

## CLASSIFICATION OF COMPUTERS:

There are different types of computers available in these days. We can classify computers according to the following three criteria.

- 1) Based on Operating principles
- 2) Based on application
- 3) Based on Size and capability.

1) Based on process and data, information computers can be classified into the following categories.

- \* Analog Computers
- \* Digital Computers
- \* Hybrid Computers

### Analog Computers:

- The analog computers represent data in the form of continuous electrical signals having the specific magnitude. and allow several other operations to be carried out at the same time.

- the electric circuit designed by using operational amplifiers. It is made up of Semiconductor integrated circuits. the characteristic features of Op-Amps are.

- \* they have large voltage gain.
- \* they have infinite input resistance
- \* they have zero output resistance.

### Digital Computers:

The digital computer, also known as the digital information processing system. It is a type of computer that stores and processes data in the digital form.

∴ each type of data is usually stored in these computers in terms of 0's & 1's. The output produced by these computers is also in the digital form.

- the digital computers are also capable of processing the analog data.

- Digital computers are generally faster and more reliable than the analog computer system & provides more accurate results. (used in schools, coll etc)

- the diff h/w components of a digital computers are an ALU, a control unit, a memory unit & I/O units.

- It performs various operations like ~~at~~ +, -, ×, ÷ & logic operations such as AND, OR, NOT.

- CU helps in directing the operations of ALU. the memory unit is used to store the data on temporary or permanent basis. the I/O units are used to enter the data <sup>in</sup> to the computer. Out units are used to display the information.

Hybrid Computers: It is the combination of both. because it encompasses the best features of both these computers.

- the h/w components of hybrid computers are usually the mixture of analog and digital components. these features make the hybrid computers very fast, efficient & reliable.

- In these computers, data is generally measured & processed in the form of electrical signals. and is stored with the help of digital components.

- the input accepted by the hybrid computers is a continuously varying sig. this sig is then converted in discrete values.

these system is used in hospitals to measure the heartbeat of the patient.

## Based on Applications :-

On the basis of different appln or purposes, computer can be classified into

1) General-purpose Computers: It can run in all environments. The general purpose computers are versatile & can store a no. of programs & performs diff tasks. But the general purpose computers are not efficient & consumes large amount of time in generating the result.

2) Special-purpose Computers: They are designed to perform only a specified task. The spcl purpose computers are not versatile & their speed & memory size depend on the task that is to be performed. The spcl purpose computers are efficient & consume less amount of time in generating the result.

## Based on Size & Capability.

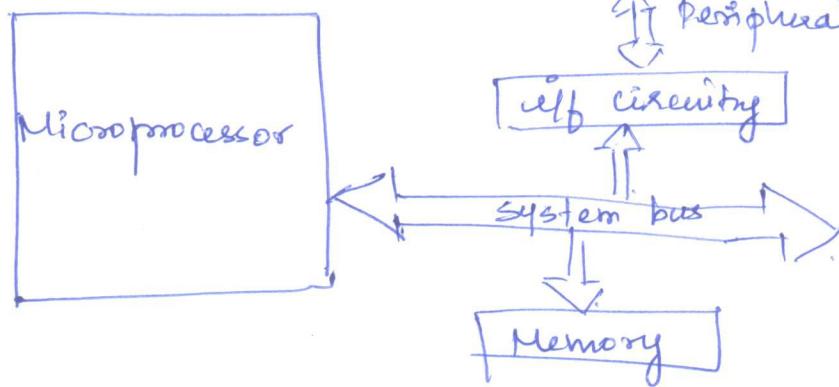
Based on speed, size and capability the computer can be classified into

\* Micro

\* Mini, Mainframe, Super.

Micro : If it is a small & cheap digital computer that is designed to be used by individuals.

- Micro compu includes power supply, connecting cables, keyboard, mouse, printer, Scanner, OS, I/O etc.



Microprocessor: It is the heart of the micro computer. It consists of ALU, etc. The various Registers used by a microcomputer are Accumulators, program counter register, I/O register, instruction Register etc.

Memory: It is Used to store the data & Instruction.

It employs 2 types of memories (1) primary (Main memory) is used to store the data & Instructions temporarily. Secondary stores permanently. Magnetic disks & Magnetic tapes are some of the ex. of Secondary storage.

Peripheral device: I/P & O/P devices are peripheral devices.

The various I/P devices such as keyboard and mouse are used to enter program & data into the Computer.

O/P device monitor, printer displays etc.

Systembus: The system bus in the Micro Computer is used to connect Microprocessors, memory & peripheral devices to the a single unit.

