

كلية شط العرب الجامعة

Shatt Al-Arab University College



قسم هندسة تقنيات الوقود والطاقة

Computer Utilization 1

(استخدامات الحاسبة 1)

مدرس المادة
م.م علي احمد العيداني

المرحلة الأولى

Computer Application in Business

– Unit(1) Introduction

BASIC COMPUTER SKILLS

INTRODUCTION

WHAT IS A COMPUTER?

The word “Computer” is derived from the word „compute“. It means „to calculate“. We all are familiar with calculations in our day-to-day life. We apply mathematical operations like addition, subtraction, multiplication, division, etc. and many other formulae for calculations. Simple calculations take less time. But complex calculations take much longer time. Another factor is accuracy in calculations.

So man explored with the idea to develop a machine, which can perform this type of arithmetic calculation faster, and with full accuracy. This gave birth to a device or machine called „computer“.

DEFINITION OF A COMPUTER

“A computer is an electronic device, which can be programmed to perform highspeed mathematical or logical operations. Computer accepts, stores, correlates, manipulates and processes information in binary format and display the results in a human understandable language.”

A decorative horizontal bar and a small square are located at the bottom of the slide. The bar is light beige and spans a portion of the width. The square is also light beige and is positioned to the right of the bar.

To put it simply, a computer is an electronic device that is designed to work with information.

The Computer...

- 1. Takes in the ***INPUT*** information, then.
- 2. ***PROCESS*** the information, and then.
- 3. Displays the ***OUTPUT*** results.

CHARACTERISTICS OF A COMPUTER

Let us identify the major characteristics of a computer.

1. Speed

As you know computer can work very fast. It takes only few seconds for calculations that we take hours to complete. You will be surprised to know that computer can perform several million (1,000,000) of instructions and even more per second. Therefore, we determine the speed of computer in terms of microsecond (10^{-6} part of a second) or nano-second (10^{-9} part of a second). From this you can imagine how fast your computer can perform.

2. Accuracy

Suppose someone calculates faster but commits a lot of errors in computing, then such a result is useless. There is another aspect, suppose you want to divide 15 by 7. You may work out up to 2 decimal places and say the quotient is 2.14. I may calculate up to 4 decimal places and say that the result is 2.1428. Someone else may go up to 9 decimal places and say the result is 2.142857143.

But a computer can give up to 100 decimal places within a fraction of second and that too accurately. Hence, in addition to speed, the computer provides very high level of accuracy or correctness in computing.

3. Diligence

A computer is free from tiredness, lack of concentration, fatigue, etc. It can work for hours or days together very attentively without creating any error.

If millions of calculations are to be performed, a computer will perform every calculation with the same accuracy. Due to this

capability it is better than human being in routine and repetitive types of work.



4. Versatility

It means the capacity to perform completely different type of work. You may use your computer to prepare payroll slips. Next moment you may use it for inventory management or to prepare electricity bills or prepare accounts, etc. Therefore computer is highly versatile.

5. Multi-tasking

A human being cannot do more than one task at the same time without losing his concentration

or with his full efficiency. But for a computer, it is a normal thing to do many tasks simultaneously without compromising its efficiency. For example, at the same time you may use the computer to type a letter and to listen to your favourite music and also you can open internet web pages to get some information. This is known as Multi-tasking.

6. Power of Memory or Storage

Computer has the power of storing huge amount of information or data. Information can be stored and recalled as

long as you require it, for any number of years. It depends entirely upon you, how much data you want to store in a computer and when to use or retrieve these data. It will not fade away like human memory as years pass.

The computer has an in-built memory where it can store a large amount of data. You can also store data in secondary storage devices such as floppies and CDs, which can be kept outside your computer and can be carried to other computers.

7. No IQ

Believe me! Computer is a dumb machine and it cannot do any work without instructions from the user. It is considered as a faithful idiot that can only perform the instructions given to it at a tremendous speed and with high accuracy without understanding of the work being done by it.

Computer has to be guided as to what you want to do and in what sequence. So a computer cannot take its own decision as you can. So we humans are great!!!

7. No Feelings

Computers do not have feelings or

emotion, taste, knowledge and experience. Thus a computer does not get tired even after doing long hours of work. It does not distinguish between users and different kinds of work being done by it.

HISTORY OF COMPUTERS

- History of computer could be traced back to the effort of man to count large numbers. This process of counting of large numbers generated various systems of numeration like Babylonian system of numeration, Greek system of numeration, Roman system of numeration and Indian system of numeration. Out of these the Indian system of numeration has been accepted universally. It is the basis of modern decimal system of numeration (0, 1, 2, 3, 4, 5, 6, 7, 8, 9). '

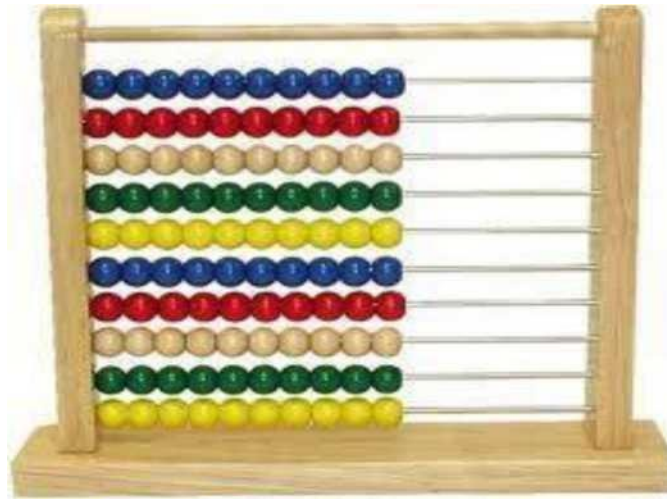
- Later you will know how the computer solves all calculations based on decimal system. However, you will be surprised to know that the computer does not understand the decimal system but it uses binary system of numeration (0 and 1) for processing.

Let us briefly know some of the path-breaking inventions in the field of computing devices.

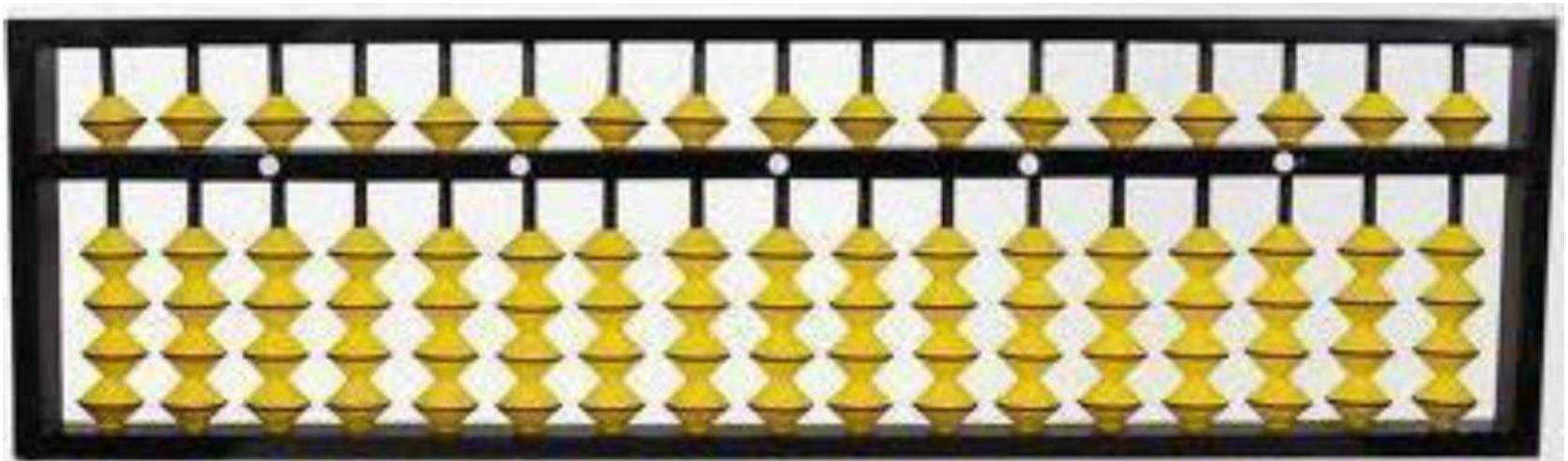
(a) Calculating Machines

It took generations for early man to build mechanical devices for counting large numbers. The first calculating device called **ABACUS**, was developed by the Egyptian and Chinese people.

The word ABACUS means calculating board. It consists of sticks in horizontal positions on which are inserted sets of pebbles. A modern form of ABACUS is as shown in the fig. It has a number of horizontal bars each having ten beads. Horizontal bars represent units, tens, hundreds, etc.



Abacus



(b) Napier's bones

English mathematician John Napier built a mechanical device for the purpose of multiplication in 1617 AD. The device was known as Napier's bones.

