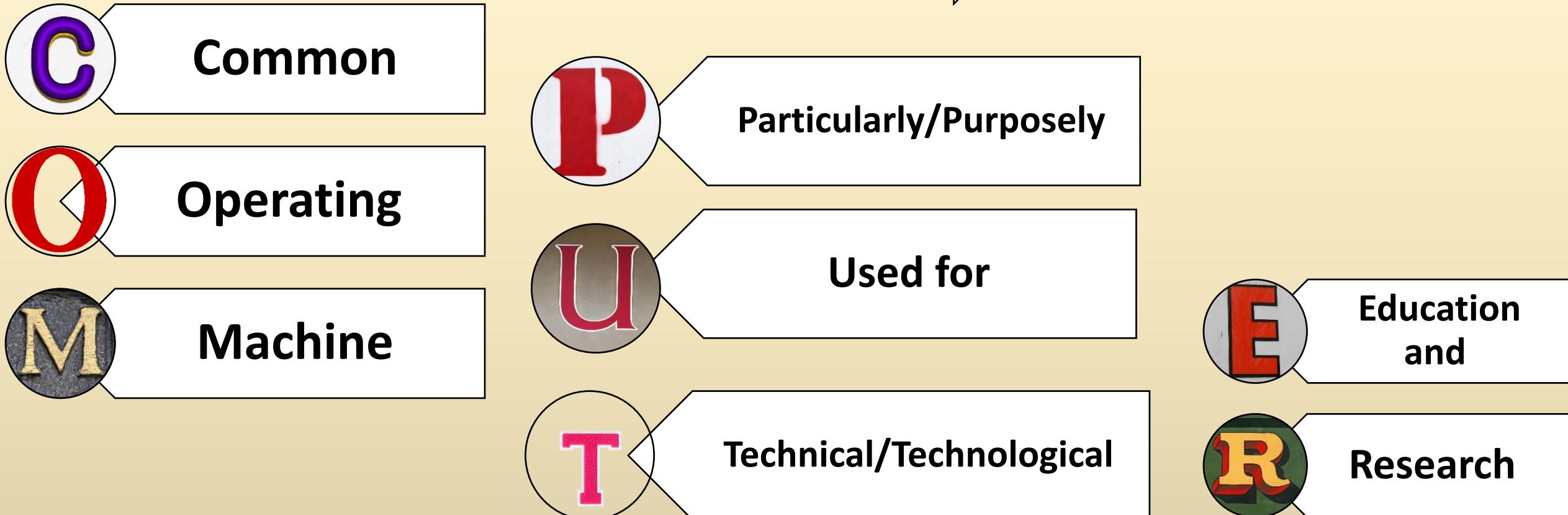




Seedling Institute of Learning

WELCOME

COMPUTER generally referred as→



What Is Computer?

A computer is an electronic device that processes data, following instructions (programs) to perform tasks like calculations, data storage, and analysis, transforming raw input into meaningful output, functioning through hardware (physical parts) and software (programs) to offer speed, accuracy, and versatility for countless applications in daily life, business, and science.