Depending on the size Micro Computer further classified into

Desktop Computer: Known as PC. The typical components of a desktop computer are keyboard, mouse, monitor, hard disk storage, peripheral devices. Used for home & business.

Laptop Computer: It is a portable Computer that can be taken from one place to another place at any time very easily. Apple, Acer, Panasonic, IBM, Dell, Sony.

Hand held Computer It is also known as PDA (personal digital Assistant) Ex: mobile.

Mini Computers: Introduced in the year 1960.

- Smaller Size than the other computers of those times.
- they can handle more data & more I/O & O/P than

Micro Computer: less powerful than Mainframe but more powerful than Micro. Designed to support more than 1 user at a time. It is generally used in business environments as part of the computer or n/o server.

Mainframe Computers: It is Very Large Computer that is employed by large business organizations for handling major applications such as financial transactions.

- they are capable of handling almost millions of records in a day. The implementation of Mainframe Computers also requires large space with a closely monitored humidity & temperature. It can maintain large databases that can be accessed by remote users. (It can carry a workload of many users)

Super Computers: fastest type of Computer that can perform complex operations at a very high speed.

- It is designed only to execute small no. of programs at a time rather than many programs simultaneously.
- It uses two methods

- 1) Pipelining - Serial Execution
- 2) Parallelism - Several instructions.

apps:-

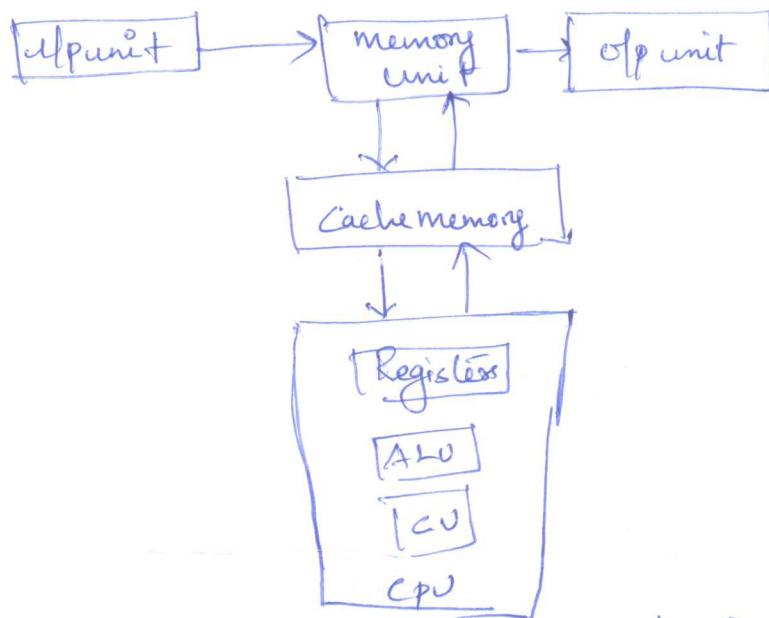
- 1) Weather forecasting
- 2) Animated graphics
- 3) Nuclear energy Research etc.
- 4) Biomedical research

## Organisation of Computer

The basic computer org involves the interfacing of different units. It explains the way in which different units of computers are interconnected with each other and controlled. The basic units of computer org are.

- \* I/O unit
- \* CPU
- \* Memory unit
- \* O/P unit.

block diagram:



An I/O unit is an electronic device, which is used to feed I/O data & control signals to a computer. I/O devices are connected to the computer system using cables. The I/O devices are

- 1) keyboard
- 2) Mouse
- 3) Scanners
- 4) joystick etc.

Keyboard:- A std keyboard includes alphanumeric keys, function keys, modifier keys, Cursor movement keys, spacebar, escape key & spl keys such as pageup, down, home, insert, delete & end.

