

I YEAR – I SEMESTER
COURSE CODE – 4BSOA1
ALLIED COURSE – I - FUNDAMENTALS OF COMPUTER
UNIT - 1

Full form of Computer

- C** - Commonly
O - Oriented
M - Machine
P - Properly
U - Used for
T - Training
E - Education
R - Research



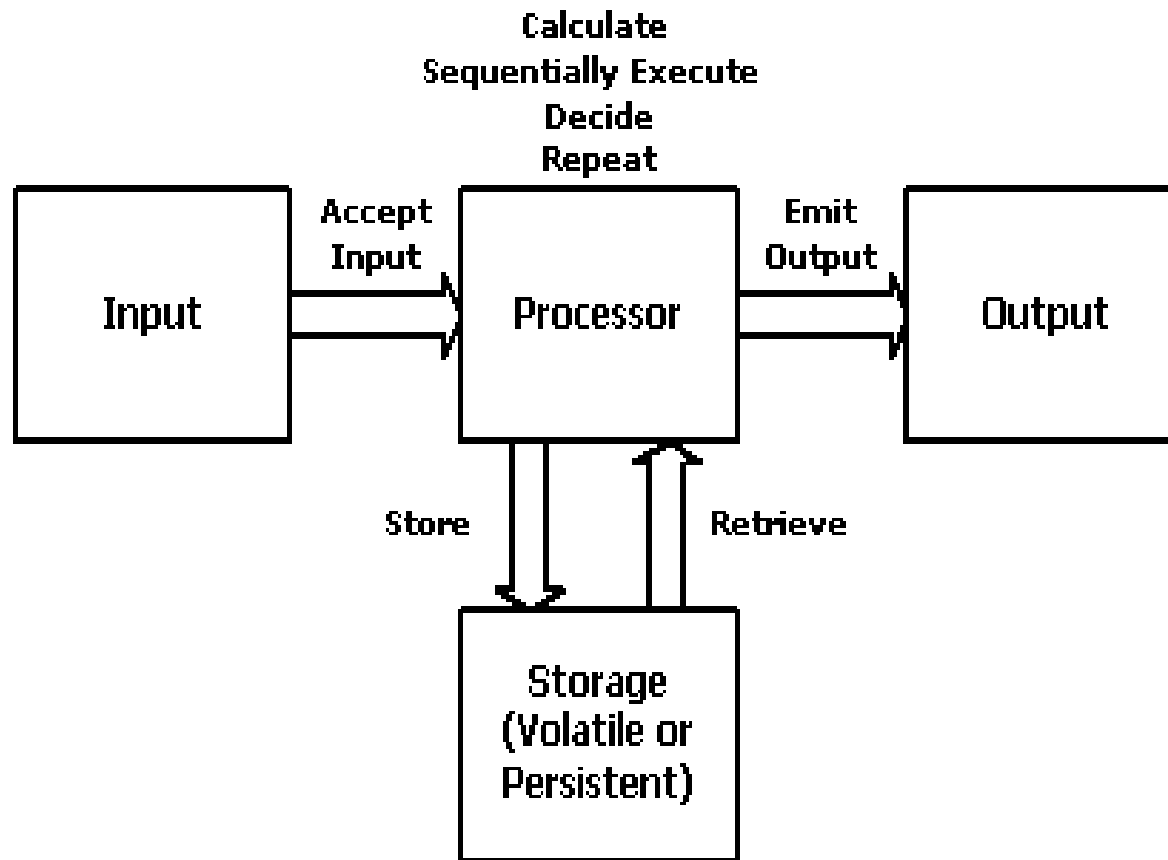
Is a PC a computer system?



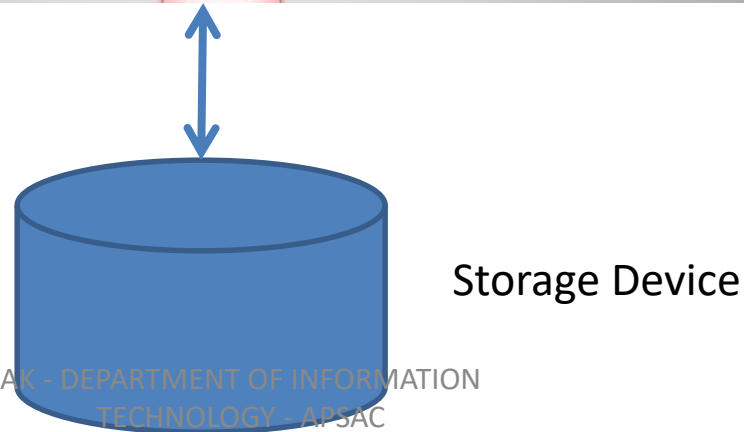
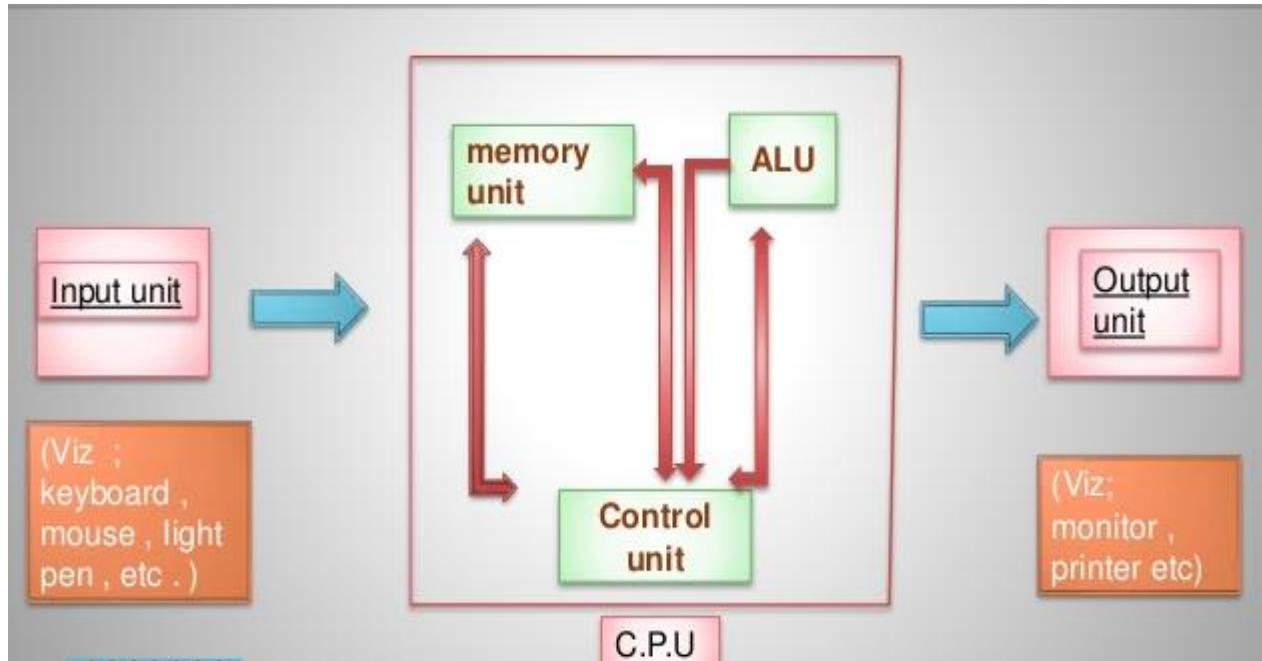
- Name some input, output and storage devices used on a PC

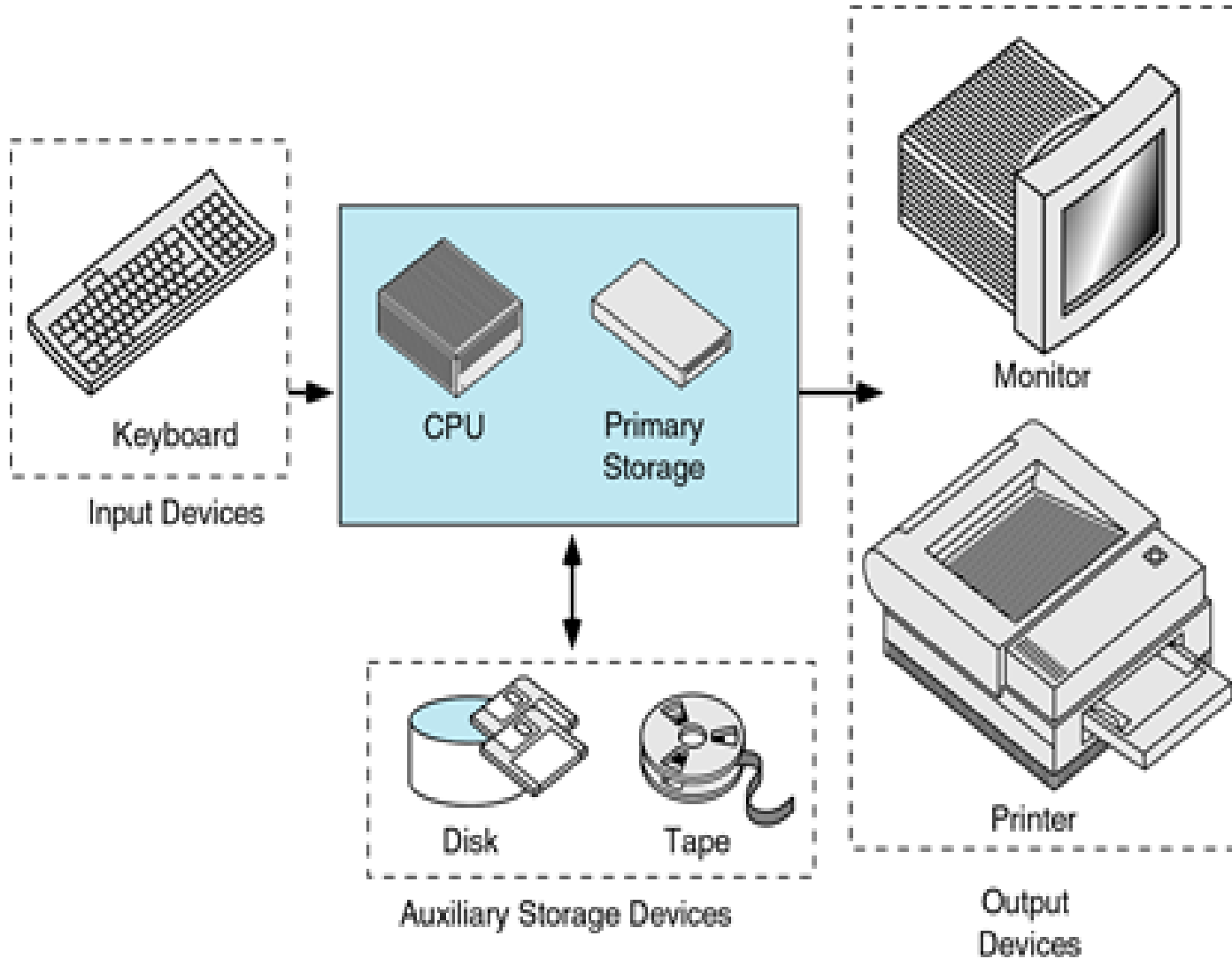
Introduction to computers

- ❖ Computer is an Electronic Device, which accepts input data and process the data and provides the results. And it's a mechanical brain which performs an activity in a rapid speed.
- ❖ It is useful for summarizing and analyzing the information quickly , it keeps the information in memory and gives it whenever required .
- ❖ It performs all sort of arithmetical calculations accurately at a high speed ,it solves the business problems by using various techniques and gives reports to the management in the form of data and statements.
- ❖ Computers are the instruments for future progress as they provide improved access to information by means of video conferencing and E-mail.
- ❖ Computer is programmable electronic machine capable of performing arithmetical and logical operations.



A Computer has 4 important components they are **input unit**, **central processing unit**, **output unit** and **storage devices**





INPUT UNIT

An Input Unit accepts instructions and data from the user and communicates them to the Computer.

It also accepts commands for running, aborting or halting a program from the user, keyboard, and mouse, lightpen are some of the input devices.

INPUT DEVICES



Joystick



Keyboard



Mouse



Keyboard



Scanner



Central Processing Unit

CPU is an important component of a computer, it has 3 parts namely arithmetic logic unit, control unit and memory unit.

Memory Unit:

This is the internal storage of the computer, it is also called as primary memory or main memory, and it is used to store the instructions given to a computer.

It is also temporarily stores data before it is processed, intermediate results and the results to print.

Part of the contents of memory is held only temporarily, that is it is stored only as long as the computer is turned on when the computer is switched off, the contents are lost.



Arithmetic and Logic Unit:

This unit do all the computations in a computer, it is made of fast electronic circuits, the data is transferred from the memory unit to the arithmetic logic unit, processed and returned to internal storage, it do the basic operations like **addition, subtraction, multiplication and division** and the logic unit makes the comparison.

Control Unit:

This unit is made of integrated circuits, it interprets instructions and schedules jobs to be performed by various units of a computer.

Functions of the CPU:

- Accepting the instructions and data from input devices.
- Storing all the instructions and data in the memory and retrieving the relevant information as and when required.
- Interpreting the instructions and sending commands to various units.
- Performing all the arithmetic and logic operations.
- Controlling and coordinating the activities of all other units by issuing proper commands.
- Communicating between primary storage and all other devices connected to the computer.
- Supplying results to the output unit and when required

OUTPUT UNIT

The processed results are given out in this part of the computer. The result is given out in ordinary language, some of the commonly used output devices are:

Printers, Monitors, Projectors, Speakers.

