

FUNDAMENTAL

Computer is an electronic device which used in every fields i.e. business, education, entertainment etc. Now a day's computer is most important part of our life because without computer we cannot complete any task quickly and perfect.

So we can say more than 80% of the work done by computer.

What is computer?

It is an electronic device which displays the result on the screen after processing of inputted data by the user based on selected program.

Computer comes from the Greek word "compute" which means to calculate.

Father of computer

Mr. Charles Babbage is the father of computer. He was a professor of mathematics at Cambridge University California in London.

He was invented two computers.

- The Difference engine (1822)
- The Analytical engine (1842)

The Difference Engine: -It was based on the mathematical principle; It was also used for solving the trigonometric function.

The Analytical Engine: -It was a general purpose computing device which used for performing any mathematical operation automatically.

Advantage of computers

Automatic: - As we know computer is an electronic device, so it perform of task automatically based on given data with specific program by the user that is calculation or storage of data.

Speed: - Computer is a very fast device which can perform a task in a few seconds. The amount of work that a human being can do in an entire year.

Accuracy: - Computer calculates the data are very accurate is very high and the degree of accuracy of a particular computer depends upon its design.

Diligence: - It can continuously work for hours without creating any error and human beings a computer is free from monotony tiredness and lack of concentration.

Versatility: - Versatility is one of the most wonderful things about the computer. A computer is capable of performing almost any task. It the task can be reduced to a series of logical steps.

Limitations of computers

Power of remembering: - A computer can store and recall any amount of information.

No I.Q: - Computer has no I.Q. It has to be told what do and in what in sequence. Hence the user can determine what task a computer will perform.

No feelings: - Computer has no feeling because they are machine.

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GENERATION OF COMPUTER

First Generation (1942-1955): - The 1st generation computer used vacuum tubes in CPU Components. It is very large in size. Also vacuum tubes consumes more power and generates heat is modest due to this region some cooling mechanism where needed to cool the computer. So that computer can be used for prolonged time.

Second Generation (1955-1964): - The 2nd generation computer used transistors. Transistor is made from silicon. It is cheaper and smaller than vacuum tube.

The procession speed and storage capacity is very high as computer to 1st generation. Power supply is also got reduced.

Third generation (1965-1975): - The 3rd generation computer used ICS (Integrated circuits) as CPU component. It is chip and small. The processing speed and storage capacity is high and power supply is very less than previous generation computer.

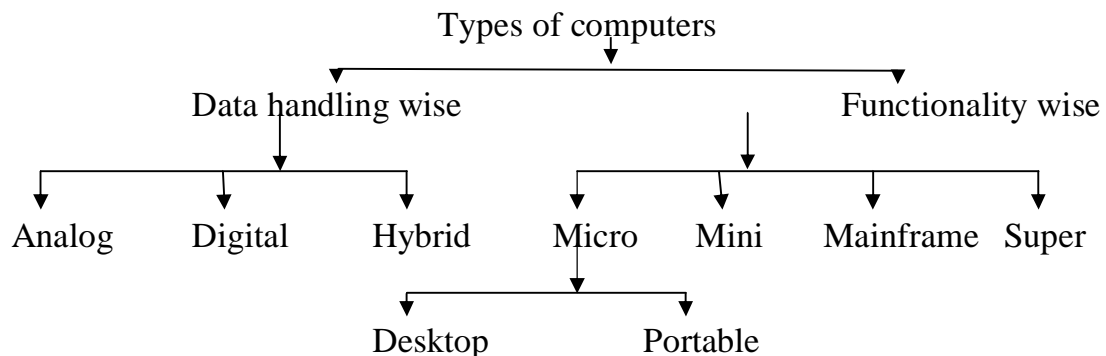
Fourth Generation (1975-onward): - The 4th generation computer used LSI (large scale Intergeneration) Procession speed. Strong capacity becomes high.

Fifth generation (yet to come): - The fifth generation design project under Japan and U.S.A.

CLASSIFICATION OF COMPUTER

Data handing: - Whether the computer is using analog. Digital, Analog or a combination of both.

Functionality: - Whether the volume of work that the computer can handle is large or small.



Data Handling Wise: -

Digital computer: - A computer that works on numbers 0 and 1 is called digital computer. Today's Computers are digital computer.

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Analog computer: - A computer that measure physical quantities such as temperature, pressure etc. whose values change time to time. It is specially used by scientist for research and development.

Hybrid computer: - It combines the features of digital computer as well as analog computer. It is specially sued for medical diagnosis.

Functionality Wise

Micro computer: - Micro computer is low cost small computer that use CPU as micro processor. It includes portable computer personal computer, Desktop computer.

Micro computer is following types: -

Desktop: - A single user personal computer that can be placed on the desk is called desktop computer.

Portable computer: -

Laptop:-It is a portable computer that can be used while travelling in car, aeroplane, train etc. It runs through battery source. It has consumed less power. It is off notebook size and hence the name of notebook computer.

