Introduction to Computing

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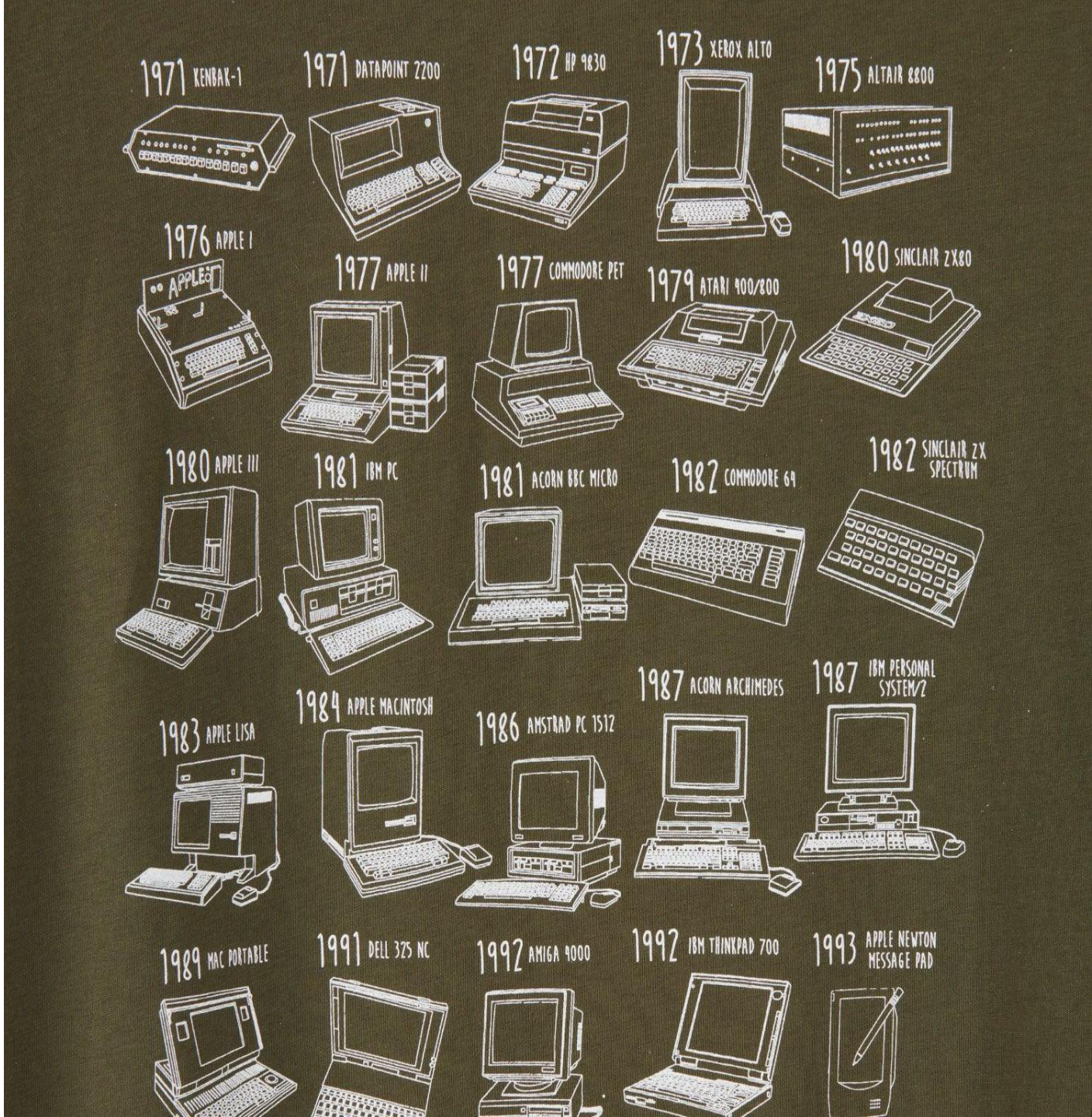

In 50,000 year ago

In 50,000 year ago

CAN THEY DIFFERENTIATE?

=?

Yes, they can and this is the source of counting.

Start Counting(Around 40,000 years ago)

