SETUP BY SETUP

INTRODUCTION TO IT

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Chapter # 1

INTRODUCTION

What is Computer?

A Computer is an electronic device which accept data and instructions, store it, process that data according to instructions and give us result/information.

Or

Computer is an electronic device which accept data and instructions in the form of Input, store it, process the data and give us result in the form of output.

DATA

Data is a plural form of the Latin word Datum, which means "something given."

The collection of facts and figures in raw form is called data. Data is not meaningful.

Any thing which we enter into computer is also called data.

For example Name, Address, Numbers, Marks, Phone Numbers, Roll No etc.

Types of Data:

The following are types of data to be entered in the computer.

I. **Alphabetic Data:** It consists of Capital letters from A-Z, and small letters from a-z, for example Gohar Peshawar.

II. **Numeric Data:** It consist of Decimal numbers (digit) from 0-9, decimal point notations for example 132,987 etc.

III. **Alphanumeric Data:** It consists of Alphabetic letter as well as numeric digit and special characters/symbols. For example street no B/23 etc.

IV. **Audio**: Audio data consists of voices and sounds.

V. **Video**: Video data consists of images and movies clips.

INFORMATION:

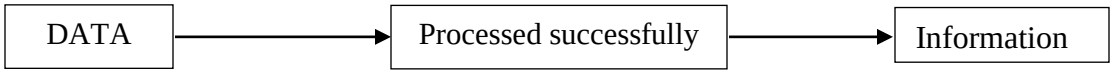
The process form of data is called Information.

To organize the data in meaningful form upon which people can take necessary decision is called information. For example (8,3,2,6,4,5) is data, when sorted it become (2,3,4,5,6,8) which is information

$$\underline{2 + 4 - 1} \quad = \quad \underline{5}$$

Data Information

Examples are vouchers, bills, fee registration cards or library cards.

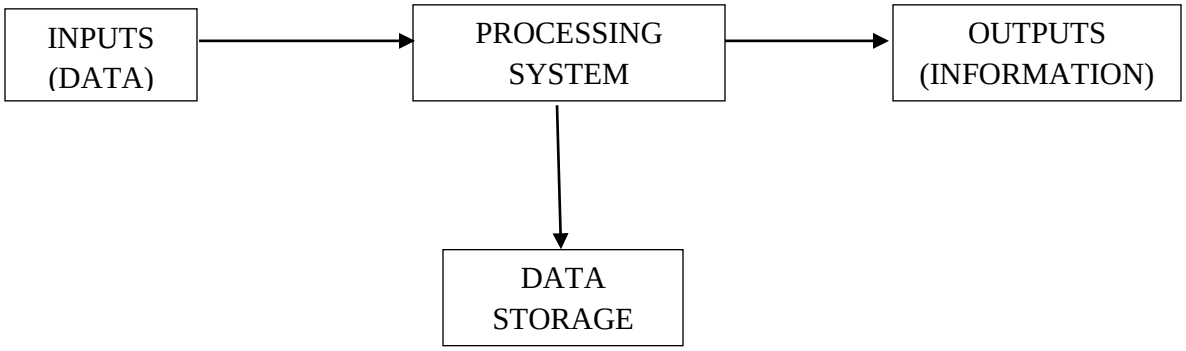


INFORMATION TECHNOLOGY (IT):

The merging of computer with communication is called information technology. In other words, Information technology means the use of hardware, software Networking, Telecommunication and Internet.

DATA PROCESSING SYSTEM:

The system that process data and produce information is called data processing system or information processing system. The diagrammatic representation of Data processing system is given below:



Types of Data Processing:

There are two types of Data Processing:

1. Conventional Data Processing(Manual Data Processing)
2. Electronic Data Processing(Computer Based Data Processing)

1. Conventional Data Processing (Manual Data Processing):

Conventional Data Processing is the manual method of transforming data into information. The human beings themselves collect data, classify and arrange according to the item of data, perform manual calculations and hence produce the required output result.

2. Electronic Data Processing (Computer Based Data Processing):

When computer is used to convert data into information is called Electronic data processing (EDP). Electronic data processing uses computer hardware and software.

FUNCTION OF COMPUTER SYSTEM

All computers perform the following five basic operation for converting raw input i.e. Data in to useful information and presenting it to a user

1. Inputting:

Process of entering data and instruction into a computer system.

2. Storing:

Saving data and instructions to make them available for initial or additional processing as and when required.

3. Processing:

Performing arithmetic operation (add, subtract, multiply, divide. etc), or logical operations (comparisons, like equal to, less then, greater then, etc) on data to convert them into useful information.

4. Outputting :

Process of producing useful information or result for a user, such as printed report or visual display.

5. Controlling:

Directing the manner and sequence in which the above operations are performed.

CHARACTERISTICS OF COMPUTER SYSTEMS.

Following are the main characteristics of computer systems.

Automatic:

An automatic machine works by itself without human intervention. Computers are automatic machines because once started on a job, they carry out the job until it is finished. However computer can't perform any job by its own. Computer must be instructed by user what to do, how to do and when to do.

Speed:

A computer is a very fast device. It can perform in a few seconds, the amount of work that a human being can do in an entire year-if he/she worked day and night and did nothing else. A powerful computer is capable of performing several billion simple arithmetic operation per second.

Accuracy:

Computers are very accurate. Accuracy of a computer is consistently high. A computer performs every calculation with the same accuracy. However error can occur in a computer. These errors are mainly due to human rather than technological weakness.

Versatility:

Versatility is one of the most wonderful aspect about a computer. One moment it is preparing result of an examination, next time it is busy preparing bills.

Power of remembering:

A computer can store and recall any amount of information because of its storage capability. It can retain a piece of information as long as a user desires and the user can recall the information whenever required.

No I.Q:

Computers has no intelligence of its own. Its I.Q is zero, at least until today. It has to be told what to do and in what sequence.

Chapter # 2:

TYPES OF COMPUTER

TYPES OF COMPUTER (According to Functionality)

There are three types of computer according to their functionality/working.

1. Analog computers
2. Digital computers
3. Hybrid computers

1. Analog computers:

This computer accepts an analog input and provides an analog output of information. It represents physical quantities such as distance, displacement, velocity, acceleration, temperature etc. it measures continues changes in some physical quantities,

Examples:

- Thermometer
- Analog clock
- Speedometer
- Tire pressure gauge

2. Digital computers:

This computer provides a digital output from an input of information represented in digital form and processes information which is based on the presence or absence of electrical charge or binary one or zero.

Examples:

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

3. Hybrid Computers:

A hybrid computer has the characteristics of both analog and digital computer which means that it is a computer which can measure both in terms of physical as well as digital quantities. It combines the best features of both analog and digital computers. They have the speed of analog and accuracy of digital computers.

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
- Air defense system

Classification of Computers **(According to Size, Speed and Cost)**

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

1. Mainframe Computer:

Mainframe computer was introduced in 1975.

- Very large in size
- Very expensive
- More powerful
- Multiple processor
- It can store a large amount of data.
- Normally it can execute 16 million instructions per second.
- Qualified operators are required to use these computers.
- Used in large organizations such as banks, educational institutions and atomic research centers.
- Examples are IBM S/390, Amdahl 580, Control Data Cyber 176

2. Mini Computer:

It was introduced in 1960s.