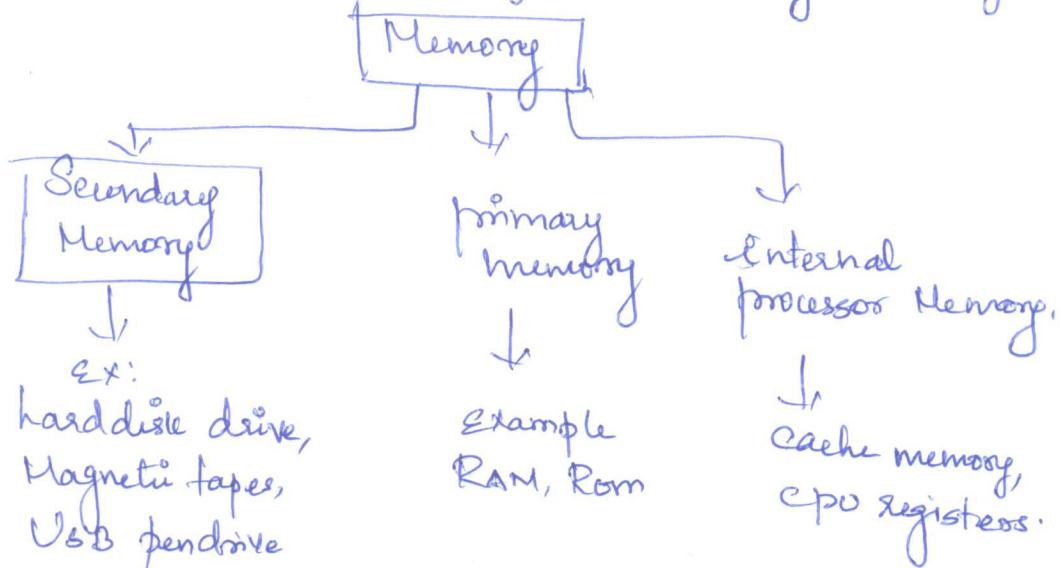
Mouse:- the mouse allows the user to select elements on the screen, such as tools, icons & buttons & helps to drawing the painting.

- the mouse consists of 2 buttons, a wheel at the top & a ball at the bottom of the mouse. When the ball moves, the cursor on the screen moves in the direction in which the ball rotates.



Scanner: It is an input device that converts documents & images as the digitised images understandable by the computer.

Memory unit: The memory unit of computer is used to store data, instructions for processing data. The memory units of computer are classified as primary & Secondary memory.



Primary memory: It is available in the computer as a built-in Unit of a computer. It is used to store temporary data. The primary memory is represented as a set of locations with each location occupying 8 bits. Each bit in the memory is identified by a unique address.

ROM, RAM, Cache.

Cache Memory: is used to store the data and the related applications that was last processed by the CPU. It is always placed below the CPU and main memory.

Secondary Memory: Represents the External storage devices that are connected to the computer. They provide a non-volatile memory source used to store information that is not stored in use currently.

CPU :- CPU is the brain of the computer. It is responsible for processing the data inside the computer system. It is also responsible for controlling all other component of the system. The main operations of the CPU include 4 phases.

- 1) Fetching instructions from the memory  
2) Decoding the instructions to decide what operations are to be performed.  
3) Executing the instructions  
4) Storing the results back in the memory.

The three main components of CPU are

- 1) ALU  
2) CU & Registers.

ALU :- It is a part of the CPU that performs arithmetic & logical operations on the data. The arithmetic operations can be addition, subtraction, multiplication & division. It performs the various logical operations which includes greater than (>), less than (<), equal to (=) ( $\neq$ ), shift left, shift right etc.

CU :- It is an important component of CPU that controls the flow of operation data & information. It maintains the sequence of operations being performed by the CPU.

- CU guides the ALU about the operations that are to be performed & also suggests the I/O devices to which the data is to be communicated. It uses the program counter register for retrieving the next instruction.

Registers :- CPU contains a few, special purpose, temporary storage units known as Registers. A processor can have diff types of registers to hold diff types of information. They include.

- 1) Program Counter - to keep track of the next instruction to be executed.
- 2) Instruction Register - to hold instruction to be decoded by the Control unit.
- 3) Memory Address Register → to save address.
- 4) Memory Buffer Reg - for storing data received from memory and sent to CPU
- 5) MDR - for storing operands & data
- 6) Accumulator - for storing arithmetic & logic results produced by arithmetic & logic units.

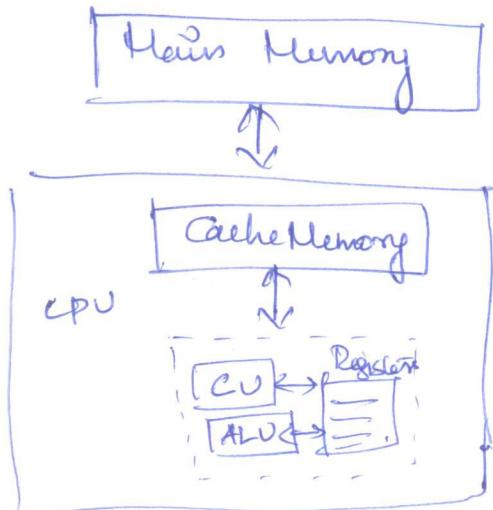


Illustration of CPU memory.