**Power of
Remembering**

Diligence

Versatility

Accuracy

Characteristics Of Computer

Storage Capability

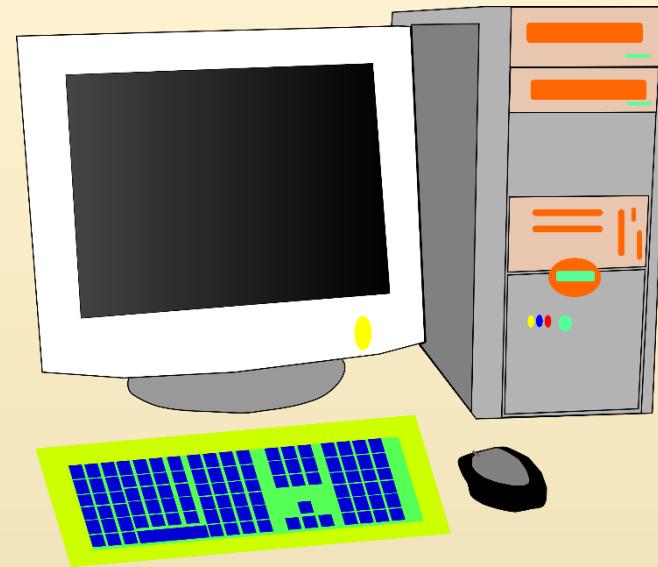
No Feeling

Speed

Automatic

Input

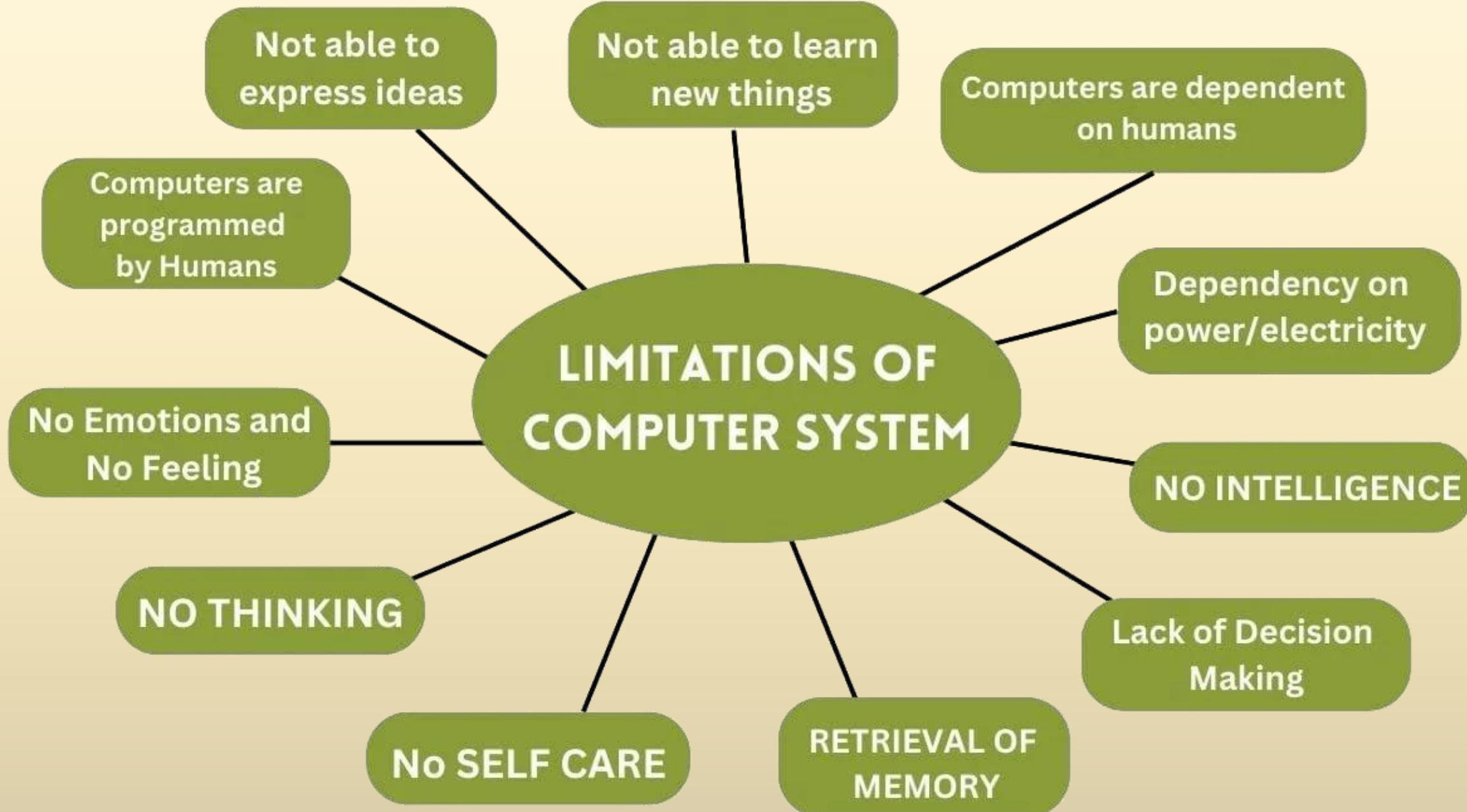
Processing



Functions of Computer

Storing

Output

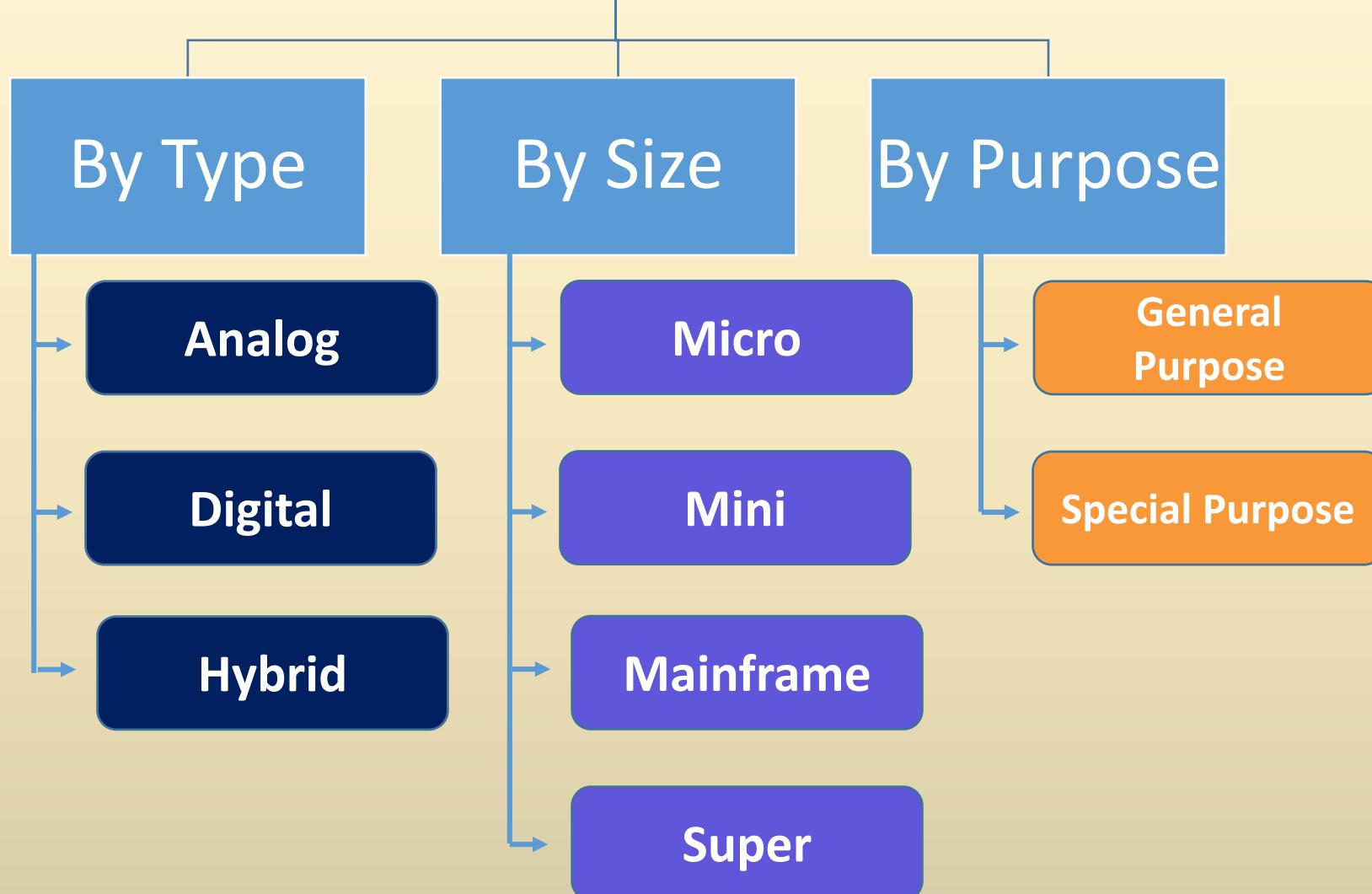




Uses of Computer



Classification of Computer



Analog computer

An Analog computer is a type of computer that uses the continuous variation aspect of physical phenomena such as electrical, mechanical, or hydraulic quantities to model the problem being solved.