- Small in size than Mainframe computer.
- Less expensive than Mainframe computer
- Less expensive than Mainframe computer
- Two or more than two processors.
- Fewer amounts of data can store as compare to Mainframe computer.
- Used by small and mid size organizations.
- Examples are IBM AS/400, IBM SYSTEM 360, HP 3000, PRIME 9755

3. Microcomputer (PC):

It was introduced in 1970s. There are two types of Microcomputer, Desktop and Laptop.

- Very small in size as than Mainframe and Minicomputer.
- Less expensive than both Mainframe and Minicomputer.
- Very less amount of data can be stored than Mainframe and Minicomputer.
- It is also called Personal Computer (PC).
- Less Powerful than Mainframe and Mini.
- It is used at home, Office and educational institutions.
- 

4. Super Computer:

Super Computer introduced in 1970s. it is the biggest in size and the most expensive in price than any other computer. It has a very large storage Capacity. It is more advanced computer. It can process trillions of instructions per second. Super computer consists of thousands of Microprocessors.

For example Cray-1, Cray-2, Control Data Cyber 205, ETA

Types of computer (According to purpose):

There are two types of computer according to purpose.

1. Special purpose computer
2. General Purpose computer

1. Special purpose computer:

The computers which are designed to perform a particular job is called special purpose computer. These are also known as dedicated computer. For example they are used in computer games, control of traffic lights or navigation system of atomic submarine. Special purpose computers are faster because they have to perform only one task.

2. General Purpose computer:

General purpose computer are the machines designed to perform a variety of jobs. For example a personal computer, a user can perform typing, can play games, can make graphs/charts or can do arithmetic calculation.

Mobile Computers and Mobile Devices

A **mobile computer** is a personal computer you can carry from place to place. Similarly, a **mobile device** is a computing device small enough to hold in your hand. The most popular type of mobile computer is the notebook computer.

Notebook Computers

A **notebook computer**, also called a **laptop computer**, is a portable, personal computer often designed to fit on your lap. Notebook computers are thin and lightweight, yet can be as powerful as the average desktop computer. Most notebook computers can operate on batteries or a power supply or both.

Tablet PC

The Tablet PC, or tablet computer, is a special type of notebook computer you can interact with by touching the screen with your finger or a digital pen. One design of Tablet PC, called a convertible tablet, has an attached keyboard. Another design, which does not include a keyboard, is called a slate tablet and provides other means for typing.

Smart Phone:

Smart phone is an Internet-enabled phone that provides personal information management functions such as a calendar, an appointment book, an address book, a calculator, and a notepad. In addition to basic phone capabilities, a smart phone allows you to send and receive e-mail messages and access the Web. Many models also function as a portable media player and include built-in digital cameras so that you can share photos or videos. Many smart phones also offer a variety of application software such as word processing, spreadsheet, and games.

PDA:

A PDA (personal digital assistant), which often looks like a smart phone, provides personal information management functions such as a calendar, an appointment book, an address book, a calculator, and a notepad. A PDA differs from a smart phone in that it usually does not provide phone capabilities and may not be Internet-enabled, support voice input, have a built-in camera, or function as a portable media player.

E-Book Readers:

An e-book reader (short for electronic book reader), or e-reader, is a handheld device that is used primarily for reading e-books. An e-book, or digital book, is an electronic version of a printed book, readable on computers and other digital devices. Most e-book readers have a touch screen and are Internet-enabled.

Embedded Computers

An embedded computer is a special-purpose computer that functions as a component in a larger product. A variety of everyday products contain embedded computers:

- Consumer electronics
- Home automation devices
- Automobiles
- Process controllers and robotics
- Computer devices and office machines

Embedded computers perform various functions, depending on the requirements of the product in which they reside. Embedded computers in printers, for example, monitor the amount of paper in the tray, check the ink or toner level, signal if a paper jam has occurred, and so on. Figure shows some of the many embedded computers in cars.

Adaptive cruise control systems detect if cars in front of you are too close and, if necessary, adjust the vehicle's throttle, may apply brakes, and/or sound an alarm.

Advanced airbag systems have crash-severity sensors that determine the appropriate level to inflate the airbag, reducing the chance of airbag injury in low-speed accidents.

Tire pressure monitoring systems send warning signals if tire pressure is insufficient.

Cars equipped with wireless communications capabilities, called telematics, include such features as navigation systems, remote diagnosis and alerts, and Internet access.

Drive-by-wire systems sense pressure on the gas pedal and communicate electronically to the engine how much and how fast to accelerate.

Some of the embedded computers designed to improve your safety, security, and performance in today's automobiles.

Generation of Computer:

Generation in computer terminology is a change in technology a computer is/was being used. Initially, the generation term was used to distinguish between varying hardware technologies. But nowadays, generation includes both hardware and software, which together make up an entire computer system.

There are totally five computer generations known till date. Each generation has been discussed in detail along with their time period, characteristics. We've used approximate dates against each generations which are normally accepted.

Following are the main five generations of computers

S.N.	Generation & Description
1	**First Generation** The period of first generation: 1946-1959. Vacuums tube based.
2	**Second Generation** The period of second generation: 1959-1965. Transistor based.
3	**Third Generation** The period of third generation: 1965-1971. Integrated Circuit based.
4	**Fourth Generation** The period of fourth generation: 1971-1980. VLSI microprocessor based.
5	**Fifth Generation** The period of fifth generation : 1980-onwards.ULSI microprocessor based

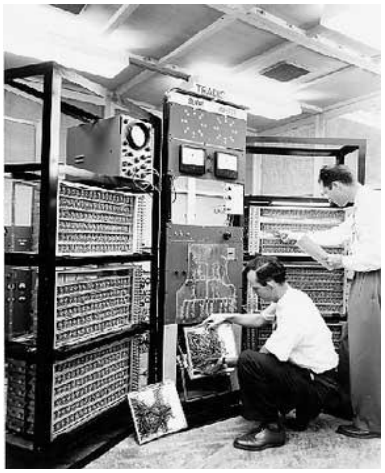
First Generation

The period of first generation was 1946-1959.

First generation of computer started with using vacuum tubes as the basic components for memory and circuitry for CPU (Central Processing Unit). These tubes like electric bulbs produced a lot of heat and were prone to frequent fusing of the installations, therefore, were very expensive and could be afforded only by very large organizations.

In this generation mainly batch processing operating system were used. In this generation Punched cards, Paper tape, Magnetic tape Input & Output device were used.

There were Machine code and electric wired board languages used.



The main features of First Generation are:

- Vacuum tube technology
- Unreliable
- Supported Machine language only
- Very costly
- Generate lot of heat
- Slow Input/output device
- Huge size
- Need of A.C.
- Non portable
- Consumed lot of electricity

Some computer of this generation were:

- ENIAC
- EDVAC
- UNIVAC
- IBM-701
- IBM-650

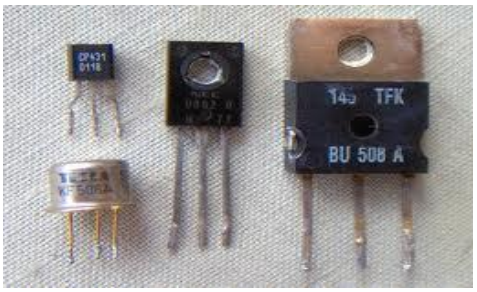
Second Generation

The period of second generation was 1959-1965.