OUTPUT DEVICES



Webcam



Webcam

Speakers



Microphone



Monitor



Printer



Printer



Headphone



input

output



Storage Unit:

It is known as auxiliary storage or secondary storage, it is a supplementary to the primary storage. It is an extensively used for storing data and instructions and for data transportation

Hard disk, Floppy disks, Pen drives, are some Storage devices.



The evolution of modern computer is divided in different generations as below.

First Generation (1941-1956):

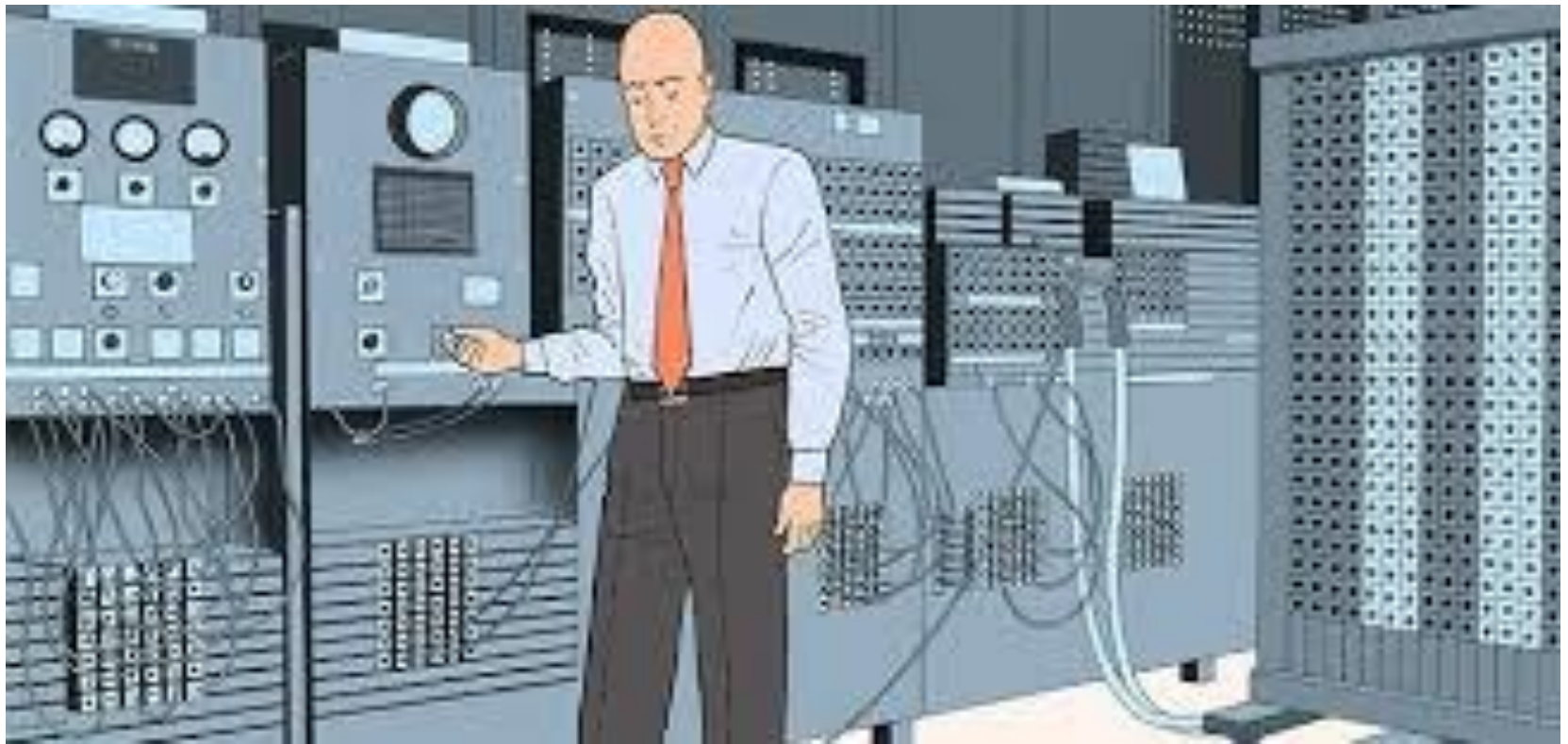
By 1941 – a German Engineer Konard Zuse had developed a computer the Z3, to design airplanes and missiles.

In 1943 the British developed a code breaking computer called COLOSSUS to decode German messages, but COLOSSUS was not a general purpose computer and it was designed to decode secret messages.

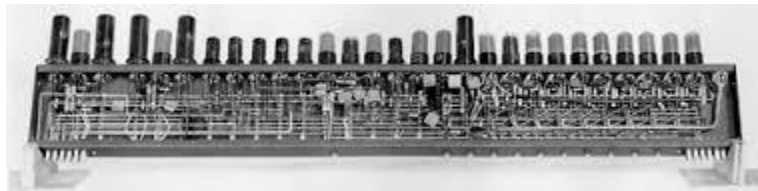
And then US government and the University of Pennsylvania was developed ENIAC (Electronic Numerical Integrator and Computer)

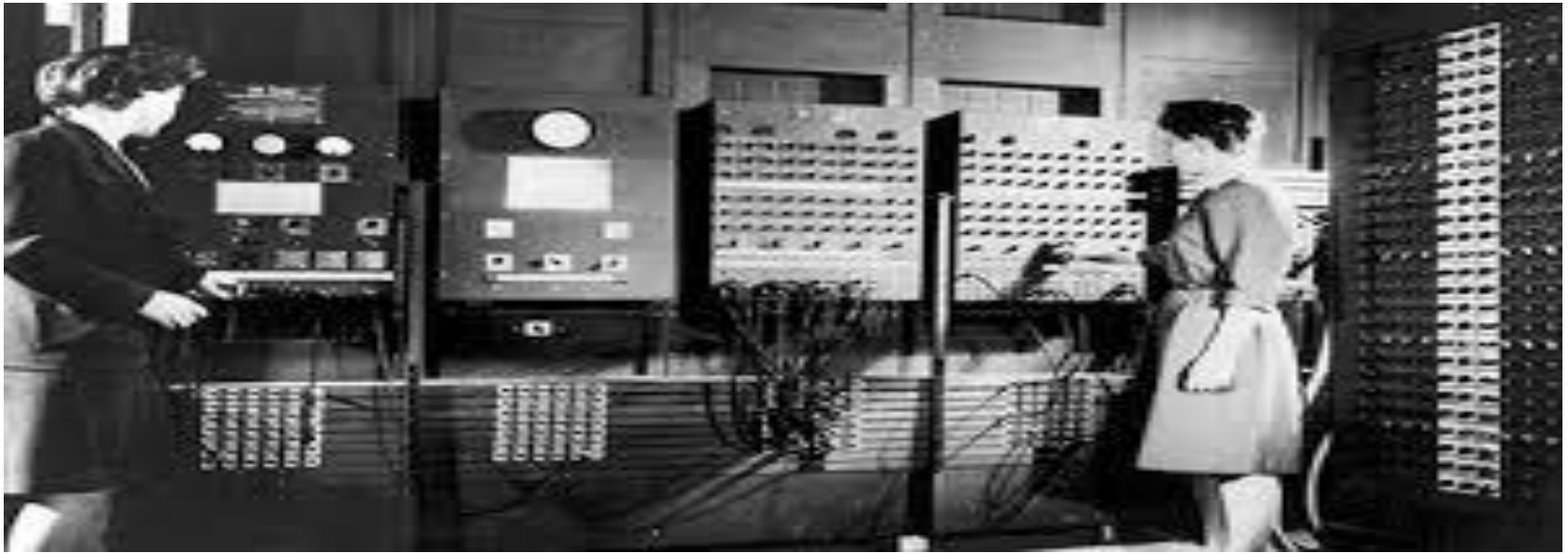
it consist of 18000 VACCUM TUBES, 70000 RESISTORS and 5 million soldered joints, this computer consumed 160kilowatts of electrical power, enough energy to dim the lights in small city.

JOHN VAN NEUMANN a professor in the University of Pennsylvania, designed the Electronic Discrete Variable Automatic Computer (EDVAC) in 1945, this computer had a memory to hold both a stored program and data, this allowed the computer to be stopped at any point and then resumed, allowed for greater versatility in computer programming. In 1951 the UNIVAC I (Universal Automatic Computer) was designed



ENIAC (Electronic Numerical Integrator and Computer)





ENIAC (Electronic Numerical Integrator and Computer)



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Second Generation (1956-1965):

These computers used transistors instead of valves, transistors are made up of semi-conductor materials like germanium and silicon. IBM 70, 1400, 1600 series, UNIVAC-III were some second generation computers.

Features:

- They were smaller in size compared to first generation computers.
- They generated less amount of heat.
- They were portable and the computational time was reduced to micro seconds.
- They were reliable, the manufacturing and running costs were less.
- Assembly language was used to code the program and hence, programming became easier.
- Magnetic cores were used as primary memory and magnetic disks were the secondary storage devices.
- They used punched cards for input and got the output through printouts.

SECOND GENERATION OF COMPUTERS



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Third Generation (1965-1972):

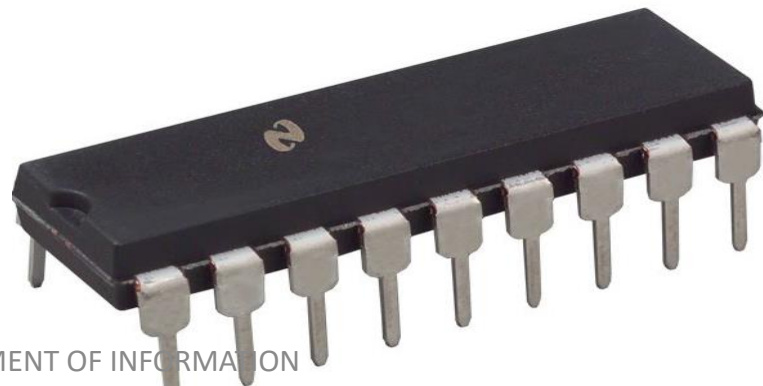
These computers used **integrated circuits** as their electronic component. **IBM 360 series UNIVAC 1100 series** etc... are some of the successful 3rd generation computers.

They processed increased **input-output, storage and processing** capabilities. They processed increased input-output, storage and processing capabilities.

They were able to process several programming concurrently through time sharing of the computers resources among many geographically dispersed users.

Features:

- They were smaller in size; they consumed less power and generated less heat.
- They were more portable and the computational time was reduced to Nano seconds.
- They were more reliable, high level languages were used to write the programs.
- These computers used magnetic tapes and magnetic disks as secondary storage devices.
- Keyboard and Monitors were used as input and output medium.





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Fourth Generation (1972-1984...94):

These computers used microprocessors, **Large Scale Integration (LSI)**, **Very Large Scale Integration (VLSI)** in their design. **IBM pc** and all other microcomputers belong to this generation, they have greater input, output, storage and processing capabilities.

The concept of virtual storage was introduced, **the (GUIs)**, **Graphical User Interfaces mouse** and hand held devices were developed during this period.

Features:

- They were very small in size, they generate negligible amount of heat and hence do not require air conditioning.
- They are portable and more reliable, GUI and pointing devices help the users to learn to use the computer quickly.
- Interconnection of computers leads to better communication and resources sharing.
- Keyboards, mouse, touch screen, optical readers audio, input and graphics terminal are used for inputting data whereas output is given out through printers, monitors, plotters and audio output.



THESE COMPUTERS RELIED LARGE SCALE INTEGRATED CIRCUITS (LSI)WHOSE BASE WAS THE INTEGRATED CHIP



Fifth Generation (1994 to yet):

The 5th generation computers are a step in this direction as these computers are planned to have “**THINKING**” power and capacity to take decisions. The concept of **ARTIFICIAL INTELLIGENCE (AI)** is being used in these computers and the processors used are known as “Knowledge Processors”.

Features:

- **Mega chips:** They will have mega chips memories.
- **Parallel data processing:** They are expected to process **1000** of instructions simultaneously.
- **Artificial Intelligence:** They are expected to learn from their mistakes that are to process A.I.
- **Speed activated machines:** These machines will be able to respond to the spoken word in a variety of dialects and languages.
- **Scanning Devices:** these devices will automatically sense data in more than **100000** character configurations and hence handle every language form.
- **Translating capabilities:** They will be able to translate written and spoken messages instantly to other languages.





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welcome <small>Edit</small>			வரவேற்பு	
			Varavēṛpu	
2 more translations				

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Google Translate

<https://translate.google.co.in/>

Google's free service instantly translates words, phrases, and web pages between English and over 100 other languages.

Characteristics of Computers:

- 1.Speed:** Computers can calculate at high speeds
- 2.Accuracy:** A computer is consistently highly accurate in its calculations and decisions
- 3.Reliability:** It is the extent to which we can rely on a computer
- 4.Diligence:** A computer is free from tiredness, lack of concentration,
- 5.Storage Capacity:** A computer can store and recall any amount of information because of its secondary storage capacity
- 6.No I.Q./Dumb machine:** Computer is a dumb machine and it can't do any work without instruction from the user
- 7.No feelings/Emotion:** Computers are devoid of emotions, they have no feelings and no instinct because they are machines,
- 8.Power of Remembering:** Computer has the power of storing any amount of information or data, any information can be stored and recalled as long as you require it,

Uses of Computer:.

