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Introduction to COMPUTER

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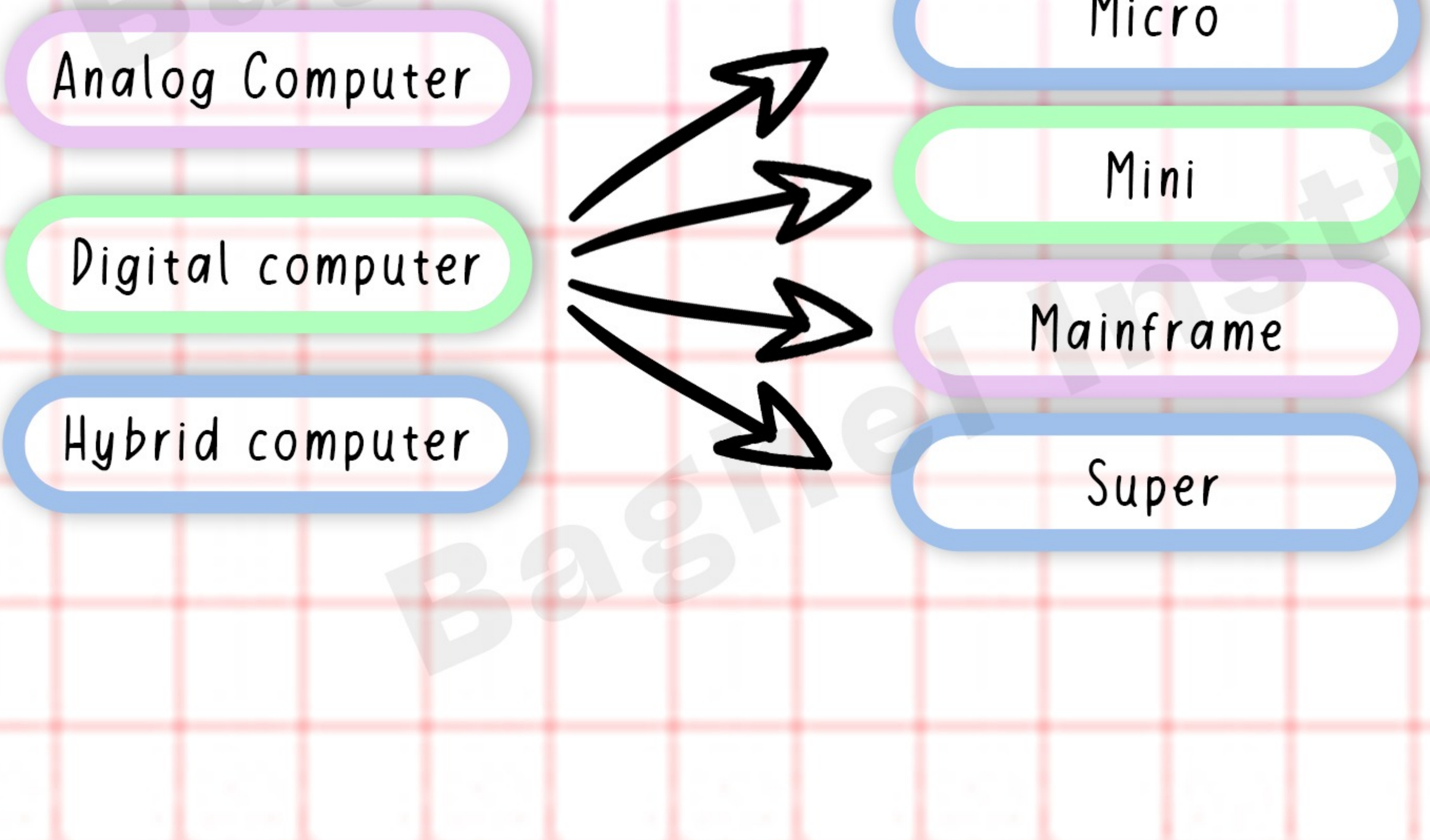
Introduction To Computer

Computer

Computer is an electronic device. The word computer is derived from the Latin word 'compute',which means 'to calculate','to count','to think',or 'to sum up'.
A computer is programmed to carry out sequences of arithmetic or logical operations automatically.It works on priciple:- input - process - output.

Types of computer



Analog Computer

It is particularly designed to process analogue data. Continuous data that changes continuously and cannot have discrete values is called analogue data.Ex:-speedometer, mercury thermometer, etc.

Digital computer

It works on discrete signal.It only understands the binary input 0 and 1, it is processed by the computer to produce the result or final output. All modern computers, like laptops, desktops including smartphones are digital computers.

There are four types of computer

Micro Computer

It is basically a general-purpose computer,small in size and designed for individual use. It consists of a microprocessor as a central processing unit(CPU), memory,input unit, and output unit.

Mini Computer

Minicomputer is a medium size multiprocessing computer. In this type of computer, there are two or more processors, and it supports 4 to 200 users at one time

Mainframe Computer

Mainframe computers are designed in such a way that it can support **hundreds or thousands** of users at the same time. It is used as **servers.**

Super computers

Supercomputers are designed such that they can process a **huge amount of data,** like processing trillions of instructions or data just in a second. It is calculate **complex value.**

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Some Important points

CRAY-1	1st super computer developed in america by Seymour Cray
PARAM 8000	India's first supercomputer Developed by Professor Vijay Bhatkar in 1991- Pune(Maharastra) by C-DAC(Center for Development Advanced Computing).
Param Anantha	Latest supercomputer of India.
FRONTIER	Latest world super computer.
ANUPAM	India's super computer- Bhabha Atomic Research Computer, MUMBAI.
FLOSOLVER	NAL(National Aeronautic Lab.), bengaluru.

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Some Important points

India's fastest super computer are:

- PARAM SIDHI
- PRATUSH
- MIHIR

NSM (National Supercomputer Mission)

- It started in 2015 to promote supercomputer in India.
- Ex: CDAC -PUNE
- IISC- BANGULURU

World's fastest super computer are:

- FUGAKU -Japan (2019)

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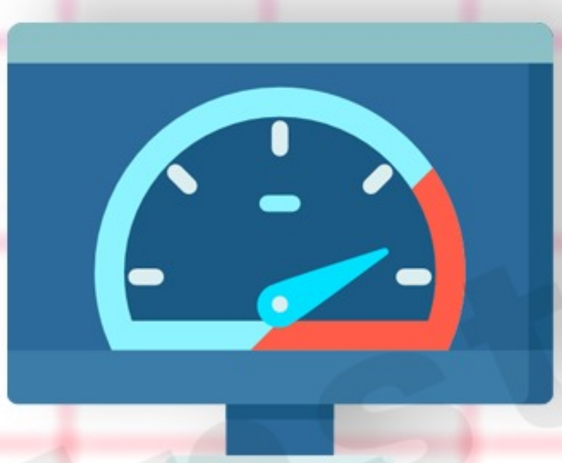
Hybrid Computer

The hybrid computer is a combination of both analog and digital computers. Hybrid computers are fast like an analog computer and have memory, and accuracy like a digital computer. So, it has the ability to process both continuous and discrete data.

Ex: hospital.

Characteristics of Computers

1. Speed



It takes only few seconds for calculations that we take hours to complete. The computer can perform millions (1,000,000) of instructions per second(MIPS).

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2. Accuracy

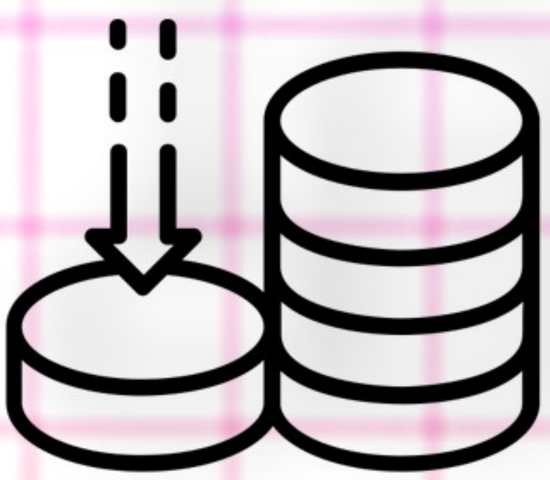
Computers can do the calculations without errors and very accurately.

3. Diligence

Perform any task continuously without getting tired.

4. Storage Capacity

Computers can store large volume of data and information on magnetic media.



5. Versatility

They perform multiple different tasks at the same time for eg. Playing music and drafting your document and even you can print a page.

Application of computer

The various applications of computers in today's arena :

1. Business
2. Education
3. Marketing
4. Banking
5. Insurance
6. Communication
7. Health Care
8. Military
9. Engineering Design

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Units Uses In Computers To Store And Process Data:

1 Bit	One binary digit (represented by 0 or 1)
1 Byte	8 Bits
1 Nibble	4 Bits
1 Kilobyte	1024Bytes
1 Megabyte	1024 Kilobytes
1 Gigabyte	1024 Megabytes
1 Terabyte	1024 Gigabytes
1 Petabyte	1024 Terabytes
1 Exabyte	1024 Petabytes
1 Zettabyte	1024 Exabytes
1 Yottabyte	1024 Zettabytes

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Binary Conversion

A binary number is a number expressed in the base-2 numeral system or binary numeral system, a method of mathematical expression which uses only two symbols: typically "0" and "1". The base-2 numeral system is a positional notation with a radix of 2. Each digit is referred to as a bit, or binary digit.

- To make 12,

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	64	32	16	8	4	2	1
0	0	0	0	1	1	0	0

1. To make 12, You go to the left of the table and find the first number in the second row that fits into 12.
2. It goes into 8 once so you put a one in that column.
3. It goes once into 4 so you put a one in that column.
4. This has now made 12 so all the other columns get a zero in and then you have your binary number.

- To make 37

2^7	2^6	2^5	2^4	2^3	2^2	2^1	2^0
128	64	32	16	8	4	2	1
0	0	1	0	0	1	0	1

1. To make 37, It goes once into 32.
2. Then there is not enough left over to use 16 and 8 so the next one it goes into is 4.
3. There is not enough left for 2 so it then goes into 1.
4. All the other columns are then zero.

IT GADGET

It is a small device

Use for specific function/purpose

Make our life comfortable

Save money and time

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Application of IT gadgets.

1. Smartwatch 360,
2. Google lens
3. Personal Digital Assistant (PDA)
4. Pen with camera
5. Tablet
6. Personal computer
7. Notebook
8. Mobiles

*NOTE

Before 1945:-Mechanical Era

After 1945:- Electronic Era

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EVOLUTION OF COMPUTER

S.no	DEVICE	DATA	INVENTOR
1	ABACUS (counting frame)	2700 BC-2300 BC	Mesopotamian
2	Pascaline	1644	Blaise pascal
3	Jacquard loom	1805	Joseph jacquard
4	Difference engine	1820	Charles babbage
5	Analytical engine	1834	Charles babbage