This generation using the transistor were cheaper, consumed less power, more compact in size, more reliable and faster than the first generation machines made of vacuum tubes. In this generation, magnetic cores were used as primary memory and magnetic tape and magnetic disks as secondary storage devices.

In this generation assembly language and high level programming language like FORTRAN, COBOL were used.

There were Batch processing and Multiprogramming Operating system used.



The main features of Second Generation are:

- Use of transistors
- Reliable as compared to First generation computers
- Smaller size as compared to First generation computers
- Generate less heat as compared to First generation computers
- Consumed less electricity as compared to First generation computers
- Faster than first generation computers
- Still very costly
- A.C. needed
- Support machine and assembly languages

Some computer of this generation were:

- IBM 1620
- IBM 7094
- CDC 1604
- CDC 3600
- UNIVAC 1108

Third Generation

The period of third generation was 1965-1971.

The third generation of computer is marked by the use of Integrated Circuits (IC's) in place of transistors. A single I.C has many transistors, resistors and capacitors along with the associated circuitry The I.C was invented by Jack Kilby. This development made computers smaller in size, reliable and efficient.

In this generation Remote processing, Time-sharing, Real-time, Multi-programming Operating System were used.

High level language (FORTRAN-II TO IV, COBOL, PASCAL PL/1, BASIC, ALGOL-68 etc.) were used during this generation.

The main features of Third Generation are:

- IC used
- More reliable
- Smaller size
- Generate less heat

- Faster
- Still costly
- A.C needed
- Consumed lesser electricity
- Support high level language

Some computer of this generation were:

- IBM-360 series
- Honeywell-6000 series
- PDP(Personal Data Processor)
- IBM-370/168
- TDC-316

Fourth Generation

The period of Fourth Generation was 1971-1980.

The fourth generation of computers is marked by the use of Very Large Scale Integrated (VLSI) circuits. VLSI circuits having about 5000 transistors and other circuit elements and their associated circuits on a single chip made it possible to have microcomputers of fourth generation. Fourth Generation computers became more powerful, compact, reliable, and affordable. As a result, it gave rise to personal computer (PC) revolution.

In this generation Time sharing, Real time, Networks, Distributed Operating System were used.

All the Higher level languages like C and C++, DBASE etc. were used in this generation.

The main features of Fourth Generation are:

- VLSI technology used
- Very cheap
- Portable and reliable
- Use of PC's
- Very small size
- Pipeline processing
- No A.C. needed
- Concept of internet was introduced
- Great developments in the fields of networks
- Computers became easily available

Some computer of this generation were:

- DEC 10
- STAR 1000
- PDP 11
- CRAY-1(Super Computer)
- CRAY-X-MP(Super Computer)

Fifth Generation

The period of Fifth Generation is 1980-till date.

In the fifth generation, the VLSI technology became ULSI (Ultra Large Scale Integration) technology, resulting in the production of microprocessor chips having ten million electronic components.

This generation is based on parallel processing hardware and AI (Artificial Intelligence) software.

AI is an emerging branch in computer science, which interprets means and method of making computers think like human beings.

All the Higher level languages like C and C++, Java, .Net etc. are used in this generation.

AI includes:

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

The main features of Fifth Generation are:

- ULSI technology
- Development of true artificial intelligence
- Development of Natural language processing
- Advancement in Parallel Processing
- Availability of very powerful and compact computers at cheaper rates

Some computer types of this generation are:

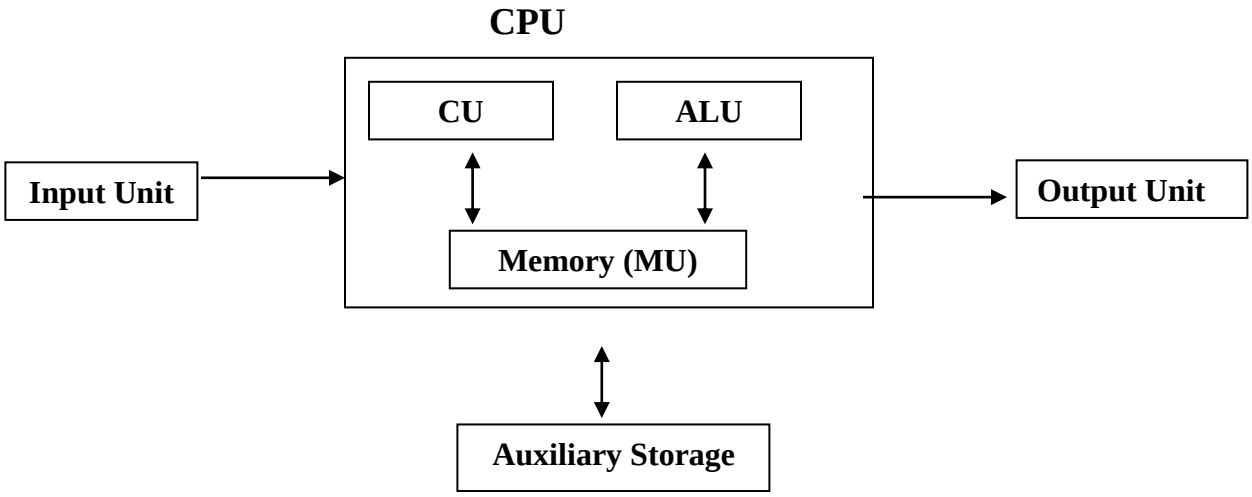
- Desktop
- Laptop
- Notebook
- Ultra Book
- Chrome Book

Chapter # 3

COMPUTER HARDWARE

The physical component of computer system is called hardware. All components which are tangible (touchable) are called Hardware. For example Mouse, Keyboard, Monitor, and Hard disk etc.

COMPONENTS OF A COMPUTER SYSTEM



Block Diagram of Computer

1. Input Unit:

The unit or device through which computer get data and instructions from user is called input unit/device. For example mouse, keyboard, scanner, camera etc.

2. CPU (Central processing Unit):

The CPU is the brain of computer system. It is the administrative section. In computer system all operations are performed by CPU. All input, output and storage devices are connected to the CPU. The CPU is responsible for activating and controlling the operations of other units of the computer system. CPU has the following three parts.

i. Arithmetic Logic Unit:

ALU is divided into two units

a) Arithmetic Unit: Arithmetic are designed to perform four basic arithmetic operations such that addition, subtraction, multiplication and division.

b) Logical Unit: Logical unit perform all logical operation or comparison (decision making operation) such as less than, equal to or not equal to, greater etc,

ii. Control Unit:

CU is the administrative component of computer system. CU does not perform any actual processing on data, it just Control data. It obtains instructions from the main memory; interpret the instructions, and issues to other units of system to execute them.

iii. Memory Unit:

The place or Location where our data and programs are stored for processing is called Memory Unit (Register and cache memory or primary memory). Before data processing and after data processing data will be stored in MU for temporary time.

