IS SOFTWARE?

*Software* is the set of instructions (also called a program) that guides the hardware through its job. That tells the computer what to do? And how to do it? All components which are non tangible (Not Touchable) are called software.

Examples: Ms Office, Operating Systems, Adobe photo shop etc

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## 1) KEYBOARD

### Definition:

-Keyboard is an *input device*, that contain keys user press to enter data or instructions in to the computerl.

You enter most input data into the computer by using a keyboard. This input method is similar to typing on a typewriter.



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## KEYS OF KEYBOARD

Computer keyboards include keys that are designed to perform specific tasks. These keys enable the user to perform complex tasks easily when using the application. For example, many applications use a function key to access online help for the user.

Keyboard keys consist of

- Alphabetic keys
- Numerical keys
- Symbols
- Functional keys
- Extra keys

**Alphabetic keys** contain alphabets from A-Z & a-z

**Numerical keys** contain numbers 0-9

**Symbols keys** contain many symbols like !, @, #, \$, % etc

**Functional keys** contain f1-f12, design for special purpose will discuss latter.

**Extra keys** contain Esc, Alt, Ctrl, Backspace, Enter etc

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## 2) POINTING DEVICES

### **Definition:**

A pointing device is an *input device* which is used to control a pointer on a screen. Pointer is a small symbol on a screen.

A **pointing device** is an input interface (specifically a human interface device) that allows a user to input spatial (i.e., continuous and multi-dimensional) data to a computer. CAD systems and graphical user interfaces (GUI) allow the user to control and provide data to the computer using physical gestures — point, click, and drag — for example, by moving a hand-held mouse across the surface of the physical desktop and activating switches on the mouse. Movements of the pointing device are echoed on the screen by movements of the pointer (or cursor) and other visual changes.

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## MOUSE

### **Definition:**

-Mouse is an *input device* that fits under palm of hand and Controls movement of pointer, also called mouse

The mouse is a palm-size device with a ball built into the bottom. The mouse is usually connected to the computer by a cable (computer wires are frequently called cables) and may have from one to four buttons (but usually two). Mouse come in many shapes and sizes. When you move the mouse over a smooth surface, the ball rolls, and the pointer on the display screen moves in the same direction.



With the mouse, you can draw, select options from a menu, and modify or move text. You issue commands by pointing with the pointer and clicking a mouse button. In addition to minimizing typing errors, a mouse makes operating a microcomputer easier for beginning.

### TYPES OF MOUSE

There are three types of mouse

1. Mechanical mouse
2. Optical mouse
3. Wireless mouse



### **MECHANICAL MOUSE:**

The mouse that contains a metal or rubber ball on its under side. When the ball is rolled in any direction, sensors inside the mouse detect this motion and move the on-screen mouse pointer in the same direction (picture above).



### **OPTICAL MOUSE:**

An **optical mouse** uses a light-emitting (laser) to detect movement relative to the underlying surface.

### **WIRELESS MOUSE:**

Wireless mice usually work via radio frequencies commonly referred to as RF. RF wireless mice require two components to work properly a radio transmitter and a radio receiver.

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## JOY STICK

A joystick is a pointing device often used for playing games. The joystick has a gearshift-like lever that is used to move the pointer on the screen. On most joysticks, a button on the top is used to select options. In industry and manufacturing, joysticks are used to control robots. Flight simulators and other training simulators also use joysticks.



## TRACKBALL

A *trackball* is like an upside-down mouse. Used similarly to the mouse, the trackball is frequently attached to or built into the keyboard.

The main advantage of a trackball is that it requires less desk space than a mouse. (Some individuals in the computer industry believe that the mouse will soon be replaced by devices that do not require as much space to use.)

The mouse is not practical for people using a laptop computer in a small space. Early alternatives, such as trackballs clipped to the side of the keyboard, have not proved satisfactory. The IBM ThinkPad replaces the trackball with a red plastic button, called a *track point*, located in the middle of the keyboard. You move the button with your thumbs.



## TOUCHPAD

A touch pad is a device for pointing (controlling input positioning) on a computer display screen. It is an alternative to the mouse. Originally incorporated in laptop computers, touch pads are also being made for use with desktop computers. A touch pad works by sensing the user's finger movement and downward pressure.

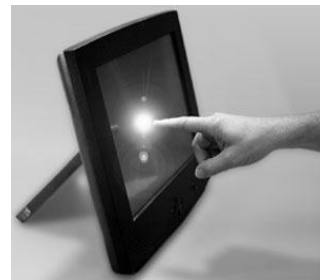
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## TOUCHSCREEN

A touch screen is a computer display screen that is also an input device. The screens are sensitive to pressure; a user interacts with the computer by touching pictures or words on the screen.



## DIGITAL PEN

A digital pen is a battery-operated writing instrument that allows the user to digitally capture a handwritten note or drawing. Typically, a digital pen comes with a Universal Serial Bus (USB) cradle to let the user upload the handwritten notes to a personal computer (PC).

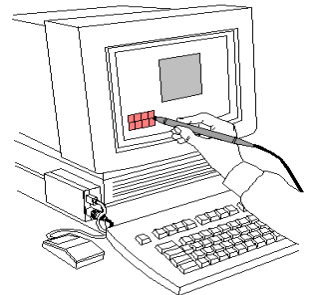
The pen looks like a regular ball-point pen and can be used as such, but requires special digital paper if the user wishes to digitally capture what he has written. A page of digital paper, which can be purchased in traditional pad or sticky-note size, has small dots on it that allow the pen to "see" what has been written.



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## LIGHT PEN

A light-sensitive stylus wired to a video terminal used to draw pictures or select menu options. The user brings the pen to the desired point on screen and presses the pen button to make contact. Contrary to what it looks like, the pen does not shine light onto the screen; rather, the screen beams into the pen. Screen pixels are constantly being refreshed. When the user presses the button, the pen senses light, and the pixel being illuminated at that instant identifies the screen location.



## 3) BIOMETRIC DEVICES

A "biometric device" is any device that measures a biological function or trait. It identifies persons seeking access to a computing system by determining their physical characteristics through fingerprints, voice recognition, retina patterns, pictures, weight, or other means.

4) MIC/ HEAD PHONE Both are input devices which are related to audio input. These devices are used to enter sound into the system for processing. It can be used in chatting, video conferencing, music or whenever we want to interact with the computer from voice input.



## 5) DIGITAL CAMERA

A digital camera can be used to take pictures. It can be hooked up to a computer to transfer the pictures from the camera to the computer. It uses light sensitive processing chips to capture pictures or images.

We can save these images wherever we want, such as on a CD, Computer disk, USB drive or can transfer from one computer to another computer or device.



## 6) DIGITAL SCANNER

A scanner is used to copy pictures or other things and save them as files on the computer. A scanner is similar to a photocopier, except that instead of producing a paper copy of the document you place on it, you get an electronic copy which appears on your computer screen. This is a very important input device used to convert a hardcopy file (printed paper) to a softcopy (image or display file).



# COMPONENTS OF COMPUTER

## OUTPUT DEVICES

### WHAT IS OUTPUT?

An output is the data that has been processed in that form which is useful by user or machine for future processing. Output can be in two forms Soft Copy and Hard Copy. (Describe further)

### WHAT ARE OUTPUT DEVICES?

Any *hardware component* used to show results after processing to any user and it use to send the results of processing to the user. Output can be text, Audio, Video & graphics.

#### Examples

- Monitor
- Printer
- Plotter
- Projectors
- Speakers
- Headphone etc



### MONITOR/DISPLAY DEVICES

#### Definition:

-Monitor or display devices are used to get output on screen. It is like small television and available in different sizes and specifications. The text which is displayed on screen is called softcopy (as defined above)l

#### TYPES OF MONITOR

There are majorly two type of monitor according to its specification. These are

- Monochrome monitor
- Color monitor

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## MONOCHROME MONITOR

Monochrome monitor is based on a single color that can be white, blue, black or gray etc. these type of monitors is same like the old mobile phones which have a single color in back ground with black text in display. That is very much useful in these devices where we need simple display. Like some ATM machines, mobile phones, specific digital devices like PDA, pagers etc

## COLOR MONITOR

Color monitor is such monitor which is based on colors as its name implies. Today mostly monitor are based on color display rather it is flat panel or tube based monitors. The basic colors in that monitors are three which are RGB stands for Red, Blue, Green by these basic colors a monitor can generate many other colors by the combination of these basic colors.

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## 2. PRINTERS

The second most common form of computer output is printed documents. Although a computer can operate perfectly without a printer, it is certainly helpful to the user to have one. People often prefer to get printouts of the work they have done rather than to look at it on the screen it is considered a form of hard copy.

### Types:

Printer has majorly two types.

- Impact printers
- Non impact printers



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## 3. PLOTTERS

A plotter, like a printer, produces hard-copy output. Plotters, which produce high-quality color graphics, are usually categorized by whether they use pens or electrostatic charges to create images. A continuous-curve plotter is used to draw maps from stored data. Computer-generated maps can be retrieved and plotted or used to show changes over time. Plotters are generally more expensive than printers, ranging from about 100,000 to \$750,000 (or even more).