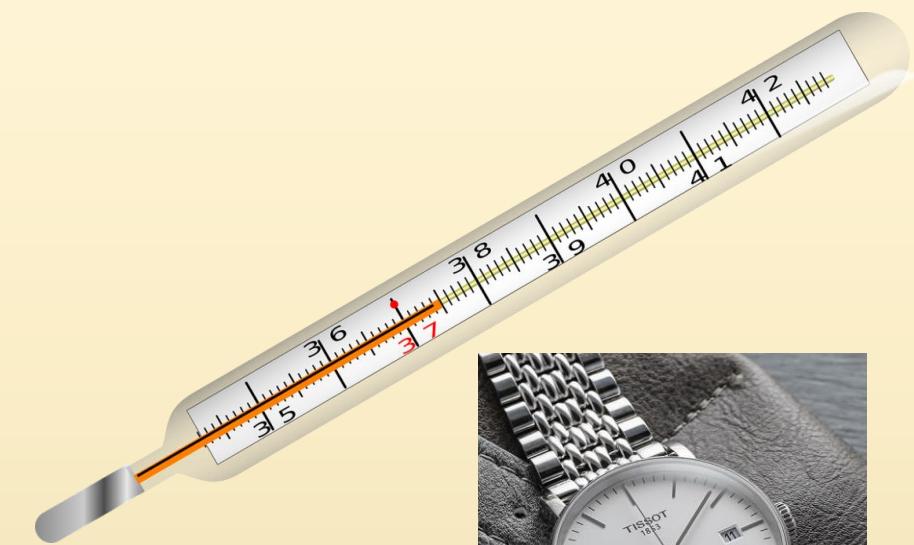
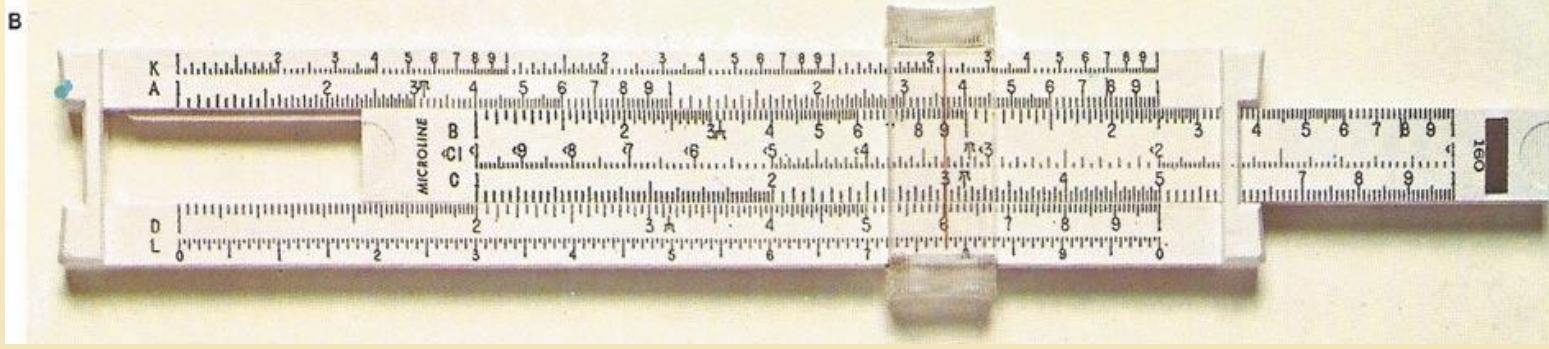
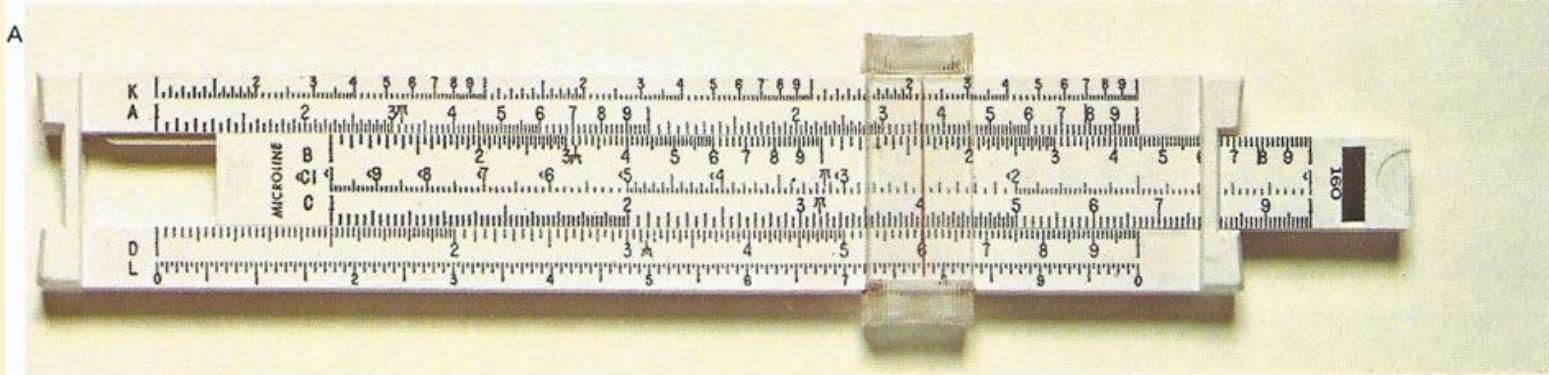
Analog computers use measurements to execute computations and store data in a continuous form of physical values.