3. Secondary Storage:

The place or location where our data and programs stored for future use permanently is called secondary storage or auxiliary Storage. For example Hard disk, CD-ROM, Floppy Disk and Flash Memory etc.

4. Output Unit:

The unit/ device through which we get result or information from CPU is called Output unit/device. For example Monitor, Printers, Speaker etc.

INPUT DEVICES

The unit or device through which computer get data and instructions from user is called input unit/device. For example mouse, keyboard, scanner, camera etc.

An input unit performs the following functions:

a. It accepts instructions and data from outside world.
b. It converts these instruction and data in computer acceptable form.
c. It supplies the converted instruction and data to computer system for further processing.

Different types of input devices are used.

- Keyboard
- Mouse
- Trackball.
- Joystick.
- Touch Screen.
- Track Point
- Touch Pad
- Light Pen.
- Scanner.
- BCR
- OCR.
- OMR
- MICR.
- Graphic Tablet or Digitizer

KEYBOARD

The keyboard is an essential input device. It has typewriter like key with some additional keys. There are different types of keyboard used with the computer system have a certain number of features in common.

- Standard typewriter keys.
- Function Keys.
- .Navigation Keys
- Numeric Keys.

MOUSE

A mouse a handheld device connected to the computer by a small cable that actually looks a little bit like a mouse. The mouse, which has a ball on its underside, is rolled on a flat surface. The rolling movement causes a corresponding movement on the screen processing various keyboard keys can also move the cursor.

TRACK BALL

The trackball is like an upside down mouse. It has a ball on the top and one can roll the ball directly with the hand. It is normally used with the laptops.

JOYSTICK

A joystick is an input device that enables one to move cursor, page, object and pictures from one point to another on the screen. A joystick uses a level to control the position of the cursor. It performs the same function as of an arrow keys in the keyboard but it is fast and gives you eight direction movement as compared to four.

TOUCH SCREEN

The touch screen registers input when a finger or the other object comes in contact with the screen. Two touch screen techniques involve infrared beams and ultrasonic acoustic waves.

Touch screen have long been used in military applications. Today because they have been less expensive, touch screens are found in many applications.

TRACK POINT

Some portable computer provides a mouse substitute called a track point, a button that produces from the middle of the keyboard. With a track point, one imitates mouse movements by pushing the button from side to side.

TOUCH PAD

Many laptop computers use a touchpad in front of the keyboard. One can move the finger on the pad to move the cursor on the screen. When one wants to click, they can tap the pad or use the buttons in front of pad.

LIGHT PEN

The light pen look like an ordinary pen, but its tip is light sensitive detector. The light pen uses a light-sensitive photoelectric cell to signal screen positions to the

computer. Light pens are frequently used are graphic designers, illustrators and drafting engineers.

SCANNER

Scanners are input devise. A scanner works very much like a photocopier, but a scanner digitizes the information into a computer, not onto the other piece of paper. In a process called imaging, a scanner converts a drawing, a picture, on any document into computer recognizable form.

BCR (Bar Coded reader)

Data coded in the form of light and dark lines or bars are known as bar coded. Bar codes are used particularly by the retail trade for labeling goods. BCR is a device used for reading bar coded data. Bar code reading is performed by laser beam scanner, which is lined to the computer.

OCR (Optical Character Recognition)

In 1950's a number of OCR input devices were developed. It is device that utilizes light beams to read alphanumeric characters. The printed characters are examined by passing them under a strong light and a lens system which differentiate the non inked area from the inked area and a logical system which attempts to determine which of the possible character being examined.

OMR (Optical Mark Recognition)

OMR employs mark sensing, one of the simplest forms of the optical recognition, to scan and translate, based on its location, a series of pen or pencil marks into a computer readable form. The optical mark technology is widely used for scoring examination and inputting raw data recorded on question papers.

MICR (Magnetic Ink Character Recognition)

MICR is the interpretation by a computer of a line of characters written in special ink. Human can read these characters as well. Magnetic ink character recognition devices were developed to assist in banking industry to process huge volumes of checkup.

Graphic Tablet or Digitizer

It is a very sophisticated device that is used in the production of pictorial images. Digitizer is used in design and engineering business such as those that develop aircraft or computer chips.

OUTPUT DEVICES

The unit/ device through which we get result or information from CPU is called Output unit/device. For example Monitor, Printers, Speaker etc.

An output unit performs the following functions:

a. It accepts the results produced by a computer, which are in coded form
b. It converts these coded results to human acceptable form.
c. It supplies the converted results to outside world.

The output that is obtained from a computer system can be categorized into two main forms.

- Soft Copy.
- Hard Copy.

SOFT COPY

Generally refers to the output displayed on a computer screen. It is a transparent form of output and is lost when the computer is turned off. But if the data needed to

create a soft copy have been saved on disk or tapes, the soft copy can be reproduced on the screen any time. The monitor is the main soft copy device.

Monitor: A monitor is a television like device used to display data or information. Monitors allow the users to view the results of processing.

HARD COPY

Hard copy refers to the information that has been on paper etc. It can be read immediately or stored and read later. Printers and plotters are hard copy devices.

PRINTER:

A printer is an output device that can convert electrical signal into printed characters on papers and provides a permanent visual record of data.

Or

Printers are used to transfer information from the computer onto paper. For example, if you typed a letter in a word processor, you could print out a paper copy to send. There are many different types of printers (presented below).

Laser:

These are large, expensive printers that work like a Photocopier. They usually have very high quality printouts and can Print very fast.

Inkjet and Bubble-Jet:

These are smaller, cheaper printers that use a little cartridge to spray a jet of ink onto the paper. They are fairly quiet and of good quality, but are not as fast or produce such high Quality output as a laser printer. These printers are sometimes known as **line printers** because they print each page one line at a time.

Dot matrix/impact:

An older type of printer that uses a ribbon and a print head, like a typewriter. They are very loud and extremely slow. However, they are very much cheaper.

PLOTTER:

A plotter is an output device designed to produce high-quality graphics in a variety of colors. The plotter is used to give very neat best quality to the graphics. Plotter is useful for the engineers, artists, designers, architects to make graphics when the size output in more than one page.

Memory:

The place or location where data and programs are stored called Memory. There are two types of Memory.

1. Primary Memory
2. Secondary Memory

1. Primary Memory:

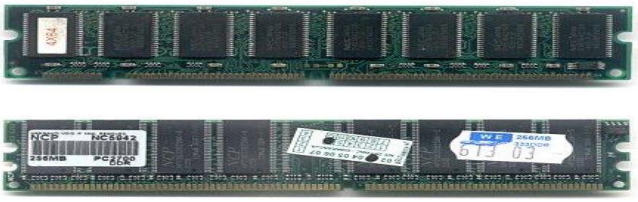
The memory where data and programs are stored for the purpose of processing called Primary Memory. Primary Memory Stored Data for Temporary Time. It is also called Internal Memory or Main Memory.