Palmtop computer: A small computer that can be kept in palm or pocket is called palmtop computer.

Handheld Or Mobile Computer:-These computer store little information .like: Phone number, call records, short message etc is called handheld or mobile computer.

Mini Computer: - It is a more powerful than micro computer. The mini computer is specially used a multiuser system in small organization. It is also referred to as supermini.

Mainframe Computer:-It is large computer compared to mini computer. The storage capacity and processing speed is very high. It is suited for big organization.

Super Computer:-It is most powerful computer that does very complex computation works like whether for costing image, sending rockets in space etc.

Embedding computer:-There are many computing device which are fitted into various other device such as washing machine, phones, TV, AC etc are known as Embedding Computers.

Anatomy of Computer: - Digital computer performs five major functions. These are: -

- Inputting
- Processing
- Outputting
- Storing

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➤ Controlling

Inputting: - Refers to the process of Entering data into the computer by the user using an input device.

Storing: - Refers to the holding of data and instructions in the computer's main memory for manipulations.

Processing: - Refers to performing operations (both arithmetic and logical) or manipulation of data entered into the computer so that useful information may be taken out of the entered data.

Outputting: - Refers to the processor of showing the information or result to the user either on screen (monitor) or on paper (through printer).

Controlling: - Refers to direction all the above processes, in co-ordination. This controlling is done by the control unit (CU) in a central processing unit.

Central processing unit: - It is the brain of any computer system. The major parts of CPU are: -

- ALU
- CU
- MU

ALU (Arithmetic Logic Unit): - It is an electronic chip that performs actual calculation like arithmetical and logical.

CU (Control Unit): - It is an electronic chip. It can be compared as the nervous system of human being.

MU (Memory Unit): - MU is small fast memory that provides storage to ALU.

MEMORY ORGNISATION

RAM (Random Access Memory): - It is a read write memory. The data can be written into or read from RAM. RAM is popularly referred to as main memory. The Computer is switch off or there is suddenly power failure then the data from RAM are lost. In other word it store data as long as power supply is continue.

Kinds of RAM: -

- SRAM (Static RAM)
- DRAM (Dynamic RAM)
- Video RAM
- Flash RAM

SRAM: - Static Ram written store information only as long as the power supply is continues. Static Ram is faster but it is more expensive.

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DRAM: - Dynamic Ram is cheaper and consumes less power than static Ram. It is used to very large capacity of memory. The store information is a very short time. If power supply is continue.

Video RAM: - Video Rom is used to store image data for the video display monitor. Video Ram come in one or two MB package and it is located on the video on graphic cards in the computer.

Flash RAM: - Flash Ram is used to digital camera, pc cards for notebook computers, LAN switch & other devices.

ROM (Read Only Memory): - It is a Semi- conductor memory from which store data can be read but cannot be written into it. Hence the computer Name is read only memory. It is totally used be system itself. It stores the instructions in bit language which are needed to store the data when the computer is switch on.

Kinds of ROM: -

- PROM (Programmable ROM)
- EPROM (Erasable Programmable Rom)
- EEPROM (Electrically Erasable Programmable Rom)

PROM: - It is a type of Rom that permits the user to write data into once. This is similar to way of CD-ROM.

EPROM: - It is a type of Rom that allows to user the erase and re-writes the data repeatedly EPROM is chip and hence they are widely used.

EEPROM: - The erasing of data is done by electric volt and hence EEPROM is needs not be taken out. It is specially used in software development.

SECONDARY STORAGE DEVICES

Sequential and direct access device

Sequential access devices

Magnetic Tape: - Magnetic tape is the most popular storage medium for large data which are sequentially accessed and processed. The magnetic tape is a plastic ribbon which is usually ½ inch or ¼ inch wide and 50 to 2400 feet long.

Tape drive: - Magnetic tape drive is used for storage and retrieval of data which is stored on magnetic tape. A magnetic tape is used for storage data.

Types of magnetic disk: -

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Floppy Disk: - It contains cellular plates of plastic which is covered with hard plastic jacket of square shape. It is low storage capacity and very chip and data access & more access time.

Hard Disk: - Hard disks are online storage device. The hard disk are permanently connected to computer system, when computer is on device is available to store information or give information the storage capacity is very high but it is very costly.

Optical Disk: - A disk that use light for reading or writing data is called optical disk.

Optical Disk Drive: - An optical disk drive contents all the mechanical and electronic components for holding and optical disk and for reading or writing information on to it.

Type of Optical Disk: -

CD-ROM (Compact Disk Read Only Memory): - It is an optical disk from which data can be read but cannot be written onto it. The data on CD-ROM is recorded only one side. The process or recording data on CD is called CD-Burning. It is specially used for storage data as well as software.