## 4. SPEAKERS/ HEADPHONE



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Speakers and headset is used to get audio output. A system's speaker is the component that takes the electronic signal stored on things like CDs, tapes and DVDs and turns it back into actual sound that we can hear. In any sound system, ultimate quality depends on the speakers. The best recording, encoded on the most advanced storage device and played by a top-of-the-line deck and amplifier, will sound awful if the system is hooked up to poor speakers.

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## MULTIMEDIA/PROJECTORS

A **Digital Projector/Multimedia** is an electro-optical machine which converts image data from a computer or video source to a bright image which is then imaged on a distant wall or screen using a lens system. The cost of a device is not only determined by its resolution, but also by its brightness. The projector serves the following purposes:

- Visualization of data stored in a computer for presentations
- Demonstration of program products for a large number of prospective customers
- The projector replaces the white board as well as written documents.
- Watching moving images from a video tape player or digital video disk player.
- Digital projectors may also be built into cabinets which use a rear projection screen to form a single unified display device, now popular for "home theater" applications.

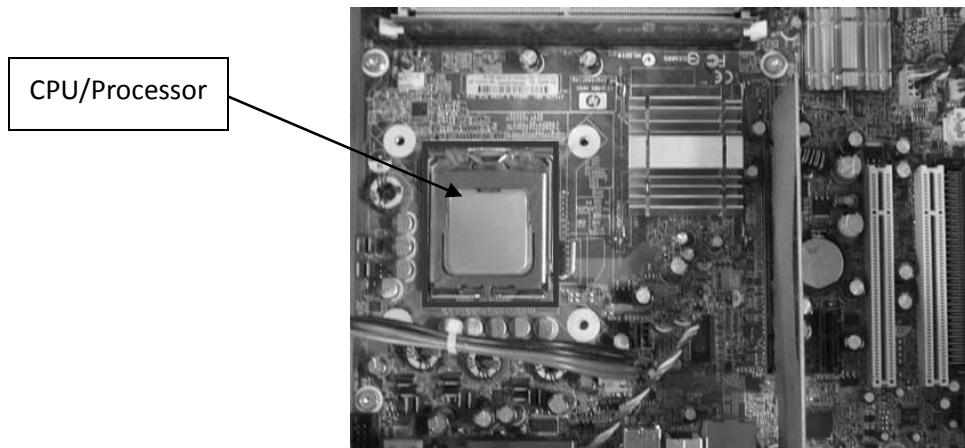


## CENTRAL PROCESSING UNIT

The CPU stands for Central Processing Unit, is the part of a computer system that is commonly referred to as the "brains" of a computer. The CPU is also known as the -processor or -microprocessor.

The CPU is responsible for executing a sequence of stored instructions called a *program*. The programs tells a computer what to do and how to do? This program will take *inputs* from an input device, process the input in some way and *output* the results to an *output device*.



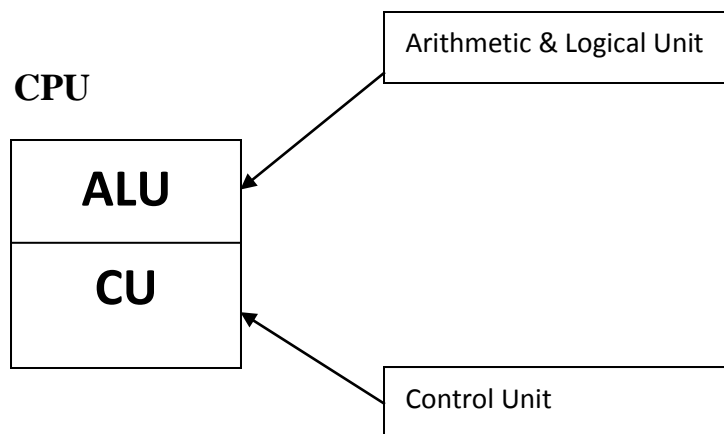


CPUs aren't only found in desktop or laptop computers, many electronic devices now rely on them for their operation. Mobile phones, *DVD* players and washing machines are examples of equipment that have a CPU. CPU is located in motherboard. The speed of processing of CPU is about 500 MHz to 2.5 GHz.

## PARTS OF CPU

CPU is subdivided in to three parts defined below:

1. ALU
2. CU
3. Register





## **ARITHMETIC & LOGICAL UNIT**

ALU stands for –Arithmetic and Logical unit. This unit of the CPU is capable of performing arithmetic and logical operations. This unit of the CPU gets data from the computer memory and perform arithmetic and logical operations on it.

ALU is further divided in to two parts, Arithmetic unit & Logical unit.

### **ARITHMETIC UNIT:**

The arithmetic unit of ALU performs arithmetic operations like addition, multiplication, subtraction and division.

### **LOGICAL UNIT:**

The Logical unit of ALU performs logical operations such as comparison of two numbers. It tells us which number is greater and which is smaller. The common comparisons such as less than, equal to, or greater than are performed by the logical unit.

### **REGISTERS:**

A processor has its own memory inside it in the shape of small cells. Each memory cell is called a "Register". Registers are used to carry data temporarily for performing operations. There are total 13 registers in a processor. ALU gets data from registers and stores it in registers to perform arithmetic and logical operations. And data comes in registers from main memory of the computer.

### **1) CONTROL UNIT**

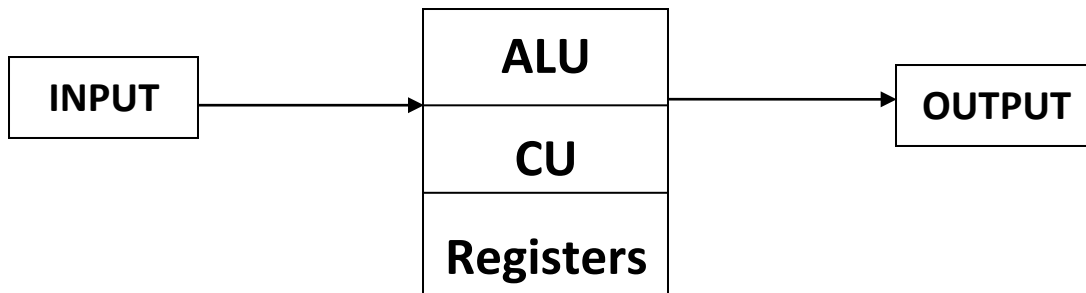
This unit of the processor controls all the activities of the processor and also controls the input and output devices of the computer. It acts just like a police inspector who controls the traffic on a road.

The control unit controls the whole traffic of the computer. It tells the input device that it is now his turn to feed data in the computer and show result of data after execution on the output units. This unit also controls the flow of instructions, which are given to a computer.

It obtains instructions from the program stored in main memory, interprets (translation of instructions into computer language) the instructions, and issues signals that cause other units of the computer to execute them



## WORKING COLLECTING



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## PRIMARY MEMORY

The primary memory or the main memory is part of the main computer system. The processor or the CPU directly stores and retrieves information from it. This memory is accessed by CPU, in random fashion. That means any location of this memory can be accessed by the CPU to either read information from it, or to store information in it.

There are two types of memory CPU

1. RAM
2. ROM

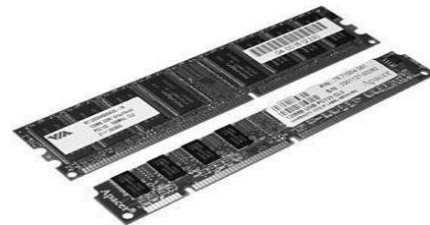
## RANDOM ACCESS MEMORY (RAM)

RAM is used to store programs and data that are being used by the computer. When the computer is turned on the RAM is empty. Data and programs can be put into RAM from either an input device or backing store.

The data in RAM is lost when the computer is turned off so it is known as **Volatile Memory**. To keep data the user must save it to backing store before computer is turned off.

RAM is further divided in to two types

- DRAM (Dynamic Random access Memory)
- SRAM (Static Random access Memory)



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## DRAM

DRAM stands for Dynamic RAM. A type of physical memory used in most personal computers. The term *dynamic* indicates that the memory must be constantly *refreshed* (reenergized) or it will lose its contents. RAM is sometimes referred to as *DRAM* (pronounced *dee-ram*) to distinguish it from *static RAM* (*SRAM*). Static RAM is faster and **less volatile** than dynamic RAM, but it requires more power and is more expensive.