- **Avoid waste of time:** With the help of computers, more complicated calculations can be done speedily; as a result it avoids waste of time.
- **Avoid errors:** By computers the errors which may arise from complicated calculations can be avoided.
- **Prevents wastage of human energy:** Computers prevent the wastage of human energy in doing the activities or calculations which are to be repeated.
- **Storing and retrieval of information:** The computers are very much helpful for storing a lot of information, moreover with the help of computers one can get the required information very quickly.
- **Cheapest and fastest communication mode:** Electronic mail is the cheapest and fastest way for sending mails and reports, it is done with the help of computer and telephone line.
- **Management decisions:** The computers are also essential for giving the reports, required by the management, immediately for taking decisions.
- **Solves Problems:** The computers are essential for solving the problems resulting from business and scientific development.

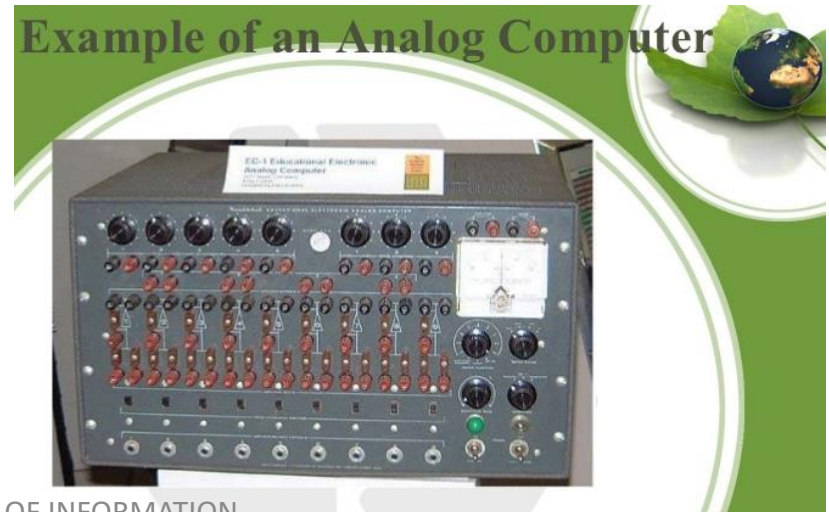
Types of computers:

Computers have been classified into 3 types.

1. Analog Computers
2. Digital Computers
3. Hybrid Computers

Analog Computers:

Analog Computers are special purpose computers that represent and store data in continuously **varying physical quantities such as current, voltage or frequency**, these computers are programmed for measuring physical quantities like **pressure, temperature, speed etc..** and to perform computations on these measurement. Analog computers are mainly used for scientific and engineering applications, some of the ex.. are:-



Digital Computer:

Digital Computer are mainly general purpose computers that represent and store data in discrete quantities or numbers, in these computers, **all processing is done in terms of numeric representation (Binary digit) of data and information**, although the user enter data in decimal or character form, it is connected into binary digits (0's and 1's). Almost all of the computers used now-a-days are digital computers.



Hybrid Computers:

Hybrid Computers incorporate the technology of both analog and digital computers, these computers stores and process analog signals which have been converted into discrete numbers using analog-to-digital convertors, they can also convert the digital numbers into analog signals or physical properties using digital-to-analog converters. Hybrid computers are mainly used in artificial intelligence (robotics) and computer aided manufacturing (e.g. Process control).





Medical
Equipment
's are
hybrid
computers



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Types of Computers:

❖ Main Frame Computers

❖ Micro Computers

❖ Mini Computers

❖ Super Computers

❖ Mini Super Computers

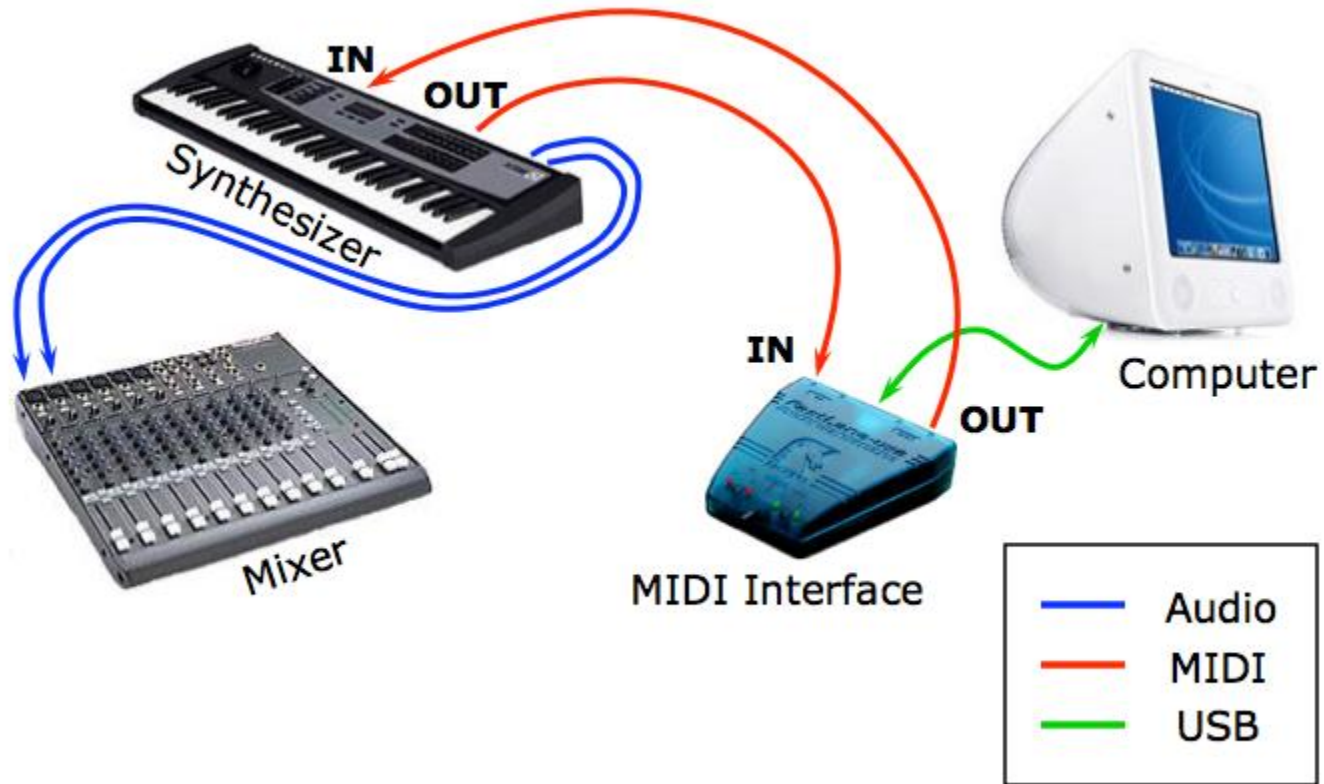
Main Frame Computers:

Main Frame Computers are very large and fast computers. It is also called as main frame computers are machines with 32 bits, 64 bits CPU chips with memory capacities from 1MB to 16GB. These are centralized location where many terminal (I/O devices are connected with one CPU and thus, **allow different users to share the single CPU**, they are used for the following applications.

- Railway ,Airplane Reservations
- Banking Applications
- Commercial Applications of Large Industries Companies.

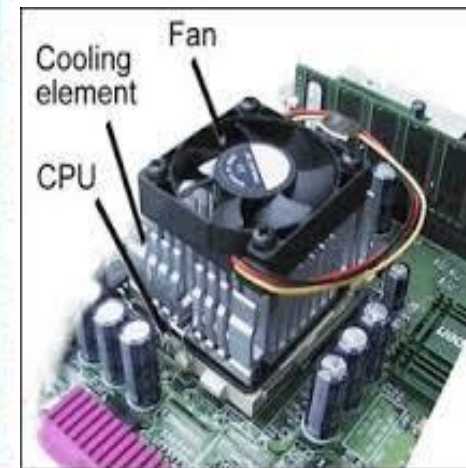


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Micro Computers:

- A micro computer is the smallest digital computer, which uses a micro processor as its CPU.
- Micro Processors is a single chip (I.C) CPU.
- It is also called as PC (Personal Computer).
- Some latest micro computer has a word length 16 bits and 32 bits.
- Micro Computers are either of desktop portable models; it can be carried from one place to another



Mini Computer:

- Mini Computer are medium –Scale, smaller and generally slower than main frame computers like main frames, they have many terminals which are connected with one CPU and can support many users.
- The cost of Minicomputer is very less as compared to main frame.
- Therefore It is mainly used in applications where processing can be distributed among several mini computers rather than using a main frame computer.





iRevo Smart Mini PC-(Desktop/Computer Stick), 8GB IR-QC1B08

 2 viewed per hour


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Ships to: **India**



Intel Compute Stick PC Stick (Atom-2 GB RAM-32 GB HDD-Windows8.1) (Black)

★★★★☆ 6 Ratings | 2 Reviews | Q&A

- 1 Year Manufacturer Warranty

- Brand: Intel

- Type: Mini PC

- Operating System: Windows 8.1

- Memory (RAM): 2 GB

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Logitech M90 USB Mouse

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Rs. 349



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Super Computer:

- Super Computers are the biggest & fastest computer which is mainly designed for complex scientific applications.
- It has many CPUs (Central Processing Units-main part of the computer) which operate in parallel to make it as a faster computer.
- Weather forecasting, petroleum exploration and production, Energy management, Defense, Nuclear Energy Research, Structural Analysis, Electronic Design, Real time animation, Medicine.





Supercomputers

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PARAM

Mini Super Computers:

- Personal Data Assistant
- Work Station
- Single board Micro Computer
- Single Chip Micro Computer

This is also a little bit of micro computer looks like micro, mini and also super computers fast and efficiency.



Personal Data Assistant:

- PDAs are pen based and use a stylus to tap selections on menus and to enter printed characters.
- The unit may also include a small on-screen keyboard, which is taped with the pen.

Data is synchronized between the PDA and desktop computer via cable or wireless transmission



Workstations:

These are high performance personal computers they are used in Engineering and scientific applications such as Computer Aided Design (CAD), computer Aided Engineering (CAE), simulation of Application specific Integrated Circuit (ASIC) and animations films etc...



Single board Micro Computer:

These Micro computers are primarily used in college/ institutes laboratory for instructions performance or to evaluate the performance of a micro processor.

Single Chip Micro Computer:

These are designed on single chips which typically have microprocessors 64bytes of R/W memory, from 1K to 4K of ROM and several single lines to connect to inputs /outputs



Hardware:

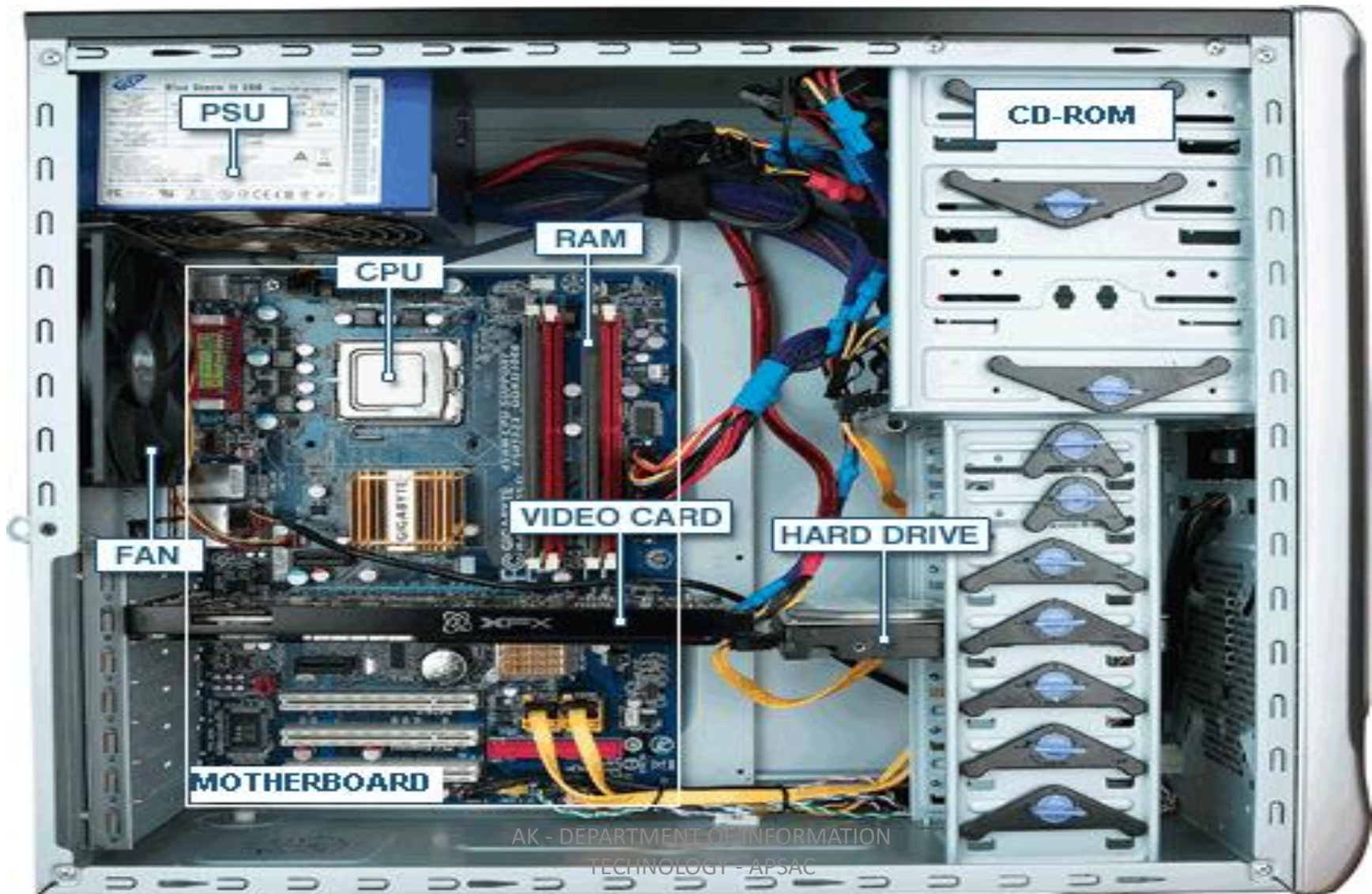
The hardware is the parts of computer itself including the CPU and related micro chips and micro-circuitry, keyboards, monitors, case and drives (FLOPPY, HARDISK, CD, DVD, optical, tape etc...) Other extra parts called peripheral components or devices include mouse, printers, modems, scanners digital cameras and Cards (sound, color, video)etc...