There are three Types of Primary Memory.

RAM, ROM, Cache Memory

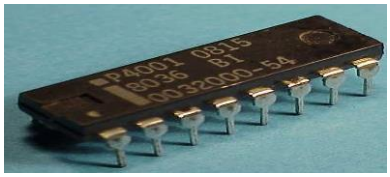
RAM:

RAM Stand for Random Access Memory because we can access data directly from any memory location of RAM. It is also called Volatile Memory because it stored data whenever power is on and lost data if power is off. It is a Temporary Memory. It is also called Read/Write Memory.



ROM:

ROM Stands for Read Only Memory. It is also called Non Volatile Memory because it store data and programs if power is on or off. It can not accept any input data or instructions from the users. It stores Bios Setup Programs. In ROM Data and Programs are stored by manufacturer during Manufacturing. And we can not erase or change the data stored in ROM.



Programmable Read Only Memory (PROM)

In the beginning PROM are empty, nothing programmed or recorded on them. The data is recorded on them with special programming device which then become permanent like Rom. These ROMs are also programmed by the manufacturer.

Erasable Programmable Read Only Memory (EPROM)

It is also empty chips like PROM. The data is also recorded on them with a special programming device but the difference is that the data can be erased and reprogrammed when ever it is required. The data is erased with ultraviolet light.

Electronically or Electrical Erasable Programmable Read Only Memory (EEPROM)

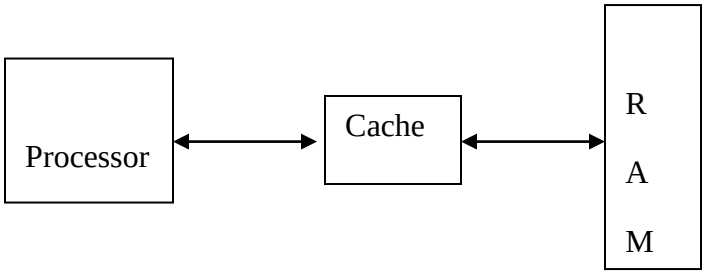
The Characteristics of this EEPROM are same as EPROM but the only difference is that it uses electrical pulses instead of ultraviolet light for erasing. It is also called Flash Rom.

Cache Memory:

Cache Memory is a special purpose Memory which increases the processing speed of processor. It is to used to store that data and programs which are most frequently used by processor. It works between RAM and Processor.

There are three types of cache Memory.

1. Level 1 Cache Memory:
2. Level 2 Cache Memory:
3. Level 3 Cache Memory:



2. Secondary Storage/ Memory:

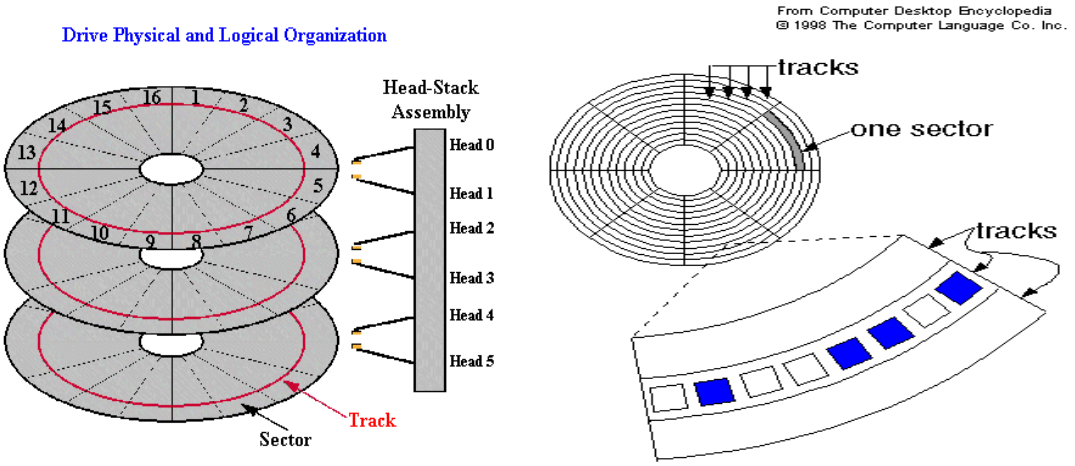
The Memory where our data and programs are stored for Future use permanently called Secondary Memory. It is also called Auxiliary Storage or Backing Storage or Mass storage or External Memory.
For Example Hard disk, CD Rom, Floppy Disk, Flash Memory etc.

Following are the Different types of Media used to store Data.

I. Magnetic Disk or Storage
II. Optical Disk
III. Solid State Storage

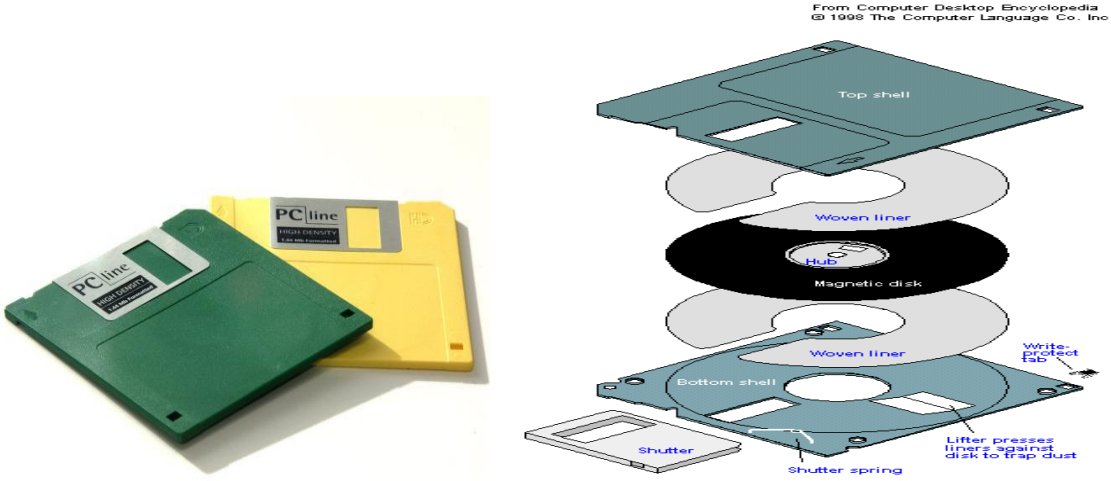
I. Magnetic Storage:

Magnetic Storage is the most widely used storage Media. A magnetic disk is a thin, circular Metal/Plastic plate coated with magnetic material. Information can be recorded on or read from the magnetic surface. A disk must be formatted before it can be used. Formatting process creates tracks and sectors on disk.
Read/Write head are used to read from or write on Magnetic disk Data are writing on or read from disk through Read/Write Head. Floppy Disk and Hard disk are the Example of Floppy Disk.-



a) Floppy disk

A floppy disk is small flexible plastic disk coated with magnetic material on which data are stored. It was introduced by IBM in 1970s. Floppy disk comes in several sizes. Floppy disk is used for software distribution, to share data with other users, make duplicate copies of your data.