Worm Disk: - It stands for write once read many. It is also called CDR (Compact Disk Recordable). The user can write data on worm only one and the written data are read as much time.

BUS: - Set of connecting parallel wired that connect various parts of computer for providing path of communication among then.

There are three types of BUS: -

Data Bus: - A set of connecting parallel wire that carries data from one part to another part is called "Data bus".

Control Bus: - A set of connecting parallel wires that carries control and timing signals generated by control units is called "control Bus".

Address Bus: - A set of connecting parallel wires that carries address is called "address Bus".

Input/output devices

Input device: - A device through which data and instruction are entered into computer is called input device.

Type of input device: -

Keyboard: - Keyboard is an input device which is used to enter the data into computer. The most popular keyboard is 101 key.

Mouse: - Mouse is an input device. It is also known as pointing device which is used to draw the picture and also download the data into the internet.

Trackball: - A trackball is pointing device which is similar to a mouse. Track ball built into the keyboard which is commonly used in laptop computer.

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Joy stick: - It is also pointing device. It is used to move cursor position on the screen. It is specially used in playing games.

Electric Pen: - This input device is used to create drawing directly on screen. It is also known as pointing device.

Touch screen: - Touch screen is the most similar input device which can simply touching with finger the desired icon or menu item displayed on the computer screen.

Scanner: - This input device is used to entered data of source document into computer directly without typing. It can scan text data as well as image data.

There are two commonly scanner: -

Flatbed scanner: - It is a large scanner which used to scan contains of entire page.

Hand held scanner: - It is a small scanner which used to scan small image to go keeping in palm.

Web cameras: - This input device is used to live photograph into computer. It is also used in online video conferencing allow to chatting communicate face to face.

OUTPUT DEVICE:-

A device produced the information generated by computer is called output device.

Types of Output Device: -

Monitor: - Monitor is an output device which displays the information on our screen.

Printer: - This output device produced print the information on the paper received from computer. The printed sheet is also called hard copy.

Type of printer: -

Dot matrix printer: - It is an impact printer that prints on character at a time. Hence it is also called character printer.

Inkjet printer: - It is a non impact printer. It prints the data by sparing droplets ink on the paper, color, inkjet, printer contains for inkjet cartridge.

Laser Printer: - It prints 1 page at a time. It prints quality is very high. It is very fast printer. The printing speed of the laser in the range of 8 to 200 pages. The only disadvantage of this printer is very costly.

Plotter: - It is an output device which is specially used for image printing. The image quality produce by plotter is very high.

Thermal Printer: -This printer is used in calculators and fax machine are inexpensive but produce low quality.

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NUMBER SYSTEM

A number system represent a number is called Number System. As we know computer process the data and information of number it understand 0 and 1.

Hence the study of number system is required to understand how our instruction data get converted into computer language.

The no. of digits / symbols used in a system to require a number is called radix / base.

There are following types of number system: -

- **Decimal Number System (0 To 9)**
- **Binary Number System (0 to 1)**
- **Octal Number System (0 to 7)**
- **Hexadecimal Number System (0 to 9 and A to F)**

Decimal Number System: -In this number system any no. is represented by 10 digits (0 to 9). The base of this no. system is 10.

Ex: - $(579)_{10}$

Positional Narration: -It is a location to represent a number by sum of value of each digit by its positional value weight of each digit can be calculated by multiplying the digit with its positional value.

$$\begin{aligned} \text{Ex: - } & (5^2 7^1 8^0)_{10} \\ & = 5 * 10^2 + 7 * 10^1 + 8 * 10^0 \\ & = 5 * 100 + 7 * 10 + 8 * 1 \\ & = 500 + 70 + 8 \\ & = 578 \end{aligned}$$

Binary Number System: - In this number system any no. is represented by 2 digits (0 to 1). The base of this no. system is 2.

$$\begin{array}{r|l} \text{Ex: - } (110)_2 & (?)_{10} \\ \hline 2 & 110 & 0 \\ \hline 2 & 55 & 1 \\ \hline 2 & 27 & 1 \\ \hline 2 & 13 & 1 \\ \hline 2 & 6 & 0 \\ \hline 2 & 3 & 1 \\ \hline & 1 & \end{array}$$

Result: - $(1101110)_{10}$

Octal Number System: - In this number system any no. is represented by 8 digits (0 to 7). The base of this no. system is 8.

$$\begin{array}{r|l} \text{Ex: - } (25)_{10} & (?)_8 \\ \hline 8 & 25 & 1 \\ \hline & 3 & \end{array}$$

Result: - $(31)_8$

Hexadecimal Number System: - In this number system any no. is represented by 16 digits (0 to 9 and A to F). The base of this no. system is 16.

A B C D E F

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10 11 12 13 14 15

Ex: - (351)₁₀ (?)₁₆

$\frac{16}{16} \overline{)351}$

$\frac{16}{16} \overline{)21}$

1

15

5

Result: - (15F)₁₆