Features of Analog Computers

- Non-programmable
- Real-time processing
- Accuracy
- Continuous signals usage

Example:

Slide Rule, Speedometer, Mercury Thermometer, Mechanical Watches



Digital computer

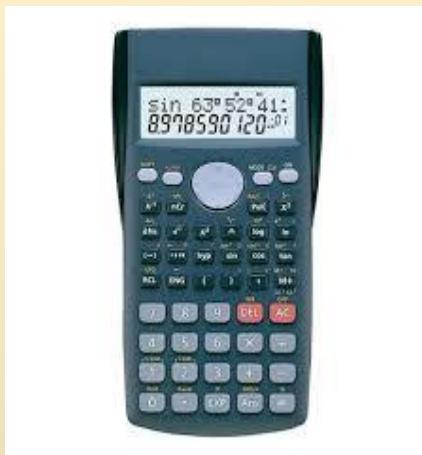
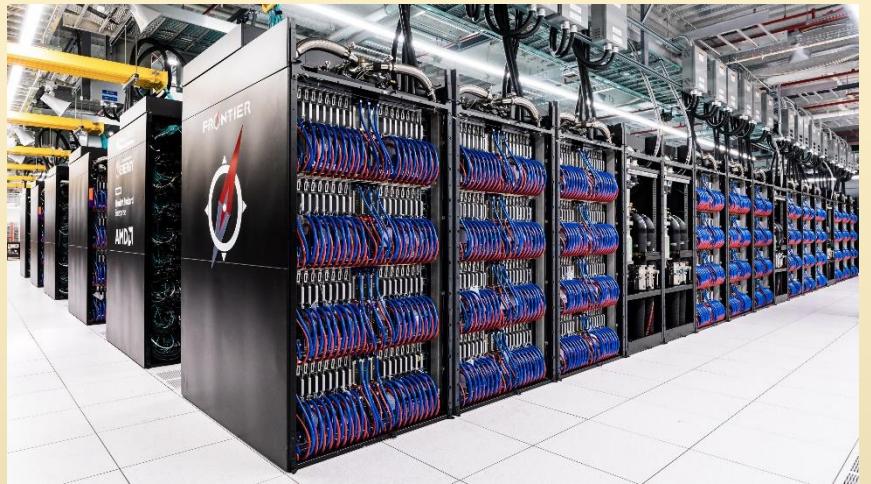
A digital computer is an electronic device that processes data in discrete, binary form (0s and 1s) to perform calculations and tasks, operating on logical states rather than continuous physical quantities, making it highly accurate, efficient, and versatile for everything.

Features of Digital Computers

- Binary Processing
- High Speed & Accuracy
- Versatility & Programmability
- Large Storage Capacity
- Automation & Diligence
- Digital Communication

Example:

Desktops, Laptops, Smartphones, And Tablets, As well as Specialized Machines such as Supercomputers, Mainframes, Digital Cameras, Calculators, and ATMs.



Hybrid Computer

A hybrid computer can perform tasks and offer capabilities found in both digital and analog computers. Developing a combined or hybrid computer model aims to produce a functional device that incorporates the most beneficial aspects of both computer systems. While the digital components of the computer handle the system's logical processes, the analog components of the apparatus are in charge of efficiently processing differential equations.

Features of Hybrid Computer

- Manage large equations
- System Ready For Use
- Proven Performance
- Simple Expanded

Examples

Electrocardiogram(ECG) Machine, Monitoring Machine, Ultrasound Machine



Required Components to Run a Computer

To run a computer, we need **Hardware** and **Software**.

Hardware refers to the physical, tangible components of a computer system that you can see and touch, which work in concert with software (intangible instructions) to perform tasks. These components can be categorized as

- i) Internal
- ii) External.

Internal Hardware Components

Internal hardware is located inside the computer case and is essential for the core operation and processing capabilities of the computer.

- Central Processing Unit (CPU)
- Motherboard
- Random Access Memory (RAM)
- Graphics Processing Unit (GPU)
- Storage Drive (HDD or SSD)
- Power Supply Unit (PSU)

USB ⇒ Universal Serial Bus

HDMI ⇒ High-Definition Multimedia
Interface

External Hardware Components

External hardware connects to the outside of the computer case via ports (like USB or HDMI) and enhances the computer's functionality or allows user interaction.

- Input Devices: Allow users to enter data and commands into the computer system.
 - Keyboard.

- Microphone
- Scanner
- Mouse/Touchpad
- Output Devices: Display or present the results of the computer's processing to the user.
 - Monitor
 - Printer
 - Speakers/Headphones
 - Projector
 - Networking Equipment: Routers, modems, and network switches
 - External Storage Devices: USB flash drives, SD cards, and external HDDs/SSDs

The Central Processing Unit (CPU)