7x1

=

7x2

=

7x3

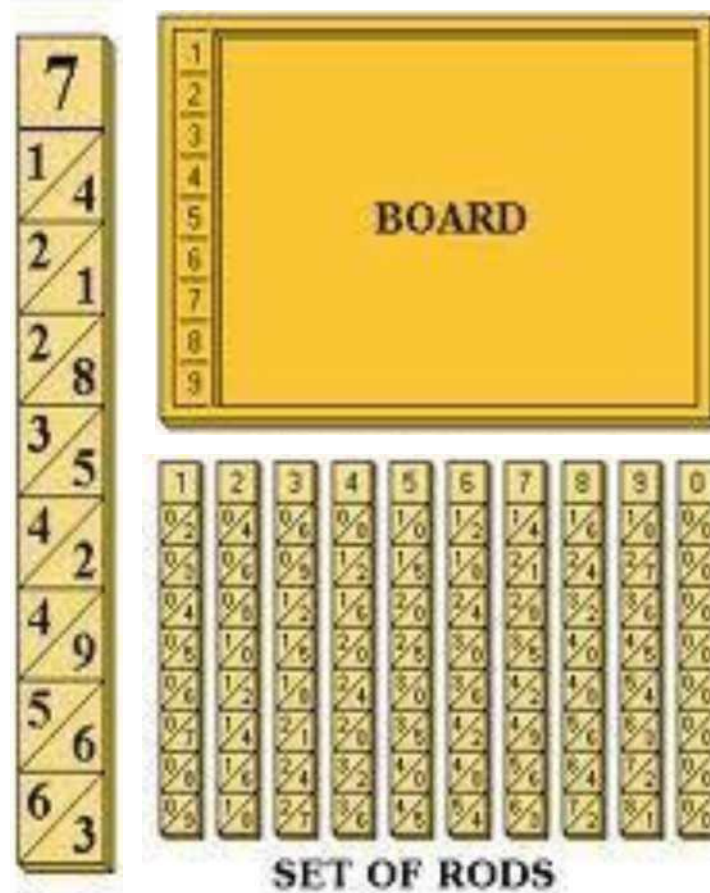
=

7x4

=

7x5

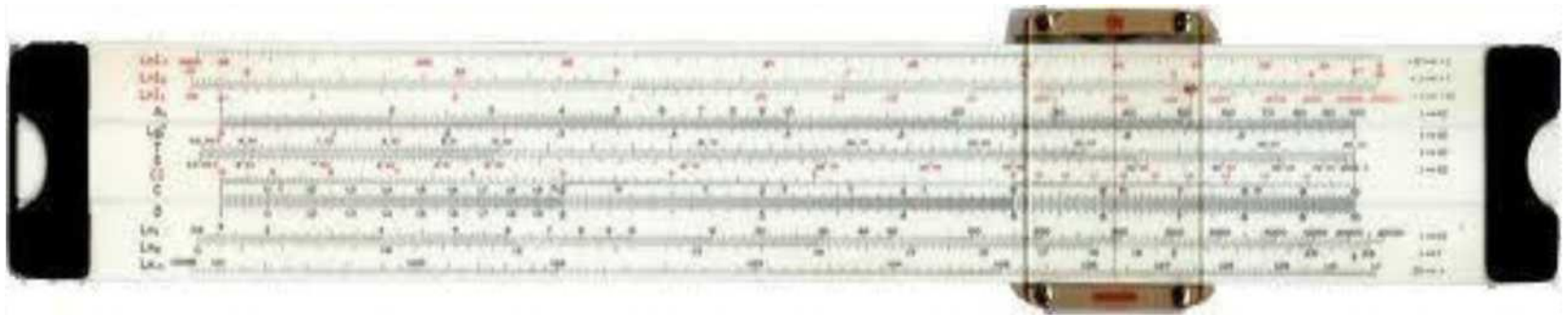
=



(c) Slide Rule

English mathematician Edmund Gunter developed the slide rule. This machine could perform operations like

addition, subtraction, multiplication, and division. It was widely used in Europe in 16th century.



(d) **Pascal's Adding and Subtraction Machine**

You might have heard the name of Blaise Pascal. He developed a machine at the age of 19 that could add and subtract. The machine consisted of wheels, gears and cylinders.

(e) Leibniz's Multiplication and Dividing Machine

The German philosopher and mathematician Gottfried Leibniz built around 1673 a mechanical device that could both multiply and divide.

(f) **Babbage's Analytical Engine**

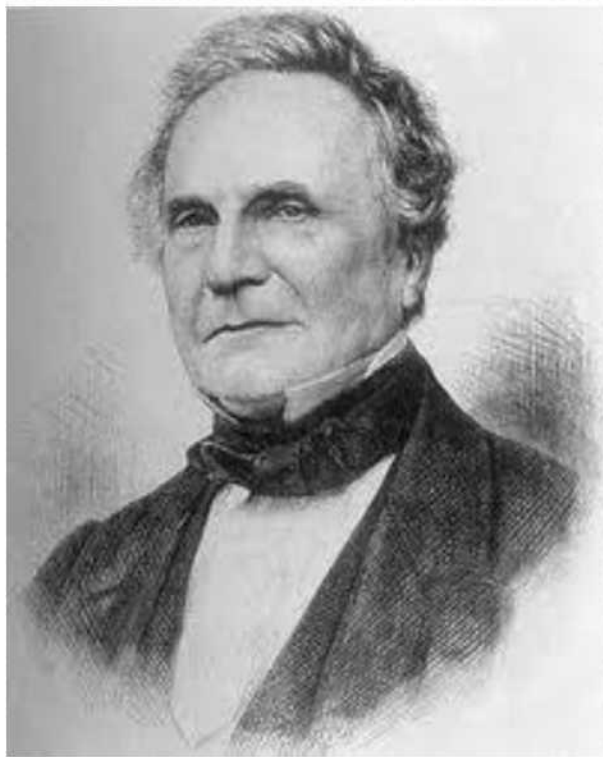
It was in the year **1823** that a famous English man Charles Babbage built a mechanical machine to do complex mathematical calculations. It was called difference engine. Later he developed a general purpose calculating machine called analytical engine. You should know that ***Charles Babbage is called the Father of computers.***

(g) **Mechanical and Electrical Calculator**

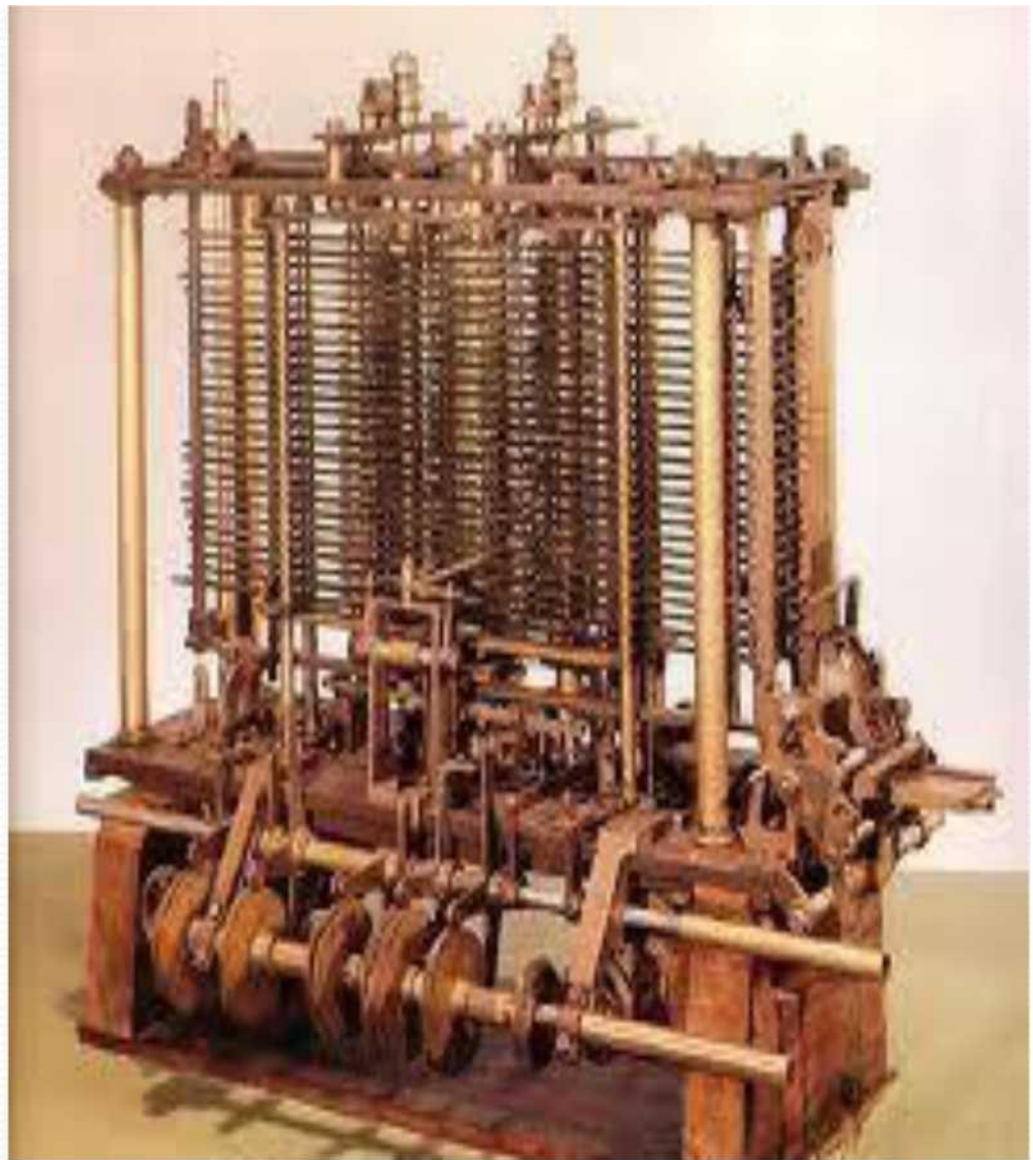
In the beginning of 19th century the mechanical calculator was developed to perform all sorts of mathematical calculations and it was widely used till 1960.

Later the routine part of mechanical calculator was replaced by electric motor. It was called the electrical

Sarita, Vikki, SRCC, DU calculator.



Charles Babbage



Babbage's Analytical Engine

(h) Modern Electronic Calculator

The electronic calculator used in 1960s was run with electron tubes, which was quite bulky. Later it was replaced with transistors and as a result the size of calculators became too small. The modern electronic calculators can compute all kinds of mathematical computations and mathematical

functions. It can also be used to store some data permanently.



COMPUTER GENERATIONS

You know that the evolution of computer started from 16th century and resulted in the form that we see today. The present day computer, however, has also undergone rapid changes during the last fifty years. This period, during which the evolution of computer took place, can be divided into five distinct phases known as Generations of Computers.

Generation of computer means the technological evolution over the period of time. Computers are classified as belonging to specific “generations”. The term generations was initially introduced to distinguish between different hardware technologies. Gradually it shifted to both

hardware and software as the total system consists of both of them.

(a) First Generation Computers (1946-59)

First generation computers used Thermion valves or **Vacuum tubes**. These computers were large in size and writing programs on them was difficult. Some of the important computers of this generation were:

ENIAC: It was the first electronic computer built in 1946 at University of Pennsylvania, USA by John Eckert and John Mauchly. It was named Electronic Numerical Integrator and Calculator (ENIAC). The ENIAC was 30 x 50 feet long, weighed 30 tons, contained 18,000 vacuum tubes, 70,000 resistors, 10,000 capacitors and required 150

kilowatts of electricity. Today your favourite computer is many times as powerful as ENIAC; still the size is very small.

- **EDVAC:** It stands for Electronic Discrete Variable Automatic Computer and was developed in 1950. The concept of storing data and instructions inside the computer was introduced here. This allowed much faster operation since the computer had rapid access to both data and instructions. The other advantage of storing instruction was that computer could take logical decisions internally.
- **EDSAC:** It was developed by M.V. Wilkes at Cambridge University in 1949.

- **UNIVAC-1:** Eckert and Mauchly produced it in 1951 by Universal Accounting Computer setup.

Sarita,Vikki,SRCC,DU

Followings were the major drawbacks of first generation computers.

1. They were quite bulky.
2. The operating speed was quite slow.
3. Power consumption was very high.
4. It required large space for installation.
5. They had no operating system.
6. The programming capability was quite low.

(b) Second Generation Computers (1959-64)

Around 1959 an electronic device called **Transistor** replaced the bulky vacuum tubes in the first generation computer. A single transistor contained circuit produced by several hundred vacuum tubes. Thus the size of the computer got reduced considerably. Transistors therefore provided higher operating speed than vacuum tubes. They had no filament and require no heating. Manufacturing cost was also very low.