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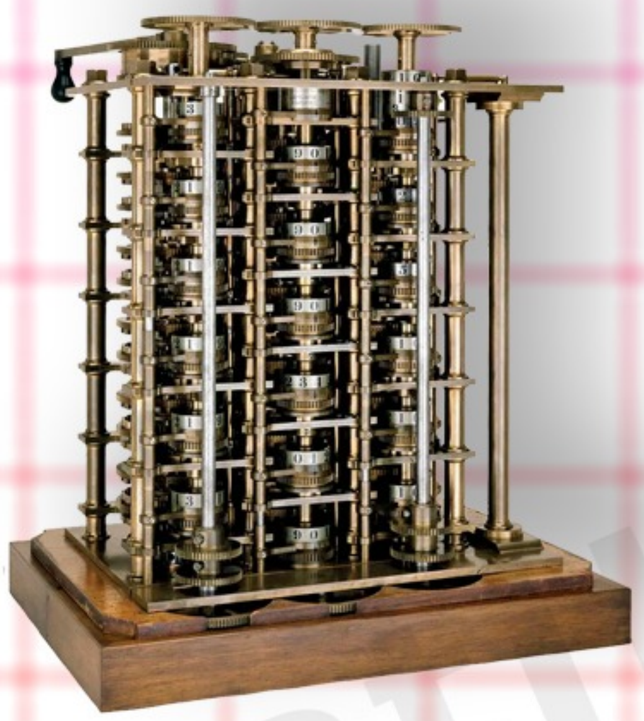
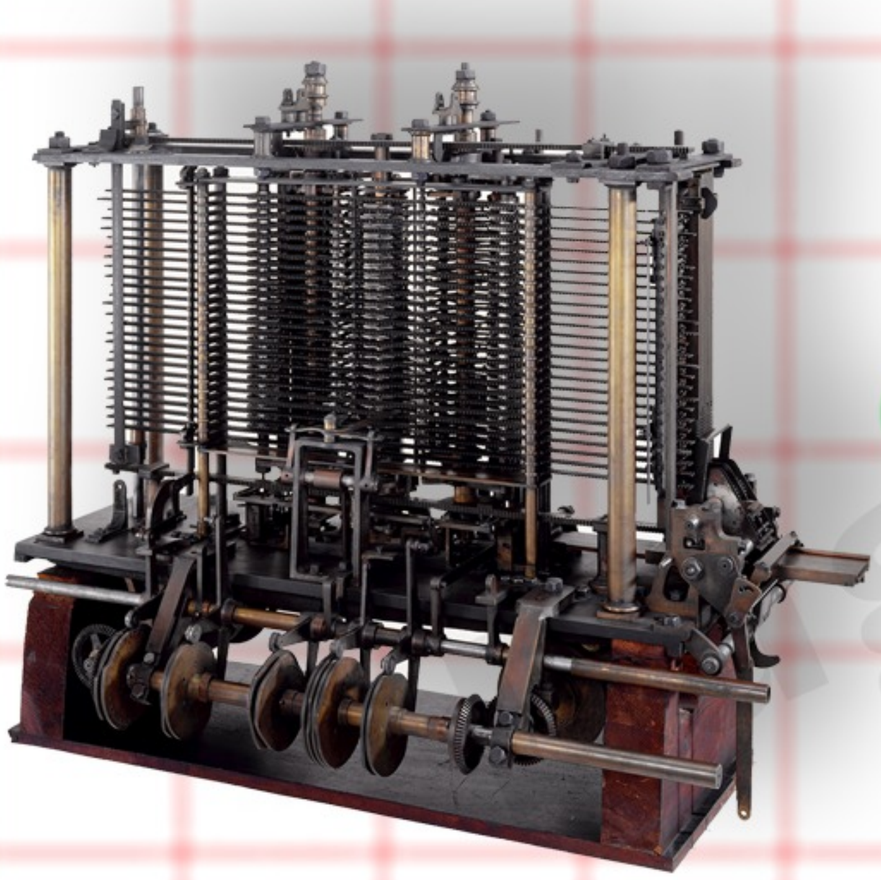
ABACUS
(counting frame)
2700 BC-2300 BC

Pascaline
1644

Jacquard loom
1805



Difference engine
1820



Analytical engine
1834

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GENERATION OF COMPUTER

Vacuum tube

Punch card

First Generation Of Computer		
1	Timeline	1945-1955
2	Component	Vacuum tube
3	Language	machine language
4	Storage	Punch card
5	Speed	Mili second
6	Extra	ENIAC,UNIVAC computer (Punch card used)

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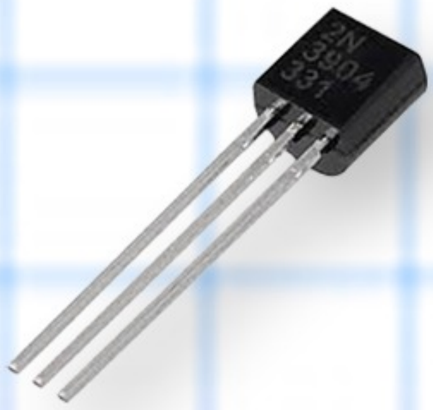
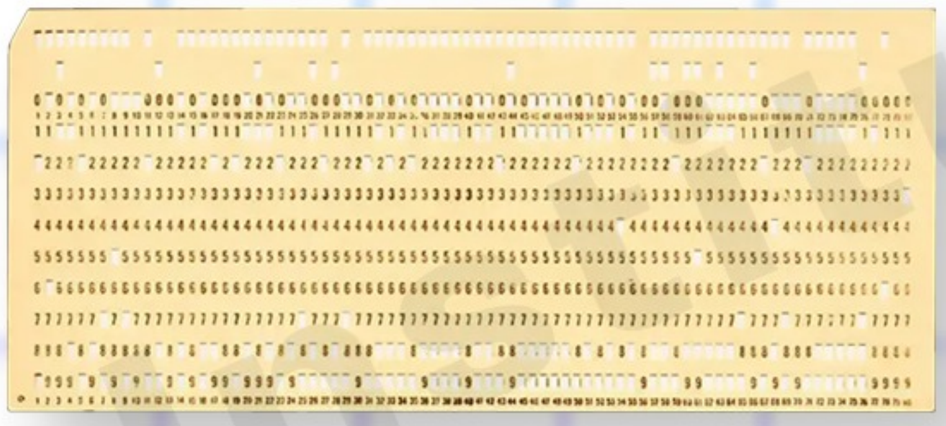


Transistor



Punch card

Magnetic tape

Second Generation Of Computer

1	Timeline	1955-1964
2	Component	Transistor
3	Language	Assembly language
4	Storage	Punch card,Magnetic tape
5	Speed	Micro second
6	Extra	IBM-1401,1402,1642,1620

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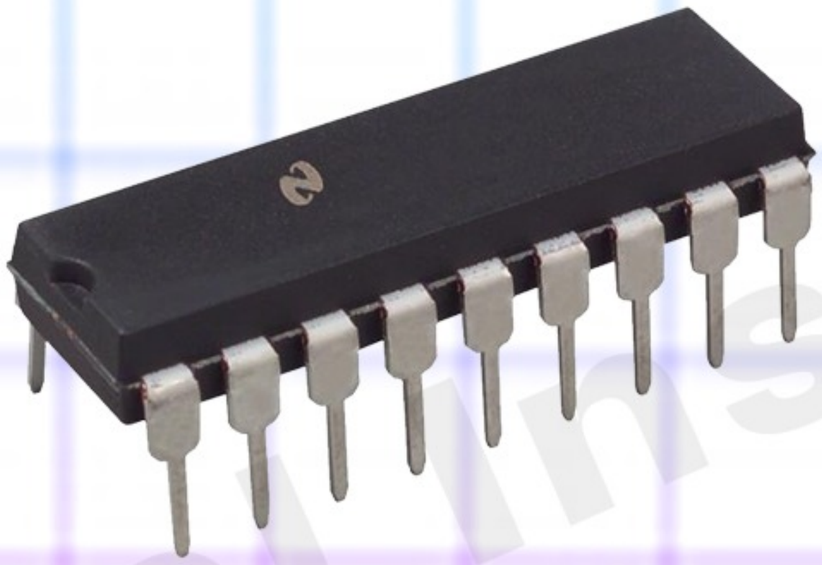
IC (Integrated Circuit)



Magnetic tape

Third Generation Of Computer

1	Timeline	1964-1975
2	Component	IC (Integrated Circuit)
3	Language	High Level Language
4	Storage	Magnetic tape
5	Speed	Nano second
6	Extra	IBM-360

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Microprocessor

Optical Disk (CD,DVD,BRD)

Fourth Generation Of Computer

1	Timeline	1975-1989
2	Component	Microprocessor, VLSIC(Very Large Scale Integrated Circuit)
3	Language	C,SQL(Structure Query Language), Domain Based Lnaguage
4	Storage	Optical Disk (CD,DVD,BRD)
5	Speed	Pico second
6	Extra	IBM PC, Apple PC

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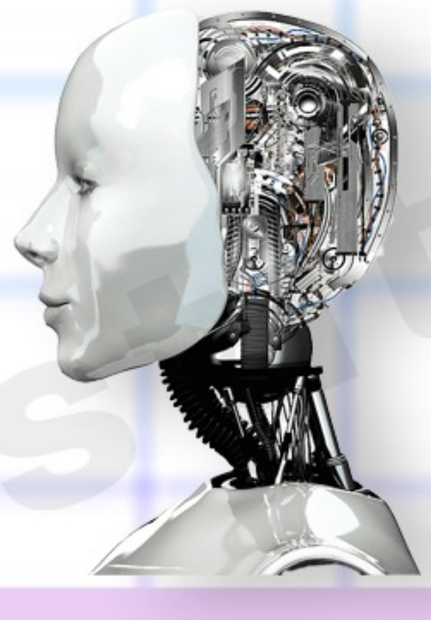
Microprocessor



HDD, SSD, Pendrive

Artificial Intelligence

Fifth Generation Of Computer		
1	Timeline	1989-Till now
2	Component	Microprocessor+Artificial Intelligence , ULSIC(Ultra Large Scale Integrated Circuit)
3	Language	Python, Java, C++,etc
4	Storage	HDD, SSD, Pendrive etc
5	Speed	Pico second
6	Extra	PC, Desktop, Laptop, Small Phone etc

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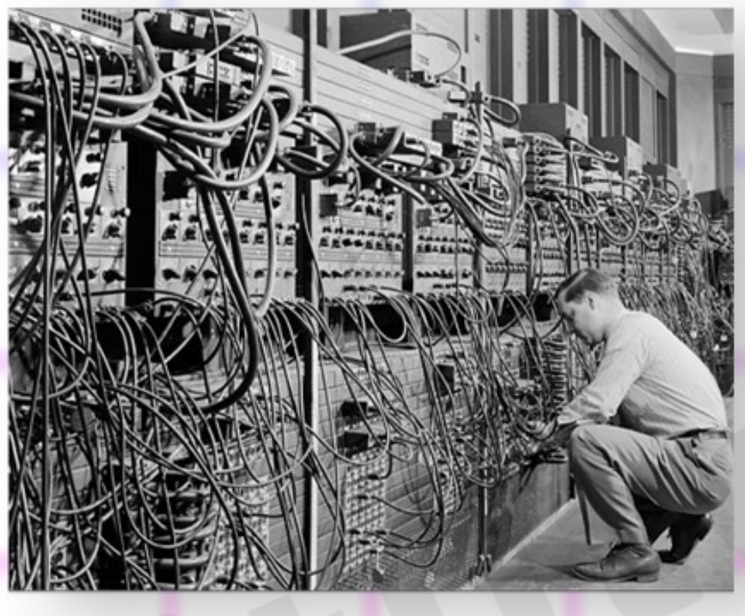
IMPORTANT POINT TO NOTE

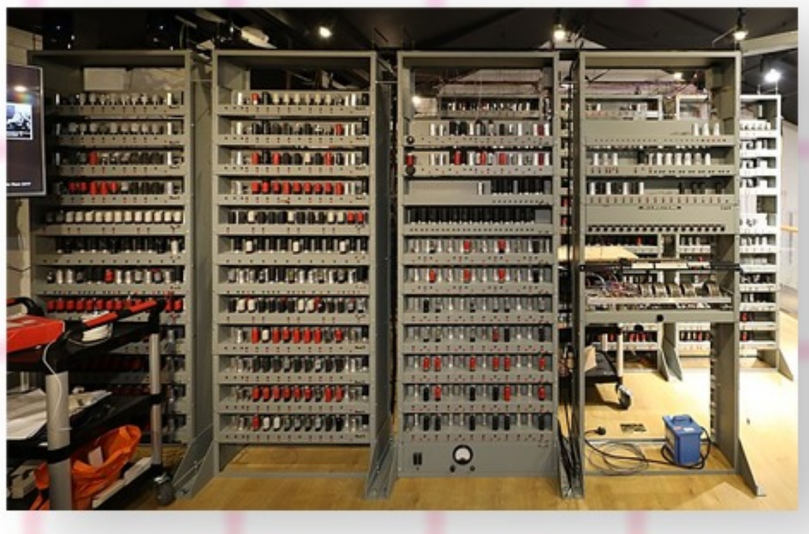
COMPUTER OF FIRST GENERATION

ENIAC



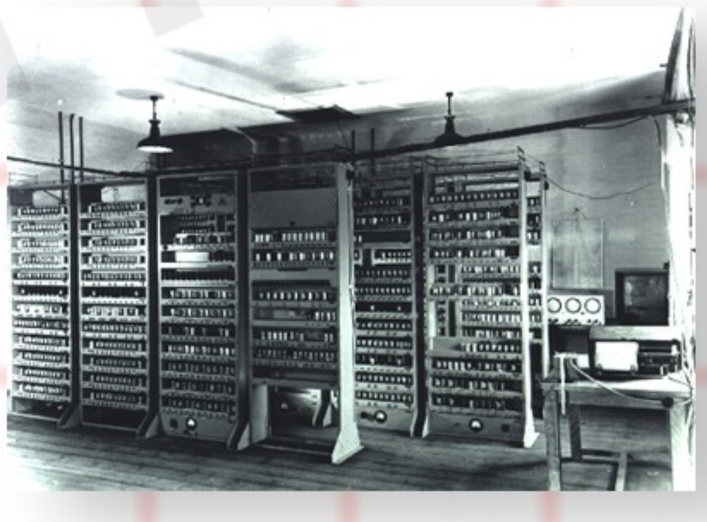
- Electronic Numerical Integrator And Calculator
- It was first general purpose computer.
- Invented by John Mauchly and J.Presper Eckert in 1946

EDSAC



- Electronic Delay Storage Automatic Calculator.
- It was invented by Maurice Wilkies in 1949.