## SRAM

SRAM stands for Static RAM. Short for *static random access memory*, and pronounced *ess-ram*. SRAM is a type of memory that is faster and more reliable than the more common DRAM (dynamic RAM). The term *static* is derived from the fact that it doesn't need to be refreshed like dynamic RAM

## READ ONLY MEMORY (ROM)

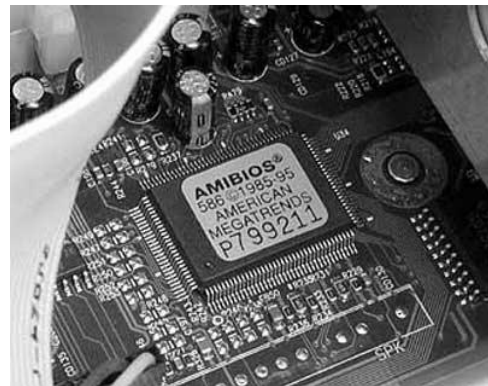
The contents of ROM are permanent. It cannot be altered by the user. The content is written onto the ROM when it is first made. ROM keeps its contents even when the computer is turned off and so is known as **Non-Volatile Memory**.

On some computers a special piece of software called the operating system is stored in ROM. ROM is also often used in embedded systems where a small built-in computer is used to control a device such as a washing machine. The program that controls the machine is stored on ROM.

## TYPES OF ROM

ROM is further divided in to three types

- PROM (Programmable Read-Only Memory)
- EPROM (Erasable Programmable Read-Only Memory)
- EEPROM (Electrically Erasable Programmable Read-Only Memory)



## PROM

PROMs are manufactured as blank chips on which data can be written with a special device called a PROM programmer.

## EPROM

A rewritable memory chip that holds its content without power. EPROM chips are written on an external programming device before being placed on the mother board.

### EEPROM

A rewritable memory chip that holds its content without power. EEPROMs are typically used on circuit boards to store small amounts of instructions and data.

## GENERATIONS OF COMPUTER

The history of computer development is often referred to in reference to the different generations of computing devices. A generation refers to the state of improvement in the product development process. This term is also used in the different advancements of new computer technology. With each new generation, the circuitry has gotten smaller and more advanced than the previous generation before it.

As a result of the miniaturization, speed, power, and computer memory has proportionally increased. New discoveries are constantly being developed that affect the way we live, work and play.

Each generation of computers is characterized by major technological development that fundamentally changed the way computers operate, resulting in increasingly smaller, cheaper, and more powerful and more efficient and reliable devices.

Read about each generation and the developments that led to the current devices that we use today. The generations which are divided in to fifth categories can be describe as:

<b>Generations</b>	<b>Period</b>	<b>Technology</b>
First Generation	1942-1955	Vacuums Tube
Second Generation	1955-1964	Transistors
Third Generation	1964-1975	Integrated Circuits (ICs)
Forth Generation	Since 1975	Microprocessor/Large Scale Integration
Fifth Generation	Since 1980	Artificial Intelligence

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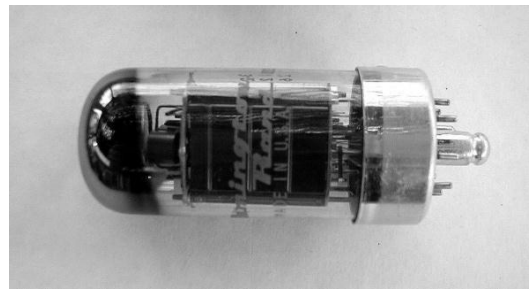
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## **FIRST GENERATION (1942 - 1955)**

The first computers used **vacuum tubes** for circuitry and magnetic drums for memory, and were often enormous, taking up entire rooms. First generation computers relied on machine language to perform operations, and they could only solve one problem at a time.

The Mark-I, EDSAC, EDVAC, UNIVAC-I and ENIAC computers are examples of first-generation computing devices. It was very expensive to operate and in addition to using a great deal of electricity, generated a lot of heat, which was often the cause of malfunctions.

Vacuum tubes used to calculate and store information, these computers were also very hard to maintain. First generation computers also used punched cards to store symbolic programming languages. Most people were indirectly affected by this first generation of computing machines and knew little of their existence.



## **IMPORTANT MACHINES:**

Mark-I, EDSAC, EDVAC, UNIVAC-I and ENIAC

## **ADVANTAGES:**

1. After long history of computations, the 1G computers are able to process any tasks in milliseconds.
2. The hardware designs are functioned and programmed by machine languages (Languages close to machine understanding).
3. Vacuum tube technology is very much important which opened the gates of digital world communication.

## **DISADVANTAGES:**

1. Size of that machines are very big
2. Required large amount of energy for processing

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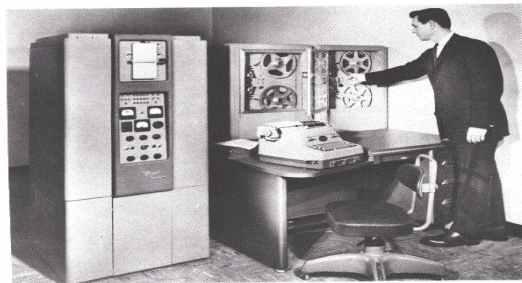
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3. Very expensive
4. Heat generated and need air conditioning.
5. Not portable ( never take from one place to other)
6. Comparing with 5G computers, these computers are slow in speed.
7. Not reliable
8. In order to get proper processing, maintenance is required continuously.

## SECOND GENERATION (1942 - 1955)

Transistors replaced vacuum tubes and ushered in the second generation computer. **Transistor** is a device composed of semiconductor material that amplifies a signal or opens or closes a circuit. Invented in 1947 at Bell Labs, transistors have become the key ingredient of all digital circuits, including computers. Today's latest microprocessor contains tens of millions of microscopic transistors.

Prior to the invention of transistors, digital circuits were composed of vacuum tubes, which had many disadvantages. They were much larger, required more energy, dissipated more heat, and were more prone to failures. It's safe to say that without the invention of transistors, computing as we know it today would not be possible.



The transistor was invented in 1947 but did not see widespread use in computers until the late 50s. The transistor was far superior to the vacuum tube, allowing computers to become smaller, faster, cheaper, more energy-efficient and more reliable than their first-generation predecessors. Though the transistor still generated a great deal of heat that subjected the computer to damage, it was a vast improvement over the vacuum tube. Second-generation computers still relied on punched cards for input and printouts for output.

Second-generation computers moved from cryptic binary machine language to symbolic, or assembly, languages, which allowed programmers to specify instructions in words. High-level programming languages were also being developed at this time, such as early versions of COBOL and FORTRAN. These were also the first computers that stored their instructions in

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their memory, which moved from a magnetic drum to magnetic core technology. The first computers of this generation were developed for the atomic energy industry.

## **IMPORTANT MACHINES:**

IBM 7074 series, CDC 164, IBM 1400 Series.

## **ADVANTAGES:**

1. If we compare it with G1 computer, less expensive and smaller in size.
2. Fast in speed
3. Less head generated as G1 computers generate more.
4. Need low power consumption
5. Language after machine language for programming, in G2 assembly language (COBOL, FORTRON) is introduced for programming.
6. Portable.

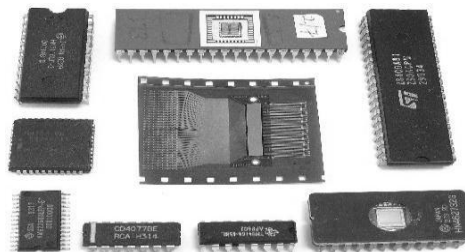
## **DISADVANTAGES:**

1. Maintenance of machine is required.
2. Air conditioning required still as heat causes to process slowly.
3. These computers are not used as personal system.
4. Preferably used for commercial purposes

## **THIRD GENERATION (1964 - 1975)**

The development of the **Integrated Circuit** was the hallmark of the third generation of computers. Transistors were miniaturized and placed on silicon chips, called semiconductors, which drastically increased the speed and efficiency of computers.

Instead of punched cards and printouts, users interacted with third generation computers through keyboards and monitors and interfaced with an operating system, which allowed the device to run many different applications at one time with a central program that monitored the memory. Computers for the first time became accessible to a mass audience because they were smaller and cheaper than their predecessors.





## IMPORTANT MACHINES:

IBM System/360 & IBM 370, PDP-8, DEC, UNIVAC 1108, UNIVAC 9000.

## ADVANTAGES:

1. Smaller in size
2. Low cost then previous
3. Low power consumption
4. Easy to operate
5. Portable
6. Input devices introduced and that make user easy to interact with it like keyboard, mouse etc
7. External Storage medium introduced like floppy & tape.

## DISADVANTAGES:

1. IC chips are still difficult to maintain
2. Need complex technology.

## FOURTH GENERATION (1975 ONWARDS)

The **Microprocessor** brought the fourth generation of computers, as thousands of integrated circuits were built onto a single silicon chip. What in the first generation filled an entire room could now fit in the palm of the hand.

The Intel 4004 chip, developed in 1971, located all the components of the computer—from the central processing unit and memory to input/output controls—on a single chip.

In 1981 IBM introduced its first computer for the home user, and in 1984 Apple introduced the Macintosh. Microprocessors also moved out of the realm of desktop computers

and into many areas of life as more and more everyday products began to use microprocessors.