It is in the second generation that the concept of Central Processing Unit (CPU), memory, programming language and input and output units were developed. The programming languages such as COBOL, FORTRAN were developed during this period.

Some of the computers of the Second Generation were

- **IBM 1920** : Its size was small as compared to First Generation computers and mostly used for scientific purpose.
- **IBM 1401** : Its size was small to medium and used for business applications.

- **CDC 3600** : Its size was large and used for scientific purpose.
- **The salient features of this generation were:**
 1. Relatively faster than the first generation computers.
 2. Smaller than the first generation computers.
 3. Generated lower level of heat.
 4. More reliable.
 5. Higher capacity of internal storage.

(c) Third Generation Computers (1964-71)

The third generation computers were introduced in 1964. They used **Integrated Circuits (ICs)**. These ICs are popularly known as Chips. A single IC has many transistors, resistors and capacitors built on a single thin slice of silicon. So it is quite obvious that the size of the computer got further reduced. Some of the computers developed during this period were IBM-360, ICL-1900, IBM-370, and VAX-750.

Higher-level language such as BASIC (Beginners All purpose Symbolic Instruction Code) was developed during this period.

The features of computers belonging to this generation were:

- > Used tiny ICs
- > Relatively very small in size
- > Made use of operating system
- > High processing speed
- > More reliable
- > Power efficient and high speed
- > Use of high level languages

- > Large memory
- > Low cost

(d) Fourth Generation Computers (1971 onwards)

The present day computers that you see today are the fourth generation computers that started around 1975. It uses **Large Scale Integrated Circuits (LSIC)** built on a single silicon chip called microprocessors. Due to the development of microprocessor it is possible to place computer's central processing unit (CPU) on a single chip. These computers are called microcomputers. Later **Very Large Scale Integrated Circuits (VLSIC)** replaced LSICs. These integrated circuits are so advanced that they incorporate hundreds of thousands of active components in volumes of a fraction of an inch.

Thus the computer, which was occupying a very large room in earlier days, can now be placed on a table. The personal computer (PC) that you see in your school is a Fourth Generation Computer.

The salient features of this generation are:-

- Very fast
- Very low heat generation
- Smaller in size
- Very reliable
- Negligible hardware failure
- Highly sophisticated

Some of the computers of the Second Generation were

- **IBM 1920** : Its size was small as compared to First Generation computers and mostly used for scientific purpose.
- **IBM 1401** : Its size was small to medium and used for business applications.
- **CDC 3600** : Its size was large and used for scientific purpose.

(e) Fifth Generation Computers

The computers, which can think and take decisions like human beings have been characterized as Fifth generation computers and are also referred as thinking machines. The speed is extremely high in fifth generation computer. Apart from this they can perform parallel processing. The concept of **Artificial Intelligence** has been introduced to allow the computer to take its own decision. It is still in a developmental stage.

A lot of research and development work is going on in this area in United States and Japan but it will take some time before such machines are produced for use by the industry.

CLASSIFICATION OF COMPUTERS

Differences in certain computer characteristics have led to the development of major computer classifications based on the type of electronic signal and memory size.

Types of **computers based on electronic signal they transmit** are:-

- (i) Analog Computers
- (ii) Digital Computers
- (iii) Hybrid Computers

Types of **computers based on memory size**

are:-

1. **Micro Computers**:- Microcomputer is at the lowest end of the computer range in terms of speed and storage capacity. Its CPU is a microprocessor. The first microcomputers were built of 8-bit microprocessor chips. The most common microcomputer is a **personal computer (PC)**. The PC supports a number of input and output devices. An improvement of 8-bit chip is 16-bit and 32-bit chips. Examples of microcomputer are IBM PC, PC-AT.
2. **Mini Computers**:- This is designed to support more than one user at a time. (various users can work at the same time)

It possesses large storage capacity and operates at a high speed than a microcomputer. This type of computer is generally used for processing large volume of data in an organization. They are also used as servers in Local Area Networks (LAN).

3. Mainframe Computers:- These types of computers are generally 32-bit computers. They operate at very high speed, have very large storage capacity and can handle the workload of many users. They are generally used in centralized databases. They are also used as controlling nodes in Wide Area Network (WAN). Example of mainframes are DEC, ICL and IBM 3000 series.

4. Super Computers:-

This is the fastest and most expensive machines. It has high processing speed compared to other computers. They also have multiprocessing technique. One of the ways in which supercomputers are built is by interconnecting hundreds of microprocessors.

Supercomputer is mainly used for weather forecasting, biomedical research, remote sensing, aircraft design and other areas of science and technology. Examples of supercomputers are CRAY YMP, CRAY2, NEC SX-3, CRAY XMP and PARAM from India.

APPLICATIONS OF COMPUTERS IN VARIOUS FIELDS

Computers have their application or utility everywhere. We find their applications in almost every sphere of life-particularly in fields where computations are required to be done at a very fast speed and where data is so complicated that the human brain finds it difficult to cope up with. As you must be aware, computer now-adays are being used almost in every department to do the work at a greater speed and accuracy.

Some of the prominent areas of computer applications are in ***Tourism, Banks, Industries, Transportation, Education, Entertainment*** and so on...

ENTIFY THE MODELS OF COMPUTERS

1) **Tower**; The system box is placed vertically adjacent to monitor.



Tower Model Computer

2)Desktop; It is not designed for portability. The expectations with desktop system are that we will set the computer at permanent location. Most desktop offer more power, storage versatility for less cost than their portable brethren.



Desktop Computer

3) **Laptop:** There are also called note books. Laptops are portable computers that integrate the display, keyboard, pointing, device or track ball, processors, memory and hard drive all in battery operated package slightly larger than an average hard cover book.



Laptop Computer

4)**Palmtop**; There are also called as personal digital assistants (PDA"s), palmtop are tightly integrated computers. They often use flash memory instead of a

hard drive for storage. These computers do not have keyboards but rely on touch screen technology for user input.



Palmtop Computer

CONCEPTS OF HARDWARE AND SOFTWARE

Computer hardware is the collection of physical elements that comprise computer system. Computer hardware refers to the physical parts or components of computer such as monitor, keyboard, hard disk, mouse, etc.

“Hardware refers to objects that you can actually see, touch, and feel” like disks, disk drives, display screens, keyboards, printers, mother boards, and chips.

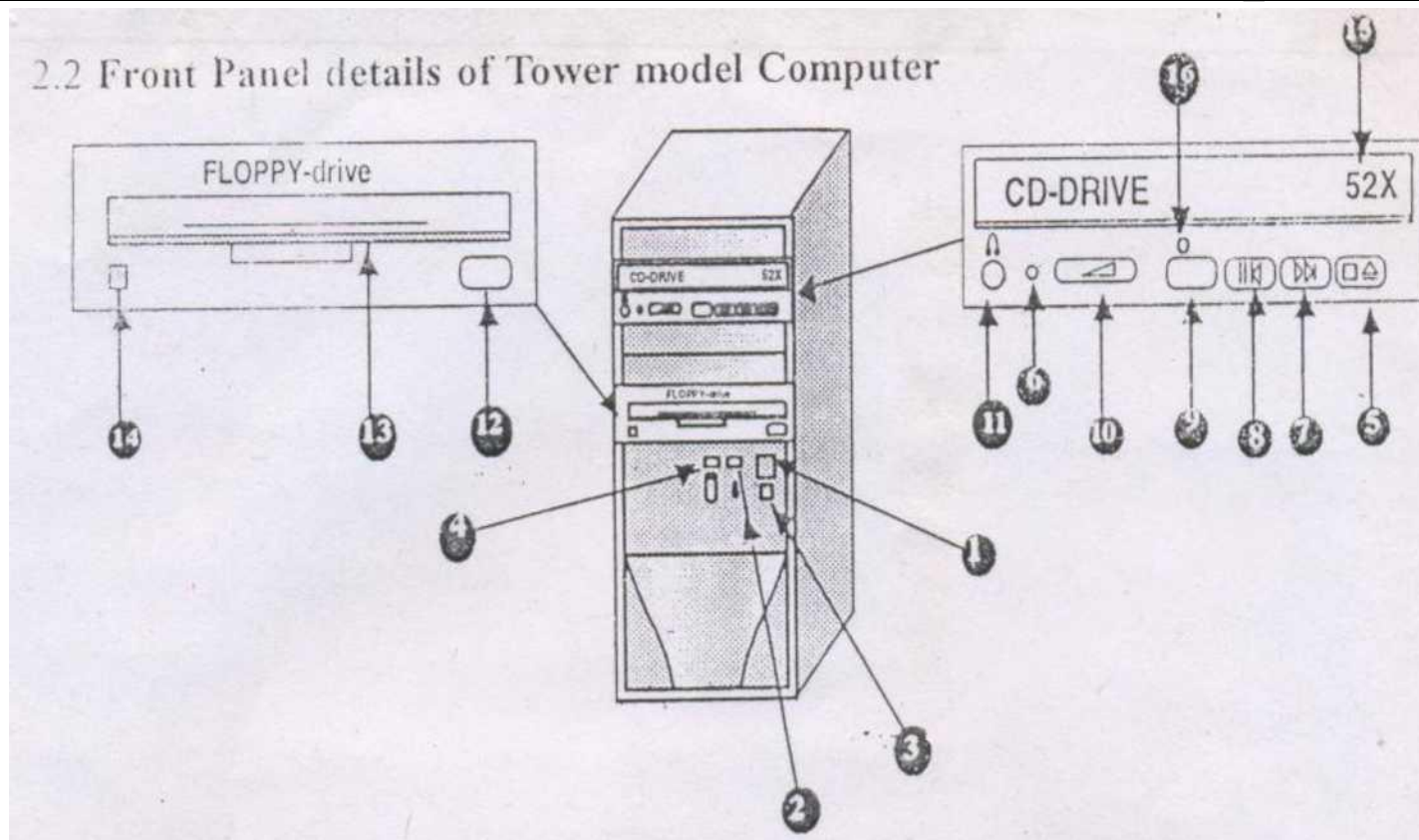
Computer software or just **software**, is a collection of computer programs and related data that provides the

instructions for telling a computer what to do and how to do it. In other words, software is a set of ***programs, procedures, algorithms*** and its ***documentation*** concerned with the operation of a data processing system.

“Software refers to programs which we cannot touch, cannot see and cannot feel by our senses”. Software exists as ideas, concepts, and symbols, but it has no substance.

A combination of hardware and software forms a usable computing system.