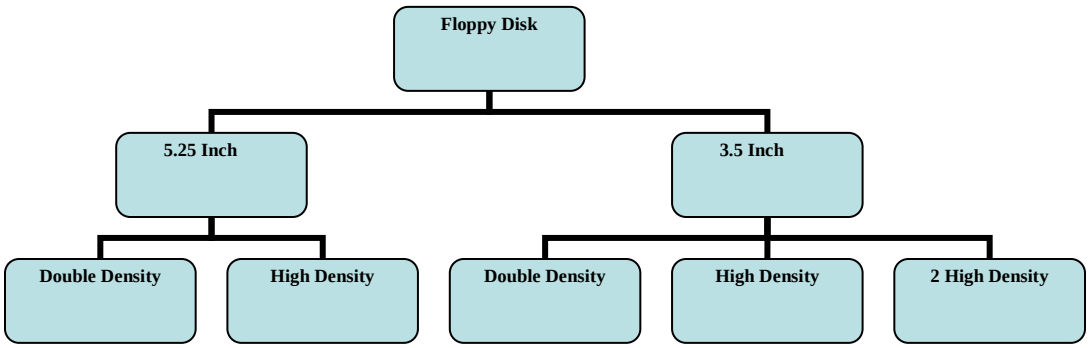


5.25 Inch

Double Density (**DD**) 360KB
High Density (**HD**) 1.2MB

3.5 Inch

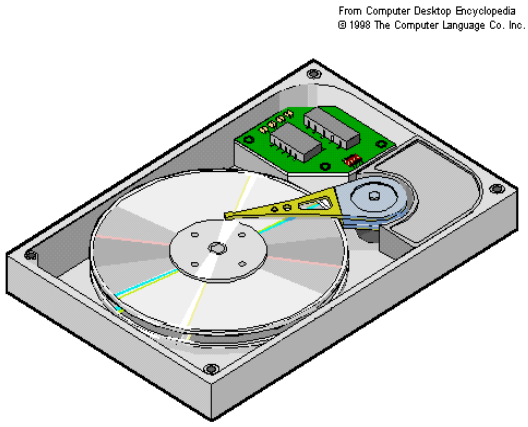
Double Density (**DD**) 720KB
High Density (**HD**) 1.44MB
2 High Density (**2HD**) 2.88MB



b) Hard disk

A hard Disk is a Secondary Storage Device which can Store more data than Floppy Disk. Hard disks provide faster access to files than floppy disk. Nowadays capacity of hard disk is measured in gaga bytes or Terra bytes.

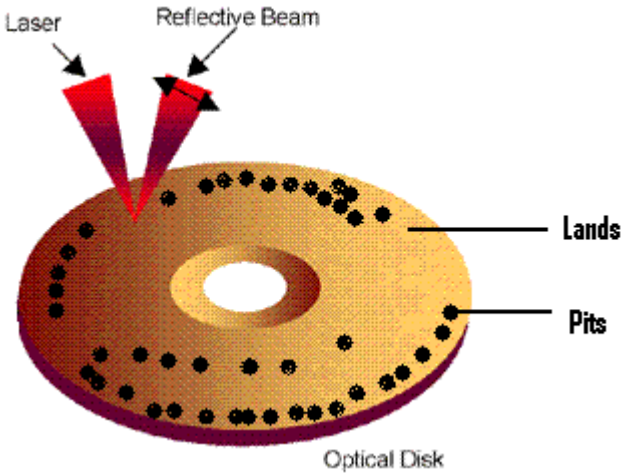
It is also called fixed disk. a hard disk consists of several circular disk called platters. Data are writing on or read from the platters through Read/write head. Each platter contains two read/write head.



Hard disk

II. Optical Disk

Optical disk uses Laser technology to Read and write Data. A laser beam (light) is used to read and write data on optical disk. Optical drive reads data by focusing laser beam on the surface of the disk. Some area of the disk Reflect the light called Lands represent the 1 and other area does not reflect light is called pits represents 0.



CD ROM, CDR, CD RW, DVD ROM, DVD R and DVD RW are the example of Optical Disk.

a. CD ROM

CD ROM Stands For compact Disk Read Only Memory. A Cd can store 700 MB of data. The contents of Cd can be Read by CD

Drive. The data stored on CD ROM can only be read. It cannot be erased or changed. The X on the CD ROM show the speed of transferring Data per Second.

1X = 150 KB/S
2X = 2 * 150KB = 300KB/S
52X = 52 * 150 KB = 7800 KB

b. CD R

CD R Stands for Compact Disk Recordable. The user can write data on CD R only once but can read it many times. The data written to CD R can not be erased. It is also known as WORM (Write Once Read More).

c. CD RW

CD RW Stands for Compact Disk Rewritable. It is also known erasable Disk. The user can write data on CD RW many times by erasing the existing contents.

d. DVD ROM

DVD ROM Stands for Digital Video Disk Read Only Memory. It is similar to CD ROM but it can store more Data than CD ROM. It can store up to 17 GB of Data. DVD is read by DVD Drive. The X on the DD ROM show the speed of transferring Data per Second.

1x= 1350
DVD 1x= CD 9x

e. DVD R

DVD R Stands for Digital Video Disk Recordable. It is similar to CD R disk. The user can write data on DVD R only once but can read it many times. The data written to DVD R can not be erased. DVD Writer is used to write data on DVD R.

f. DVD RW

DVD RW Stands for Digital Video Disk Rewritable. The user can write data on DVD RW many times by erasing the existing contents. DVD Writer is used to write data on DVD RW.

g. Blu-Ray

Blu-ray (not Blue-ray) also known as Blu-ray Disc (BD), is the name of a new optical disc format jointly developed by the Blu-ray Disc Association (BDA).The format was developed to enable recording, rewriting and playback of high-definition video (HD), as well as storing large amounts of data. The format offers more than five times the storage capacity of traditional DVDs and can hold up to 25GB on a single-layer disc and 50GB on a dual-layer disc.

III. Solid State Storage

Solid storage devices or Flash Memory devices are unique among all storage devices. These devices do not use disks. These devices are neither magnetic nor optical. It use Integrated Circuit (IC) to store data.

USB Flash Drive:

USB Flash Drive is also known as **Pen drive** Or **Keychain drive.** It provides much greater storage capacity than floppy disk. It can store more than 16 GB of Data. It can be plugged into any USB Port.

Storage units:

The following are some basic units of storage.

BIT: A bit is a smallest unit of memory. A bit is a binary digit which represents 0 or 1. It is denoted by "b".

Nibble: a nibble is combination of 4 bits.
i.e. 1Nibble = 4bits

Byte: A byte is the unit of memory that stores a single alphanumeric character of data. It is represented by "B". It is equal to 8 bits.

1Byte = 8bits = 2Nibbles

1024B=1KB (Kilo)

1024KB=1MB (Mega)

1024MB=1GB (Giga)

1024GB=1TB (Terra)

1024TB=1PB (Pitta)

1024PB=1EB (Exa)

1024EB=1ZB (Zeta)

1024ZB=1YB (Yotta)

Chapter # 4

COMPUTER SOFTWARE

The logical part of computer system to which we can see but can not touch is called software. The set of instruction is called Software.