As these small computers became more powerful, they could be linked together to form networks, which eventually led to the development of the Internet. Fourth generation computers also saw the development of GUIs, the mouse and handheld devices.



## **IMPORTANT MACHINES:**

Intel processors, AMD processor based machines

## **ADVANTAGES:**

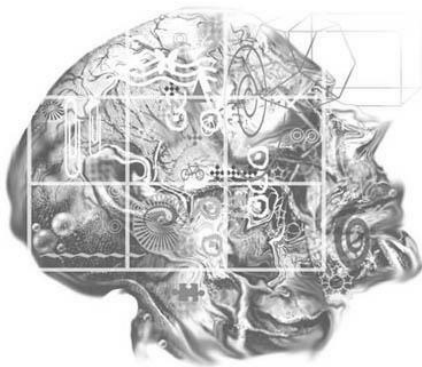
1. Smaller in size
2. High processing speed
3. Very reliable
4. For general purpose
5. More external storage mediums are introduced like CD-ROM, DVD-ROM.
6. GUIs developed for interaction

## **FIFTH GENERATION (1980 ONWARDS)**

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

The use of parallel processing and superconductors is helping to make artificial intelligence a reality. Quantum computation and molecular and nanotechnology will radically change the face of computers in years to come.

The goal of fifth-generation computing is to develop devices that respond to natural language input and are capable of learning and self-organization.





## **IMPORTANT MACHINES:**

ULAIC Technology, Artificial intelligence etc

## **PROPERTIES**

1. Program independent
2. Have thinking and analysis by its own
3. Voice reorganization & biometric devices
4. Self organization and learning

## **TYPES OF COMPUTER**

The computer sitting on the desk in your classroom is a microcomputer. It is a small, powerful piece of equipment. Even so, the power of the microcomputer is not enough for most large organizations. The computer industry consists of more than just microcomputers.

Any classification of computers is somewhat arbitrary. Computer can be classified it to following basis defined below.

- On the basis of functionality
- On the basis of Size, Speed and Cost.

### **ON THE BASIS OF FUNCTIONALITY:**

According to functionality computer can be divided in to three types:

1. Analog
2. Digital
3. Hybrid

### **ANALOG COMPUTERS:**

#### **DEFINITION:**

- -An analog (spelled analogue in British English) computer is a form of computer that uses the **continuously-changeable** aspects of physical fact such as electrical, mechanical, or hydraulic quantities to model the problem being solved.||
- Analog means **continuity** of associated quantity just like an analog clock measures time by means of the distance traveled by the hand of the clock around a dial.

# Introduction to Computers & its applications

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## HISTORY:

Mechanical analog computers were very important in gun fire control in World War II and the Korean War; they were made in significant numbers. In particular, development of transistors made electronic analog computers practical, and before digital computers had developed sufficiently, they were commonly used in science and industry.



## EXAMPLES:

- Thermometer
- Analog clock
- Speedometer
- Tire pressure gauge

## ADVANTAGES:

- Analog computer has come to refer to
  - devices and media that represent
  - Store images
  - Sound, motion pictures, etc.

## DISADVANTAGES:

- Analog computers can have a very wide range of complexity.
- Slide rules and monographs are the simplest, while naval gun fire control computers and large hybrid digital/analogue computers were among the most complicated.
- Very complicated for containing output for the users some time.

## DIGITAL COMPUTERS:

### DEFINITION:

- -A computer that performs calculations and logical operations with quantities represented as digits, usually in the binary number system of 0 and 1.
- -Computer capable of solving problems by processing information expressed in discrete form. By manipulating combinations of binary digits ("0", "1"), it can perform mathematical calculations, organize and analyze data, control industrial and other processes, and simulate dynamic systems such as global weather patterns. ||

# Introduction to Computers & its applications

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## **HISTORY:**

In 1937 at Bell Labs, George Stibitz invented the first calculator based on binary circuits to perform complex mathematical formulas.

Steinitz's invention transformed computer science from analog to digital. With the advent of digital technology, scientists could customize a computer's operating functions by developing programming languages.

## **EXAMPLES:**

- IBM PC
- Apple Macintosh
- Calculators
- Digital watches etc

## **HYBRID COMPUTERS:**

### **DEFINITION:**

- -A computer that processes both analog and digital data.
- -Hybrid computer is a digital computer that accepts analog signals, converts them to digital and processes them in digital form

A hybrid computer may use or produce analog data or digital data. It accepts a continuously varying input, which is then converted into a set of discrete values for digital processing.

### **Examples:**

- Hybrid computer is the computer used in hospitals to measure the heartbeat of the patient.
- Devices used in petrol pump.
- Hybrid Machines are generally used in scientific applications or in controlling industrial processes.



## **ON THE BASIS OF SIZE, SPEED AND COST:**

We can divide computers on the basis of size cost and speed as:

- Super Computer
- Mainframe Computer
- Mini Computer
- Micro Computer
- Personal Computer

# Introduction to Computers & its applications

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- Desktop computers
- Laptop /Note Books
- Mobile Computer & Devices
  - PDA
  - Tablet PC
  - Hand Held Computer
  - Laptop/Note Books

## SUPER COMPUTER

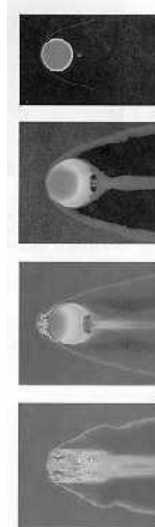
Supercomputers are the largest, fastest, most powerful, and most expensive computers made. Like other large systems, supercomputers can be accessed by many individuals at the same time. Supercomputers are used primarily for scientific applications that are mathematically intensive. The first supercomputer was built in the 1960s for the United States Department of Defense.

This computer was designed to be the world's fastest and most powerful computer of that time. The commitment to create the fastest, most powerful computer in the world is still the driving force behind the development of supercomputers. Manufacturers produce relatively few of any one model of supercomputer, and they spend millions of dollars on research and development of new machines.

Supercomputers derive much of their speed from the use of multiple processors. **Multiprocessing** enables the computers to perform tasks simultaneously--either assigning different tasks to each processing unit or dividing a complex task among several processing units.

### **EXAMPLE:**

- Cray-1
- Cray-2
- Control Data Cyber 205
- ETA



# Introduction to Computers & its applications

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## FEATURES:

- The aerospace, automotive, chemical, electronics and petroleum industries use supercomputers extensively.
- Supercomputers are used in weather forecasting and seismic analysis. They are found in many public and private research centers, such as universities and government laboratories.
- A supercomputer was used to alert scientists to the impending collision of a comet with Jupiter in 1994, giving them time to prepare to observe and record the event.
- The ultra supercomputer will simulate nuclear explosions (eliminating the need to detonate any bombs), model global weather trends, and design power plants.
- Supercomputers can perform at up to 128 gigaflops, and use bus widths of 32 or 64 bits. This capability makes supercomputers suitable for processor-intensive applications, such as graphics.

## Note:

The speed of modern supercomputers is measured in nanoseconds and gigaflop. A **nanosecond** is one billionth of a second. A **gigaflop** is one billion floating-point arithmetic operations per second.

## MAINFRAME COMPUTER

Mainframe computers are the most powerful computers. A mainframe computer may contain several microprocessors. A single mainframe computer can be used by hundreds of people at once.

Each user has his own **terminal** that is connected to the mainframe. Mainframe computers are usually kept in a special cooled, clean computer room. Minicomputers are medium-sized computers which are more powerful than microcomputers but not as powerful as mainframes.

A mainframe computer system is usually composed of several computers in addition to the mainframe, or host processor.

## Host Processor:

The host processor is responsible for controlling the other processors, all the peripheral devices, and the mathematics operations.

## Front End processor:

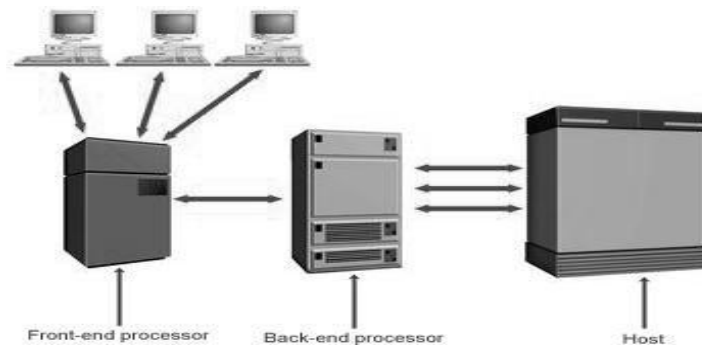
# Introduction to Computers & its applications

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A front-end processor is responsible for handling communications to and from all the remote terminals connected to the computer system.

## Back end Processor:

Sometimes a **back-end processor** is used to handle data retrieval operations. Although the host computer could perform all these operations, it can be used more efficiently if relieved of time-consuming chores that do not require processing speed.