Entify and Understand Front Panel Switches and Back Panel Connections of Computer



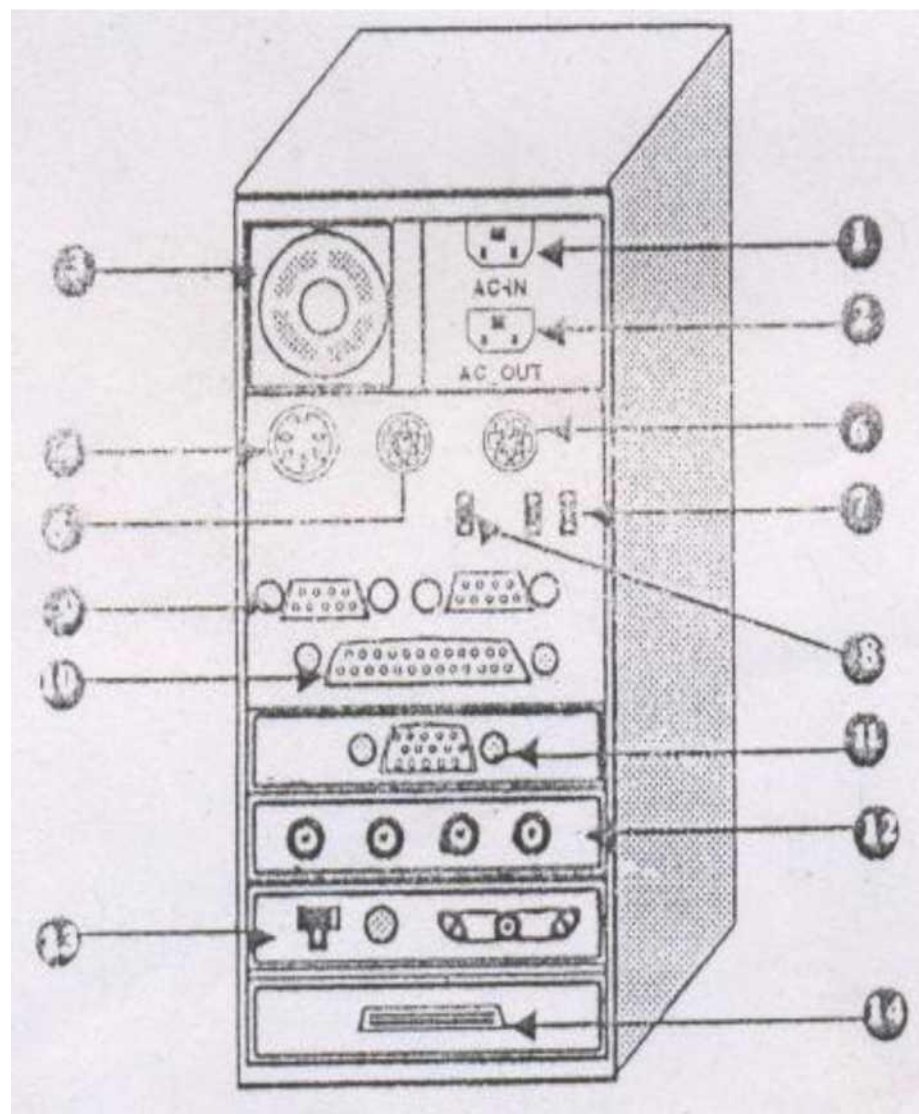
Front Panel details of Tower model computer

1. Power on Switch.
2. Power on (LED) indicator.
3. Reset Switch.
4. Hard Disk Activity indicator.
5. CD-Open / Close / Stop button.
6. CD-Drive Activity indicator.
7. Play / Skip button.
8. Previous Track button.

S arita, Vikki, SRC C ,DU

9. Turbo button.

- 10. Head Phone Volume controller. 11. Head Phone Jack.
- 12. Floppy Disk Eject button.
- 13. Floppy Disk Insertion slot.
- 14. Floppy Disk Activity button.
- 15. CD-R/W Speed.
- 16. Emergency Eject hole.



PC Back Panel details

Sarita,Vikki,SRCC,DU

E-RESOURCE

48

1. AC-Power in (From Main or UPS)
2. AC-Power out (To Monitor)
3. Exhaust Fan.
4. Keyboard Port(For AT2 Keyboard connector)
5. Keyboard port (For PS2 Keyboard connector)
6. Mouse Port(For PS2 Mouse connector)

7. USB Port (2 No's for Inkjet Printer)
8. Fire wall port

S arita, Vikki, SRC C ,DU

9. Serial Port (COM1 and COM2 for Mouse / Modem Connector)
10. Parallel Port (LPT1 for printer connection)
11. Video Port (For Monitor)
12. Multimedia Ports. (For mic, speaker, line-in connection)

- 13. Network Ports (RCAJACK / BNC for network cable connection)
- 14. SCSI ports (For connecting external SCSI hard disk)



Practice

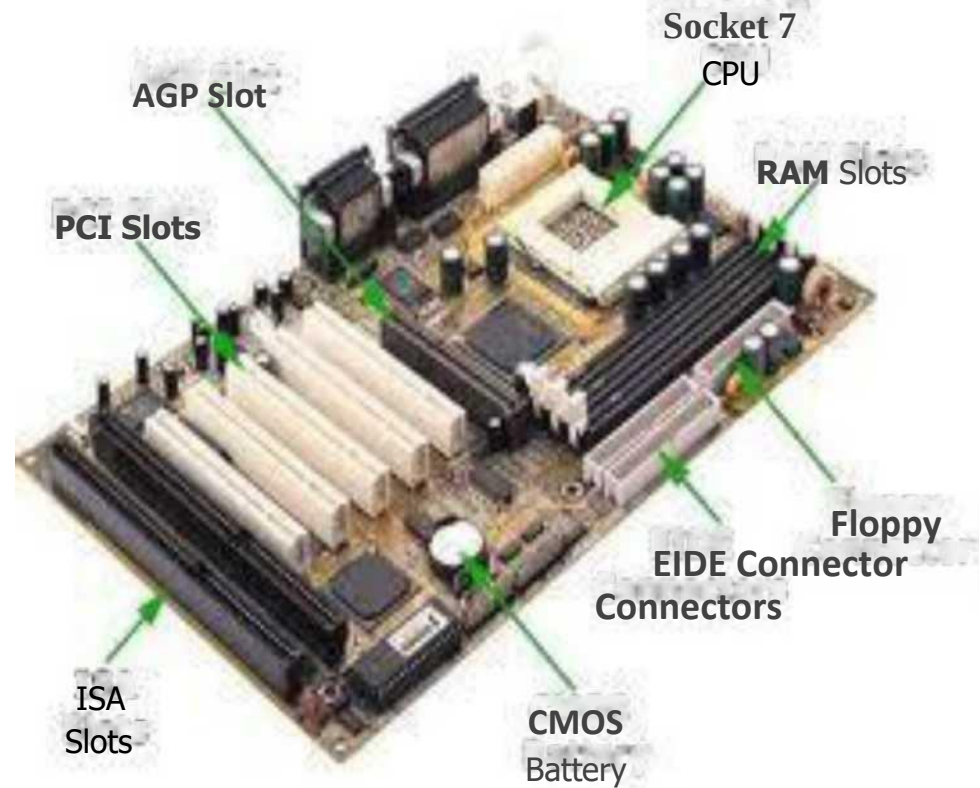
Connecting The Cables.

PRACTICE CONNECTING THE CABLES INTO THE BACK PANEL OF COMPUTER



PHYSICAL COMPONENTS OF COMPUTER

Mother Board: It is also called as system board / panel board / main board. It is a large printed circuit board (PCB) inside a system unit. It holds the majority of crucial components of the system providing connectors for other peripherals.



Motherboard

Processor Chip: It is also called as Central Processing

Unit (CPU). It carries out the instructions of a computer program by performing the basic arithmetical, logical, and input/output operations of the system. All calculations and processing of computer is executed using processor. The CPU plays a role of somewhat analogous to the brain in the computer.

Two typical components of a CPU are the Arithmetic Logic Unit (ALU), which performs arithmetic and logical operations, and the Control Unit (CU), which extracts instructions from memory and decodes and executes them, calling on the ALU when necessary.

Eg: Intel Pentium 4, AMD Athlon



C.P.U.

MEMORY

Memory: It is a storage device used to store information in computers. The semiconductor memory is organized into *memory cells or bistable flip-flops*, each storing one *binary bit (0 or 1)*. The memory cells are grouped into words of fix word length, for example 1, 2, 4, 8, 16, 32, 64 or 128 bit. Each word can be accessed by a binary address of N bit, making it possible to store 2^N words in the memory

What are bits, bytes, and other units of measure for digital information?

A bit is a binary digit, the smallest increment of data on a computer. A **bit** can hold only one of two values: **0 or 1**, corresponding to the electrical values of off or on, respectively.

Because bits are so small, you rarely work with information one bit at a time. Bits are usually assembled into a group of eight to form a byte. A byte contains enough information to store a single ASCII character, like “k” (maybe 00101101).

So in computer jargon, the following memory units are used:

Unit	<u>Equivalent</u>
1 bit	0 or 1
1 nibble	a group of 4 bits
1 Byte	a group of 8 bits
1 Kilobyte (KB)	10^3
1 Megabyte	(i.e., 1024 bytes) 10^6
(MB) 1 Gigabyte	bytes 10^9 bytes 10^{12}
(GB)	bytes 10^{15} bytes
1 Terabyte (TB)	
1 Petabyte (PB)	

There are different types of memories in computers:-

Registers: Small memory, internal to processor, where actual processing is done.

Cache Memory: Catches some of content of main memory which current in use of the processor.

Main Memory (RAM/ROM): Large memory which is fast but not as internal Processor memory.

All the above memories are volatile memories because the stored information is lost when the power is removed from the system.

RAM; Random Access Memory. It is volatile memory.

It allows both read/write operations.

ROM; Read Only Memory. It is non-volatile memory.

It allows only read operations.

Random Access Memory (RAM) is a form of ***computer data storage***. Today, it takes the form of integrated circuits that allow stored data to be accessed in any order. Other memory devices (magnetic tapes, floppy discs, CDs and DVDs) can access the storage data only in a predetermined order, because of mechanical design limitations. The two main forms of modern RAM are Static RAM (SRAM) and Dynamic RAM (DRAM).



R.A.M.

SECONDARY MEMORY

Secondary Memory; Very large memory. It is a nonvolatile permanent memory.

- **Eg;** Magnetic disk (Hard / Floppy) memory, Magnetic Tape memory etc.,

HDD (Hard Disk Drive): It is a mechanism which drives Hard Disks to rotate and controls the flow of data between hard disk and computer. Both hard disk and hard disk drive comes in a single unit, it is permanently fixed in a system unit.

A **Hard Disk Drive (HDD)** is device for storing and retrieving digital information, primarily computer data. It consists of one or more rigid (hence "hard") rapidly rotating discs (platters usually rotating at 7,200 RPM) coated with magnetic material, and with magnetic heads to write data to the surfaces and read it from them.