There are three types of instructions

a) What to do
b) How to do
c) When to do

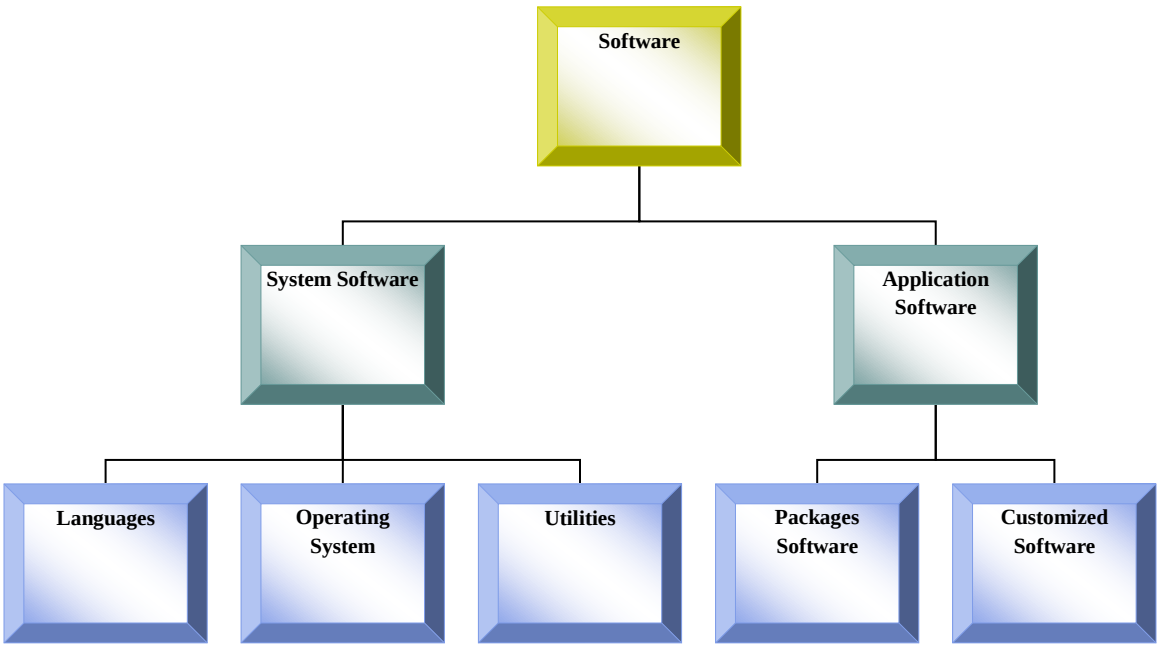
A software program contains the instructions that the computer must follow to carry out the task. Sometimes more than one program is required to complete a task. When this is the case the groups of programs which together complete the task are known as a software package.

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

Types of Software

There are two types of software.

1. System Software
2. Application Software



System Software:

The Software which is used to fulfill the requirements of System is called System Software. Or any program that controls the computer's hardware is called System Software.

Examples of System Software

- Operation systems
- Utility program
- Languages

a) Operating System Software

Operating system Software is software that Control hardware as well as Computer Software. An operating system is essential for any computer, because it acts as an interpreter between hardware, application and the user.

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.

Ms Window (Win98, WinXp, win2000, Window Vista), Linux and Macintosh etc are the examples Of Operating System.

COMMAND LINE INTERFACE:

Command Line Interface (CLI) lets you control your PC by typing commands. There's no mouse or graphical controls like you get in a GUI such as Windows.

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.

UTILITY PROGRAM

A program that performs a specific task related to the management of computer functions, resources, or files, as password protection, memory management, virus protection, and file compression.

It is part that is used to provide services for the hardware and software but it is not absolutely required to run programs and, if it didn't come with the operating system, you

could perhaps add it. In other usages, a utility is an application that is very specialized and relatively limited in capability.

Examples of some utilities are here under:

- Virus scanning software
- Backup software
- Scandisk
- Disk defragmenter
-

Introduction to Computer Languages

A computer language is a mean of communication between user and computer. Just as human being can communicate with each other in different languages, similarly in order to communicate with the computer user also needs to have a language that computer should under stand. Computer languages, which can understand by computer, are needed to tell the machine what to do.

Computer languages are divided into two general types:

1. Low Level Language
2. High Level Language

1) 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:

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.

Assembly Language

Assembly language is one step higher than machine language in human readability. It consist of English-like abbreviations instead of binary codes so less human

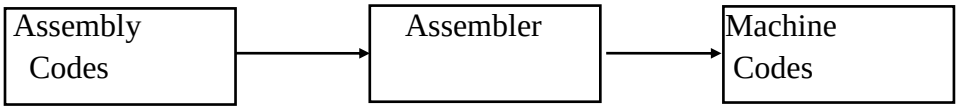
efforts are required. It is also called low-level or symbolic Programming language. A program written in Assembly language cannot be directly understood and executed by the computer. It must be translated into machine code, for this purpose Assembler is used. It is easier to learn as compared to machine language and easy to locate and correct error.

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 some examples of high-level languages are Cobol Common Business oriented language), Basic (Beginners all purpose symbolic Instruction Code), Pascal, C, C++, FORTRAN (formula Translation) etc.

ASSEMBLERS

A program written in assembly language must be translated into machine language so to enable the computer to execute it. This translation is done by program called Assembler program or Assembler. So all program written in assembly language or low level language used assembler to convert into machine code.
Process is as follow:



TRANSLATOR

The programs which translate instructions into machine code are called Translator programs or simply translator. As we know that computer can understand only machine-code instructions, therefore any instructions presented to computer must be ultimately converted into machine language instructions. For this purpose translator are used which translate program written in language other than machine language to machine code. There are three types of translator which are as follows:

COMPILERS

As computers can understand only machine language; the programs written in high-level languages must also be translated into machine language. In the case of assembly language, the translation to machine language is done by an assembler, similarly, for high-level languages, this job is accomplished by Compilers or Interpreters.

A compiler is a complex program which translates high-level language program (source program) to an equivalent machine language program (object program). This process of translation is called 'COMPILATION'. In this process, the whole program is translated completely before executing the machine language program. A compiler is also known as a language processor or simply a processor or translator.

INTERPRETERS

An interpreter is another type of translator program that translates and executes each statement in turn from a high-level languages program into machine language program. In interpretation process, each statement of the program is translated and executed alternately i.e. it takes one instruction, translates it into machine language and then executes it before taking upon the next instruction. This differs from a compiler which translates the entire source program into an equivalent object program. Thus interpreters are much slower in speed as compared to compilers. Moreover, these interpreters waste a lot of times and efforts in case the program contains any errors.

2. Application Software:

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

i) Custom based software (Special purpose software)

ii) Package software (General purpose software)

i) Custom based software (Special purpose software)

The software which is specified by the software vendor/producer **for a specific organization** or institute is called custom based software.

Example:
Software used to maintain the student fee record, teachers salary record and other records of Khurasan University.

ii) Package software (General purpose software)

Software package is a package that can be put to a wide variety of uses. It is design for general public uses. For example a spreadsheet package can be used for any task involving calculations or graph plotting.