## FEATURES:

- Mainframe computer systems are powerful enough to support several hundred users simultaneously at remote terminals.
- Mainframe Computers are so much faster than people, the users never notice that the computer is handling other tasks.
- This capability to process many programs concurrently for multiple users is known as multiprogramming.
- The typical mainframe computer occupies much of a large room.
- Like supercomputers, mainframes require an environment with closely monitored humidity and temperature.
- Mainframe computers are priced between \$100,000 and \$2,000,000.

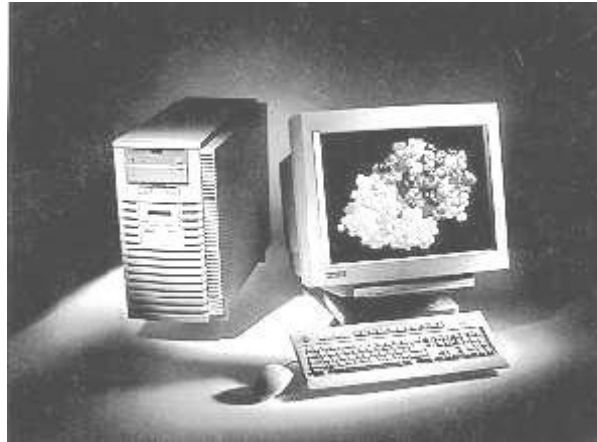
## EXAMPLE:

- IBM S/390
- Amdahl 580

- Control Data Cyber 176

## MINI COMPUTER

The "age of the mini" started in the late 1960s. The creation of integrated circuits suitable for computers enabled designers to shrink the size of the computer. Minicomputers are frequently referred to as **mid-range computers**.



Before Digital Equipment Corporation (DEC) released the first DEC PDP-8 **minicomputer** in 1968, most medium-sized organizations were priced out of the computer market because they couldn't afford mainframe computers.

### *FEACTURES:*

- Like mainframes, most minicomputers are multiuser systems.
- Many of today's minicomputers can accommodate as many as 200 users working from individual terminals.
- Mini computers are a little slower than mainframe.
- Like mainframes, minicomputers can accommodate remote users, but not as many.
- Minicomputers' input, output, and storage devices look like those on mainframes.
- Minicomputers have slightly less storage, and the printers are slightly slower.

### **EXAMPLE:**

- IBM AS/400
- IBM SYSTEM 360
- HP 3000

## MICROCOMPUTER

When you are working on a multiuser computer, such as a mainframe or minicomputer, you can control the input and see the output on the display, but you control nothing else.

A single-user computer gives you control over all the phases of computer processing: input, processing, output, and storage. You can select the programs you want to use, and you don't have to compete with other users to gain access to the system. A single-user system is designed to meet the computing needs of an individual.

Single-user computers fall into two categories:

- Workstations
- Microcomputers.

### WORKSTATION:

A **workstation** is a powerful desktop computer designed to meet the computing needs of engineers, architects, and other professionals who need detailed graphics displays. The workstation has sometimes been called a "*super micro*." The workstation looks very much like a desktop microcomputer, but the chips inside make the difference

For example, workstations are commonly used for **computer-aided design (CAD)**, in which industrial designers create pictures of technical parts or assemblies. To process these complex and detailed diagrams, the computer needs great processing power and much storage.

### **FEATURES:**

- *Workstations are small, powerful systems designed to drive networks of less powerful microcomputers and to create high-quality graphics.*
- *Workstations typically cost \$5,000 to \$20,000.*
- *Major competitors in this market include DEC, Hewlett-Packard, Sun, and Silicon Graphics, Inc.*

### MICROCOMPUTERS:

It is difficult to overstate the impact of the microcomputer on the computer industry. In 1975, the microcomputer did not exist. In 1995, sales exceeded \$116 billion. Microcomputers are the fastest growing segment of the computer industry.

The microcomputer segment of the industry is complex; there are different types of microcomputer platforms with varying capabilities. The most common type of microcomputer is a **desktop computer**, which is a non portable **personal computer** that fits on top of a desk.



# Introduction to Computers & its applications

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Microcomputers are the smallest and cheapest of these and are used at home, in schools and in some businesses. Mainframe computers are the most powerful computers



This table makes some comparisons between the different types of computer:

Comparison	Microcomputer	Minicomputer	Mainframe
Where Used	Home, small business, on a network in a larger business.	Medium sized business. e.g. supermarket, traffic control system.	Large businesses, universities.
Number of Users	1	1 - 20	Hundreds
Cost	30,000 – 200,000 Rs	25,000-100,00 Rs	Rs 2,000,000+

## LAPTOP /NOTE BOOK COMPUTER:

**DEFINATION:**—A laptop is a personal computer designed for mobile use, small and light enough to sit on a person's lap while in use.¶

- *“A portable computer typically weighing less than 6 pounds (3 kilograms) that has a flat-panel display and miniature hard disk drives, and is powered by rechargeable batteries.”*

*Laptops are capable of many of the same tasks that desktop computers perform, although they are typically less powerful. Laptops contain components that are similar to those in their*

# Introduction to Computers & its applications

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*desktop counterparts and perform the same functions but are miniaturized and optimized for mobile use and efficient power consumption. Laptops usually have LCD displays.*

*Laptops generally cost around twice as much as a desktop machine of similar specification. Performance is always lower than that of a comparable desktop because of the compromises necessary to keep weight and power consumption low.*



## MOBILE COMPUTERS / DEVICES

All devices which can carry in hand and portable, is said to be mobile devices and computers.

These Devices are categorized in:

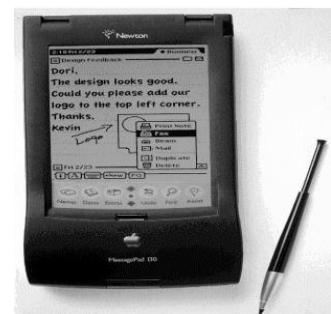
- PDA
- Tablet PC
- Hand Held Computer
- Laptop/Note Books

### PDA

#### **DEFINITION:**

PDA stands for –Personal Digital Assistant. A small, handheld system combining in one device multiple computing, Internet, networking, and fax/telephone features. A PDA contain following features:

- Keep phone directories
- Calendars and provide calculator capabilities
- Schedule appointments



- *Retrieve frequently used phone numbers*
- *Jot down notes.*
- *Most PDAs are designed to accept written input by a pen; the PDA decodes what you write.*

# SOFTWARE AND PROGRAMING LANGUAGES

## SOFTWARE:

### *DEFINITION:*

- -A piece of software is a computer program which has been written to carry out a particular task.||
- -A set of instruction to solve a particular problem||

Without software the hardware that is used to build a computer system would not be very useful. A software program contains the instructions that the computer must follow to carry out the task. Sometimes more than one program is required to complete a task. When this is the case the group of programs which together complete the task are known as a software package.

Software programs are originally produced by computer programmers who will write the instructions that form the program in a programming language.

Example pieces of software are:

- A word processor.
- A multimedia encyclopedia.
- A spreadsheet.

## TYPES OF SOFTWARE

A software is usually classified as being two types

# Introduction to Computers & its applications

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1. Systems software
2. Applications software.

## SYSTEM SOFTWARE

*Systems software controls the operation of a computer. Without systems software a computer would not function. The most important piece of systems software is the operating system. The operating system will perform vital tasks such as:*

- *Managing communications between software and hardware.*
- *Allocating computer memory to other software programs.*
- *Allocating CPU time to other software programs.*

### TYPES

- Operation systems
- Utility program
- Programming languages
- Device drivers



## APPLICATION SOFTWARE

### DEFINITION:

-Application software consists of programs designed to perform specific tasks for users.

Application software can be used as a productivity/business tool; to assist with graphics and multimedia projects; to support home, personal, and educational activities; and to facilitate communications.

### TYPES:

- Word Processor

- Presentation Software
- Database
- Spreadsheet
- Communication software
- Desktop Publisher
- Graphics Package

## **SYSTEM SOFTWARE**

### *DEFINITION:*

Systems software controls the operation of a computer. Without systems software a computer would not function. The most important piece of systems software is the operating system. The operating system will perform vital tasks such as:

- Managing communications between software and hardware.
- Allocating computer memory to other software programs.
- Allocating CPU time to other software programs.

### **EXAMPLES:**

- Operation systems
- Utility program
- Programming languages
- Device drivers

## **OPERATING SYSTEM**

The operating system is a very special piece of software. All the other applications software such as databases and spreadsheets communicate with the computer hardware through the operating system. The operating system controls the overall operation of the computer.

### **DEFINITION:**

-An operating system (or OS) is a computer program which controls the entire operation of the computer. Computer software applications communicate with the computer hardware via the operating system.