Magnetic recording A hard disk drive records data by magnetizing a thin film of ferromagnetic material on a disk. Sequential changes in the direction of magnetization represent binary data bits. The data is read from the disk by detecting the transitions in magnetization.

A typical HDD design consists of a **spindle** that holds flat circular disks, also called **platters**, which hold the recorded data. The platters are made from a nonmagnetic material, usually aluminium alloy and are coated with a shallow layer of magnetic material typically 10-20 nm in depth, with an outer layer of carbon for protection. Today, most consumer hard drives operate at a speed of 7,200 rpm.

Information is written to and read from a platter as it rotates past devices called **read and write heads** operate very close (often tens of nanometers) over the magnetic surface. The read-and-write head is used to detect and modify the magnetization of the material immediately under it.

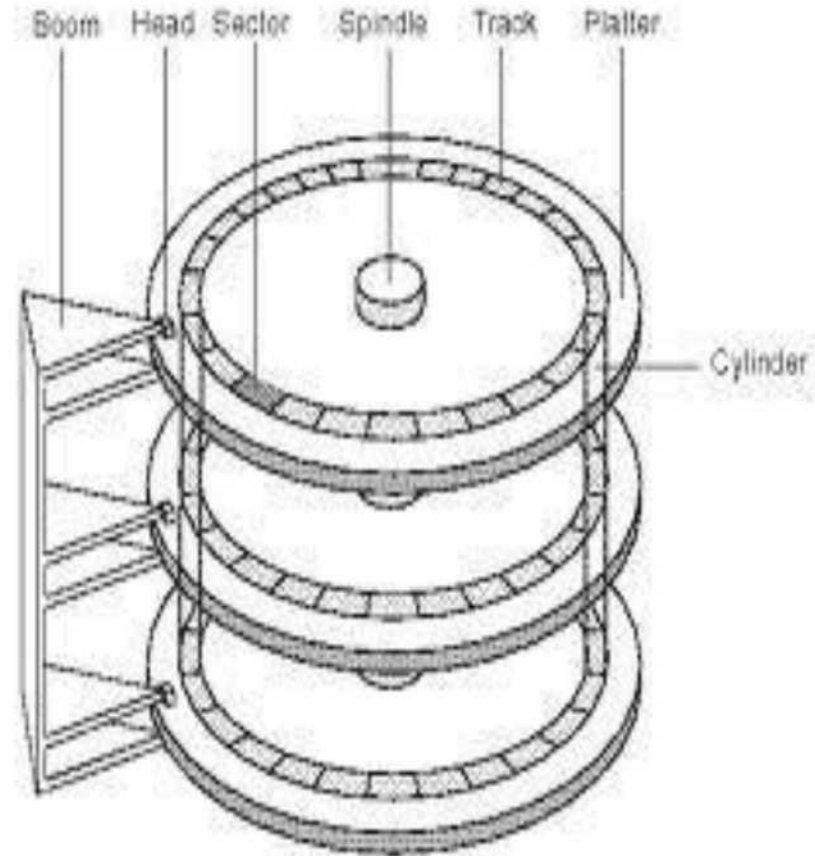
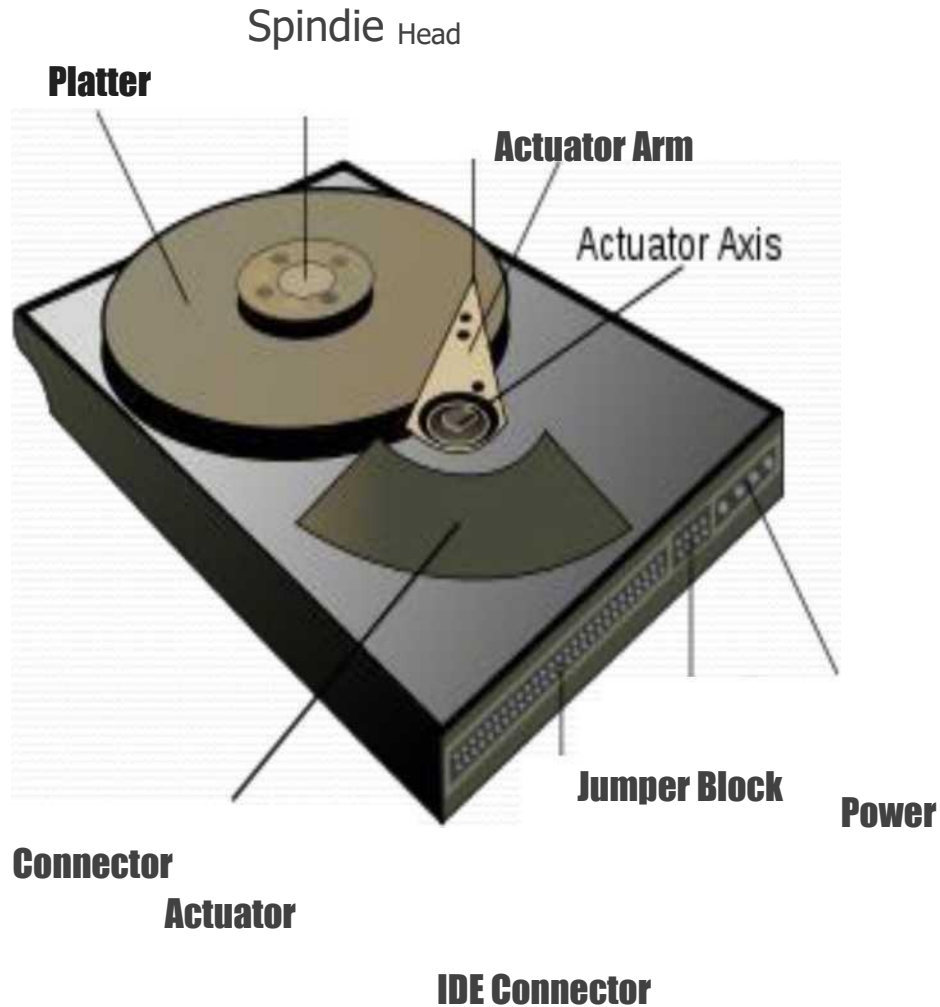
In modern drives there is one head for each magnetic platter surface on the spindle, mounted on a common arm. An actuator arm (or access arm) moves the heads on an arc (roughly radially) across the platters as they spin, allowing each head to access almost the entire surface of the platter as it spins.

A write head magnetizes a region by generating a strong local magnetic field, and a read head detects the magnetization of the regions.



Hard Disk Drive

66



Hard Disk Drive

FLOPPY DISK DRIVE

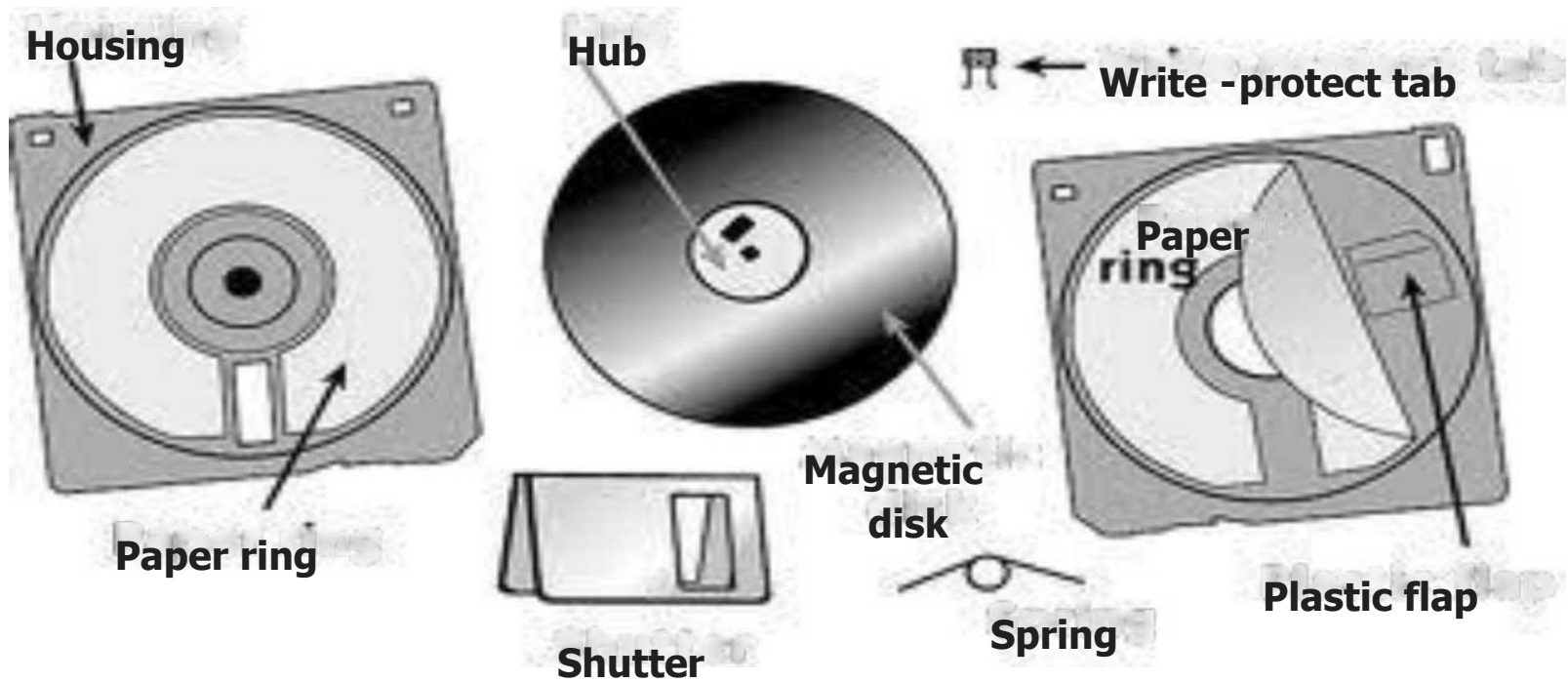
FDD (Floppy Disk Drive): Floppy disk drive is a mechanism which drives FD to rotate for read / write operations. It has a control circuit which transfers data between FD and computer.



Floppy Disk Drive Floppy

68

A **floppy disk**, or **diskette**, is a disk storage medium composed of a disk of thin and flexible magnetic storage, sealed in a rectangular plastic carrier lined with fabric that removes dust particles.



Inside of a Floppy Disk Drive

COMPACT DISK DRIVE

CDDfR/W! (Compact Disk Drive TRead / Write):

The CD-Drive is a mechanism used to read / write digital information on a CD. CD-Drives are available in different forms,

1. CD-Drive for reading purpose only (CD/R)
2. CD-Drive for both reading and writing (CD/RW)

CD drive is an optical disc drive that uses LASER light or Electromagnetic waves of suitable wavelength as part of the process of reading or writing data to or from CD. CD drives are commonly both readers and recorders, also called burners or writers. Compact Disc (**CD**), Digital Versatile Disc

(DVD) and Blue-ray Disc **(BD)** are common types of

Basipli^puter Skills - Grille



Compact Disk Drive

A recorder encodes (or ***burns***) data onto a recordable CD-R, DVD-R, DVD+R. or BD-R disc (called a “***blank***”) by selectively heating parts of an organic dye layer with a laser. This changes the reflectivity of the dye. thereby creating marks that can be read like the pits and lands on pressed discs.