The most common generic software packages are

1. Word Processor
2. Presentation Software
3. Spreadsheet
4. Database
5. Communication software

WORD PROCESSOR

"A word processing package is used to prepare and edit text."

Word processors are used to create all types of documents such as letters, reports and essays. Using a word processor you can type, revise and correct a document on the screen before printing it out.

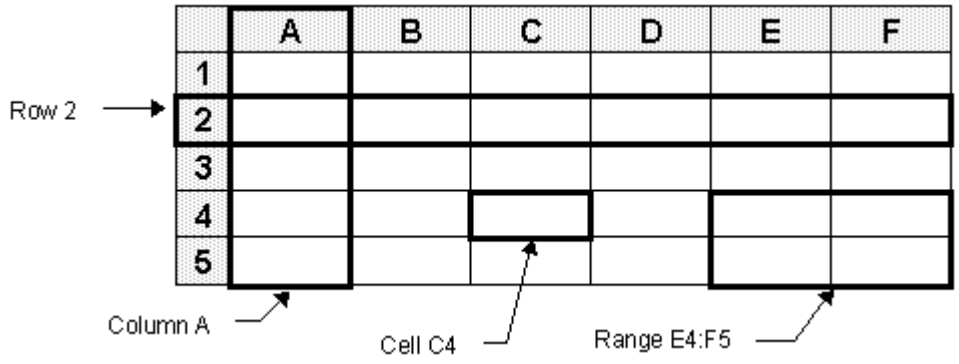
The functions of a word processor can be divided up into several different categories:

- **Page Layout**: The page layout functions let you decide how each page will be set out.
- **Text Presentation**: The appearance of text can be easily altered. Different fonts and styles can be used and the size of text can be varied. Text can be neatly lined up on the page.
- **Editing of Text**: Text editing functions are used to revise and change text that you have entered.
- **Blocks of Text**: The style and position of selected blocks of text can be changed.
- **Text Analysis**: The word processor can look at your document and try to highlight any errors such as spelling or grammatical mistakes that you have made.

- **Templates**: Template files let you save favorite document layouts that you have created so that you can use them over and over again.
- **Other Features**: Most modern word processors will offer lots of extra features such as tables, bullet points and fancy text effects.
- **Mail Merging** : A database of names and addresses can be used to personalize letters that have been created in a word processor

SPREAD SHEET SOFTWARE

A spreadsheet package is used for performing calculations and drawing charts. When you open a spreadsheet package the screen looks like a very large table similar to this:



The table is divided into a number of boxes called **Cells**. You can type information into each cell. Going across the table are many **Rows** each of which is identified by a number. Going down the table are many **Columns** each of which is identified by a letter.
Each cell is identified by a unique name called a **Cell Reference**. The cell reference is formed by writing down the letter of the column that the cell is in followed by the number of the row that it is in.
Groups of joined cells are known as a **Range**. A range can be described by writing down the cell references of the cells at the top left and bottom right corners of the range with a colon to separate them.
You can enter three different types of information into a cell. The three types are:

- **Numbers**: Any number.
- **Labels**: Combinations of letters and numbers used as titles or labels to make the sheet clearer.
- **Formulas**: Used to carry out calculations with the numbers that are entered into the sheet.

PRESENTATION SOFTWARE

"A software program for creating graphic presentations with visual aids, handouts, slides, etc. software for creating text with graphics, audio, and/or video; also called presentation graphics"

- **Presentation graphics**: Presentation software sometimes called "presentation graphics". It is a category of application program used to create sequences of words and pictures that tell a story or help support a speech or public presentation of information.

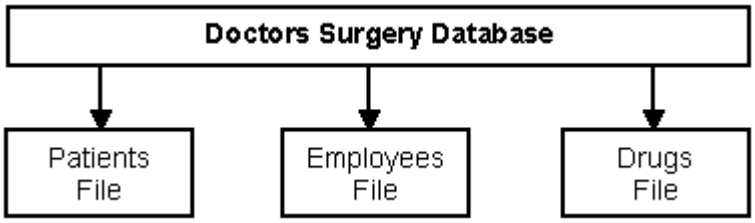
- **Multimedia authoring tools:** Presentation software can be divided into business presentation software and more general multimedia authoring tools, with some products having characteristics of both.
- **Audio and video sequences:** Multimedia authoring software enables you to create a more sophisticated presentation that includes audio and video sequences.

DATABASE SOFTWARE

"A database is a computerized record-keeping system. Databases are used when a large quantity of data has to be stored."

A database is very useful because it will provide tools to let the user search through the data that has been stored to find particular pieces of information. The data stored in a database must have a regular structure.

For example a database keeping information for a doctor's surgery may contain the following files:



When you set up a database you decide on what files you want to create and what the structure of the records in the files should be. All the **records** in the same file must have the same structure. The structure of a record refers to the names of the **fields** that the record contains and the types of these fields. Databases are split up into separate files because:

- Often you want to store information about different kinds of things (e.g. patients, employees) using different record structures. You need to use different files for the different structures.
- Splitting up files can reduce data duplication, saving storage space and improving data consistency.

Security Attacks:

There are different types of security attacks may be on data, software, or on the network.

These attacks are of the two types: Active Attack and Passive Attack

1. Active Attack

The attack that can change or damage our data, software etc is called Active Attack. E.g. Spoofing, Viruses etc

2. Passive Attack

The attack which can only hear or view your data is called passive attack. E.g. Eavesdropping etc

. Viruses:

Viruses are one of the most dangerous threats to network security. Viruses are malicious computer programs prepared by skilled programmers. Viruses are sent as attachment files or hidden in audio, video clips and games, which attach to or overwrite other programs to replicate themselves. Viruses can corrupt files or even wipeout (wash) the hard drive.

There are various types of viruses they are:

i. Transient viruses
ii. Resident viruses
iii. Logic bombs
iv. Boot viruses
v. Program Viruses

i. Transient Viruses:

A transient virus attaches itself to a specific computer program the virus is activated when the program is run and deactivated when the program is terminated.

ii. Resident Viruses

It is the powerful type of virus, because once it is loaded into computer's memory it operates for the duration of computer use. They live in some specific program and can't be transferred to other places.

iii. Logic Bombs:

This type of virus triggers when a given condition becomes true, such as clock on computer matching a specified time.

iv. Boot Viruses

This virus damages the boot sector of hard disk e.g. computing window files etc.

v. Program Viruses

This virus can damage program files and documents.

6. Trojan Horses:

These are malicious programs that hide with in a friendly program or create the identity of a legitimate program, while they can destroy data of the computer or network in the background.

They usually send back data like password credit card numbers to its owner. The main difference viruses and them is that they do not replicate. Trojan horses acts like something bad is embedded in a good thing. Like chat windows may be used stealing credit card numbers or other information.

7. Worms:

A worm is similar to a virus except that worms are itself executable. Worms do not need to be attached to another program to spread. They are only being executed when you execute them. They can be transferred to other places.

8. Web–Defacing:

Web defacing is another form of attack done by the hackers, in which the hackers illegally enters an organization website and change the content of that website.