EDVAC



- Electronic Discrete Variable Automatic Computer

UNIVAC

- Universal Automatic Computer
- It was first commercial purpose computer
- It was designed principally by J. Presper Eckert and John Mauchly, the inventors of the ENIAC in 1952

Input and output device

Input Device

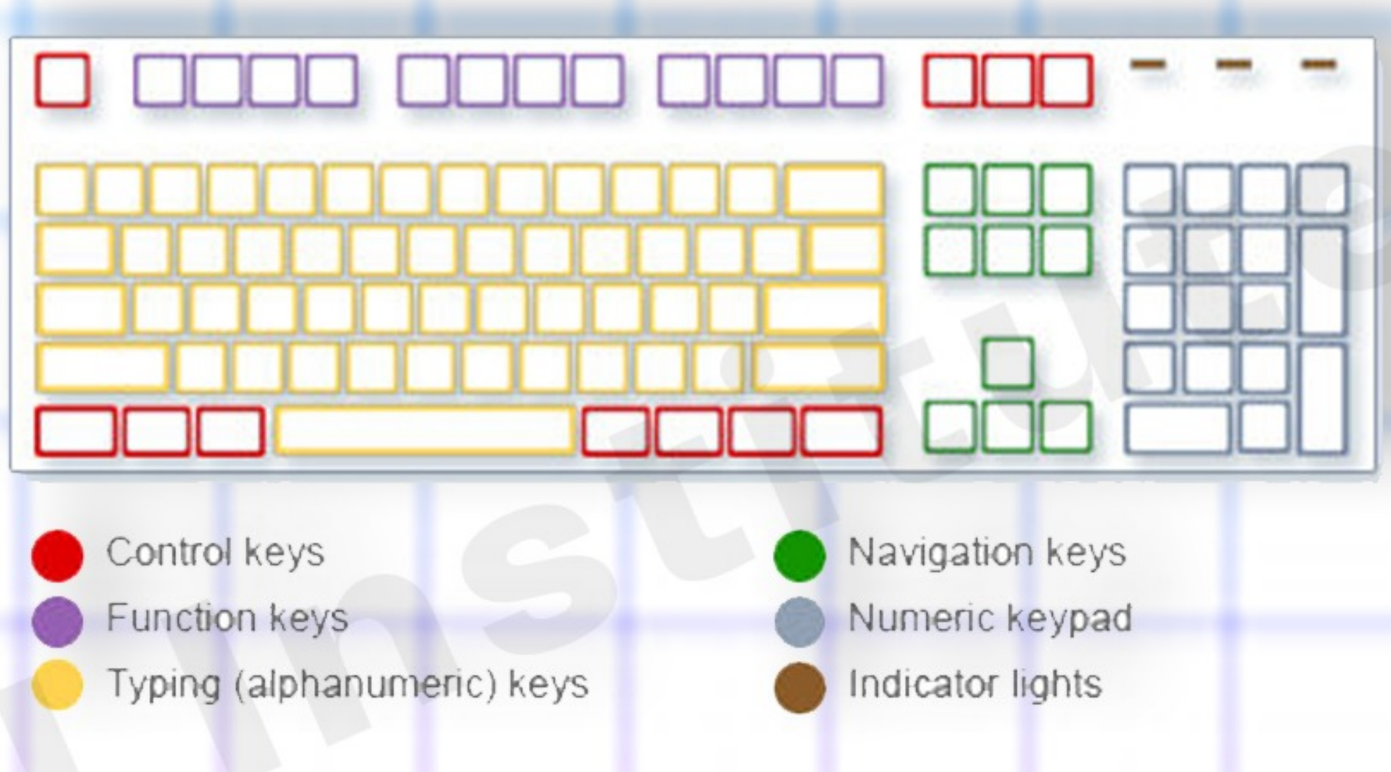
An input device is a hardware component of a computer system that allows a user to enter data and commands into the computer.

Two main input devices are

1. Keyboard
2. Mouse

Keyboard

The keyboard looks like a typewriter kind of input device.



Features

1. On key press it sends a code (ASCII-American Standard Code for Information Interchange). It is a character encoding standard for electronic communication. ASCII codes represent text in computers, telecommunications equipment, and other devices.

2. No. of keys in keyboard
   - minimum number of keys - 101 keys (without WIN keys)
   - minimum number of keys - 104 keys (with WIN keys)
   - minimum number of keys - 84 keys (on laptop)

3. layout of keyboard
   - QWERTY

4. Typing (alphanumeric) keys

These keys include the same letter, number, punctuation, and symbol keys found on a traditional typewriter.

5. Control keys/modifier keys

Shift ,Ctrl, Alt, the Windows logo key, and Esc.

6. Function keys. F1 to F12.

F1- Help

F2-Rename

F3-Search

F4 (Alt+F4)-Close Program

F5- Refresh

F6- Address Bar

F7- Spelling Error

F8-Reboot

F9-Brightness up

F10-Brightness Down

F11- Full Screen

F12- Save As

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7. Navigation keys

They include the arrow keys, Home, End, Page Up, Page Down, Delete, and Insert.

8. Numeric keypad

There are total 17 Numeric keypad.

9. Toggle Key

A toggle key is a type of keyboard key that allows you to switch between two different input modes or states. For example, the Caps Lock key is a toggle key that switches between uppercase and lowercase letters. The Num Lock key is another example of a toggle key that switches between numeric input mode and navigation input mode on a numeric keypad.

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Mouse

device used for pointing, clicking, and scrolling on a screen.

Who invented the mouse?

Invented by Douglas Engelbart in 1963.

To go to the properties of a program - Right Click

To Open a program - Double Left Click

To select a Paragraph Line - 3 Times Left Click

Page up and down - scroll button

Types of mouse

1-Mechanical Mouse (Rubber ball)

2-Optical Mouse (light based)

3- Wireless Mouse (laptop , notebook)

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• (OCR)-Optical Character Recognition

Optical Character Recognition (OCR) is the process that converts an image of text into a machine-readable text format.

• Bar Code Reader

This device reads bar codes and coverts them into electric pulses to be processed by a computer. A bar code is nothing but data coded in form of light and dark bars.

• Touch Screen

A touchscreen, or touch screen, is a both input and output device. A touch screen is a computer display screen that is sensitive to human touch, allowing a user to interact with the computer by touching pictures or words on the screen.

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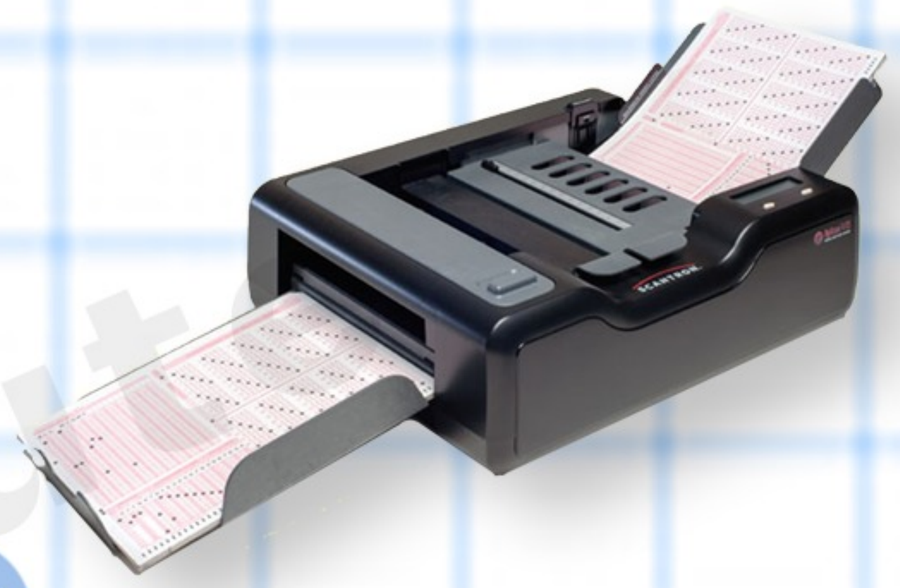
• OMR



Optical mark recognition (also called optical mark reading and OMR) is the process of capturing human-marked data from document forms such as surveys and tests. They are used to read questionnaires, multiple choice examination paper in the form of lines or shaded areas.

• Web camera

A digital camera that's connected to a computer. It can send live pictures from wherever it's sited to another location by means of the internet.

• Light Pen

A light pen is a computer input device that looks like a pen. The tip of the light pen contains a light-sensitive detector that enables the user to point to or select objects on the display screen.

• Joystick

A joystick is also a pointing input device like a mouse. The base is fitted in a socket that allows free movement of the stick. The movement of stick controls the cursor or pointer on the screen.

• Photo Scanner

It is designed to scan photographs. Hard copy (Physical Data) to Soft copy(Digital Data).

• Microphone

The microphone is a computer input device that is used to input the sound.Voice signal to digital data.

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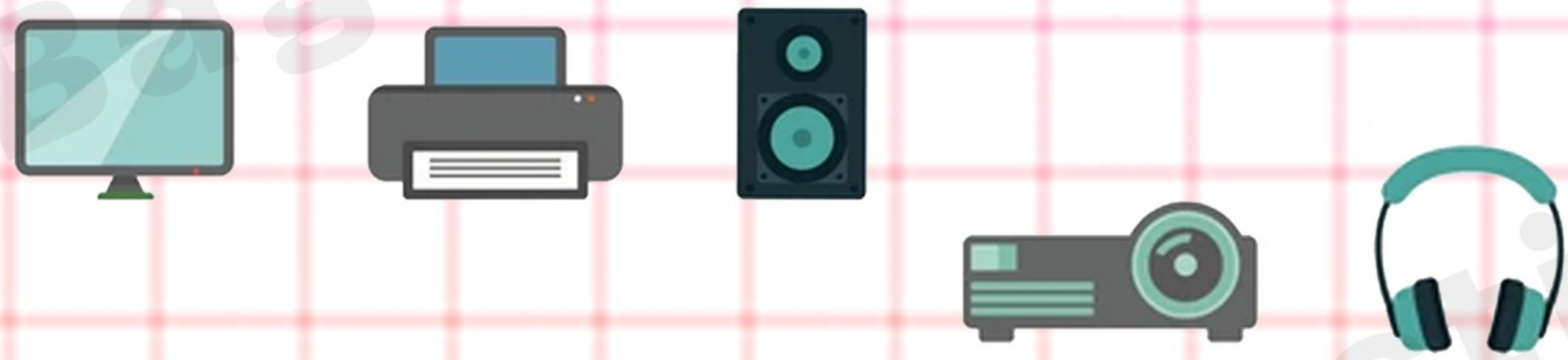
- Magnetic Ink Character Recognition (MICR)

MICR computer input device is designed to read the text printed with magnetic ink. MICR is a character recognition technology that makes use of special magnetized ink which is sensitive to magnetic fields. It is widely used in banks to process the cheques and other organizations where security is a major concern.