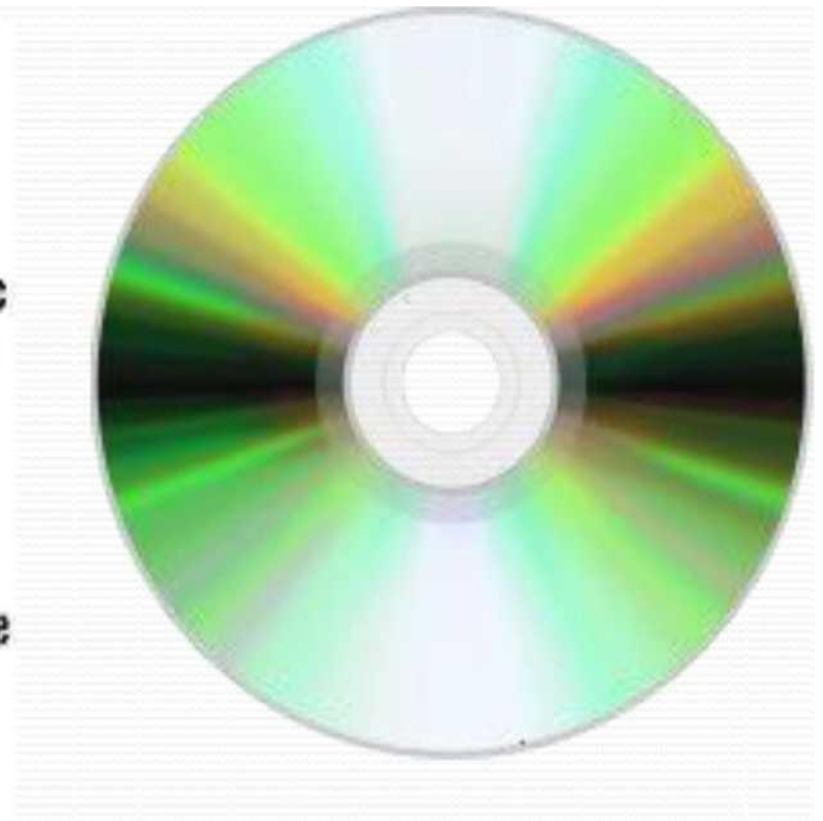
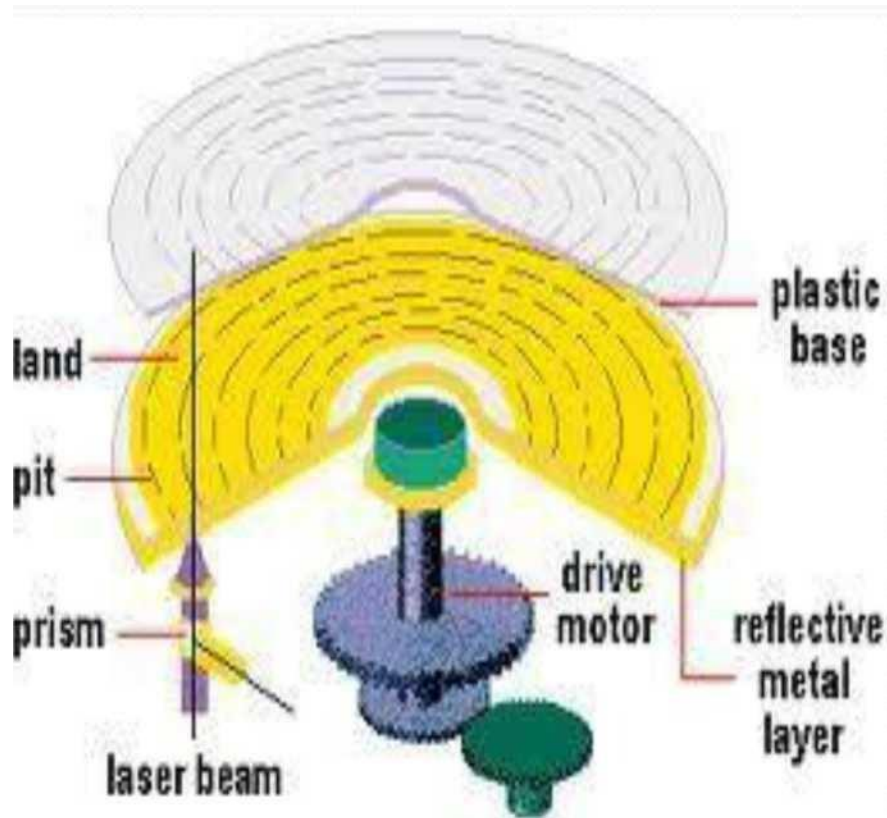
Initially. CD lasers with a wavelength of **780 nm** were used. being within infrared range. For DVDs. the wavelength was reduced to **650 nm** (red color). and the wavelength for Blu-ray Disc was reduced to **405 nm** (violet color).

A CD is made from 1.2 millimetres (0.047 in) thick polycarbonate plastic and weighs 15-20 grams. A thin layer of aluminium or, more rarely, gold is applied to the surface making it reflective. The metal is protected by a film of lacquer normally spin coated directly on the reflective layer. The label is printed on the lacquer layer, usually by screen printing or offset printing.

For rewritable CD-RW, DVD-RW, DVD+RW, DVD-RAM, or BD-RE media, the laser is used to melt a crystalline metal alloy in the recording layer of the disc.

CD data is stored as a series of tiny indentations known as "pits", encoded in a spiral track moulded into the top of the polycarbonate layer. The flat areas between pits are known as "lands". Each pit is approximately 100 nm deep by 500 nm wide, and varies from 850 nm to 3.5 μ m in length. The distance between the tracks, the pitch, is 1.6 μ m.

The pits and lands themselves do not directly represent the zeros and ones of binary data. Instead, nonreturn-to-zero encoding is used: a change from pit to land or land to pit indicates a one, while no change indicates a series of zeros.



Compact Disk (CD)

Optical Disk Drive Mechanism

Switched Mode Power Supply

SMPS: It refers to *Switched Mode Power Supply*. It is a buffer circuit, make the computer system load, compatible with its power source.

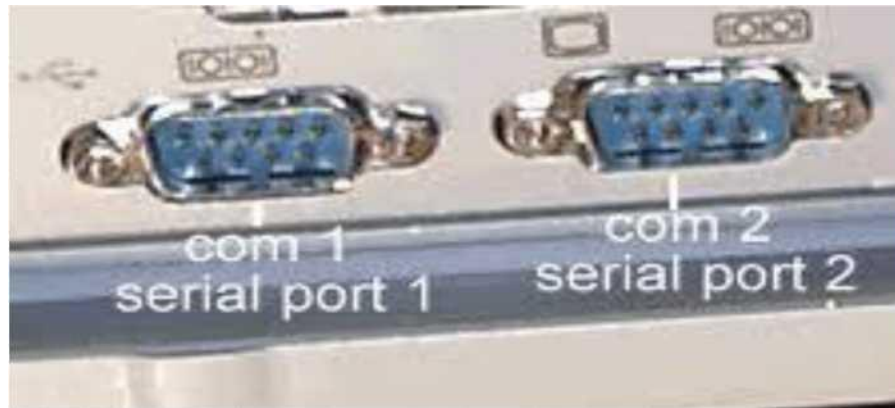
A switched-mode power supply is an electronic power supply that incorporates a switching regulator to convert electrical power efficiently. Like other power supplies, an SMPS transfers power from a source, like mains power, to a load, such as a PC, while converting voltage (from 230 V to 12V or 5V) and current (from AC to DC) characteristics. An SMPS is usually employed to efficiently provide a regulated output voltage.



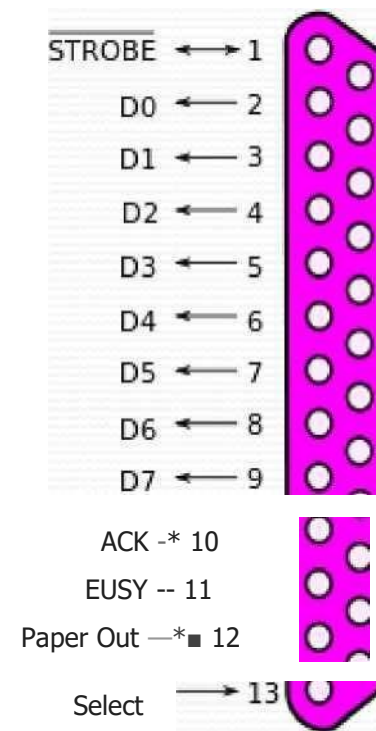
S.M.P.S.

Ports:- Ports are the sockets available on the system box. They are used to connect external devices to the computer.

Serial Port :- It is a Serial Communication physical interface through which information transfers in or out one bit at a time (in contrast to a parallel port). Serial Port is used primarily to connect a Mouse or Keyboard to the PC. It transfers data bit by bit.



Parallel Port It is a type of interface used to connect a printer



to the computer. It transfers 8 or more data bit

simultaneously.

- 14 ■+—► Line Feed
- 15 3— Error
- 16 RESET
- 17 —*■ Select Printer
- 13 - GMD

19 - GND
20 - GMD
21 - GND
22 - GND
23 - GND
24 - GND
25 - GMD

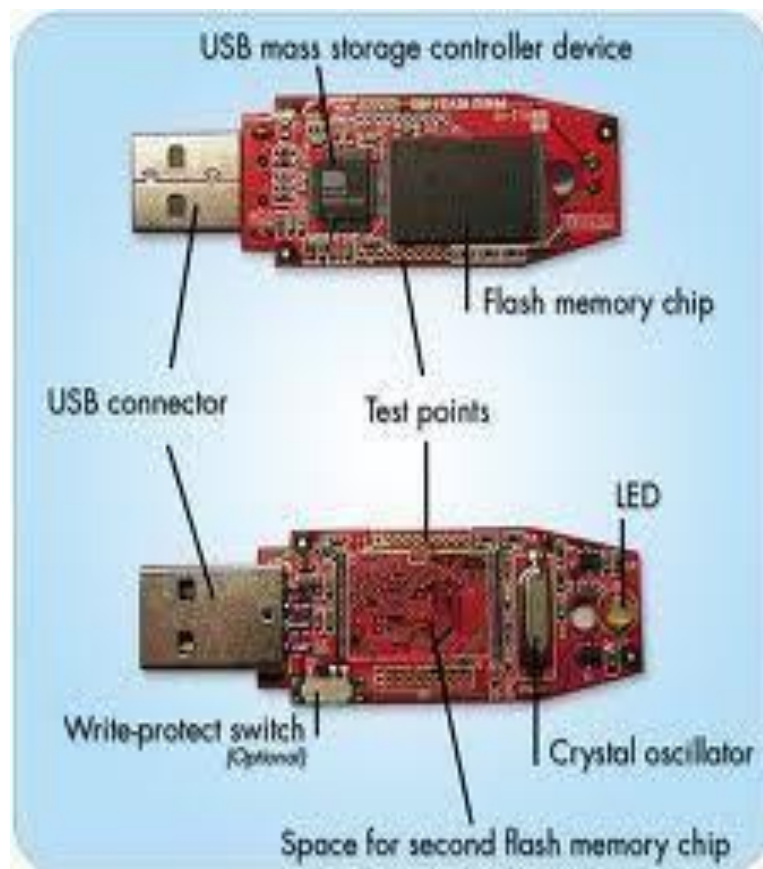
Parallel Port or Printer Port

79

USB (Universal Serial Bus):- It combines all the advantages of multi-platform serials ports. We can connect mouse, keyboard, digital camera, printer and storage devices to USB.