# Introduction to Computers & its applications

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## Example Operating Systems

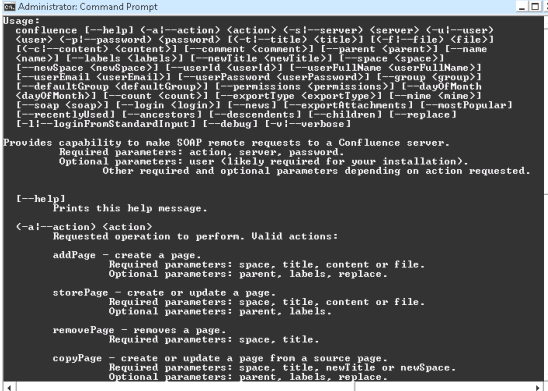
When you buy a computer it is usually supplied with an operating system already installed. You will not be able to use a computer without an operating system. Different operating systems are available for different types of computer and different purposes. Some popular operating systems are

- Microsoft windows
- Disk Operating System (DOS)
- Linux
- Unix

The choice of operating system will affect how a computer works. It will probably determine the type of user interface (command line, menu driven or graphical) that the computer uses and the types of processing (batch, transaction or real-time) that the computer can carry out.

## COMMAND LINE INTERFACE:

Command Line Interface (CLI) lets you control your PC by typing commands. In the figure below is command line interface. There's no mouse or graphical controls like you get in a GUI such as Windows.



```
Administrator: Command Prompt
Usage:
confluence [-help] [-a|--action] <action> [-s|--server] <server> [-u|--user]
<user> [-p|--password] <password> [-t|--title] <title> [-f|--file] <file>
[-c|--content] <contents> [-r|--comment] <comment> [-p|--parent] <parent> [-n|--name]
<name> [-l|--labels] <labels> [-n|--newtitle] <newtitle> [-s|--space] <space>
[-n|--newSpace] <newSpace> [-u|--userId] <userId> [-u|--userFullName] <userFullName>
[-e|--email] <email> [-p|--password] <password> [-g|--group] <group>
[-d|--defaultGroup] <defaultGroup> [-p|--permissions] <permissions> [-d|--dayOfMonth]
<dayOfMonth> [-c|--count] <count> [-e|--exportType] <exportType> [-t|--time] <time>
[-s|--soap] <soap> [-l|--login] <login> [-n|--news] [-e|--exportAttachments] [-m|--mostPopular]
[-r|--recentlyUsed] [-a|--ancestor] [-d|--descendants] [-c|--children] [-r|--replace]
[-l|--loginFromStandardInput] [-d|--debug] [-v|--verbose]

Provides capability to make SOAP remote requests to a Confluence server.
Required parameters: action, server, password.
Optional parameters: user (likely required for your installation).
Other required and optional parameters depending on action requested.

[-help]
Prints this help message.

<-a|--action> <action>
Requested operation to perform. Valid actions:

addPage - create a page.
Required parameters: space, title, content or file.
Optional parameters: parent, labels, replace.

storePage - create or update a page.
Required parameters: space, title, content or file.
Optional parameters: parent, labels.

removePage - removes a page.
Required parameters: space, title.

copyPage - create or update a page from a source page.
Required parameters: space, title, newfile or newSpace.
Optional parameters: parent, labels, replace.
```

## GRAPHICAL USER INTERFACE (GUI):

-A graphical user interface (GUI, pronounced "gooey") is a computer environment that simplifies the user's interaction with the computer by representing programs, commands, files, and other options as visual elements, such as icons, pull-down menus, buttons, scroll bars, windows, and dialog boxes.¶

# Introduction to Computers & its applications

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By selecting one of these graphical elements, through either use of a mouse or a selection from a menu, the user can initiate different activities, such as starting a program or printing a document

As define in that figure:



## **TASKS PERFORMED BY AN OPERATING SYSTEM**

There are several tasks which are performed by practically all operating systems, regardless of the complexity of the computer the operating system is being used on. These tasks include:

1. Managing communications between software and hardware.
2. Allocation of computer memory.
3. Allocation of CPU time.
4. Run and Manage program
5. Managing files
6. Configure Software and Devices
7. Configure Network
8. Coordinating Tasks
9. Performance Management

## **TYPE OF OPERATING SYSTEM**

An operating system is a software component of a computer system that is responsible for the management of various activities of the computer and the sharing of computer resources.

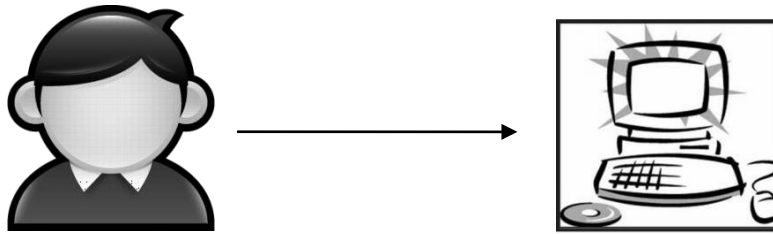
Users and application programs access the services offered by the operating systems, by means of system calls and application programming interfaces. Users interact with operating systems through Command Line Interfaces (CLIs) or Graphical User Interfaces known as GUIs as defined above. In short, operating system enables user interaction with computer systems by acting as an interface between users or application programs and the computer hardware.

The types of Operating systems are here under:

- 1) Single user/personal computer operating system
- 2) Multiuser/network operating system
- 3) Embedded operating system

## **1) SINGLE USER/PERSONAL COMPUTER SOPERATING SYSTEM:**

The most basic type of operating system can only carry out one task at a time and can only be used by **one person at a time**. More sophisticated multi-tasking and multi-user operating systems can appear to carry out more than one task and be used by more than one user at the same time.



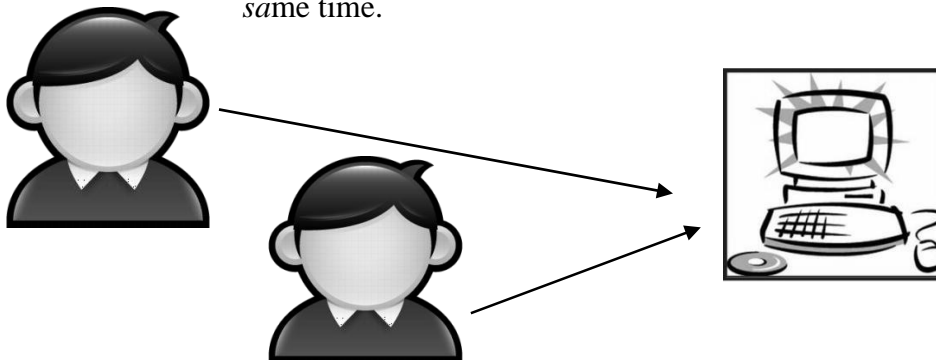
It has further types

- DOS
- MAC OS
- Windows

## **MULTIPLE USER/NETWORK OPERATING SYSTEM:**

Multi-user operating systems are used on large mainframe computers. A mainframe computer system has one very powerful processing unit. Many users will all share this processing unit. They use terminals (a keyboard and a screen) to access the mainframe computer.

A multi-user operating system lets **more than one user** work on a mainframe computer at the *same time*.



Operating systems that are used on computers connected to networks usually have to carry out some additional tasks. Probably the most important of these is managing system security. Important aspects of systems security that an operating system might manage are :

- Controlling who has access to which files.



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## Introduction to Computers & its applications

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- Keeping a log of all of the files that a user changes.
- Automatically backing up important files.

These operating systems are more complicated and require faster hardware and more memory to work than more basic operating systems.

It has further types

- WINDOWS NT SERVER
- WINDOWS 2000 SERVER
- UNIX

### PROGRAMING LANGUAGES

A language in simple word is a way of communication for any person to other person in order to understand his talk.



Like in the picture above a girl is communicating, the man who is sitting next to her. So the language is very important medium of communication like linguistics of human. Like human languages, each programming language has its own grammar and syntax. There are many components of the same language Computer also need a language so that it can communicate to the hardware and other important components of computer.

#### **Definition:**

A language used to write instructions for the computer. That is the way of representation any program in to that form which is understandable by CPU.

Reminder: program is written instruction for computer.
--

# Introduction to Computers & its applications

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Programs are written by using any language and these languages set the procedures & rules to write computer programs. Programmers have to follow that rules which is set by programming languages.

## TYPES OF PROGRAMMING LANGUAGES

According to structure, interface and procedure computer languages can be divided in to two major types.

1. Low Level Language
2. High Level Language

## LOW LEVEL LANGUAGE

Low level language is also called machine language. That types of languages are close to machine and easily understand by machine as, it is majorly in binary form (0 & 1).low level language types are

- Machine language
- Assembly language

## MACHINE LANGUAGE

This program written is this type of language sometimes referred to as machine code or object code, machine language is a collection of binary digits or bits that the computer reads and interprets. Machine language is the only language a computer is capable of understanding. Machine code is consisting of 0 & 1. Which mean off and on bit.

Program written in machine language is very fast but machine dependent. It is also referred as -First Generation Language.