OUTPUT DEVICE



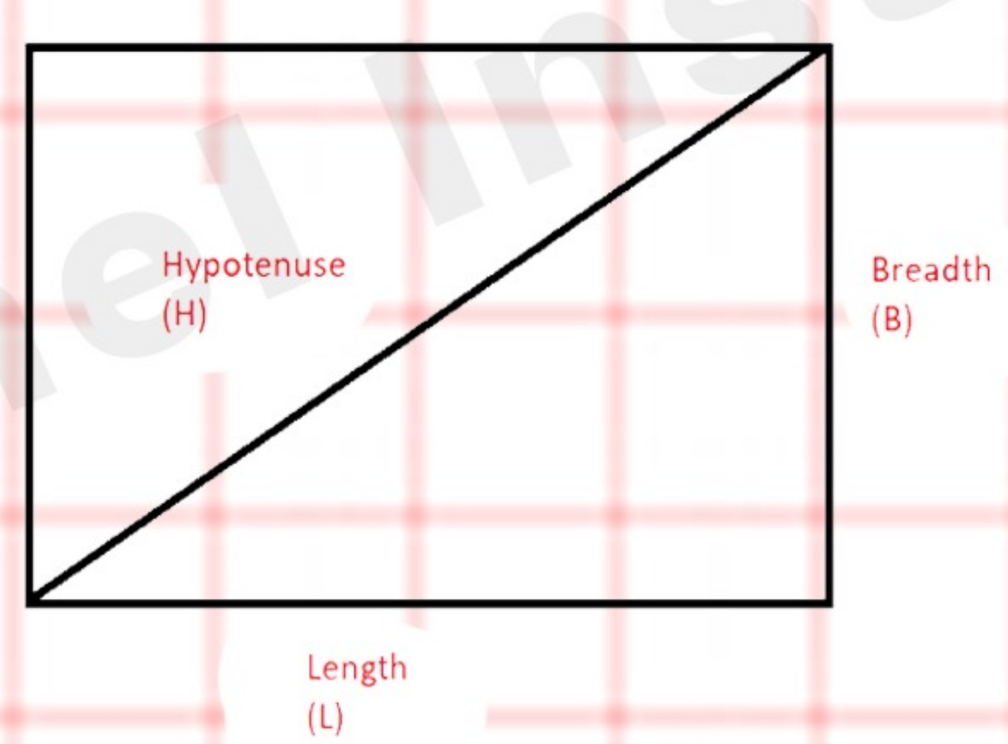
The output device displays the result of the processing of raw data that is entered in the computer through an input device. There are a number of output devices that display output in different ways such as text, images, hard copies, and audio or video.

• Monitor

The monitor is the display unit or screen of the computer. It is the main output device that displays the processed data or information as text, images, audio or video.

Important points

1. The first computer monitor was invented by Karl Ferdinand Braun in 1897.
2. Which type of LED used in TV:-Organic light emitting diodes (OLED).
3. Which type of LED used in phone:-AMOLED stands for active-matrix organic light-emitting diode.
4. Pixel: the smallest unit of a picture is called pixel.
5. Resolution: How many number of pixels are there on a screen, we call it resolution
6. how to measure length size of a monitor:



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$$H^2 = B^2 + l^2$$
$$H^2 = (15)^2 + (8)^2$$
$$H^2 = 225 + 64$$
$$H^2 = 289$$

H=17 inch

Types Of Monitor

VDU (Visual Display Unit)

CRT (Cathod Ray Tube)

Monochrome

Colour (RGB)

LCD (Liquid Crystal Display)

TFT (Thin Film Transistor)

LED (Light Emitting Diode)

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CRT Monitor

CRT monitors are based on the cathode ray tubes. They are like **vacuum tubes** which produce images in the form of video signals. **Cathode rays tube** produces a beam of electrons through electron guns that strike on the inner phosphorescent surface of the screen to produce images on the screen.

It is of two types

Monochrome

it is also known as **black and white.**

Colour

it has three different colour which emit **red, green,blue light** respectively and due to the RGB colour picture appear in coloured view.

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LCD Monitor

It is based on liquid crystal display technology which is used in the screens of laptops, tablets, smart phones, etc. An LCD screen comprises two layers of polarized glass with a liquid crystal solution between them.

TFT(Thin Film Transistor)

It is a variant of LCD and makes matrix but not self lighting.

LED(Light Emitting Diode)

It is self light emitting technology.
Picture quality is better.

- printer

A printer is an output device that prints text, document, images, spreadsheet, etc as hardcopy. Printer's quality is measured in dot per inch (DPI).

There are two types of printer,

- Impact printer
- Non impact printer

Impact printer

It is a printing device in which a printing element directly strikes a surface. Example typewriter.

Impact printer are two types.

Daisy wheel Printer.

It is an early type of impact printer invented in 1965 by David S Lee at Diablo Data Systems.

The printer rotate the disk to each characters and using a name strikes each character into an ink ribbon to create a character on paper.

It use only black ink

Dot Matrix Printer

A dot matrix printer creates character by striking pins against ink ribbon each pin makes a dot and combination of dots from character and illustrations, use of carbon paper.

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Non Impact Printer

It is a printer device in which a printing element does not directly strikes a surface.

Example:- inkjet printer and Laserjet printer

Non impact printer are two types

Inkjet Printer

It produces hard copy of a text document or Photo by sprinkling droplet of ink onto the paper.

- Colorful printer (3+1)-
- C-Cyan(Blue)
- M-Megenta (Pink)
- Y-Yellow
- K -Knight (black)

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Laser Printer

(Light Amplification for Stimulated Emission of Radiation)

It is produces image by directly laser beam at a mirror which bounces the beam on a drum. The drum has a special coating on it to which tone ink powder. Sticks.

Thermal Printer

small in size

use for bill print

instant output

dry ink-heat-stick

paper- wax coated

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Portable Printer

The one that can be taken from one place to another is called a portable printer.

- Plotter

It is used to print large maps architectural drawings, large-format printing, and create pictures, 3D postcards, advertising signs, charts.

Inventor- Ramington Rand

Invention Date- 1953

- Projector

It can be used to project the output of a computer and other devices onto a screen.

Date of invention- 1895

inventor- Jenkish and Armat

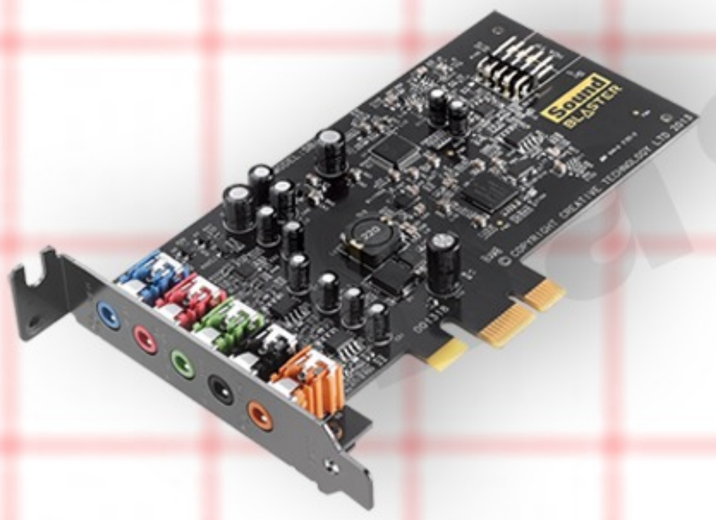
• Speakers

Speakers are connected to computers to allow sound to be output. For the working of speakers, sound cards are required.The dynamic speaker was invented in 1925 by Edward W.Kellogg and W. Rice

• Sound Card

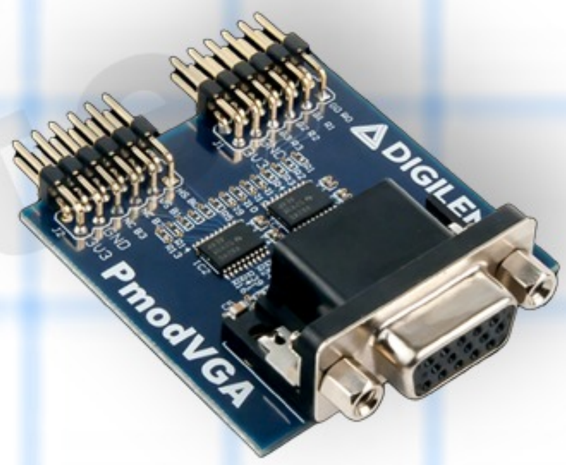
Sound cards are computer output devices that are inserted into the computer. A sound card, either external or internal, is required to produce sound on any computer (built-in).

Invented in 1972 by Servin Gooch



- Video Graphic Array (VGA)

An extension card via which a computer can transfer graphical data to a video display device like a TV, projector, or monitor. It Attach To The Motherboard. Invented In 1987 By IBM company



- Speech synthesizer

A speech synthesizer is a computerized device that takes in data, interprets it, and generates audible words.

- Headphones

To hear the sound, use earbuds with your PC, laptop, or smartphone.

Central Processing Unit (CPU)

The CPU, or Central Processing Unit, is the main processor in a computer that performs most of the processing tasks. It is sometimes referred to as the "brain" of the computer. The CPU is responsible for executing instructions from software programs, performing mathematical calculations, and making decisions based on the input it receives. The CPU is made up of transistors and other components that work together to perform these tasks quickly and efficiently. It communicates with other parts of the computer, such as memory and input/output devices, to carry out the tasks required by the computer's operating system and software applications.

Generally, a CPU has three components:

- ALU (Arithmetic Logic Unit)
- Control Unit
- Memory or Storage Unit

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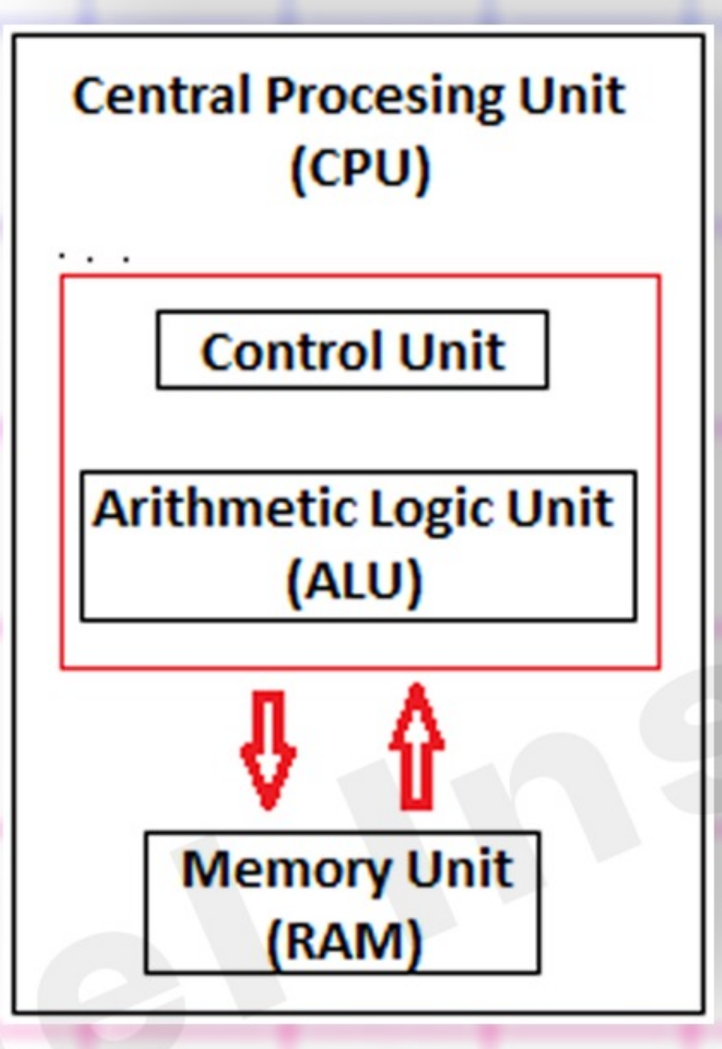
Control Unit

It takes instructions from memory and then decodes and executes these instructions. So, it controls and coordinates the functioning of all parts of the computer.