Universal Serial Bus (USB) was designed in the mid-1990s to standardize the connection of computer peripherals both to communicate and to supply electric power that defines the cables, connectors and communication protocols used in a bus for connection, communication and power supply between computers and electronic devices.





VGA / SVGA / AGP

VGA (Video Graphic Array):- Video Graphics Array is an IBM video standard capable of displaying higher resolution of 800x600 pixels, with 256/6 bit colors and 1024x780 pixels, with 256/16 bit colors.

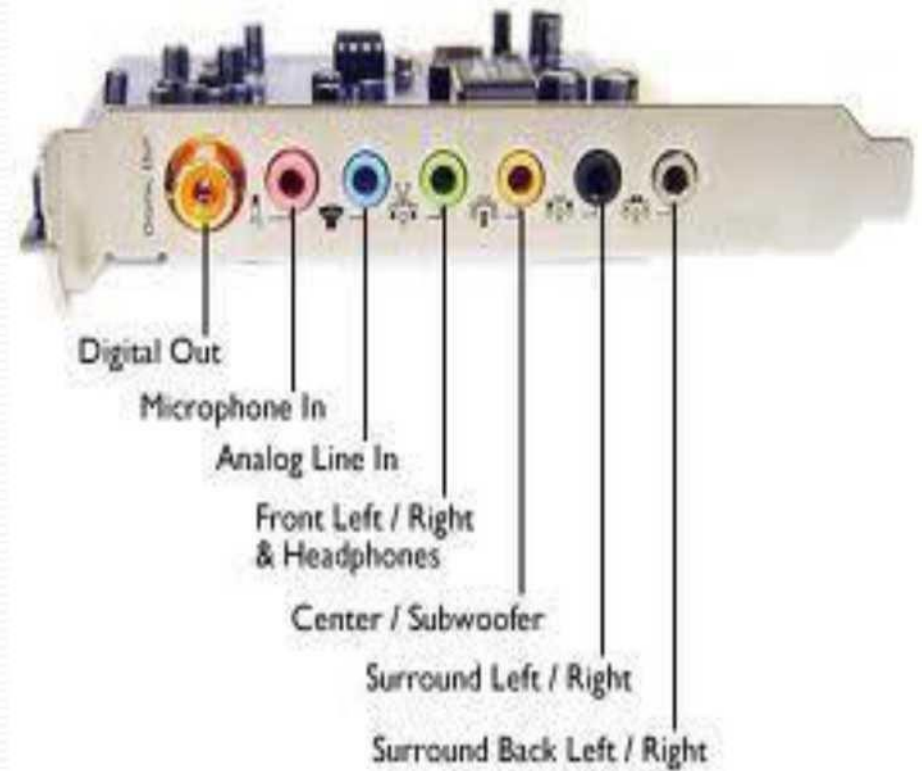
AGP (Accelerated Graphic Port):- Accelerated Graphics Port is a video card which interfaces the monitor to the Mother board. An AGP card will allow game and 3D application developers to store and retrieve larger, more realistic textures in system memory rather than video memory.



A.G.P. Card

SOUND CARD It is an expansion card that records and plays back sound by translating the analog signal from a microphone into a digitized form that the computer can store and process and then translating back the modified data into analog signals or sound.

A sound card (also known as an audio card) is an internal computer expansion card that facilitates the input and output of audio signals to and from a computer under control of computer



Sound Card

Network Card;- If we want to connect our computer to another computer we will need a Network Interface Card (NIC). NIC is an adapter card that physically connects one computer to a network cable and to another computer that has the same type of NIC.



MODEM (Modulator - Demodulator);- In order to go online and surf the web or check E-mail, we need a modem to connect to an internet service provider (ISP). A modem is a device that we connect to a computer and to a phone line. Basically, modems do for computers what a telephone does for humans.

A modem is a device that modulates an analog carrier signal to encode digital information, and also demodulates such a carrier signal to decode the transmitted information. The goal is to produce a signal that can be transmitted easily and decoded to reproduce the original digital data.

There are two types of MODEM namely,

- 1) Internal MODEM: It is integrated with mother board or attached to mother board.
- 2) External MODEM: It is an external device, connected to mother board using serial port.



MODEM

INPUT DEVICES

Input Devices: The input devices are used for transferring / entering user command or data or choice to the computer. Input unit captures or reads data / information and converts these data into form that computer understands and transfers these data to memory unit for execution.

- **Eg:** Keyboard, Mouse, Scanner, Joystick, Floppy, CD, DVD etc.,

KEY BOARD

The keyboard is default input device, which bridges the gap between the operator and their computer system. The user communicates with the computer by typing instruction or pressing keys on the key board. The keys on a key board is almost similar to typewriter keys with some additional keys such as programmed function keys, programmable keys, cursor control keys and numeric keys.

Keyboard has an arrangement of buttons or keys, to act as mechanical levers or electronic switches.

In normal usage, the keyboard is used to type text and numbers into a word processor, text editor or other programs.

90

Standard "full-travel" alphanumeric keyboards have keys that are on three-quarter inch centers (0.750 inches, 19.05 mm), and have a key travel of at least 0.150 inches (3.81 mm).

Windows standard keyboards has 104-keys, which includes alphabetic characters, punctuation symbols, numbers and a variety of Function keys. The internationally common 102/105 key

keyboards have a smaller 'left shift' key and an additional key with some more symbols between that and the letter to its right (usually Z or Y). The Enter key is usually shaped differently.



Standard Keyboard (104 Keys)



Foldable Keyboard



Virtual Laser Keyboard

MOUSE

A mouse is an input device. That can be moved around a flat surface by the user. The movement of the mouse is sensed by the computer and translated into cursor movements. The mouse has switches on its back to send command to the computer.

A **mouse** is a pointing device that functions by detecting 2 dimensional motion (X and Y axis) relative to its supporting surface (usually a Mouse Pad). Physically, a mouse consists of an object held

under one of the user's hands, with one or more buttons.

94

The mouse sometimes features other elements, such as "wheels", which allow the user to perform various system-dependent operations, or extra buttons or features that can add more control or dimensional input. The mouse's motion typically translates into the motion of a pointer on a display, which allows for fine control of a graphical user interface.

Optical and laser mice

Optical mice make use of one or more Light Emitting Diodes (LEDs) and an imaging array of photodiodes to detect movement relative to the underlying surface, rather than internal moving parts as does a mechanical mouse. A laser mouse is an optical mouse that uses coherent (laser) light.

Mechanical Mouse



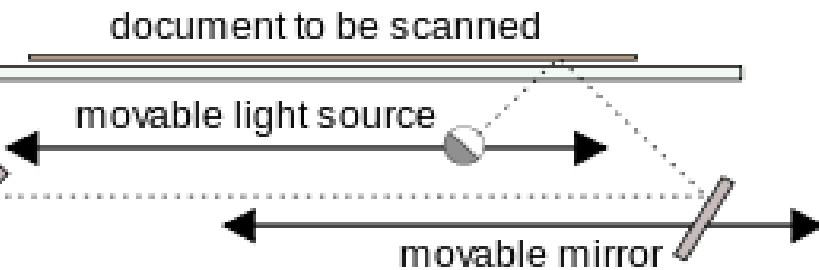
Optical Mouse

SCANNER

Scanner is a device that optically scans images, printed text, handwriting, or an object, and converts it to a digital image. Common examples found in offices are variations of the *desktop (or flatbed) scanner* where the document is placed on a glass window for scanning.

In a scanner, the object is placed on a scanner and the object scanned from left to right, at the end, image of an object will appears on the screen. Scanner consists of two components, the first one to illuminate the object so that the

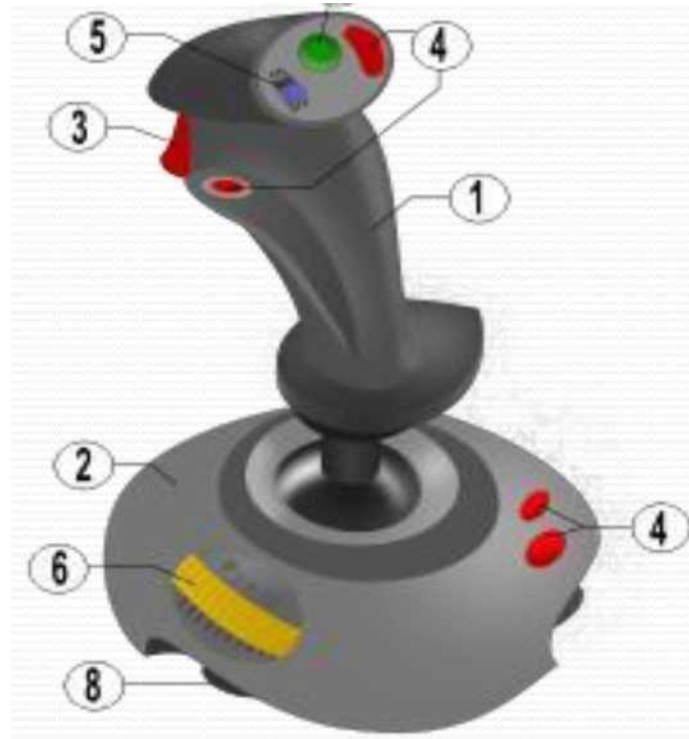
optical image can be captured and the other to convert the optical image into digital format for storage by computer.



Flatbed Scanner

JOYSTICK

A joystick is an interactive input device consisting of a stick that pivots on a base and reports its angle or direction to the device it is controlling. Joysticks are often used to control video games, and usually have one or more push-buttons whose state can also be read by the computer



•

OUTPUT DEVICES

Output Devices: An output device is a computer hardware equipment used to communicate the results of data processing carried out by computer by converting the electronically generated information into human-readable form.