Central Processing Unit:

CPU is the major component or “BRAIN” of a computer, which performs all the processing of input data, its function is to fetch examine and then execute the instructions stored in main memory of computer, in micro computer, the CPU is built on a single chip or Integrated Circuit (IC) and is called as Micro processor, the CPU consist of following distinct parts.

What is Computer Hardware?

- Computer Hardware is the physical part of the computer system, the machinery and equipment.
- Parts of the computer “you can see”



- **Arithmetic and Logic Unit(ALU):**

The ALU of CPU is responsible for all arithmetic operations like addition, subtraction, multiplication and divisions as well as logical operations such as less than equal to and greater than, actually all calculations and comparisons are performed in the ALU.

- **Control Unit(CU):**

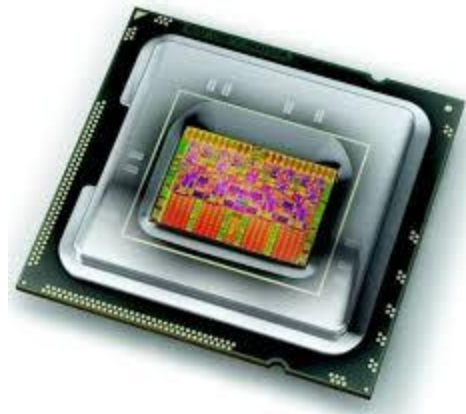
The Control Unit is responsible for controlling the transfer of data and instructions among other units of computer it is considered as a “Central Nervous System” of computer, as it manages and coordinates all the units of computer.

- **Registers:**

Registers are the small high speed circuits (memory locations) which are used to store data, instructions and memory addresses (memory location numbers), when ALU performs arithmetic and logic operations, it can store one word of data (1 word = 2bytes & 1 byte = 8 bit; details of BITS & BYTES are discussed in later part of this unit) until it is overwritten by another word.

Registers can be divided into 6 categories

- General Purpose registers.
- Pointer Registers.
- Segment Registers.
- Index Registers.
- Flags Registers and Instructions.



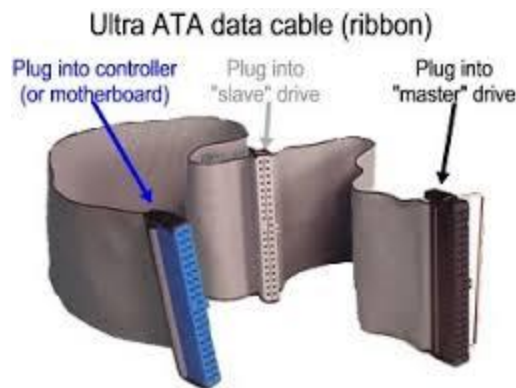
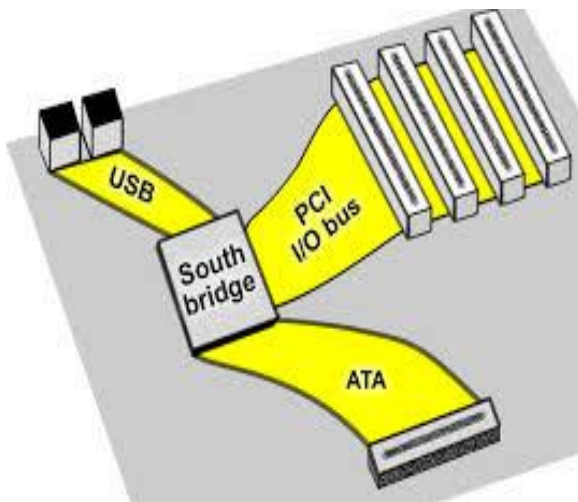
Buses:

Data is stored as a Unit of 8 bits (BIT stands for Binary Digit) i.e (0 or 1) is a register.

Each bit is transferred from one register to another by means of a separate wire, this group transfer data **between register is known as a bus.**

In general terms, bus is a connection between 2 components to transmit signal between them, it can be 3 major types viz, **Data bus, control bus, and address bus.**

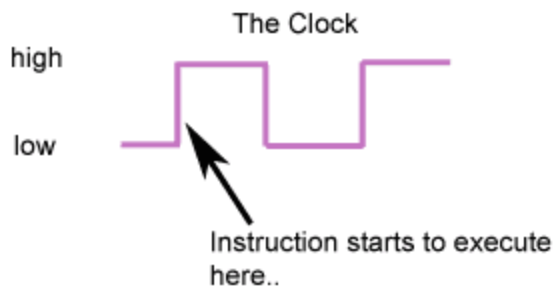
The data bus moves data, address bus moves address or memory location and control bus to send control signals between various components of a computer.



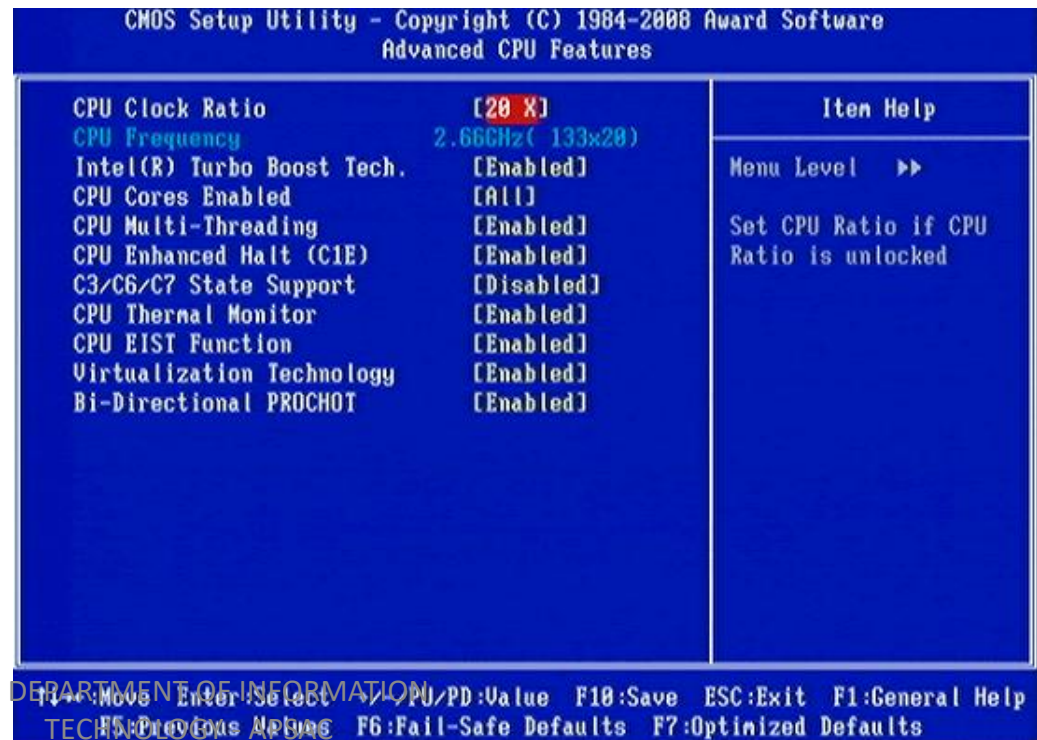
Clocks:

Clock is another important component of CPU, which measures and allocates a fixed line slot for processing each and every micro-operation.

The clock speed of CPU is measured in terms of Mega Hertz (MHZ) or millions of cycles per second, the clock speed of CPU varies from one model to another in the range 4.77 MHz (in 8088 processor) to 66Mhz (in Pentium) CPU speed is also specified in terms of Millions of Instructions Per Second (MIPS) or Million of Floating Point Operations Per Second (MFLOPS).



source: www.teach-ict.com



Memory Unit:

Memory Unit is that component of a computer system, which is used to store the data, instructions and information before, during and after the processing, by ALU, it is actually a work area(physically a collection of IC) with in the computer, where the CPU stores the data and instructions. It is also known as a Main/Primary/Internal memory. It has 3 types.

- Read Only Memory(ROM pronounced as “RA-OM”)
- Random Access Memory(RAM pronounced as “R-Aem”)
- Complementary Metal Oxide Semiconductor Memory(CMOS)

A) Read Only Memory:

Read only Memory is an essential component of the memory unit, we know that the computer, being a machine, itself has no intelligence or memory and requires the instructions which are given by man, whenever the computer is switched on, it searches for the required instructions, the memory which has these essential instructions, is known as ROM.

1. This is permanent memory and is not erased when system is switched off; the capacity of ROM is 64kb to 256 kb depending on the model of computer.
2. ROM contains a no.of.programs (set of instructions), types of ROM; there are many types of ROM available for micro computers like Mask ROM, PROM, EPROM, EEPROM and EAPROM.



Mask ROM:

It is the basic ROM chip, in this type of ROM, the information is stored of the time of its manufacturing, and so it cannot be altered or erased later on.

PROM:

PROM stands for Programmable Read Only Memory, in this type of ROM, the information is stored by programmers after its manufacturing, it cannot be altered or erased later on.

EPROM:

EPROM stands for Erasable Programmable Read Only Memory, it is similar to PROM, but its information can be erased later on by Ultra Violet light and it can be reprogrammed.

EEPROM:

EEPROM stands for Electrically Erasable Programmable Read Only Memory, it is similar to EPROM but its information can be erased by using a high voltage current.

EAPROM:

EAPROM stands for Electrically Alterable Read Only Memory, as compared to EPROM and EEPROM, the information stored in EAPROM can be altered later.

Random Access Memory:

Random Access Memory (RAM) is another important component of Memory Unit; it is used to store the data and instructions during the execution of program. Contrary to ROM, RAM is temporary and is erased when computer is switched off, RAM is a read/write type of memory and, thus can be read and written by user/programmer.

Types of RAM:

→ Dynamic and

→ Static



Dynamic RAM (DRAM):

The information stored in Dynamic RAM has to be refreshed after every few milliseconds, otherwise it is erased, DRAM has higher storage capacity and is cheaper than static RAM.



Static RAM (SRAM):

The information stored in static RAM need not be refreshed, but it remains stable as long as power supply is provided, SRAM is costlier but has higher speed than DRAM.

Complementary Metal Oxide Semiconductor Memory (CMOS):

It is used to store the system configuration, date, time and other important data, when computer is switched on, BIOS matches the information of CMOS with the peripheral devices and displays error in case of mismatching.

CMOS Setup Utility - Copyright (C) 1984-2008 Award Software
Advanced CPU Features

CPU Clock Ratio	[20 X]
CPU Frequency	2.66GHz(133x20)
Intel(R) Turbo Boost Tech.	[Enabled]
CPU Cores Enabled	[All]
CPU Multi-Threading	[Enabled]
CPU Enhanced Halt (C1E)	[Enabled]
C3/C6/C7 State Support	[Disabled]
CPU Thermal Monitor	[Enabled]
CPU EIST Function	[Enabled]
Virtualization Technology	[Enabled]
Bi-Directional PROCHOT	[Enabled]

Item Help

Menu Level >>

Set CPU Ratio if CPU
Ratio is unlocked

↑↓→←:Move Enter:Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help
F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults



Computer BIOS



CMOS Battery



Personal computer system



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HARDWARE COMPONENTS

In today's computer industry, a wide variety of hardware components are available for microcomputers

The hardware components of microcomputer can be classified into following types:

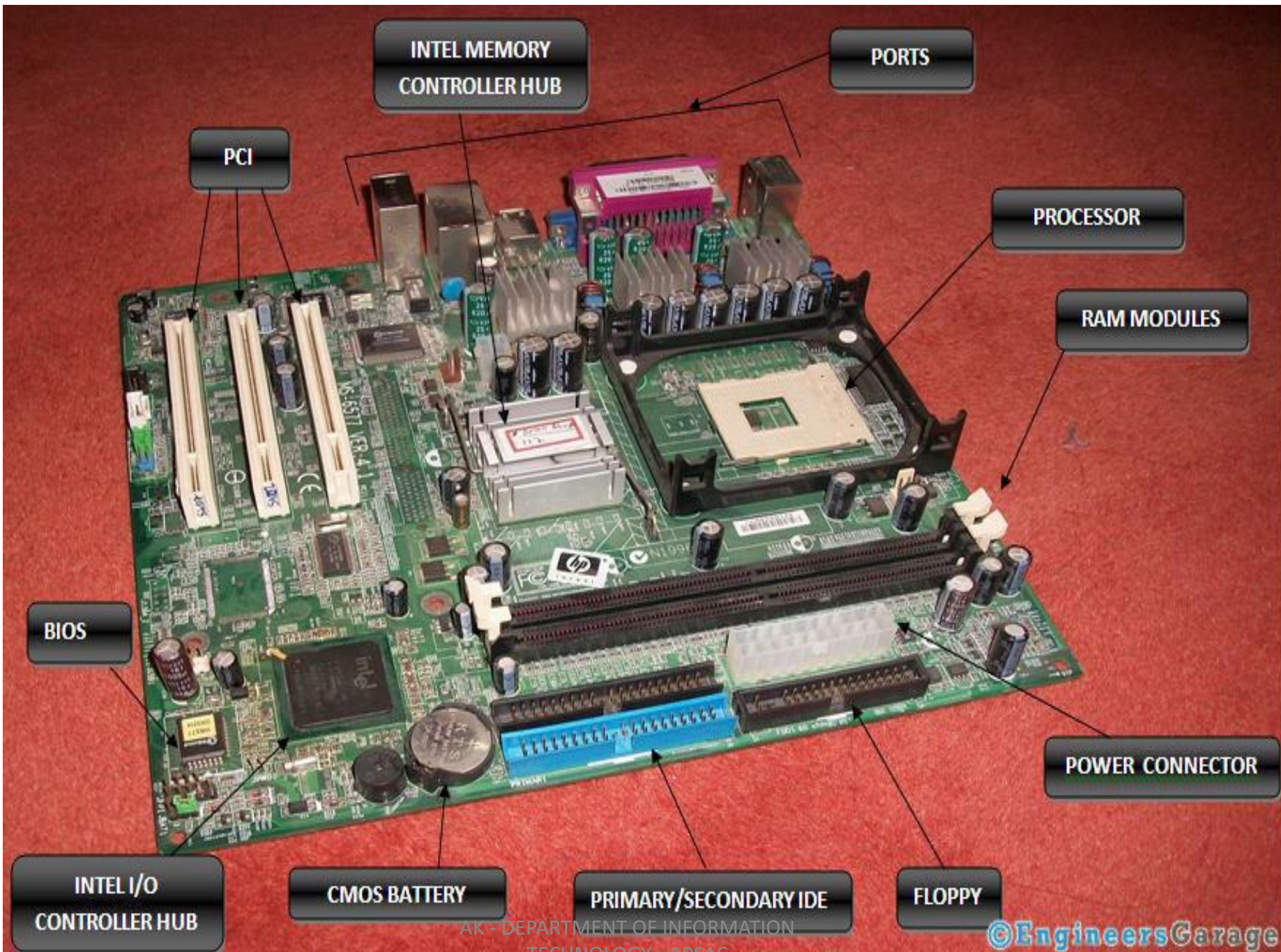
- (A) Motherboard
- (B) Input Devices
- (C) Output Devices
- (D) Storage Devices
- (E) Cards
- (F) Ports and Cords
- (G) Power Supply

All these hardware devices except motherboard are called peripheral devices, as they are connected to the motherboard.

Motherboard

Motherboard, also called as System Board, is the most important hardware component of a microcomputer. Motherboard is so called as all the other boards (printed circuit boards having chips or other electronic components) of the computer are connected to this board, hence it is like mother of all other boards.





Components of Motherboard

A motherboard contains the CPU chip, Memory chip (ROM and RAM chips), I/O interface, expansion slots and many other logic circuits. It may also contain a maths co-processor chip.

CPU or processor chip is the main component of motherboard. The types of CPU chip (8088/80286/80386/80486 etc.) vary from one model of PC to another. The function of coprocessor chip (8088/80287 etc.) is to support the CPU chip in processing of mathematical calculations.

Memory chips are physically installed on the motherboard by different packing methods. There are three different types of packing of RAM chips DIP, SIMM and SIPP

DIP (Dual Inline Package)

SIMM (Single Inline Memory Module)

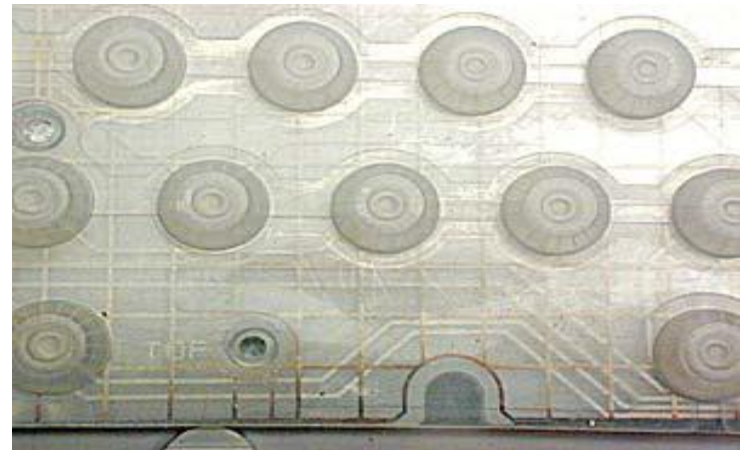
SIPP (Single Inline Pin Package)

Input Devices

Keyboard:

A Computer keyboard is a sophisticated electromechanical component designed to create special standardized electronic codes when a key is pressed, the codes are transmitted along the cable that connects the keyboard to the computer system unit or terminal, where the incoming code is analyzed and converted into the appropriate computer usable code.





Light pen:

It is a pointing device, used to select a displayed menu option on the CRT; light pens are frequently used by graphics designers, illustrators and drafting engineers. It is capable of sensing a position on the CRT screen when its tip touches the screen. A user can draw directly on the CRT screen with the light pen if the computer system is provided with computer Aided Design (CAD) packages such as AutoCAD 14.



Mouse:

A mouse is also a pointing device, as the mouse is rolled across the desktop, the cursor moves across the screen, the user can select menu or command by pushing a button on the mouse once or twice.

Trackball: A trackball looks like a mouse, as the roller is on the top with selection buttons on the side. It is again a pointing device used to move the cursor and works like a mouse



Touch screen is sensitive to human fingers. Using this device, the user can point to a selection on the screen instead of pressing keys.



Joystick: Joystick is also a pointing device which is used to move cursor position on a monitor screen. It is mainly used in Computer Aided Designing (CAD) and playing computer games.



Digitizer: Digitizer is used to create drawings and pictures using a digitizer tablet by a Computer – An Introduction process called digitizing. Digitizing is a process by which graphic representations are converted into digital data. The user makes contact with the flat digitizer tablet with a pen like stylus. As the stylus is connected to the tablet by a wire, the traced image is stored in RAM and displayed on monitor.



Scanners:

Scanners are a kind of input device, they are capable of entering information directly into the computers. The main advantage of direct entry of information is that users do not have to key in the information. This provides faster and more accurate data entry.

- Optical Scanners
- Magnetic ink Character readers



Optical Scanners:

The following are the commonly used optical scanners.

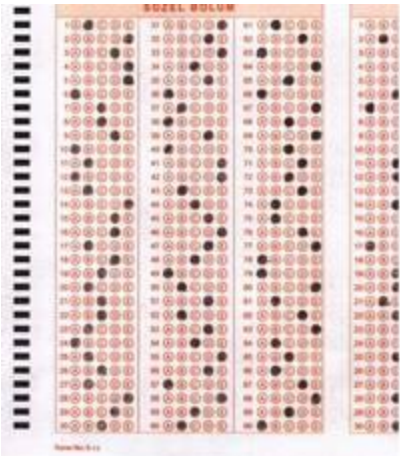
- Optical Character Readers (OCR)

It is also an optical scanner, which is capable of detecting alphanumeric characters typed or printed on paper using an **OCR font**. OCR devices are used for large volume applications like reading of passenger tickets, computer printed bills of credit card companies and reading of ZIP codes in postal services.



→ Optical Mark Readers (OMR)

It is a special type of optical scanner used to recognize the type of mark made by pen or pencil. It is specially used for checking the answer sheets of examination having multiple choice questions.



→ Optical Bar-Code Readers.

This device is an optical scanner used for reading bar-coded data (data in form of light and dark lines). Bar-coded data is generally used in labeling goods, numbering the books or encoding ID or A/c numbers.



Magnetic Ink Character Recognition (MICR): MICR is used to recognize the magnetically charged characters, mainly found on bank cheques. MICR is used by the banking industry for the processing of cheques. A special equipment is used to encode, decode and process the cheques.

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Manisha Gupta

VOID MICR

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AUTHORISED SIGNATORY
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Voice-Input Devices: These devices can recognize the human voice. They seem to be very useful but are not popular due to storage of limited vocabularies and variations in way of pronouncing words by different persons.



Output Devices:

Output devices are hardware components which are used to display or print the processed information.

Monitor: Visual Display Unit (VDU), commonly called as monitor is the main output device of computer. It consists of a **Cathode Ray Tube** (CRT), which displays characters as an output. It forms images from tiny dots, called pixels that are arranged in a rectangular form. The sharpness of the image (screen resolution) depends upon the number of the pixels.

Types of Monitors: There are different kinds of monitors depending upon the number of pixels. Depending upon the resolution, monitors can be classified as follows:

- (a) CGA (Color Graphics Adapter).
- (b) MDA (Monochrome Display Adapter).
- (c) HGA (Hercules Graphics Adapter)
- (d) EGA (Enhanced Graphics Adapter)
- (e) VGA (Video Graphics Adapter)
- (f) SVGA (Super VGA)

Depending upon color of display, monitors can be classified as Monochrome (with single color black/white display) and Color (with all colors display) Monitors.

CRT Monitor : **Cathode Ray Tube**



LCD Monitor : **Liquid Crystal Display**



LED Monitor : **Light Emitting Diode**



Printer: Printer is the most important output device, which is used to print information on papers. Printers are essential for getting output of any computer based application.



Types of Printers:

Printers can be broadly categorized into two types.

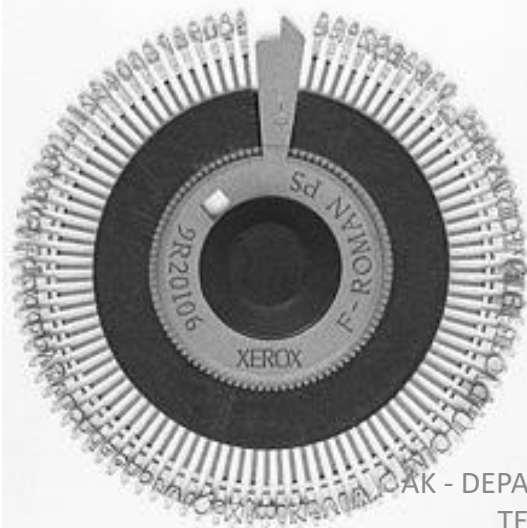
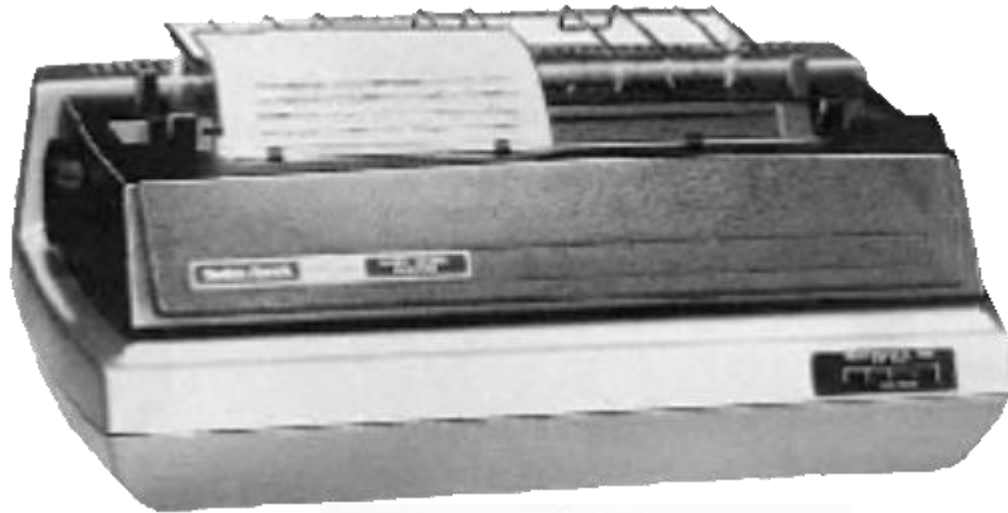
(a) Impact Printers:

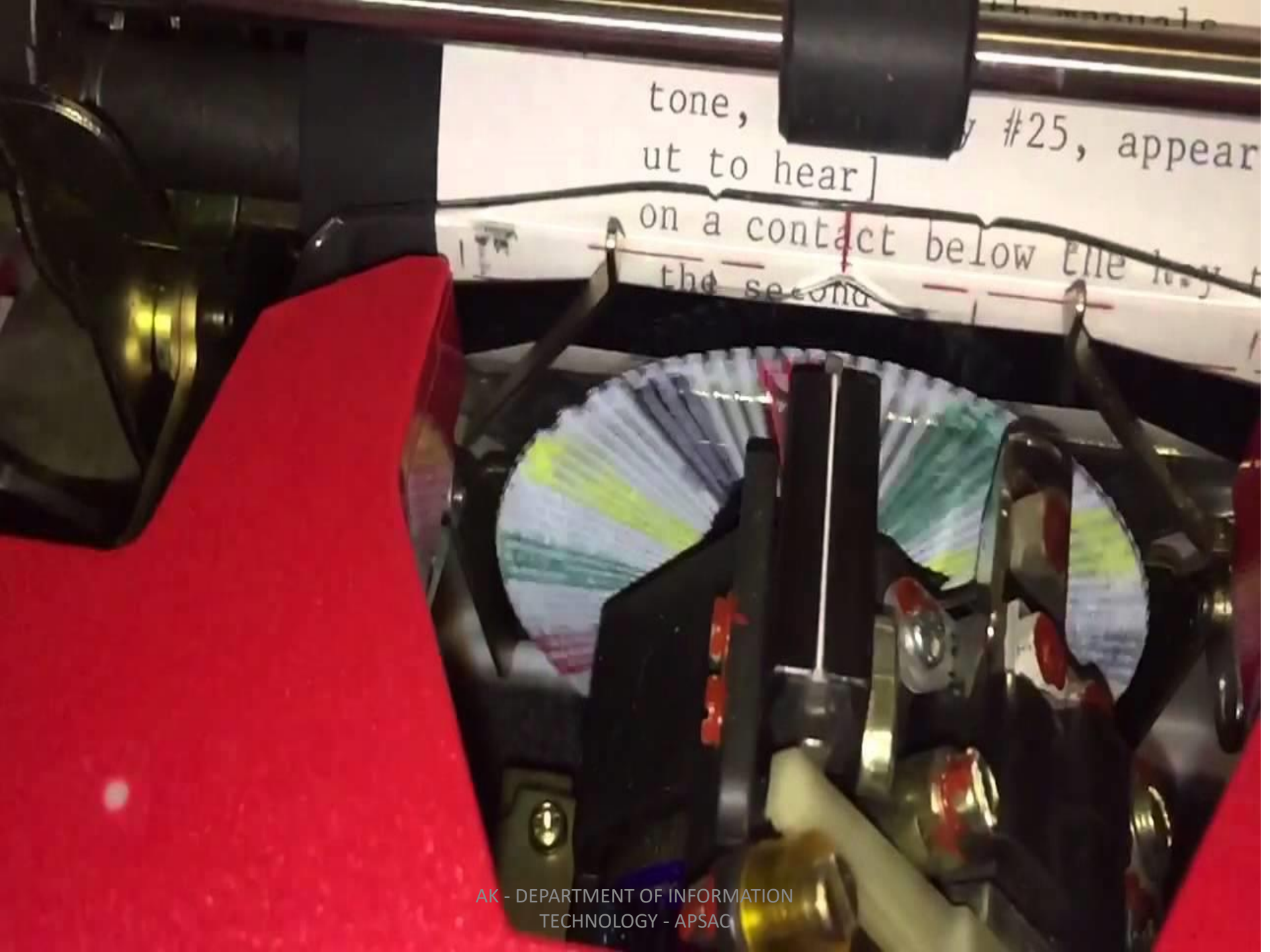
The printers that print the characters by striking against the ribbon and onto the paper, are called Impact Printers. These are two types

(i) Character Printers:

These printers print one character at a time. These printers are again of two types **Daisy Wheel and Dot Matrix Printers.**

Daisy Wheel Printers these printers print the characters by a mechanism that uses a plastic or metal hub with spokes, called daisy wheel. **The characters are embossed on the radiating spokes and printed by striking these spokes against the ribbon and paper.** Daisy Wheel printers give a **good quality** but they are **expensive** than Dot Matrix printers





tone, ut to hear] #25, appear
on a contact below the key t
the second

Dot Matrix Printers these printers print the characters by putting dots onto the paper. They do not give better printing quality than daisy wheel printers, but are faster in speed. The printing speed of a dot matrix printer **can be up to 360 cps** (characters per second). They are widely used with microcomputers in most of the offices.



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mercial supplier.

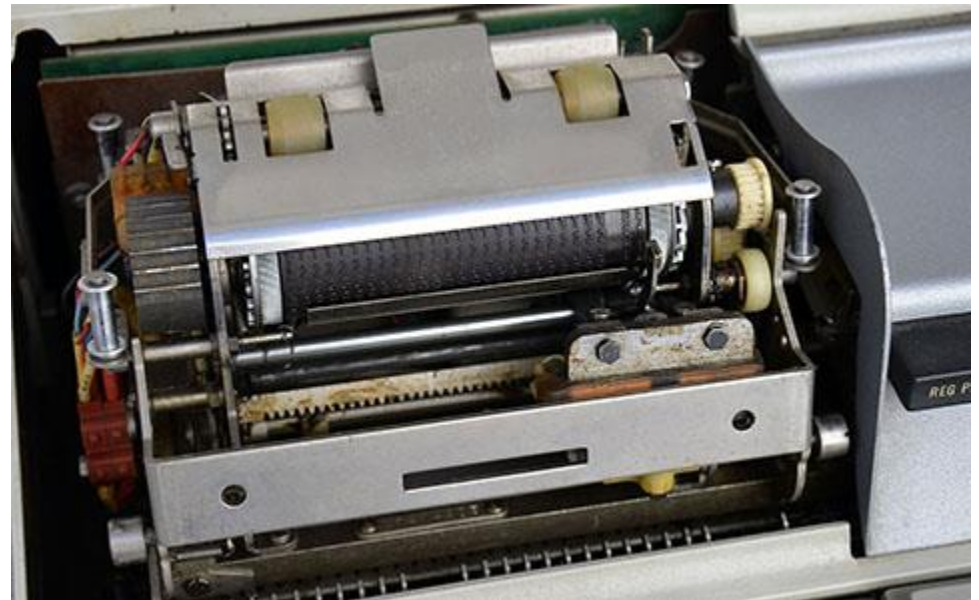
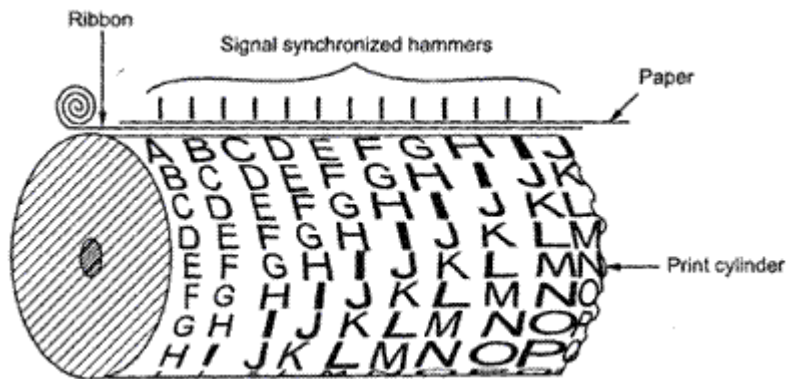


dot matrix printer ribbon cartridge

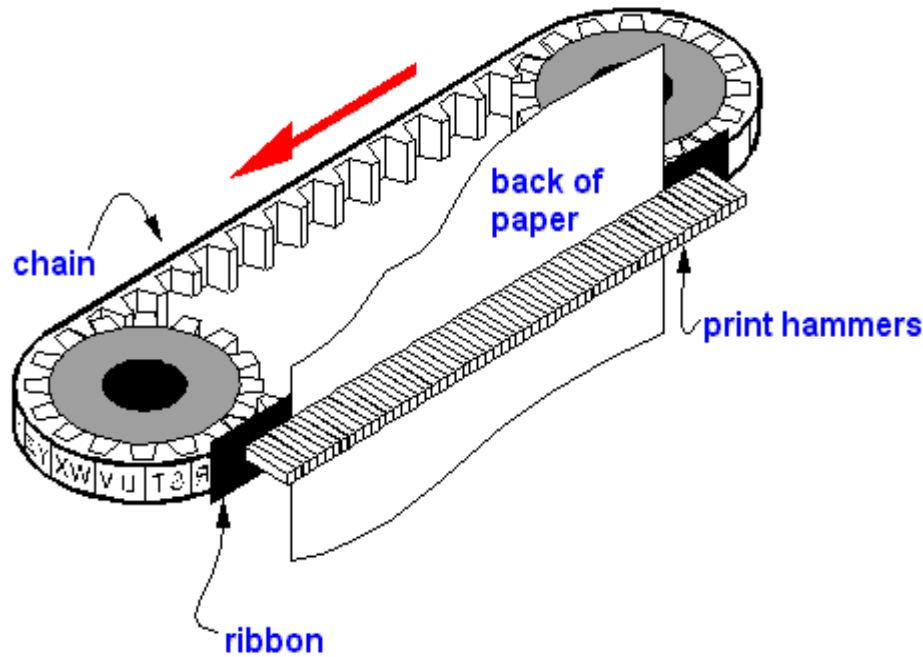


(ii) Line Printers: These printers print one line at a time. Their printing speed is much more than character printers. They are again of two types **Drum Printers** and **Chain Printers**.

Drum Printers these printers print the line by a **rotating drum** having a ring of characters for each print position. The hammers strike each character of the drum simultaneously, so that entire line is printed for one full rotation of the drum. These printers are also called as **Barrel Printers**. The printouts obtained from these printers, have even character spacing but uneven line height.



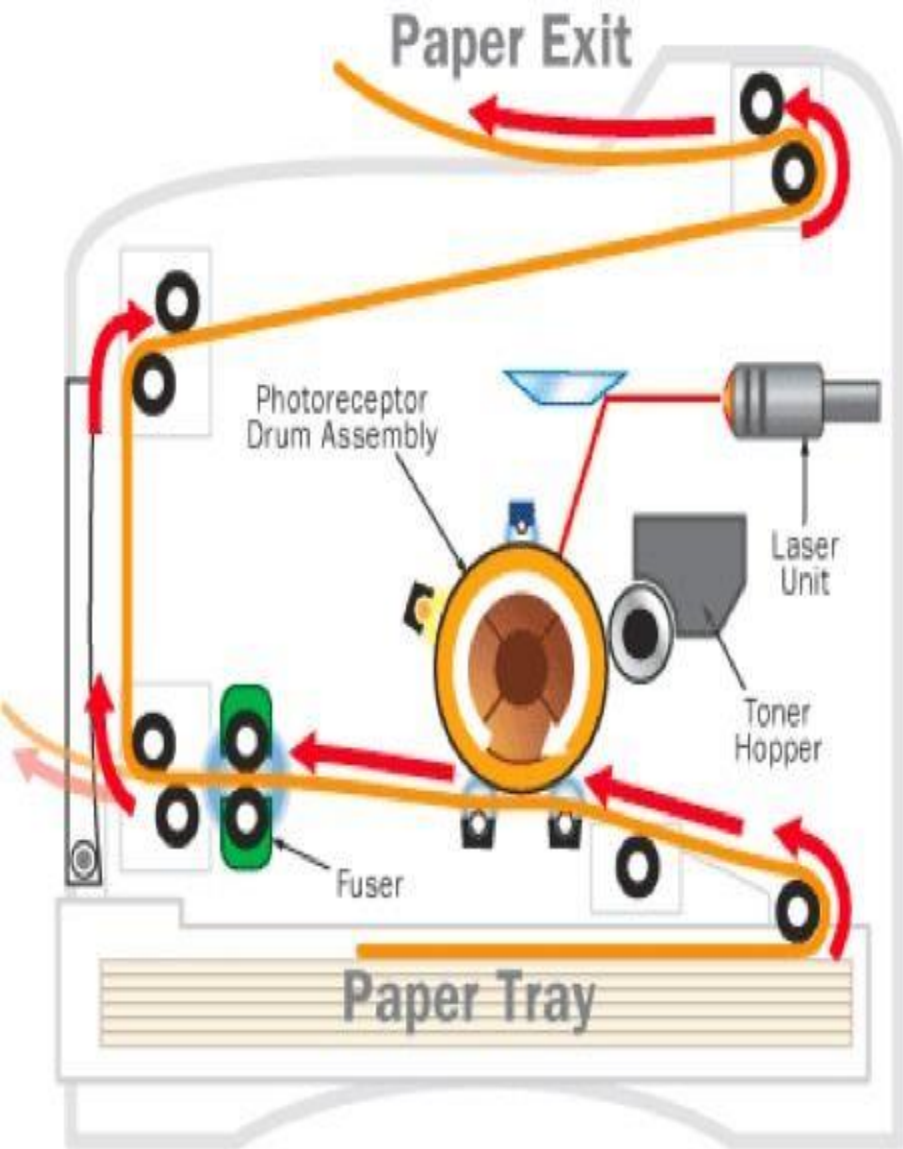
Chain Printers these printers print the line by a rotating chain having ring characters for each print position. Their printing mechanism is similar to drum printers. The printouts obtained from these printers, have uneven character spacing but even line height.



b) Non-Impact Printers: The printers that print the characters without striking against the ribbon and onto the paper, are called Non-Impact Printers. These printers print a complete page at a time, therefore, also called as Page Printers.

Page printers are of three types

(i) Laser Printers: These printers look and work like photocopiers. They are based on laser technology, which is the latest development in high speed and best quality printing. In these printers, a laser beam is used to write the image on a paper. First, the image is formed by electrically charged thousands of dots on a paper by laser beam. Then, the paper is sprayed with a toner having the opposite charge and is passed over a heated roller to make the image permanent. Laser printers are very popular and have become an essential part of Desk Top Publishing (DTP). Although laser printers are costlier than dot matrix, they are generally preferred in all offices due to their best quality of printing. There are many models of laser printers depending upon the speed and number of dots printed. The latest model of laser printer is 1200 DPI (Dots Per Inch), which can print 10 pages/minute. Some high speed laser printers give a speed of upto 100 pages/minute.