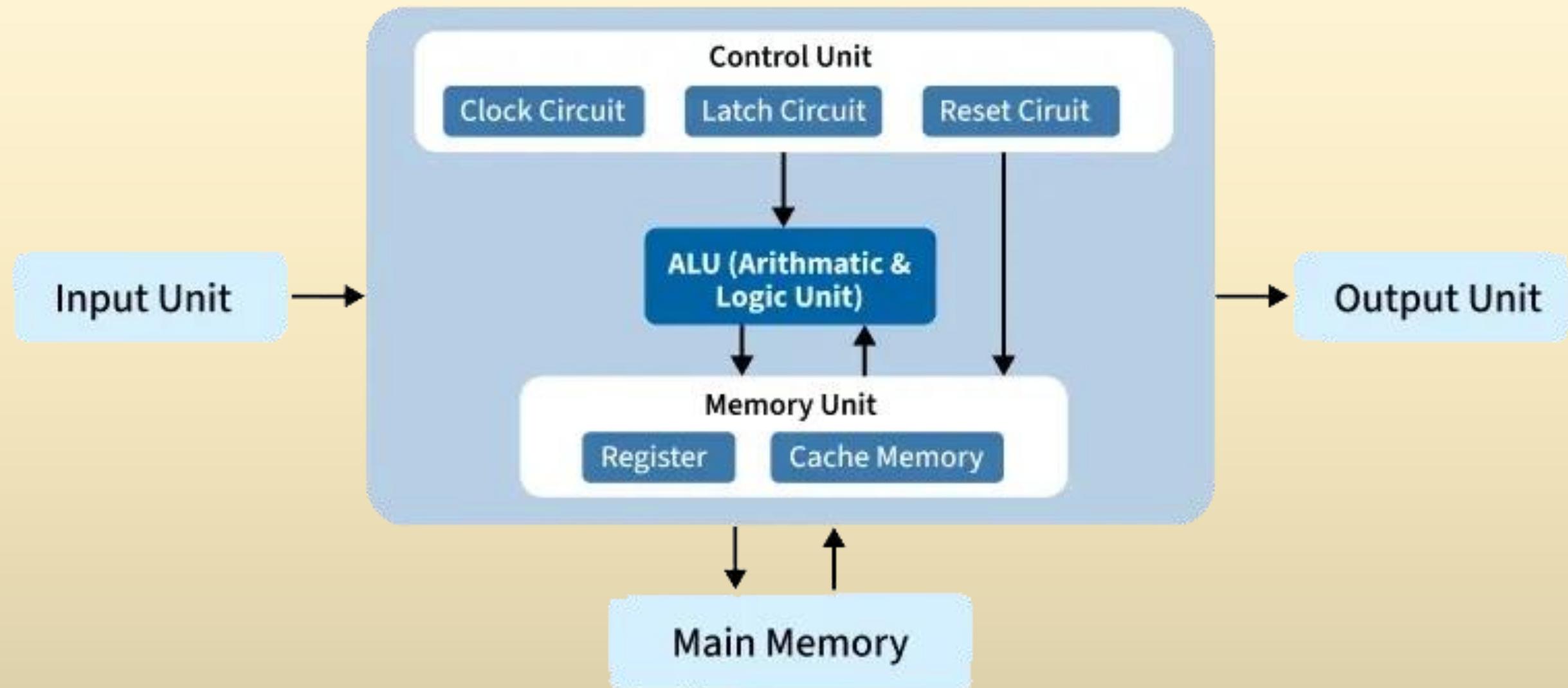
The Central Processing Unit (CPU) is like the brain of a computer.

The CPU is usually placed in a special slot called a socket on the computer's motherboard, which is like the main circuit board that connects all the parts of a computer.

The CPU handles tasks like:

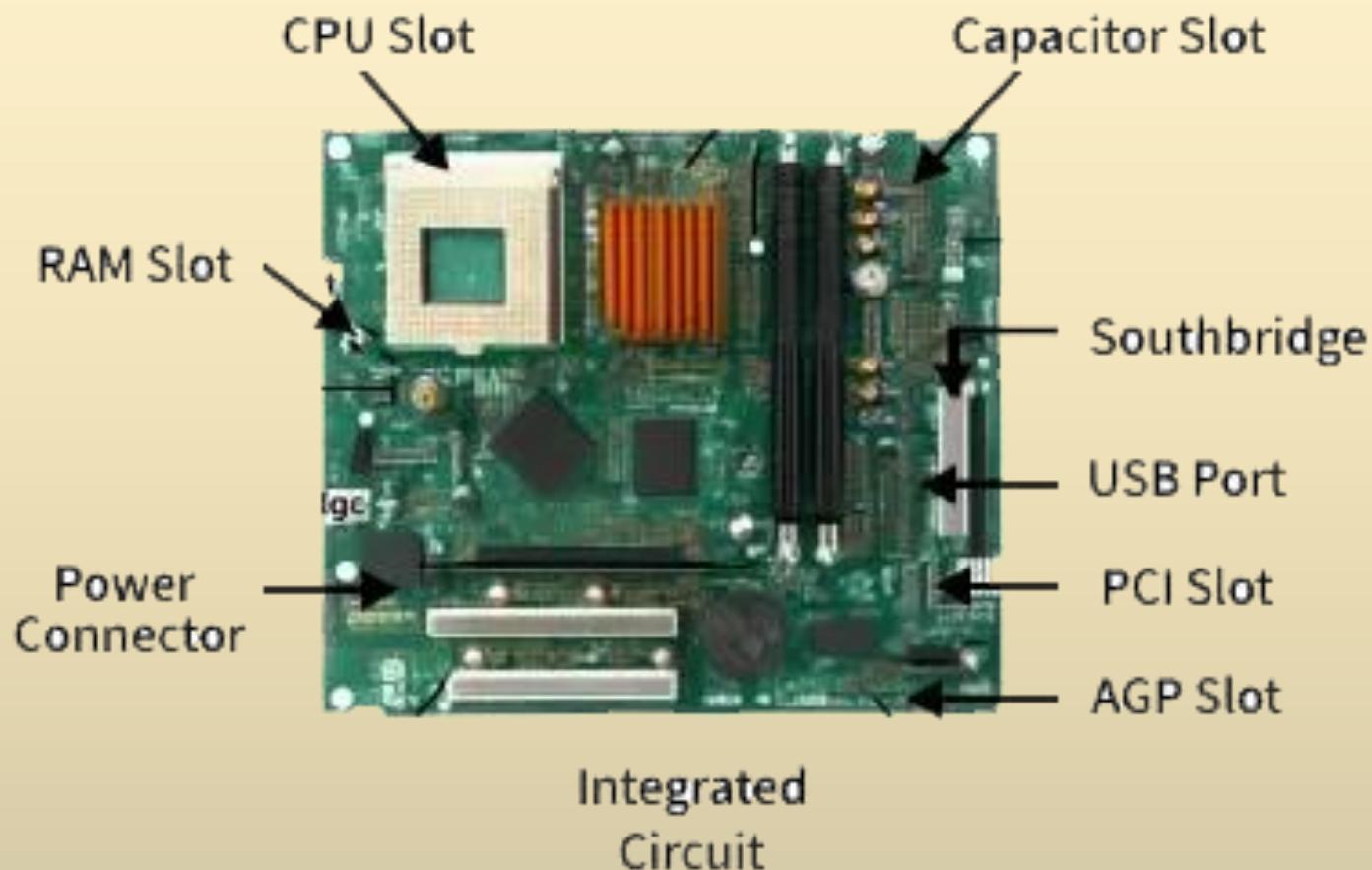
- Doing math calculations (like adding or multiplying numbers).
- Running apps or games.
- Input/Output (I/O) operations: Communicate with memory and peripherals.
- Storing and retrieving information during tasks.