Machine code →

```
100110001110110000111101110011110011
0001110110000111101110011110011000111
011000011110111001111001100011101100
001111011100111100110001110110001111
10111001110001111011001111001100011
10110001111011100111100110001110110
000111101100111100110001110110000111
110110011110011000111011000011110111
0011110011000111011000011110111001111
0001111011100111100110001110110000111
1101110011110011000111011000011110111
0011110011000111011000011110111001111
1001100011101100001111011100111100110
001110110000111101100111100011110111
0011110011000111011000011110111001111
1001100011101100001111011100111100110
```

## ASSAMBLY LANGUAGE

Assemble language is also low level language close to machine language. It is also referred as assembly or ASL, assembly language and -Second Generation Language.

# Introduction to Computers & its applications

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Assembly language



```
; Example of IBM PC assembly language
; Accepts a number in register AX;
; subtracts 32 if it is in the range 97-122;
; otherwise leaves it unchanged.

SUB32 PROC      ; procedure begins here
  CMP AX,97    ; compare AX to 97
  JL  DONE    ; if less, jump to DONE
  CMP AX,122   ; compare AX to 122
  JG  DONE    ; if greater, jump to DONE
  SUB AX,32    ; subtract 32 from AX
DONE: RET      ; return to main program
SUB32 ENDP     ; procedure ends here
```

FIGURE 17. Assembly language

---

Assembly language used to interface with computer hardware. Assembly language uses structured commands as substitutions for numbers allowing humans to read the code more easily than looking at binary. Although easier to read than binary, assembly language is still a complex language

## HIGH LEVEL LANGUAGE

High level programming languages is languages program than use languages or syntax which closes to human languages so; it is easy to understanding the languages. This type of language is machine-independent, and uses similar language as English, which is easily understandable by human. This type of language's processing is slow as compared to high level languages. As, it need any translator between interface on computer and human. So, that both can understand their languages.

## LANUAGE PROCESSOR

As, computer can understand only machine language; that's why we need an interface between user and computer so that both can understand its instructions.

Some types of language processors and translator are here under

- Compiler
- Interpreter
- Assembler

## COMPILER

A compiler is a computer program that transforms human readable **complete code** of another computer program into the machine readable code that a CPU can execute.

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## INTERPRETER

An interpreter is a computer program that reads the source code of another computer program and executes that program.

Because it is interpreted **line by line**, it is a much slower way of running a program than one that has been compiled but is easier for learners because the program can be stopped, modified and rerun without time-consuming compiles.

## ASSEMBLER

Assembler converts code written in assembly language into machine language. It works same like interpreter and compiler.

The assembler program takes each program statement in the code and generates a corresponding bit stream or pattern (a series of 0's and 1's of a given length).

# APPLICATION SOFTWARE

## *DEFINITION:*

-Application software consists of programs designed to perform specific tasks for users.

Application software can be used as a productivity/business tool; to assist with graphics and multimedia projects; to support home, personal, and educational activities; and to facilitate communications.

Application software divided in to two main types

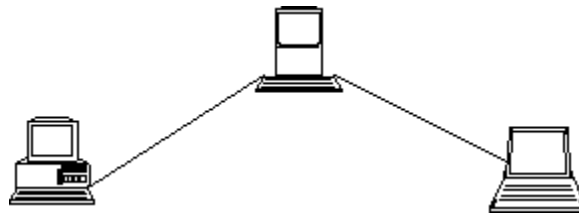
- Custom based software
- Package software

## NETWORK AND INTERNET

### COMPUTER NETWORK

#### **DEFINATION:**

-A computer network is a group of computers which are connected together to allow communication between them.!



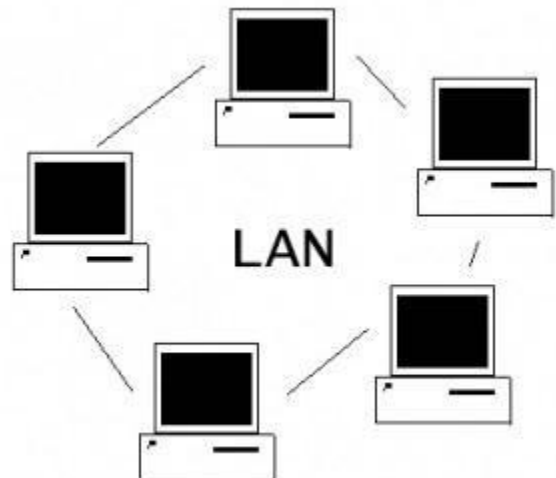
#### **TYPES OF NETWORK**

There are two main types of network :

- LAN
- WAN

#### **LOCAL AREA NETWORK (LAN) :**

**Definition:** “A network which is located entirely on one site such as an office, school or within a group of buildings that are in close proximity, that are connected together.!



#### **WIDE AREA NETWORK (WAN) :**

“A network which connects together computers on a number of sites in different areas!.

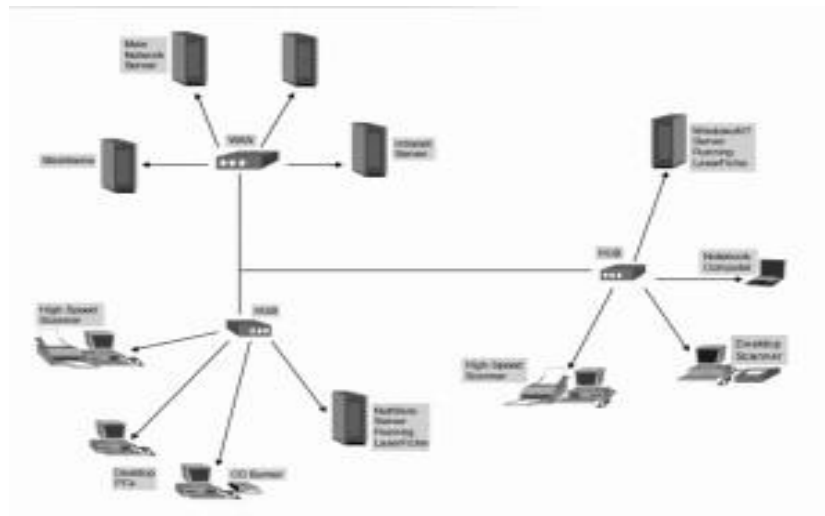
A WAN or Wide Area Network is a group of widely dispersed computers that are connected together. These could be across the same town, or across a country or even across the world!.

# Introduction to Computers & its applications

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Apart from distance, the other feature that distinguishes as WAN from a LAN is that the WAN would make use of a range of communication technologies such as telephone, microwave and satellite links.

Using a WAN, schools in Florida can communicate with places like Tokyo in a matter of minutes, without paying enormous phone bills. A WAN is complicated.



## **ADVANTAGES OF NETWORK**

- **SPEED.**

Networks provide a very rapid method for sharing and transferring files. Without a network, files are shared by copying them to memory cards or discs, then carrying or sending the discs from one computer to another. This method of transferring files can be very time-consuming.

- **COST.**

Networkable versions of many popular software programs are available at considerable savings when compared to buying individually licensed copies.

- **SECURITY.**

Files and programs on a network can be designated as "copy inhibit," so that you do not have to worry about illegal copying of programs. Also, passwords can be established for specific directories to restrict access to authorized users.

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- **CENTRALIZED SOFTWARE MANAGEMENT.**

One of the greatest benefits of installing a network at a school is the fact that all of the software can be loaded on one computer (the file server). This eliminates that need to spend time and energy installing updates and tracking files on independent computers throughout the building.

- **RESOURCE SHARING.**

Sharing resources is another advantage of school networks. Most organizations cannot afford enough laser printers, fax machines, modems, scanners, and CD players for each computer. However, if these or similar peripherals are added to a network, they can be shared by many users.

- **ELECTRONIC MAIL.**

The presence of a network provides the hardware necessary to install an e-mail system. E-mail aids in personal and professional communication for all personnel, and it facilitates the dissemination of general information to the entire staff. Electronic mail on a LAN can enable students to communicate with teachers and peers at their own institute. If the LAN is connected to the Internet, we can communicate with others throughout the world.

- **FLEXIBLE ACCESS.**

Networks allow users to access their files from computers throughout the institute. Like Students can begin an assignment in their classroom, save part of it on a public access area of the network, then go to the media center after school to finish their work. Students can also work cooperatively through the network.

- **WORKGROUP COMPUTING.**

Collaborative software allows many users to work on a document or project concurrently. For example, educators located at various schools within a county could simultaneously contribute their ideas about new curriculum standards to the same document, spreadsheets, or website.





## **NETWORK TOPOLOGY**

Network topology refers to the **layout** used to wire the computers together.