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Inkjet Printers: These printers print the characters by spraying the paper with electrically charged ink. These printers give better quality than character printers but not better than laser printers. They are cheaper than laser printers, hence used widely in many offices. They also offer an option of using color cartridges for multi-color printing.





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(iii) Thermal Printers: These printers print the characters by melting a waxbased ink off a ribbon onto a special heat sensitive paper. They give letter-quality printing but are relatively expensive in maintenance than other printers.



Plotter: Plotter is an important output device, used to print **high quality graphics and drawings**. Although the graphics can be printed on printers, the resolution of such printing is limited on printers. Plotters are generally used **for printing/drawing** graphical images such as **charts, drawings, maps** etc. of engineering and scientific applications.



Some important types of plotters are discussed below:

- (i) **Flatbed Plotters:** These plotters print the graphical images by moving the pen on stationary flat surface material. They produce very accurate drawings.



(i) **Drum Plotters:** These plotters print the graphical images by moving both the pen and the drum having paper. They do not produce as accurate drawings as printed by flat bed plotters.



(ii) **Inkjet Plotters:** These plotters use inkjets in place of pens. They are faster than flatbed plotters and can print multi-colored large drawings

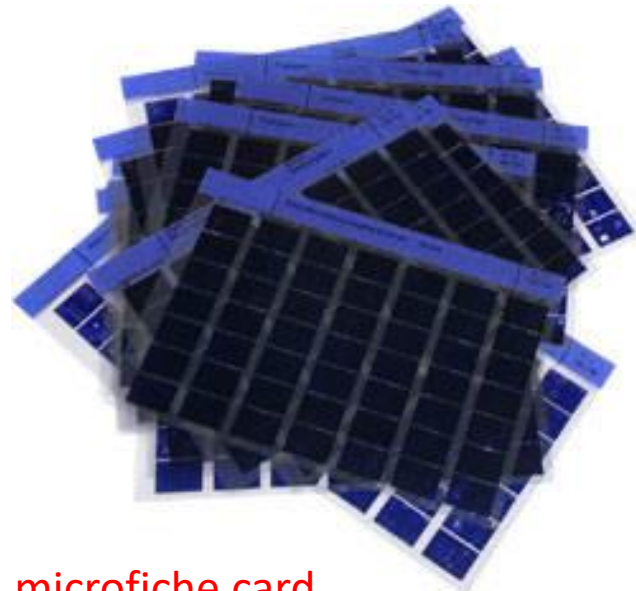


Computer Output Microfilm: Computer Output Microfilm (COM) is a technique to produce output on a microfilm media (microfilm reel or microfiche card).A microfilm is a **continuous film strip** that can **store several thousand miniaturized document** pages. A microfiche card is a 4 by 6 inch film sheet, which can store several hundred pages.

The process of producing microfilm or microfiche takes place on a special COM unit. The information recorded on the microfilm is read with the help of a microfilm viewing system. It is generally easier to read a microfiche than microfilm. Computer Output Microfilm is particularly useful for organizations which need to store and manipulate large amount of data. It helps them **in tremendous savings in paper and document** handling costs.



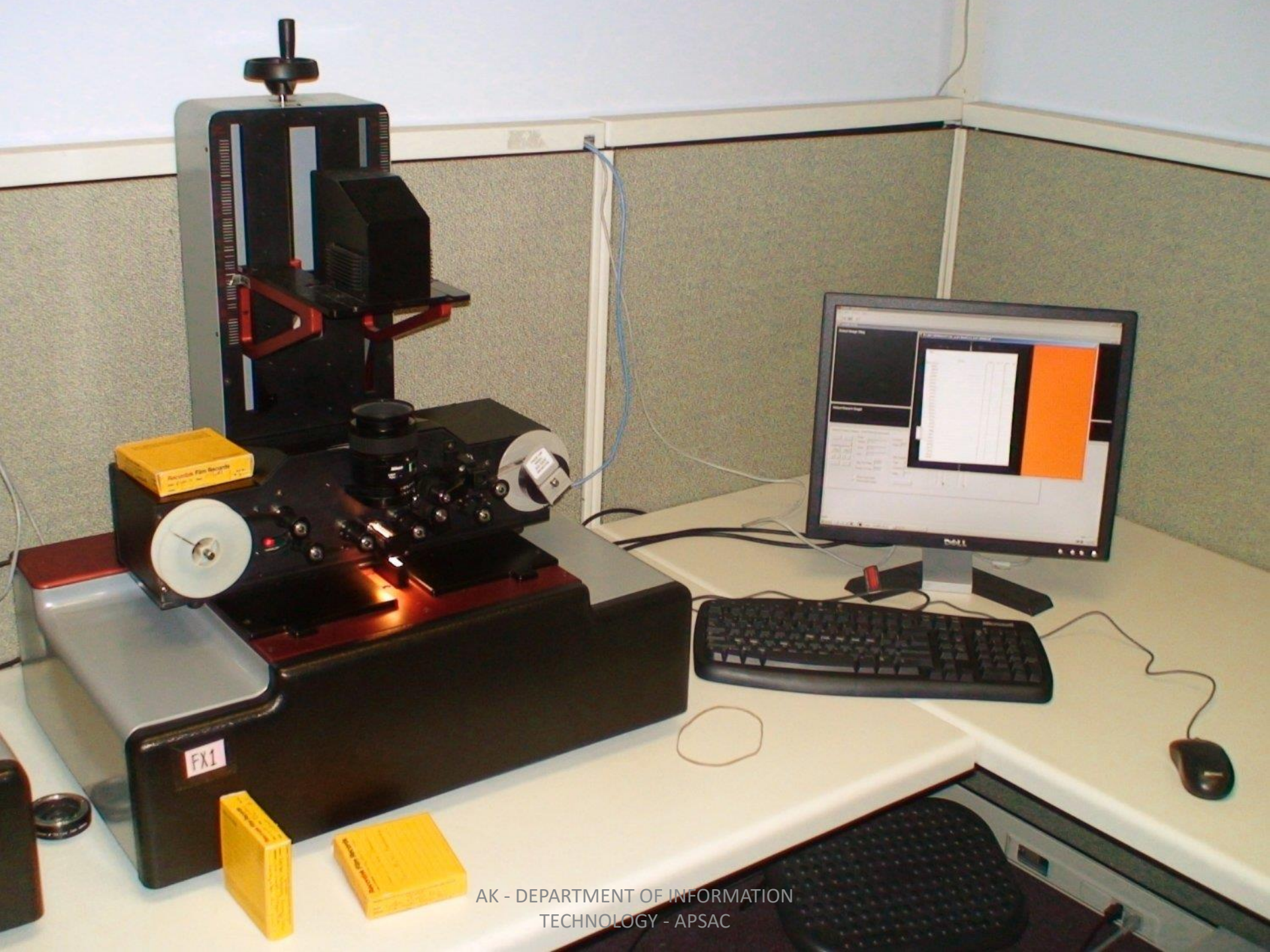
microfilm



microfiche card



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Storage Devices

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

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

Magnetic Disk

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

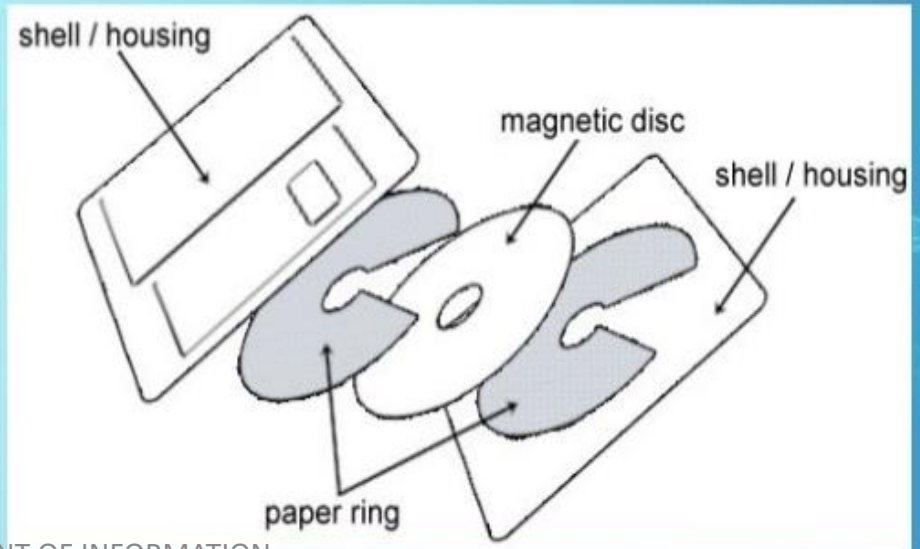


Floppy Disk

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



Magnetic disk in floppy disk



HARD DISK

Another form of auxiliary storage is a hard disk. A hard disk consists of one or more rigid metal plates coated with a metal oxide material that allows data to be magnetically recorded on the surface of the platters. The hard disk platters spin at a high rate of speed, typically 5400 to 7200 **revolutions per minute (RPM)**. Storage capacities of hard disks for personal computers range from **10 GB to 1 TB** (one billion bytes are called a gigabyte).





Optical Disks: CD-R Drive, CD-RW disks, DVD, Blue ray Discs:

Optical Mass Storage Devices Store bit values as variations in light reflection. They have higher area density & longer data life than magnetic storage. They are also standardized and relatively inexpensive.

Their Uses: read-only storage with low performance requirements, applications with high capacity requirements & where portability in a standardized format is needed.

Example of the Optical Drives

• **CD's (Compact Disk)**

Their storage:

- 700 MB storage

Their Types:

- **CD-ROM** (read only)
- **CD-R:** (record) to a CD
- **CD-RW:** can write and erase CD to reuse it (re-writable)
- **DVD** ("**digital versatile disc**" or "**digital video disc**")



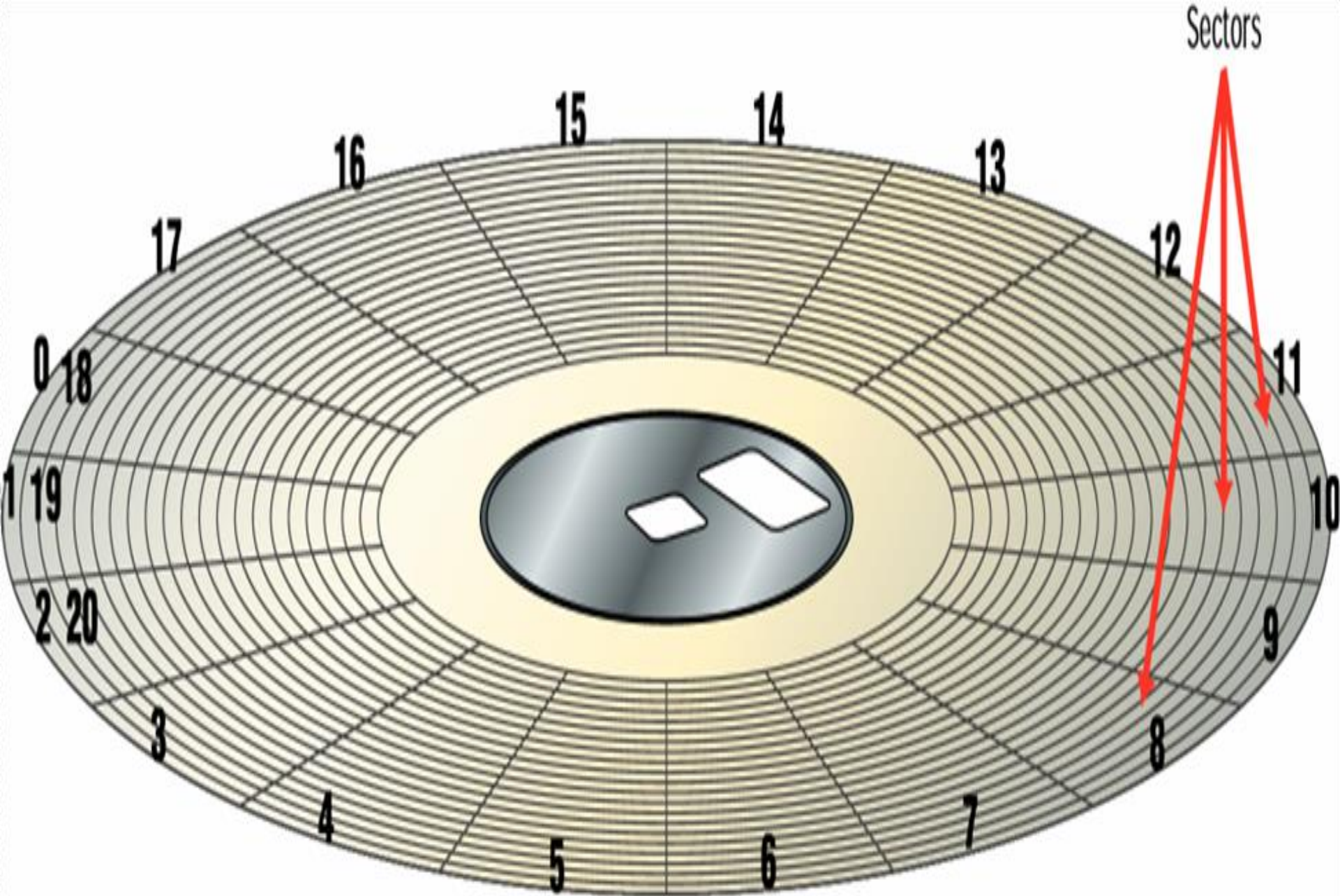
CD:

Compact Disk (CD) is portable disk having data storage capacity between 650-700 MB. It can hold large amount of information such as **music, full-motion videos, and text** etc. It contains digital information that **can be read, but cannot be rewritten**. Separate drives exist for reading and writing CDs. Since it is a very reliable storage media, it is very often used as a medium for distributing large amount of information to large number of users. In fact today most of the software is distributed through CDs.