Central Processing Unit (CPU)



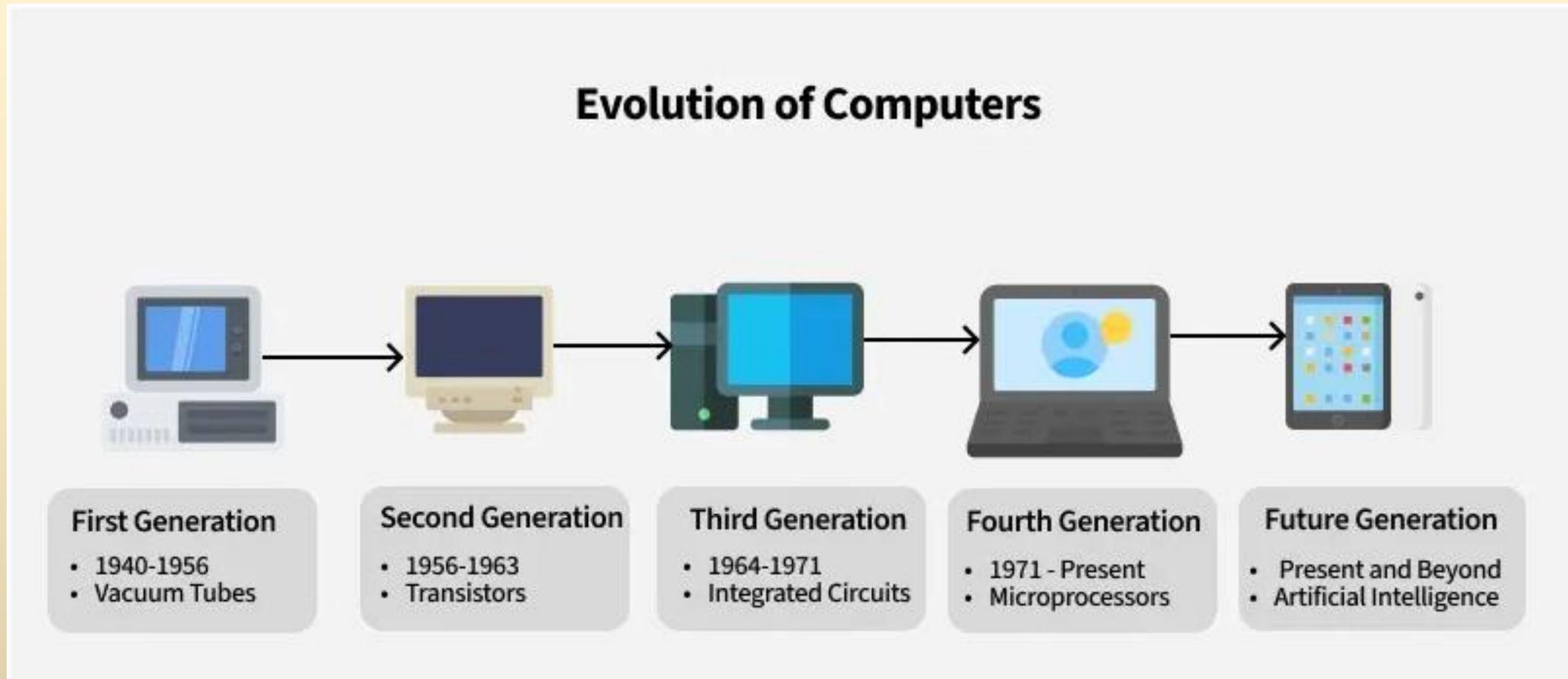
MotherBoard

The motherboard as the main road system connecting all the important buildings—like the CPU (the brain), RAM (the memory), and storage (the library). Without the motherboard, these parts couldn't talk to each other, and your computer wouldn't work.



The Evolution of Computers

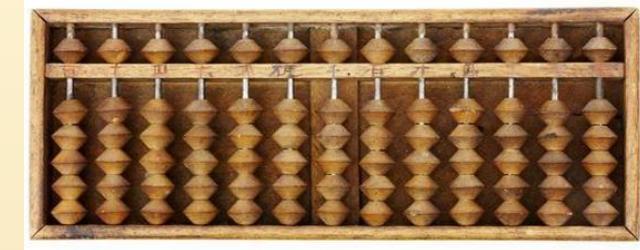
The history of computers spans thousands of years, from early counting devices to the powerful systems we use today.



1. Early Counting Devices (Pre-Computer Era)

The Abacus (c. 4000 BCE)

The abacus, created by the Chinese, is often regarded as the first computing device. It consisted of beads on rods and was used to perform simple arithmetic operations like addition and subtraction.



Napier's Bones (1617)

Invented by John Napier, Napier's Bones were a set of ivory rods engraved with numbers, designed to assist with multiplication and division. This invention also introduced the concept of the decimal point.