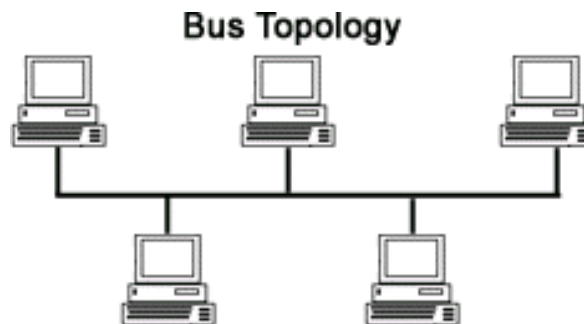
### **TYPES OF TOPOLOGY**

There are four main topologies that are used.

1. BUS
2. STAR
3. RING

### **BUS TOPOLOGY**

Each computer is connected to a single cable which connects all of the computers. All nodes (file server, workstations, and peripherals) are connected to the linear cable.



### Advantages of Bus Topology

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

### Disadvantages of a Bus Topology

- Entire network shuts down if there is a break in the main cable.
- Terminators are required at both ends of the backbone cable.
- Difficult to identify the problem if the entire network shuts down.
- Not meant to be used as a stand-alone solution in a large building.

## STAR TOPOLOGY

-All communication takes place via a central computer or **HUB** device. ||

A star topology is designed with each node connected directly to a central network hub, switch, or concentrator.

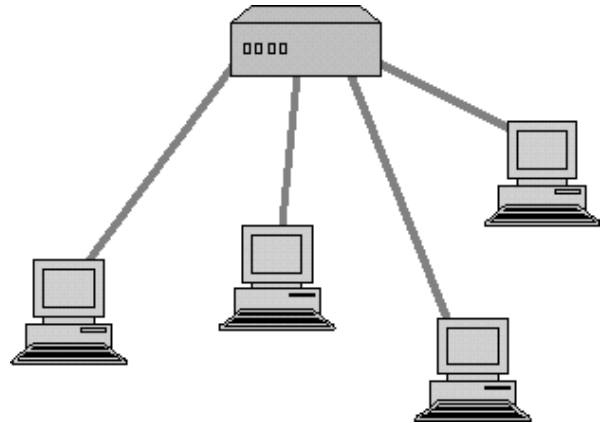
Data on a star network passes through the hub, switch before continuing to its destination. The hub, switch, or concentrator manages and controls all functions of the network. It also acts as a repeater for the data flow.

### **Advantages of a Star Topology**

- Easy to install and wire.
- No disruptions to the network then connecting or removing devices.
- Easy to detect faults and to remove parts.

### **Disadvantages of a Star Topology**

- Requires more cable length than a linear topology.
- If the hub or concentrator fails, nodes attached are disabled.
- More expensive than bus topologies because of the cost of the HUB device.



## RING TOPOLOGY

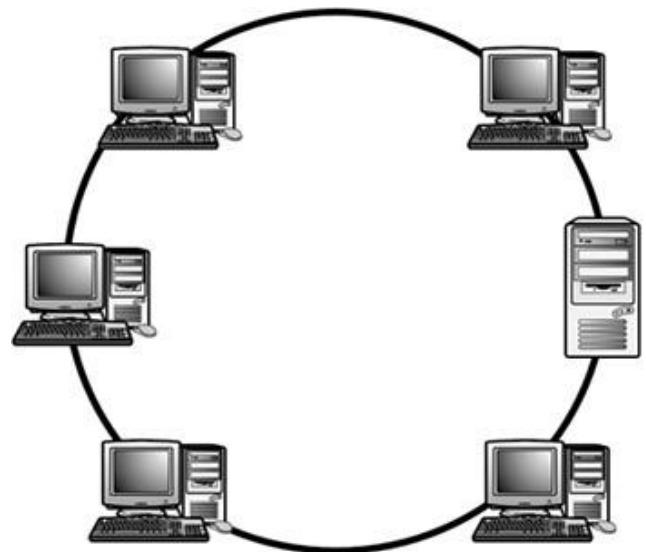
Each computer is connected to the two computers on either side of it. The last computer is linked to the first to form a ring.

### **Advantages of a Ring Topology**

- Easy to install and wire.
- Equal Access to devices no one computer will use all the bandwidth
- Easy to detect faults and to remove parts.

### **Disadvantages of a Ring Topology**

- Slow since signals goes in sequential order
- If the concentrator fails, nodes attached are disabled.
- Single break in cable can disrupt the flow of network.



## INTERNET

### **DEFINATION:**

Internet is global –**Network of Networks**||. The internet is a worldwide public network of computers on which people can join and use multiple services such as sharing of information.

By internet users at any one computer can get information from any other computer.



### HISTORY OF INTERNET

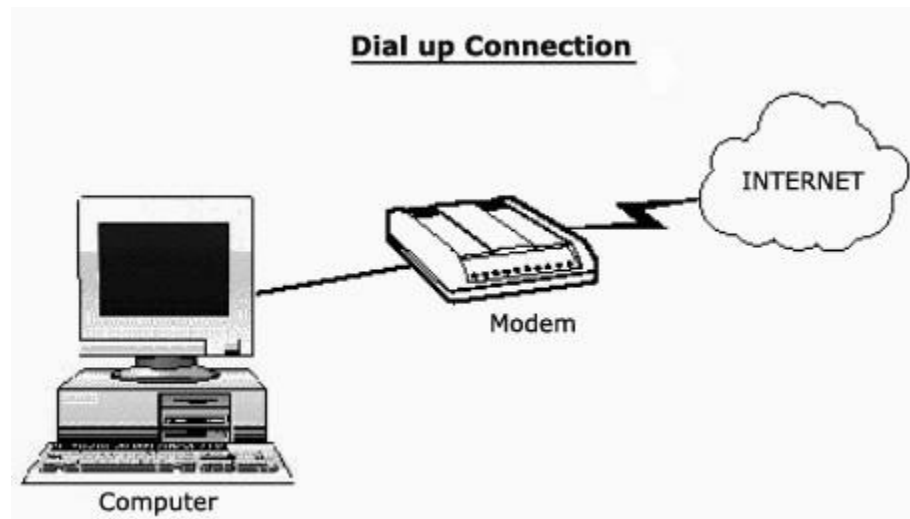
It was developed by the United States Defense Advanced Research Projects Agency in the 1970s and was initially known as **ARPANET**.

The Internet was designed to be used by companies and Universities doing military research so that they could share information. Since then the number of people who use the Internet and the services that are provided on the Internet have grown tremendously. There are now over 200,000,000 people who regularly make use of it.

### CONNECTING METHODS TO THE INTERNET

To connect to the Internet the following are needed:

- a computer
- telephone line
- modem and/or router
- an ISP (Internet Service Provider)
- Web browser, e.g. Internet Explorer, Firefox, Chrome, Safari, Opera etc.



## **WHAT IS MODEM?**

A device which convert analog signals to digital signals and digital signals to analog for transmitting data over internet.

## **WHAT IS WEB BROWSER?**

Web Browser is Software used to display the Web pages. Internet explorer is an example of web browser

Here are some types of web browser:

- Internet explorer
- Firefox
- Chrome
- Safari
- Opera





### WHAT IS WEB SITE ADDRESS?

Every web site has a specific address which is also called URL that is Uniform Resource Locator.

### EXAMPLE:

<http://www.paknews.com>

**HTTP:** Hyper Text Transfer Protocol, is rule to send and receive text on internet

**WWW:** World Wide Web, It consists of a large number of web servers that host websites. Each website will normally consist of a number of web pages. A web page can contain text, images, video, animation and sound.

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**Paknews:** Domain Name

**Com:** type of web site there are many other types of web sites like

Pak: Pakistan

Edu: education

Mil: military

Gov: govt

Com: commercial

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## **ADVANTAGES OF INTERNET**

There many advantages to using the internet such as:

- Email.
- Sharing Information.
- Services.
- Buy or sell products.
- Communities.
- News
- Searching jobs
- Advertisement
- Communication
- Entertainment
- Online education
- Online education and research

## **DISADVANTAGES OF INTERNET**

Although there are huge advantages of internet but there is always another side of picture.

So internet has some disadvantages like

- Viruses
- Security problem
- Immorality
- Many information is not accurate
- Wastage of time

## EMAIL

Electronic Mail (**email**) is a system which allows users of a computer network to send messages to each other. Users can usually:

- Send a message to another user, or group of users.
- Keep their messages in a mailbox.
- Read, print and delete messages from their mailbox.

It is not only typewritten messages that can be sent using Electronic Mail. Pictures, music, videos, in fact almost any sort of information you can think of, can also be sent.

Each user has to have his or her own address that other users need to know to send messages to him or her.

Electronic mail is good because it is much faster than the ordinary post. It is also very accessible since you can read your email on any suitable computer anywhere in the world. On the other hand not everybody has an electronic mailbox at the moment, so you cannot use email to send messages to everyone, and you certainly can't send a parcel by email.

There are many email service provider companies which allow any user to send and receive electronic mail like

- **Hotmail**
  - [www.hotmail.com](http://www.hotmail.com)
- **Yahoo**
  - [www.yahoo.com/mail](http://www.yahoo.com/mail)
- **Gmail**
  - [www.gmail.com](http://www.gmail.com)