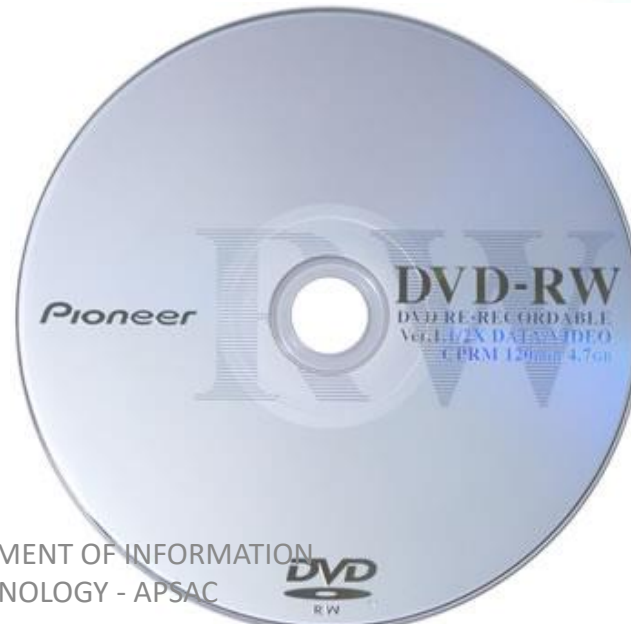
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DVD :Digital Versatile Disk (DVD) is similar to a CD but has larger storage capacity and enormous clarity. Depending upon the disk type it can store several Gigabytes of data (as opposed to around 650MB of a CD). DVDs are primarily used to store music or 6 movies and can be played back on your television or the computer too.

DVD-ROM

- Over 4.7 GB storage (varies with format)
- DVD- ROM (read only)
- Many recordable formats (e.g., DVD-R, DVD-RW; ..)
- Are more highly compact than a CD.
- Special laser is needed to read them



Blu(e)-ray Technology

The name is derived from the blue-violet laser used to read and write data. It was developed by the Blu-ray Disc Association with more than 180 members. Some companies with the technology are Dell, Sony, and LG. The Data capacity is very large because Blu-ray uses a blue laser (405 nanometers) instead of a red laser (650 nanometers) this allows the data tracks on the disc to be very compact. This allows for more than twice as small pits as on a DVD. Because of the greatly compact data Bluray can hold almost 5 times more data than a single layer DVD. Close to 25 GB! Just like a DVD Blu-ray can also be recorded in Dual-Layer format. This allows the disk

to hold up to 50 GB!! The Variations in the formats are as follows:

- BD-ROM (read-only) - for pre-recorded content
- BD-R (recordable) - for PC data storage
- BD-RW (rewritable) - for PC data storage
- BD-RE (rewritable) - for HDTV recording

Other Secondary Storage:

- Solid-State Storage
- Flash memory cards
- USB flash drives



Solid State Hard Disc



(Direct Access)

Memory Stick



(Direct Access)

Flash Memory



(Direct Access)

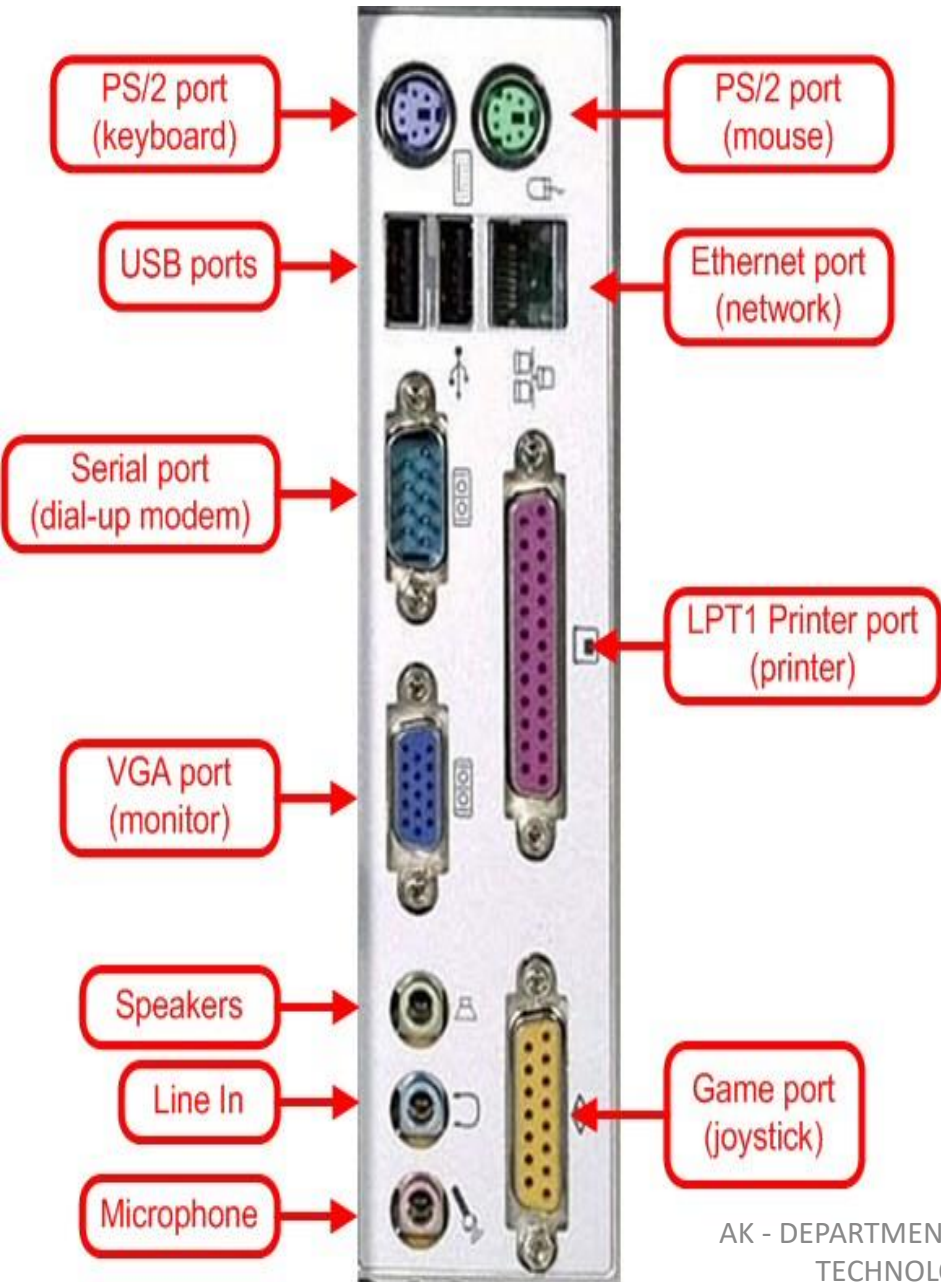
Micro Flash Memory



(Direct Access)

Connectors:

Power Supply:



Parts of a Power supply:

- Disk drive connectors
- Motherboard connector
- Power supply fan
- Power switch
- Input voltage selector
- Cover
- Power plugs receptacle



A switched-mode power supply **SMPS**, or switcher is an electronic power supply that incorporates a switching regulator to convert electrical power efficiently.

Power Supply

Power supply is considered as the 'Heart' of a Pc. Computer requires a clean and steady power source for working properly. Power supply is that important hardware, which provides the power source to a computer. It provides a voltage range of 4.95 to 5.25 volts for the highest performance of the system. Power supplies vary in size and power (in watt). An Uninterrupted Power Supply (UPS) keeps the computer running for few minutes even when the electricity supply goes off. UPS is not a part of computer and is purchased separately. It is optional but mostly preferred to CVT (Constant Voltage Transformer) and is always recommended for computerized applications like MIS.

CLASSIFICATION OF SOFTWARE

Software is broadly classified into following two types:

- (a) System Software
- (b) Application Software

System Software

Software, which are required to **control the working of hardware** and aid in effective execution of a general user's applications are called system software. This software performs a variety of functions like **file editing, storage management, resource accounting, I/O management, database management**, etc. Some of the examples of system software are DOS (Disk Operating System), Windows, BASIC, COBOL and PC TOOLS. These software are developed by System Programmers.

Types of System Software

System software can be further categorized into following three types:

- (i) System Management Software
(Operating Systems, DBMS, Operating Environments)
- (ii) System Development Software
(Language Translators, Application Generators, CASE Tools)
- (iii) System Software Utilities

Application Software

Software which are required for general and special purpose applications like database management, word processing, accounting etc. are called as application software. Some of the examples of application software are d BASE, Word Star, Tally etc.

Application software are developed using system software by Application Programmers.

(i) General Purpose Application Software(Database Management Packages, Word Processors, Spreadsheets, Office Automation Packages)

(ii) Special Purpose Application Software
(Desktop Publishing, Multimedia, Business Application)

COMPUTER LANGUAGES

One man communicates with another in a language, which another man can understand.

Similarly, man communicates with computer in a language, which machine can understand.

This language which consists of a set of commands, understandable by computer directly or after translating is known as Computer Programming Language.

There are many types of computer languages, which can be categorized into following four types

(a) Low-level Languages (First and Second Generation Languages);

(b) High-level Languages (Third Generation Languages);

(c) User-Friendly Languages (Fourth Generation Languages);

(d) Object Oriented Languages (Fifth Generation Languages).

(a) Low-level Languages: In early days of computers, only those languages were used for programming, which could be directly executed on computer. Languages, which computer can understand directly and are machine dependent, are called low-level languages. For example, Machine Language and Assembly Language are two important low-level languages.

Machine language is the oldest and most difficult of all the languages. It is also known as First Generation Language.

In machine language, all **the instructions are given to computer in binary digits**, and hence are **directly understood** by the computer.

On the other hand, **assembly language is easier than machine language**, and is known as **Second Generation Language**. In assembly language, instructions are given using mnemonic operation codes (such as ADD, MUL etc.) Low-level languages are used for development of system software. As they are not used for applications development, managers or application programmers do not need to learn these languages.

(b) High-level Languages: Development of applications using low level languages requires a deep understanding of the hardware.

These languages use common English words and are **translated into low-level languages** before processing by the computer. These languages which computer cannot understand directly and are not machine dependent, are called High-Level Languages (HLL).

These languages are also known as Third Generation Languages. Some of the common high-level languages are

- (i) BASIC (Beginners All Purpose Symbolic Instruction Code);
- (ii) COBOL (Common Business Oriented Language);
- (iii) FORTRAN (Formula Translator);
- (iv) PASCAL (Name of a Scientist);
- (v) C (it does not stand for anything).

(c) User-friendly Languages:

Although high-level languages are simpler to codify than low-level languages, they still require a lot of time to learn their programming syntax .

Hence, these languages are beyond the reach of many computer users (including MIS professionals), who do not want expertise in programming. Therefore, a new category of languages have been developed which are user-friendly, very easy to codify and simplest to learn.

These languages are called as User-friendly Languages and popularly known as 4GLs (Fourth Generation Languages). Some of the common 4GLs are dBASE, Foxbase, FoxPro, MS Access, Oracle, Sybase and Ingres.

(d) **Object-oriented Languages:** We have discussed that the object-oriented programming is the latest approach in programming. The languages which are based on Object- Oriented Programming (OOP) approach are called as Object Oriented Languages They may be classified into Fifth Generation Languages.

Object Oriented Languages are especially useful for development of GUI (Graphical User Interface) applications. These languages also offer a unique feature of Reusable Code. Some of the popular object-oriented languages are Smalltalk, C++ and Object COBOL, Object Pascal, Simula, Eiffel, Java & Visual J++. C++ and Visual J++ are widely used nowadays for development of windows-based applications.

LANGUAGE TRANSLATORS

Regardless of the programming language used (except machine language), the symbolic instructions have to be translated into a form, that can be executed by computer. The software, which convert the codes of other languages into machine code, are collectively called as Language Translators .

Types of Language Translators

Language Translators are categorized into three types

(a) **Assemblers:** Assemblers translate the assembly language code (source program) into machine language code (object program). After assembling, a linker program is used to convert the object program into an executable program. The Microsoft Assembler Program (MASM) and Borland Turbo Assembler Program (TASM) are two popular assemblers. Assemblers are used mainly in development of system software.

(b) Interpreters: Instructions of a high-level language are coded in many statements. At the time of their execution, they are converted into machine code statement by statement, by using system software, called Interpreters. For example, programs written in BASIC language are executed by using BASIC A or GWBASIC interpreters. Programs written in some fourth generation languages, like dBASE III plus are also executed using dBASE interpreter. There are certain disadvantages of interpreters. As instructions are translated and executed simultaneously using interpreters, they are very slow for executing large programs. Hence, interpreters are not suitable for most of applications development.

(c) Compilers:

In contrast to interpreters, compilers provide faster execution speed. Computer – An Introduction

Compilers do not translate and execute the instructions at the same Time. They translate the entire program (source code) into machine code (object code). Using linker, the object code is converted into executable code. Compilers are widely used in translating codes of high level languages (e.g. COBOL, FORTRAN, PASCAL, Turbo/ Quick BASIC, Turbo/ Microsoft C etc.) and fourth generation languages (dBASE IV, FoxPro etc.). As compared to interpreters.