2. Mechanical Calculators (17th-19th Century)

Pascaline (1642-1644)

French mathematician Blaise Pascal developed the Pascaline, the first mechanical calculator capable of performing addition and subtraction. It used gears and wheels to calculate, and its purpose was to help Pascal's father, a tax collector, with his work.



Stepped Reckoner (1673)

German philosopher and mathematician Gottfried Wilhelm Leibniz improved Pascal's design, developing the Stepped Reckoner.



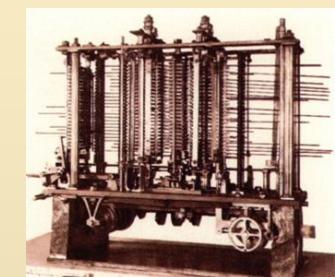
Difference Engine (1820s)

Charles Babbage, often called the "Father of Modern Computing," designed the Difference Engine, it demonstrated the potential for automatic computation.



Analytical Engine (1830s)

Babbage also developed the Analytical Engine, a more advanced version of the Difference Engine.



3. The Rise of Electronic Computing (1930s-1940s)

Tabulating Machine (1890)

Herman Hollerith, an American statistician invented this machine in the year 1890. Tabulating Machine was a mechanical tabulator that was based on punch cards. This company later became International Business Machine (IBM) in the year 1924.



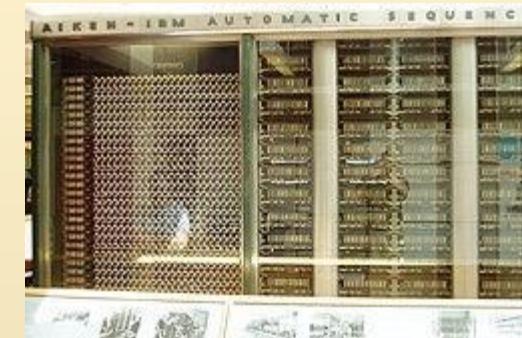
Differential Analyzer (1930s)

Differential Analyzer was the first electronic computer introduced in the year 1930 in the United States. It was basically an analog device that was invented by Vannevar Bush. This machine consists of vacuum tubes



Mark I

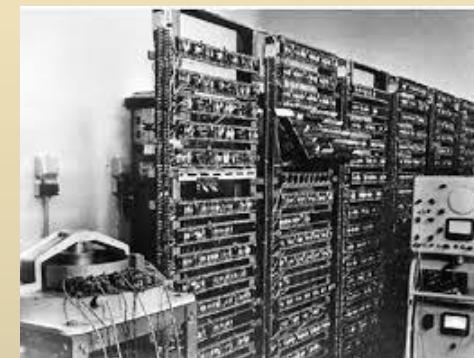
In the year 1937, Howard Aiken planned to develop a machine that could perform large calculations or calculations involving large numbers. Mark I computer was built as a partnership between IBM and Harvard. It was also the first programmable **digital computer** marking a new era in the computer world.



4. The Era of Transistors (1950s-1960s)

Transistor Computers (1950s)

In the 1950s, the invention of the transistor revolutionized computing. Transistors were smaller, more reliable, and energy-efficient compared to vacuum tubes. They played a key role in making computers more compact and affordable.



UNIVAC I (1951)

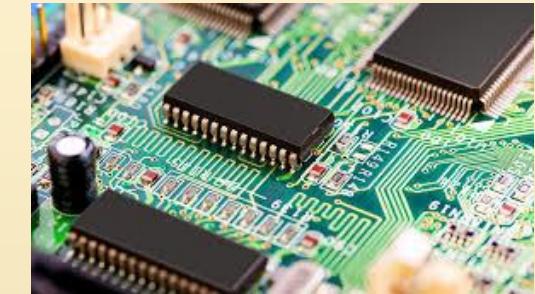
The Universal Automatic Computer I (UNIVAC I), developed by Eckert and Mauchly, was the first commercially successful computer. It was used for scientific and business applications and demonstrated the potential of electronic computing.



5. The Rise of Integrated Circuits (1960s-1970s)

Integrated Circuits (1960s)

The introduction of Integrated Circuits (ICs) allowed multiple transistors to be placed on a single chip, which dramatically reduced the size and cost of computers while improving their performance.



IBM System/360 (1964)

The IBM System/360 was a family of mainframe computers that utilized integrated circuits, setting a new standard for computing in business, government, and academia. It became one of the first systems to offer compatibility across different machines.



Minicomputers and Microcomputers

With the development of the microprocessor, the size of computers shrank even further, leading to the creation of affordable minicomputers like the PDP-8 and PDP-11. These smaller systems paved the way for the personal computer revolution.



6. The Personal Computer Revolution (1970s-1980s)

Apple II (1977)

The Apple II, developed by Steve Jobs and Steve Wozniak, was one of the first successful personal computers. It used a microprocessor and could run basic software applications like word processors and games.



IBM PC (1981)

The introduction of the IBM PC in 1981 standardized the personal computer market, offering a system that could be easily upgraded and compatible with a wide variety of software. It played a major role in the spread of personal computing.



The Macintosh (1984)

Apple's Macintosh introduced the concept of the graphical user interface (GUI), making computers more user-friendly and accessible to a broader audience.



7. The Internet and Networking (1990s-Present)

The World Wide Web (1990s)

The invention of the World Wide Web by **Tim Berners-Lee** revolutionized the way people used computers. It made information accessible globally and led to the creation of web browsers like **Netscape Navigator** and **Internet Explorer**.

Cloud Computing (2000s-Present)

Cloud computing allows users to store and access data remotely via the internet, making it easier to scale computing resources. Services like **Google Drive**, **Dropbox**, and **Amazon Web Services (AWS)** transformed how businesses and individuals manage data.

8. The Modern Day and the Future of Computing

Artificial Intelligence (AI):

AI enables computers to make decisions, recognize patterns, and even understand human language, leading to advancements in everything from virtual assistants to autonomous vehicles.