ALU

It is the arithmetic logic unit, which performs arithmetic and logical functions. Arithmetic functions include addition, subtraction, multiplication division, and comparisons. Logical functions mainly include selecting, comparing, and merging the data. A CPU may contain more than one ALU. Furthermore, ALUs can be used for maintaining timers that help run the computer.

Memory Unit

A storage unit is a component of a computer that is used to store data and programs for long-term use. The storage unit provides a permanent place for the computer to keep information and files, even when the power is turned off.

What is CPU Clock Speed?

The clock speed of a CPU or a processor refers to the number of instructions it can process in a second. It is measured in gigahertz. For example, a CPU with a clock speed of 4.0 GHz means it can process 4 billion instructions in a second.

Types of CPU

Single Core CPU

Single Core is the oldest type of computer CPU, which was used in the 1970s. It has only one core to process different operations. It can start only one operation at a time.

Dual Core CPU

Dual Core CPU contains two cores in a single Integrated Circuit (IC). It can perform faster than the single-core processors and can handle multitasking more efficiently than Single Core processors.

Quad Core CPU

This type of CPU comes with two dual-core processors in one integrated circuit (IC) or chip. So, a quad-core processor is a chip that contains four independent units called cores.

Computer memory and storage

computer memory and storage

- Primary/internal storage
  - ROM
    - PROM
    - EEPROM
    - EPROM
  - RAM
    - SRAM
    - DRAM
    - SDRAM
- Secondary /external storage
  - HDD
  - SSD
  - OPTICAL DISK
    - Floppy disk
    - FLASH drive

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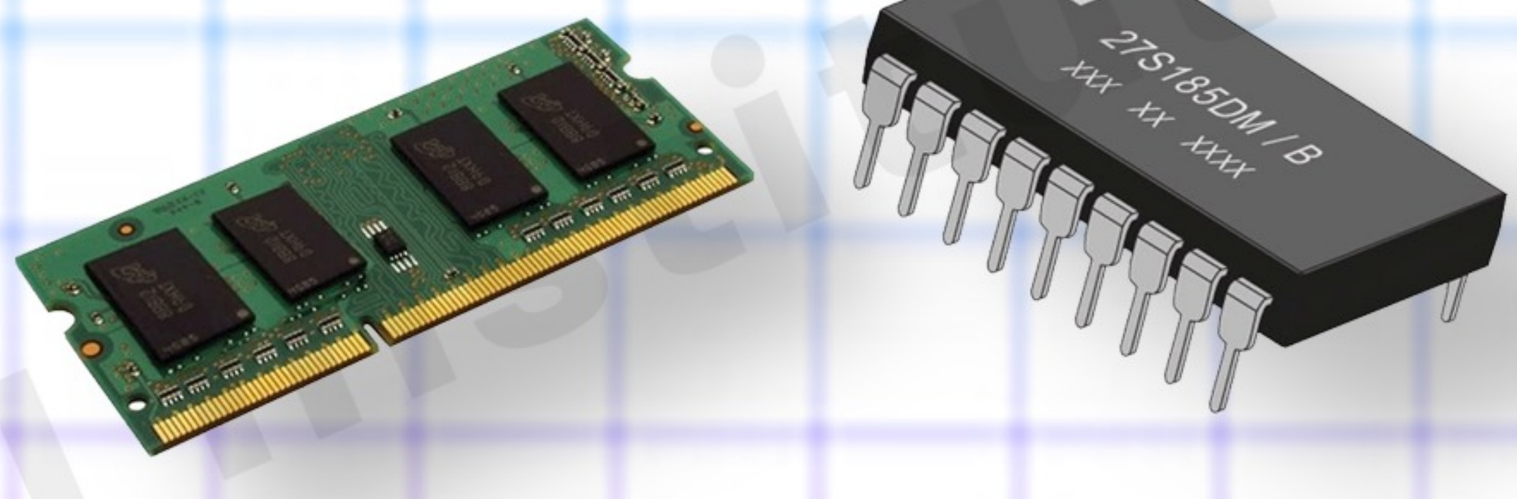
Primary memory



Primary storage/memory, also known as main memory, is the part of the computer that stores current data, programmes, and instructions. The motherboard houses the primary storage, and as a result, data from and to primary storage can be read and written very quickly.

There are two types of primary memory

ROM(Read Only Memory)

computer always contains a small amount of ROM that holds instruction for starting up the computer. It is non volatile/permanent in nature.

ROM has two types of chip i.e.

BIOS (Basic Input/Output System)

is the program a computer's microprocessor uses to start the computer system after it is powered on. It also manages data flow between the computer's operating system (OS) and the CMOS(Complementary Metal-Oxide-Semiconductor)

It is used to change the system,s time and date. When system is shutdown the time and date can be changed automatically due to CMOS battery.

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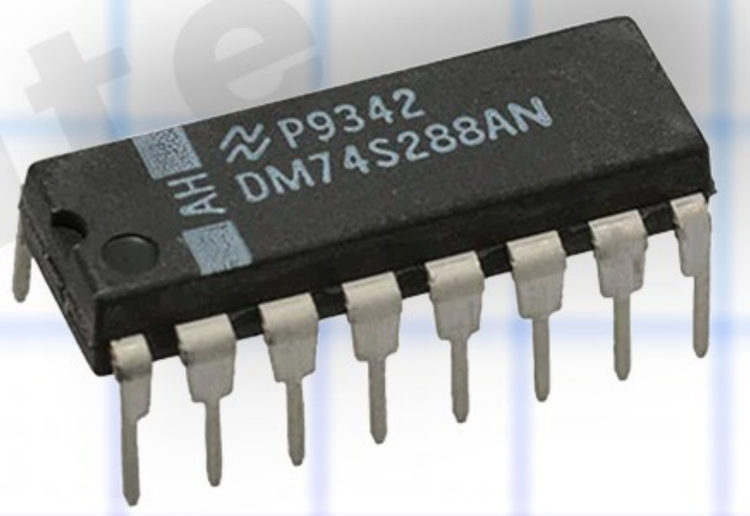
We can classify ROM into

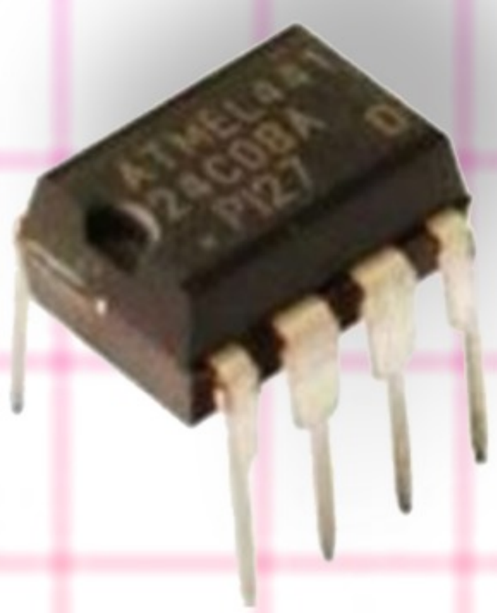
PROM (Programmable ROM)

The user can only change the Programmable ROM once



.The user purchases a blank PROM and writes the required text on it; however, the content cannot be changed once it has been written.

EPROM (Erasable Programmable ROM)

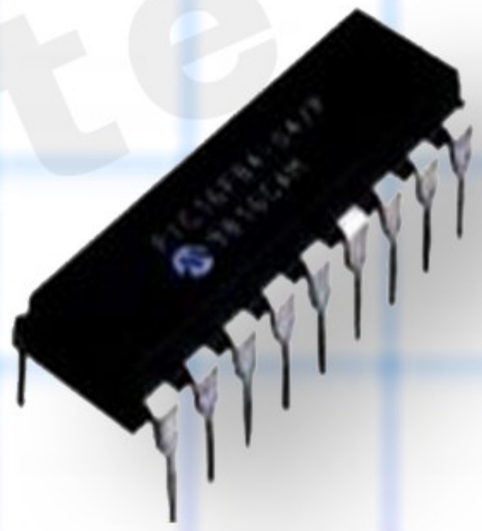


ROM that can be erased and programmed by removing the original material, which can be done by exposing EPROM to UV radiation, and the content can be modified.

The charge on the ROM is dissipated by the ultraviolet light, allowing content to be rewritten on it.

EEPROM (Electrically Erasable Programmable ROM)

The initial content of an electrically erasable and programmable ROM can be modified by erasing the content that can be easily deleted electrically.



(RAM)Random Access Memory

RAM, or Random Access Memory, is a type of computer memory that temporarily stores data and programs that are actively being used by the processor It is volatile/temporary in nature.

Types of RAM

We can broadly classify RAM into SRAM or Static RAM and DRAM or Dynamic RAM on the basis of behaviour.

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SRAM(Static RAM)

The data is stored in SRAM, as long as the system is powered on. It does not need to be refreshed on a regular basis.

DRAM(Dynamic RAM)

To keep data must be refreshed every few milliseconds. It is commonly used in personal computers and servers.

SDRAM (Synchronous DRAM)

It is the name for a form of dynamic random access memory DRAM where the operation the external interface is synchronised by an external clock signal.

Example-DDR1,DDR2,DDR3,DDR4,DDR5

Difference Between Ram And Rom

Basis for Comparison	RAM	ROM
Stands for	Random Access Memory	Read Only Memory
Memory type	Volatile	Non-volatile
Memory capacity	1 to 256 GB per chip	4 to 8 MB per chip
Operation type	Read and Write both.	Read and Write both.
Speed	Fast	Comparitively slow.
Storage type	Temporary	Permanent
Also referred as	Primary memory	Primary memory
Presence of data according to power source	Data retained in ROM even if the power is turned off.	The stored data in RAM lost in case of power failure.
Accessibility to processor	Processor can directly access the data in RAM.	Processor cannot directly access the data in ROM.
Cost	High	Comparitively low
Types	SRAM ,DRAM and SDRAM	PROM, EPROM and EEPROM

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Secondary memory

Secondary memory, also known as secondary storage, is a type of computer memory that is used to store data and programs on a long-term basis.

Types of secondary memory

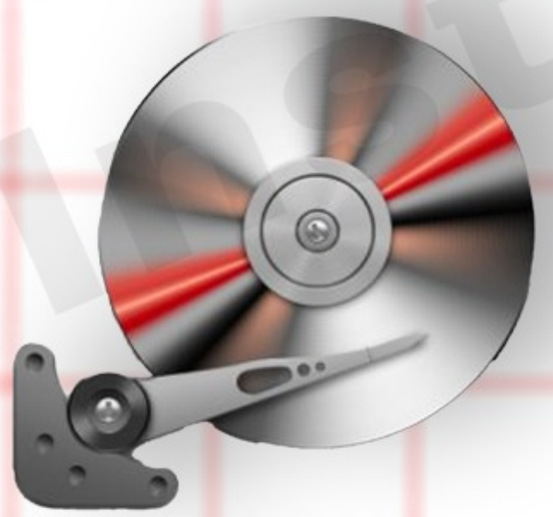
Hard Disk Drive(HDD)

It consists of a spinning disk and read/write heads, and is a popular storage option due to its high storage capacity, low cost, and compatibility with many computers. (For example, 256 GB, 500 GB, 1 TB, and 2 TB).

It has following component

Platters

The platters are the circular discs inside the hard drive On larger hard drives, several platters are used to increase the overall capacity of the drive.