Output devices produces information in the form of printouts, display on monitor etc., Output devices converts processed data into form that the user understands instantly.

- **Eg:** Monitor, Printer, Plotter, Speakers, Headphones, Projectors etc.,

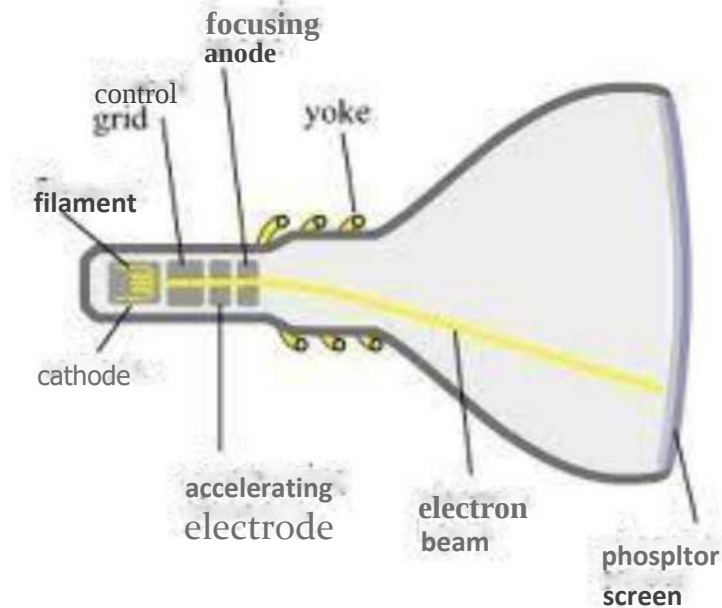
MONITOR

Monitor is a default output device. It shows the soft copy of the output.

A monitor or display or visual display unit) is an electronic visual display for computers. The monitor comprises the display device, circuitry, and an enclosure. The display device in modern monitors is typically a Thin Film Transistor or Liquid Crystal Display (TFT-LCD) thin panel, while older monitors use a Cathode Ray Tube (CRT) about as deep as the screen size.

Cathode Ray Tube

The first computer monitors used Cathode Ray Tubes (CRT). Until the early 1980s, they were known as video display terminals and were physically attached to the computer and keyboard.



TFT-LCD

Thin film transistor liquid crystal display (TFTLCD) is a variant of LCD which uses thin-film transistor (TFT) technology to improve image quality (e.g., addressability, contrast). TFT LCD is one type of Active matrix LCD, though all LCD-screens are based on matrix addressing.



LED and OLED

Organic light-emitting diode (OLED) monitors provide higher contrast and better viewing angles than LCDs, and are predicted to replace



PRINTER

A printer is a peripherals which produces the hard copy output of a text or graphics of documents stored in electronic

form, usually on physical print media such as paper or transparencies.

Many printers are primarily used as local peripherals, and are attached by a printer cable or, in most new printers, a USB cable to a computer which serves as a document source. There are two types of printers. Namely,

1) Impact Printer:- The paper actually comes in contact with a type element in order to print. Eg:
Dot Matrix Printer

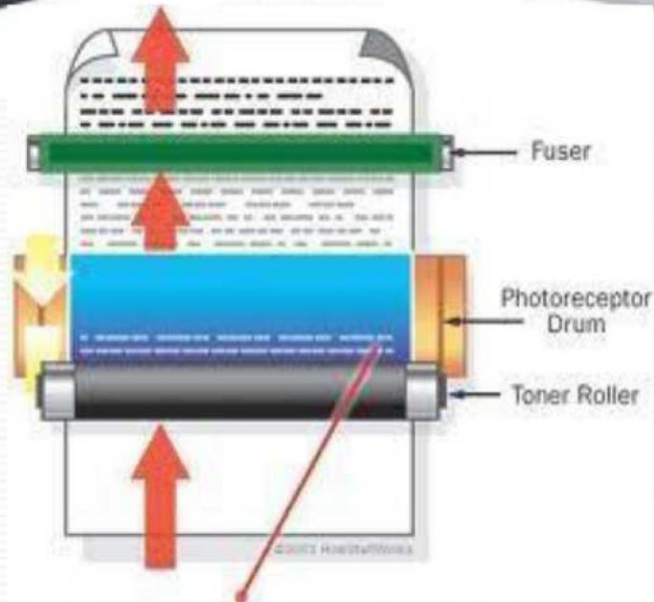
2) Non-Impact Printer: The print is created by some other means.

Eg: Laser Printer, Inkjet Printer.

Dot Matrix Printer



Laser Printer



PLOTTER

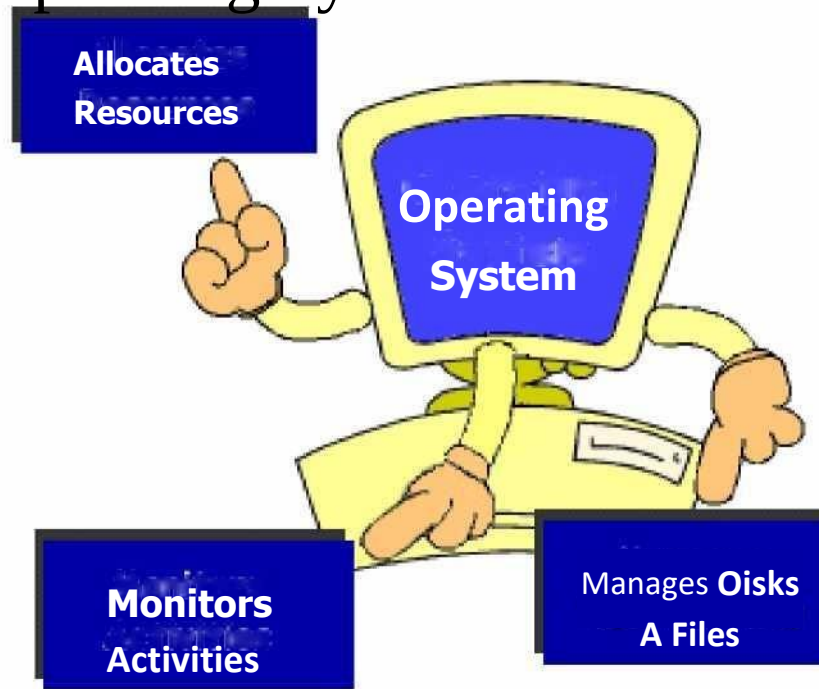
Plotter is an output device similar to printer, which produce hard copy output of graphs, maps, charts, etc., on any sort of paper. The plotter is very convenient and invaluable tool in business graphics applications for printing on very large size papers like Film posters, AutoCAD building drawings etc.,

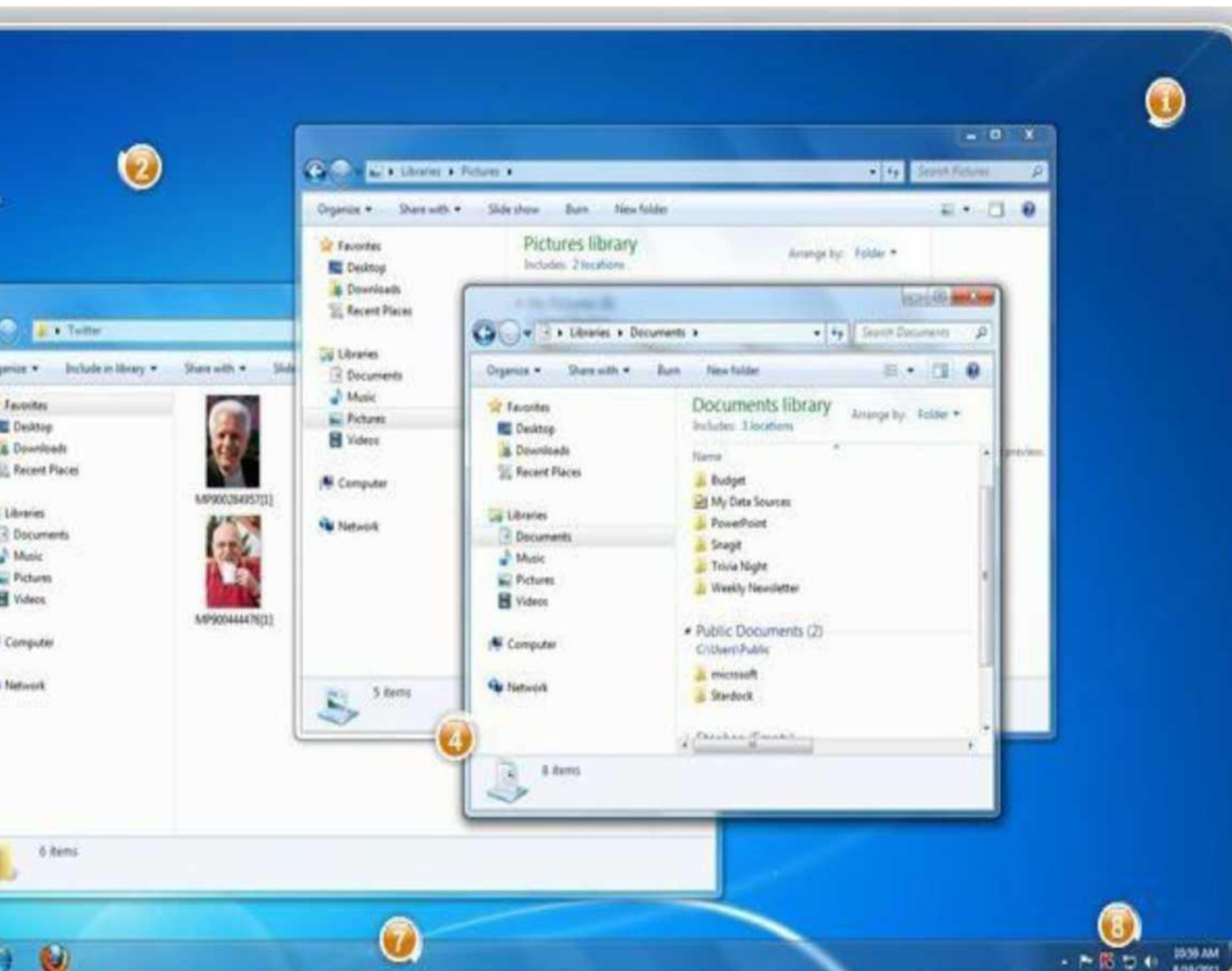


OPERATING SYSTEM

An **Operating System** is a program that controls the **overall activity of your computer**. It manages the various files in your computer. It allows the computer hardware to interact with your computer software.

Examples of Operating Systems are Windows, Mac. Unix, Linux etc.,





Know your Windows Desktop