Quantum Computing (Emerging):

Quantum computing promises to revolutionize fields like cryptography and materials science by solving problems that are beyond the reach of classical computers. Though still in its early stages, quantum computers could one day solve complex problems exponentially faster than traditional systems.

The Internet of Things (IoT):

The Internet of Things (IoT) is allowed fifth-generation, allowing them to collect and share data. From smart homes to wearable tech, IoT devices are transforming the way we interact with the world around us.

Generations of Computers

First Generation Computers 1940-1956

- These machines are slow, huge, and expensive.
- Vacuum tubes were used as the basic components of CPU and memory.
- Magnetic tape and paper tape were used as output and input devices.

For example **ENIAC, UNIVAC I, EDVAC, EDSAC, and IBM 701/650** etc.

Second Generation Computers 1957-1963

- Transistors (which were cheap in cost) are used.
- They consume less power.
- Computers are faster than first-generation computers.
- COBOL and FORTRAN are used as Assembly language and programming languages.

For example **IBM 1620, IBM 7094, CDC 1604, CDC 3600**, etc.

Third Generation Computers 1964-1971

- Integrated circuits (ICs) were used instead of transistors.
- Computers are more reliable, efficient, and smaller in size.
- FORTRON-II TO IV, COBOL, and PASCAL PL/1 were used which are high-level programming languages.

For example **IBM-360 series, Honeywell-6000 series, IBM-370/168**, etc.

Fourth Generation Computers 1971-1980

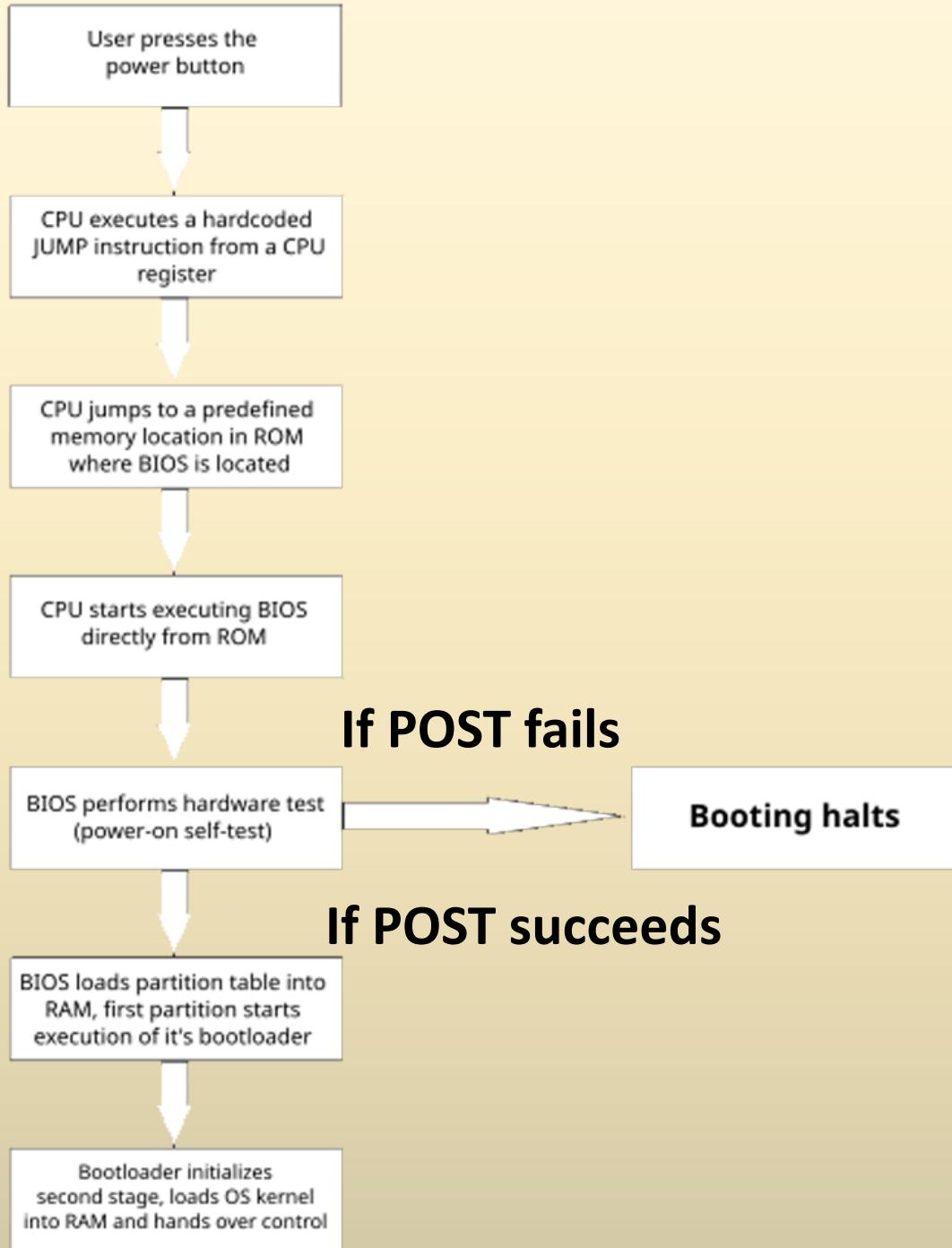
- It used VLSI(Very Large Scale Integrated) circuits.
- Computers of this generation are more compact, powerful, fast, and affordable(low in cost).
- C and C++ are used as the programming languages.

For example **STAR 1000, PDP 11, CRAY-1, CRAY-X-MP**, etc.

Fifth Generation Computers 1980 - to till date

- Computers have been Internet used.
- The ULSI (Ultra Large Scale Integration) technology is used.
- Parallel processing hardware and AI (Artificial Intelligence) software are also used.
- The programming languages like C, C++, Java, .Net, etc. are used.

For example **Desktop, Laptop, NoteBook, UltraBook**, etc.



Booting Process:

BIOS stands for Basic Input/Output System

POST stands for Power-On Self-Test