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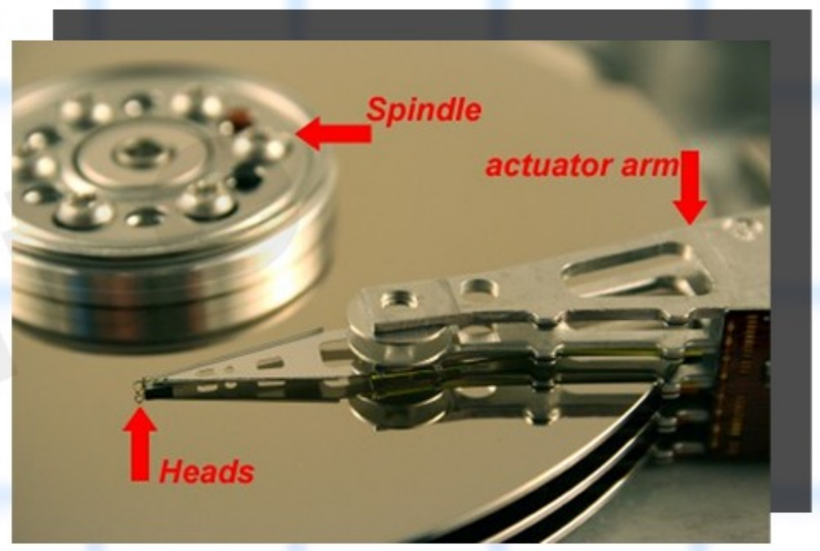
Heads

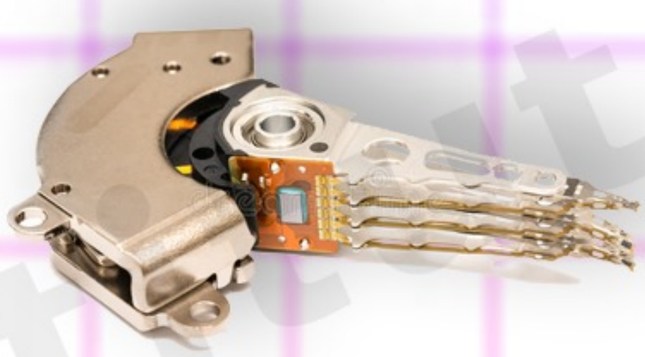
A read/write head is a specific physical part of a hard disk

Read/write heads are typically made up of a thin horizontal magnetic blade attached to an actuator arm.



Actuator arm

HDD actuator is a device which moves head arm assembly.

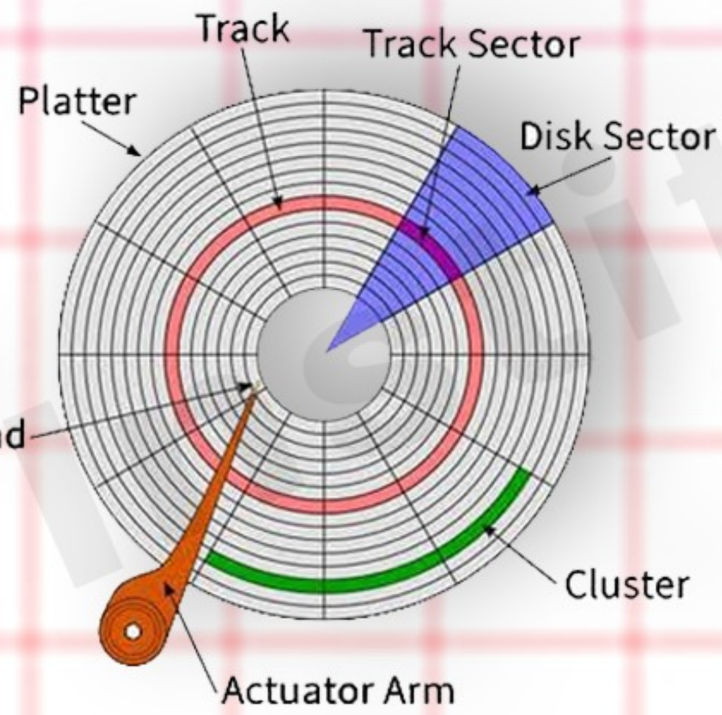


Track

A track is one complete circle of data on one side of a hard drive platter.

Sector

A sector contains a fixed number of bytes, generally at least 512.



Cluster

A cluster is also called a file allocation unit.

Solid-State Drive (SSD)

it is a new generation of storage device used in computers. SSDs store data using **flash-based memory**, which is much **faster than the traditional hard disks** they've come to replace.

Comparison of HDD versus SSD

Point of difference	SSD	HDD
Stands for	Solid State Drive	Hard Disk Drive
Heat, Electricity and Noise	Less rotation required. Uses less power. Less heat or noise.	More heat generation. More noise. More electricity to rotate the platters.
Speed	SSD has lower latency SSD has faster read/ writes	HDD has higher latency HDD has longer read/ write times
Components	SSD architecture has NO moving parts.	HDD architecture has moving parts.
Weight	Less in weight.	Heavy in weight.

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Floppy Disk

A floppy disc refers to a magnetic disc housed in a square plastic container. There are two sizes of floppy discs, Size: 3.5 inches, 1.44 MB storage capacity

Flash Drive

A flash drive or pen drive is available in a variety of storage capacities, including 1, 2, 4, 8, 16, 32, 64 GB, and 1 TB. Data is transferred and stored using a flash drive.

Optical Disc

An optical disk is any computer disk that uses optical storage techniques and technology to read and write data.

It comes in

CD-(Compact Disk) -(700 MB)

DVD -(Digital Versatile Disk)-(4.7GB-6.4GB)

BRD-(Blue Ray Disk)-(25GB-50GB)

Difference between Primary And Secondary Memory

Parameter	Primary Memory	Secondary Memory
Nature	The primary memory is categorized as volatile	The secondary memory is always a non-volatile memory.
Alias	These memories are also called internal memory.	Secondary memory is known as a Backup memory or Additional memory or Auxiliary memory.
Access	Data is directly accessed by the processing unit.	Data cannot be accessed directly by the processor.
Formation	It's a volatile memory meaning data cannot be retained in case of power failure.	It's a non-volatile memory so that that data can be retained even after power failure.
Storage	It holds data or information that is currently being used by the processing unit. Capacity is usually in 16 to 32 GB	It stores a substantial amount of data and information. Capacity is generally from 200GB to terabytes.
Expense	Primary memory is costlier than secondary memory.	Secondary memory is cheaper than primary memory.

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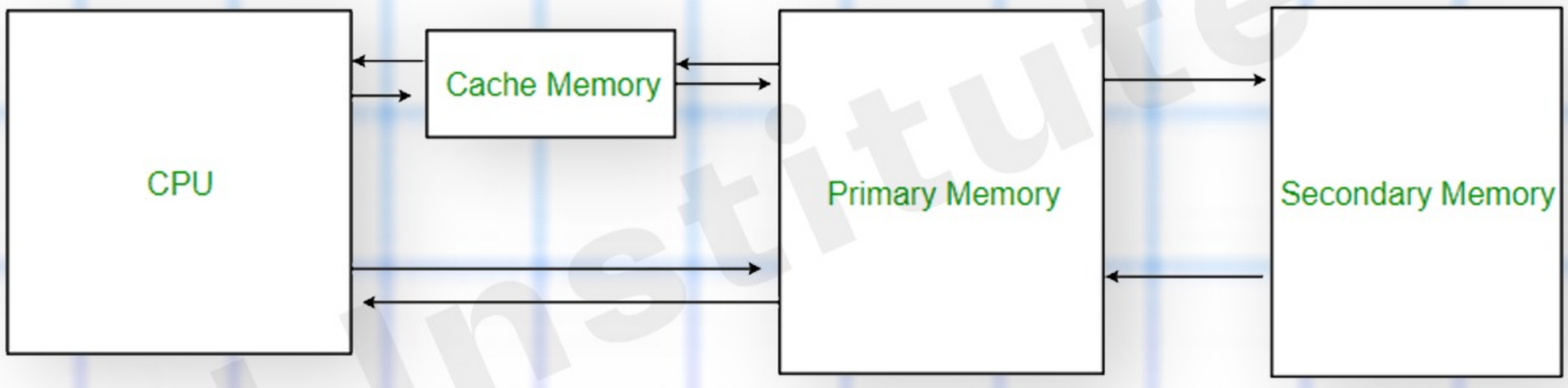
CACHE MEMORY



It holds the data and programs which are frequently used by the CPU. So, it makes sure that the data is instantly available for CPU whenever the CPU needs this data.In other words, if the CPU finds the required data or instructions in the cache memory, it doesn't need to access the primary memory (RAM).Thus, by acting as a buffer between RAM and CPU, it speeds up the system performance. It is more costlier than DRAM.

Types of Cache Memory

L1: The size of this memory ranges from 2KB to 64 KB.

L2: The memory size of this cache is in the range of 256 KB to the 512 KB.

L3: Its memory size ranges from 1 MB to 8 MB.

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HARDWARE AND SOFTWARE

HARDWARE

Hardware refers to the physical and visible components of the system such as a monitor, CPU, keyboard and mouse.

SOFTWARE

It refers to a set of instructions which enable the hardware to perform a specific set of tasks. It refers to the non-physical components of a computer, such as operating systems, applications, and programming languages. Software is intangible and cannot be physically touched, but it can be installed, run, and manipulated through the use of hardware.

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The 3 types of computer software

1:System software

The system software is the bottom layer: it sits between the hardware and the application software. Operating systems like Windows, macOS, Android and iOS are examples of system software. Operating systems are loaded into RAM when the device starts up, and have access to the hard drive.

2:Utility software

Utility software is part of the system software and performs specific tasks to keep the computer running. Utility software is always running in the background. Examples of utility software are security, clean-up, disk defragmentation, and file compression.

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3:Application software

The term "application software" refers to software that performs specific functions for a user. When a user interacts directly with a piece of software, it is called application software. The sole purpose of application software is to assist the user in doing specified tasks. Ex:Google Chrome, Safari, Firefox MS Office, PowerPoint,

Hardware	Software
Hardware is a physical component of computers that executes the instruction.	Software is a program that enables users to interact with the computer, its hardware.
It is manufactured in factories.	It is developed by software programmers or software development companies.
Storage Devices, Input Devices, Output Devices, and Internal components are the primary categories of hardware.	Operating Systems, Application Software, and Programming Software are the main categories of software.

Hardware	Software
Hardware can be seen and touch as it is a physical, electronic device.	The software can be seen but cannot be touched as it is virtual, not physical.
Computer viruses cannot affect hardware.	Computer viruses can affect software.
Hardware can be replaced with a new one if it is damaged.	The software is reinstalled if it gets damaged.
Through the network, hardware cannot be transferred electrically. Only, it can be physically transferred.	The software can be transferred easily.
Examples of hardware are RAM, ROM, Printer, Monitor, Mouse, Hard disk and more.	Examples of software are Google Chrome, MySQL, MS Word, Excel, PowerPoint, Notepad, Photoshop and more.

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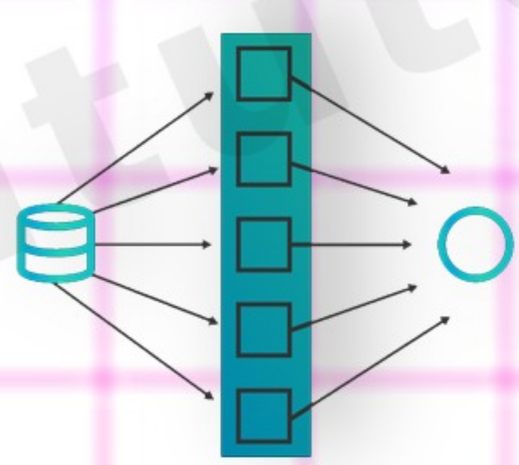
TYPES OF PROCESSING

Serial processing

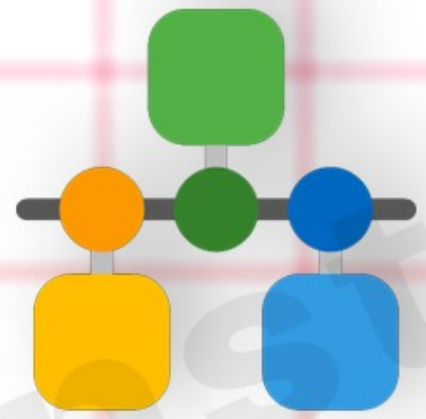
A processing in which one task is completed at a time and all the tasks are run by the processor in a sequence.

Parallel processing



A type of processing in which multiple tasks are completed at a time by different processors.

Pipelining Processing



A technique where the processor begins executing a second instruction before the first has been completed.

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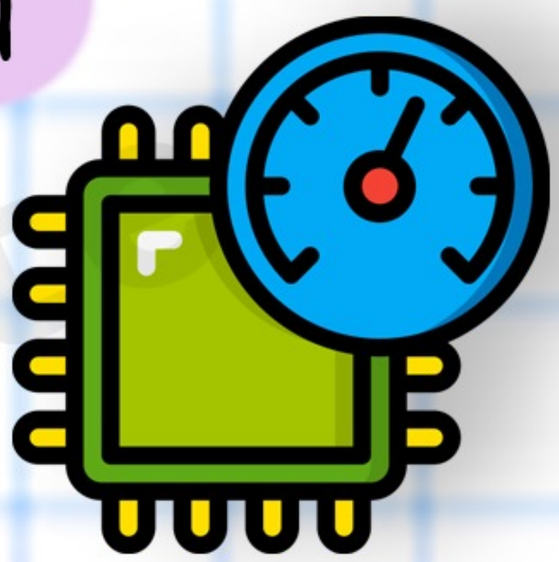
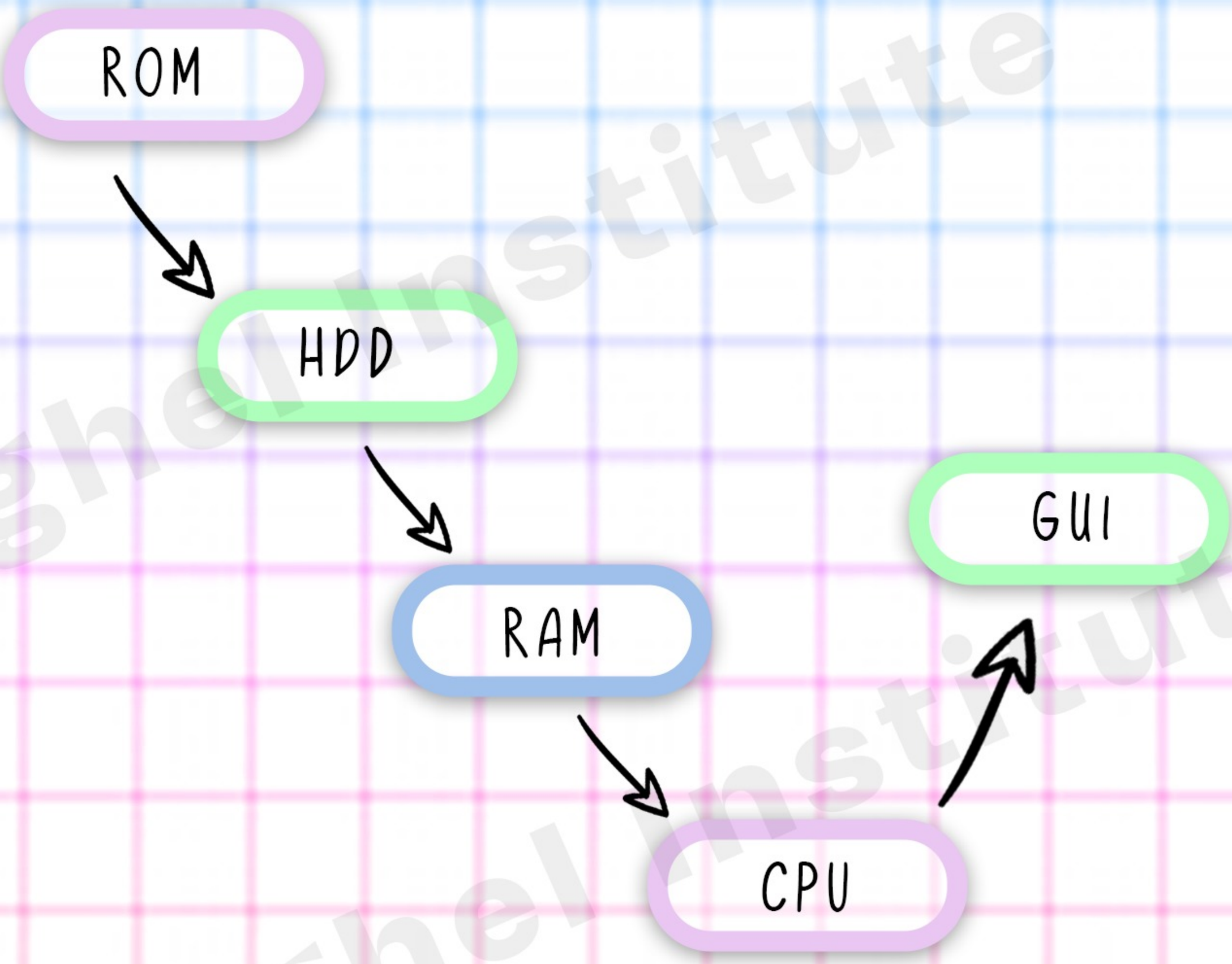
Processor Speed



Processor is the major component of the computer system which does processing of the data and information as per the user instructions.It can process instructions more than one million in a second that is formally called or known as million instructions per second (MIPS).

- The 8-bit processor executes 8 bits at a time in the form binary number system like (10010111) .
- The 16-bit processor executes 16 bits at a time in the form of binary number system.
- The 32-bit processor executes 32 bits at a time means twice faster than 16-bit processor.
- The 64-bit processor executes 64 bits at a time, is used at servers or mini computers to handle or process bulk data.

HOW COMPUTER WORKS



Graphical user interface(GUI)

GUI stands for Graphical User Interface, which is a type of user interface that allows users to interact with computer systems and applications using graphical icons and visual indicators, rather than text-based commands.

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UTILITY PROGRAM

A utility program is a type of system software that is used to perform a specific task it is normally used to solve the common problems of software and hardware.

COMPUTER LANGUAGE

LOW LEVEL LANGUAGE

- MACHINE LANGUAGE
  - EX- 0,1
- ASSEMBLY LANGUAGE

HIGH LEVEL LANGUAGE

- C
- C++
- Java etc.
- FAP
  (Fortran Assembly Language)
- MAP
  (Macro Assembly Language)

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Low-Level Language

A low-level language, often known as a computer's native language, is a sort of programming language.

Machine Language

It is also know as binary number(0,1).

Assembly Language

It is a type of low level language which communicate directly with computer's hardware.

It is also known as mnemonics language.

High level languages

High level language is the programming language which uses text commands written in general english near to user comprehension. This kind of programming language needs a Compiler or Interpreter so that the program code may be converted into machine level code. Examples of High level language is C, C++, BASIC, FORTRON, Java, Visual Basic etc.

LANGUAGE CONVERTER

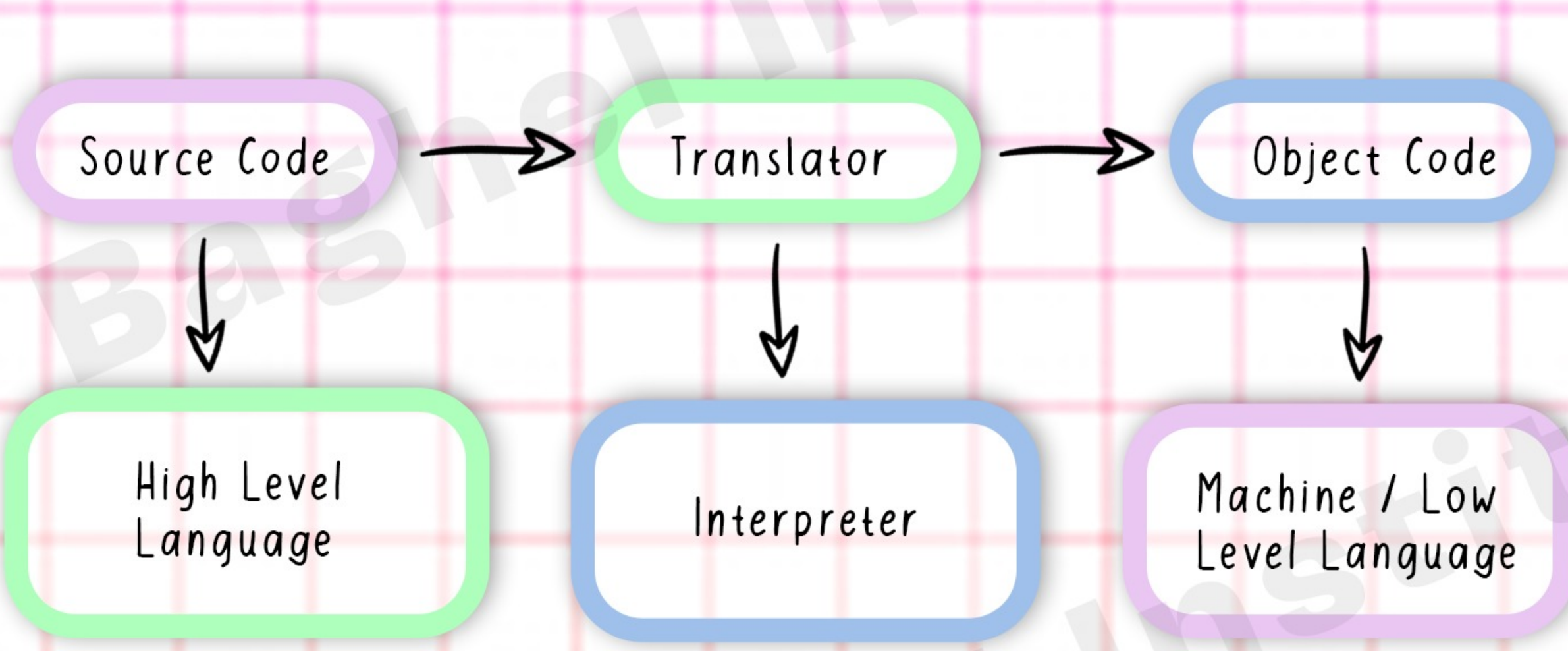
Source code

It is the **set of instructions and statements** written by a programmer using a computer programming language.

Object Code

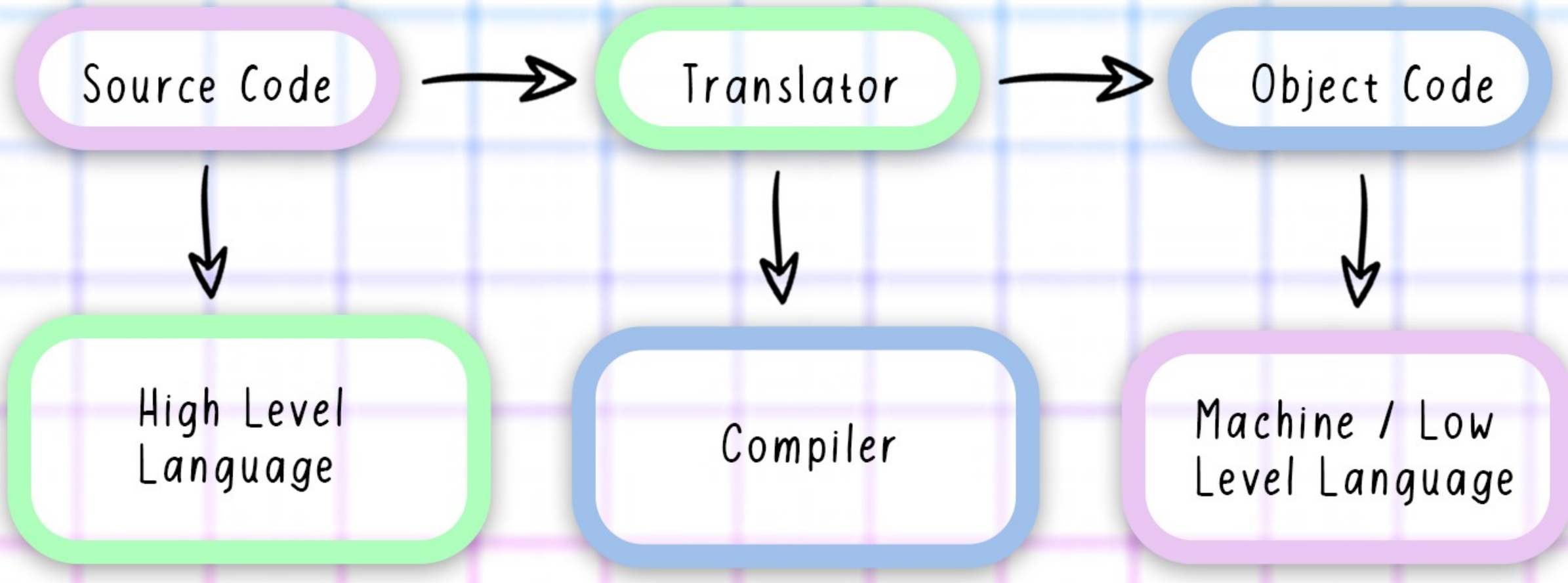
Object code refers to **low level code** which is understandable by machine.

Interpreter



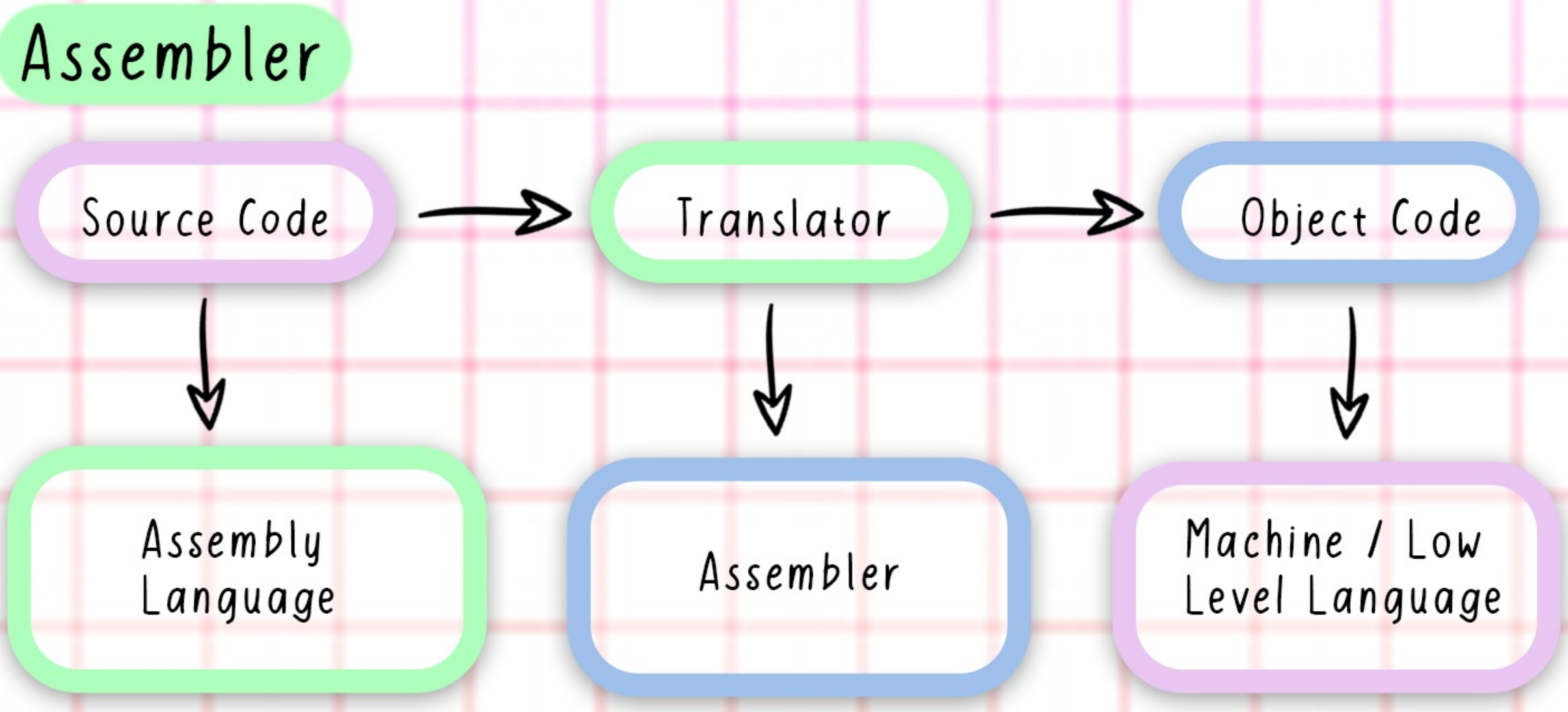
It checks programs **line by line** and when it gets the first line correct then it sends to execute and when if there are any mistakes exist in the program during deploying (running) process then it **prompts you to rectify the error.**

Compiler



It is checks the entire program at ones.Compiler displays all errors and warning at the compilation time. Therefore, you can't run the program without fixing errors.

Assembler



An assembly language is a type of low-level programming language that is intended to communicate directly with a computer's hardware. An assembler is a program that converts assembly language into machine code.

Mobile Apps

APP Name	Launch Date	specification
Bharat Interface for Money(BHIM)	30 December 2016	1. developed by National Payments Corporation of India (NPCI) 2. based on the Unified Payments Interface. 3. it is intended to facilitate e-payments directly through banks and encourage cashless transactions.
(IRCTC) is the Indian Railways Catering and Tourism Corporation	—	To perform Train Ticket Booking, Book Your meal via Mobile, Air Ticket booking and IRCTC Tourism etc via your mobile phone.
Digi locker	1 July 2015.	DigiLocker is a platform for issuance and verification of documents & certificates in a digital way, thus eliminating the use of physical documents. The DigiLocker website can be accessed at https://digitallocker.gov.in/.

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APP Name	Launch Date	specification
Grameen Vidyutikaran(GARV)	October 2015	Has been upgraded for monitoring the villages and households electrification in the country.
Voter helpline app	—	The app aims to provide a single plateform for service and information delivery to voters across the country.
Online RTI	—	RTI- Right to Information Act allows any Indian citizen to get information from the government RTI act is applicable to all 28 states and 8 union territories.
UMANG (Unified Mobile Application for New-age Governance)	November 2017	1. It is developed by Ministry of Electronics and Information Technology (MeitY) and National e-Governance Division (NeGD) to drive Mobile Governance in India. 2. The app supports 13 Indian languages.

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APP Name	Launch Date	specification
MyGov	26th July 2014	MyGov has been established as Government of India's Citizen Engagement Platform which collaborates with multiple Government bodies/ Ministries to engage with citizens for policy formulation and seeks the opinion of people on issues/ topics of public interest and welfare.

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Open Source Software and Proprietary software

Open Source Software

Open source software (OSS) is software that has an open-source license that allows the source code to be freely available to the public, allowing anyone to use, modify, or distribute the software. The main idea behind open-source software is that collaboration and sharing can lead to better and more innovative software. Some examples of open source software are Firefox, OpenOffice,Android etc.

Features Of OSS

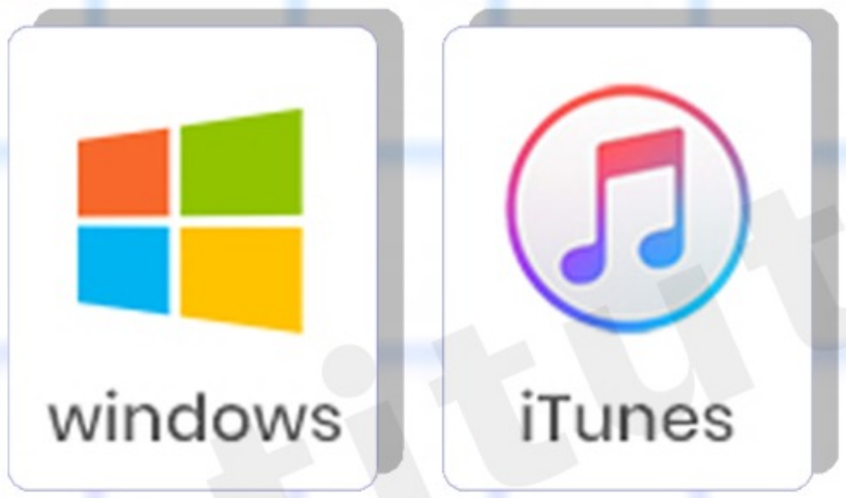
Free to Try Before You Buy

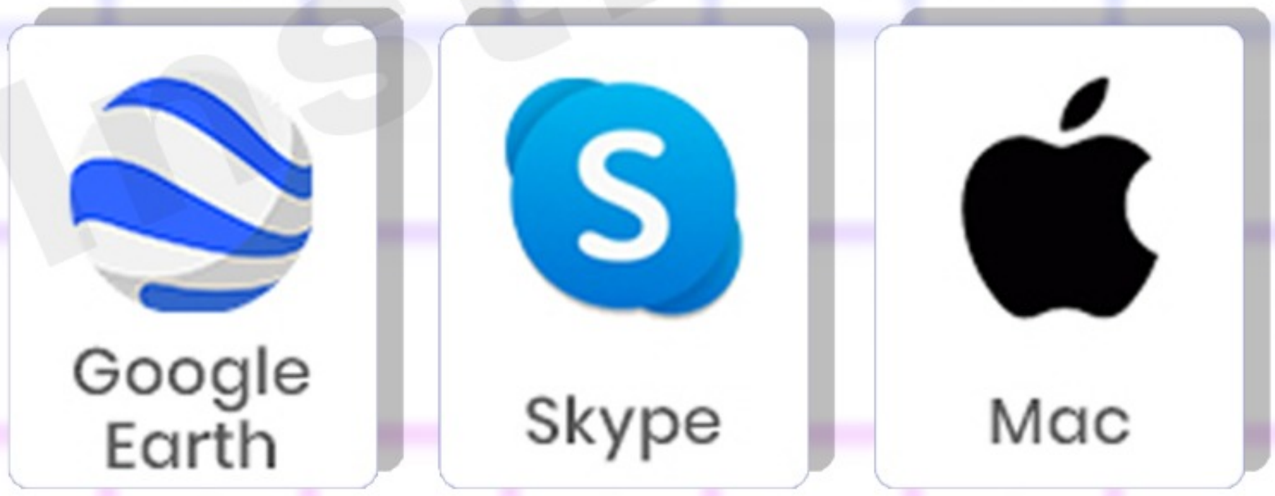
Free Support

Fewer Bugs and Faster Fixes

Better Security

Increased technical skills





Proprietary software

Proprietary software, also known as closed-source software, is a type of software that is owned by an individual or a company and whose source code is kept confidential and not made available to the public. Some examples of closed source software are Skype, Google earth, Java, Adobe Flash, Virtual Box, Adobe Reader, Microsoft office, Microsoft Windows, WinRAR, mac OS, Adobe Flash Player etc.

Parameter of Comparison	Open Source Software	Proprietary Software
Definition	Open Source software refers to software that contains a source code with license which is open to free use, modification and distribution.	Proprietary software refers to the type of software that contains a licensed source code and is copyrighted for use.
Collaboration	Open Source software is developed for open collaboration.	Proprietary software is not meant for open collaboration, but only for the creator and users who have paid for it.
Access	Open Source software has open access, that is, can be accessed by anyone.	Proprietary software can be accessed only by those who developed it and those who have paid for it.
Flexibility	Open Source software is flexible, that is, it can be used, modified and distributed by anyone.	Proprietary software has restricted flexibility,that is, there are restrictions on its usage.
Example	FreeBSD (Berklee Software Distribution), Android, LibreOffice,Ubuntu are a few examples of Open Source software.	Windows, Microsoft, macOS,Adobe Photoshop, Adobe Flash Player are a few examples of Proprietary software.

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IMPORTANT FACT

World's first calculating device	ABACUS (Abundant Beads Addition Calculation Utility System)
Addition system	Pascaline
Punch Card	Joseph jacquard for cloth weaving. & Herman Hollerith - use for calculation(input device).
Ada Lovelace	The First Computer Programmer.
Antasoff Bery Computer	World's first electro mechanical computer running on binary code:
World first electro mechanical computer	Mark - 1 was probably the last electro mechanical computer which was invented by Prof. Howard Aiken in the U.S.A. Mark-1 was constructed in 1943.

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First computer bought by India from America	HEC-2M (Herman Equipment Corporation) in 1956-by ISA (Indian Statistal Academy),kolkata.
India's first Automatic Calculator	TIFRAC(Tata Institute of Fundamental Research Automatic Calculator)
Father of computer in India	Rangaswami Narsimhan.
First computer made by India	Sidharth.
Computer day	2 dec
Computer Educated District In India	Mallapuram, kerala
world's first working programmable, fully automatic digital computer.	The Z3 was a German electromechanical computer designed by Konrad Zuse in 1938, and completed in 1941
Which computer was built by the British to break Germany's secret codes during World War II?	ANS:- Collossus

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