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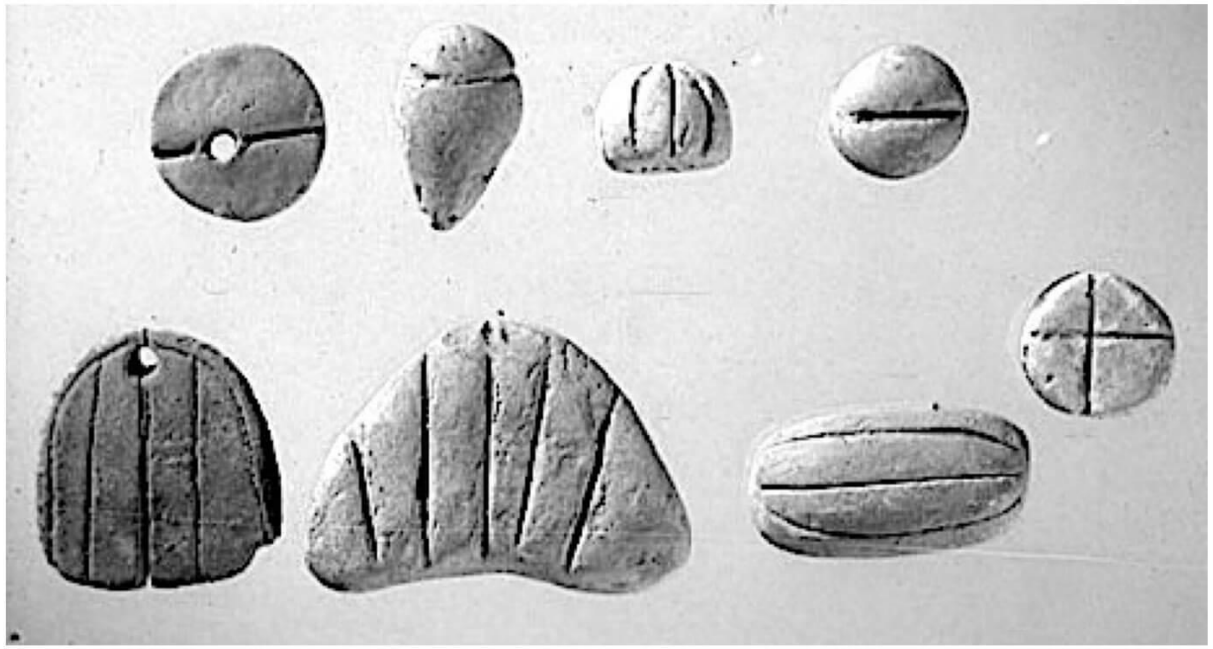
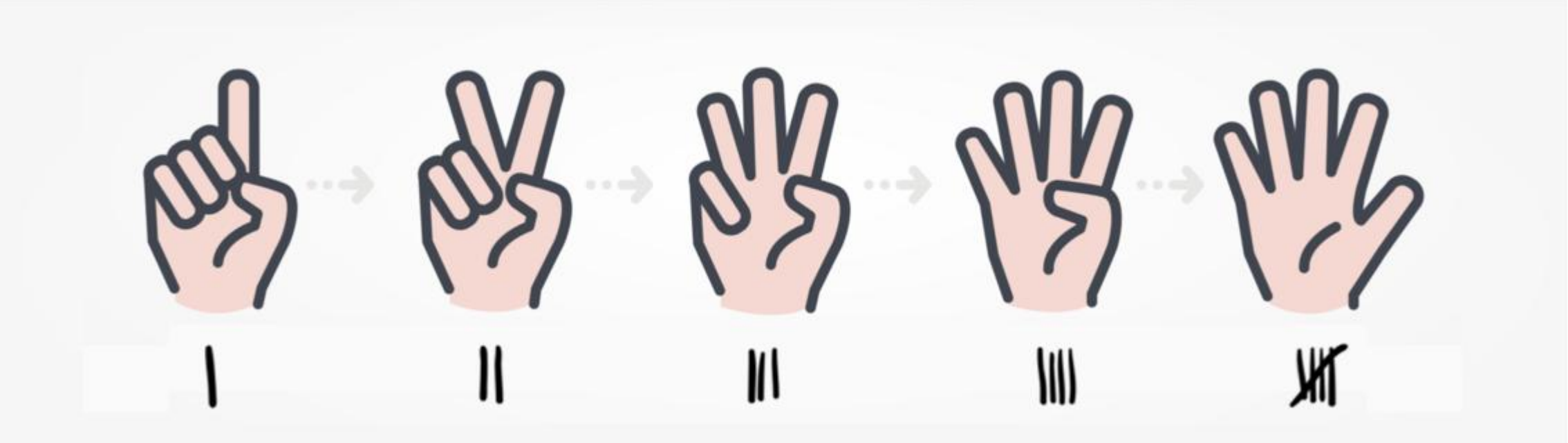


Represent the counted number



Tally Mark

Represent the counted number

Roman numerals

Represent the counted number

The Greek Numeral System

1	Ι	10	Δ	1000	Χ
2	ΙΙ	20	ΔΔ	2000	ΧΧ
3	ΙΙΙ	50	Γ	5000	Γ
4	ΙΙΙΙ	80	ΓΔΔΔ	6000	ΓΧ
5	Γ	100	Η	10,000	Μ
6	ΓΙ	300	ΗΗΗ	20,000	ΜΜ
7	ΓΙΙ	500	Γ	50,000	Γ
8	ΓΙΙΙ	700	ΓΗΗ	60,000	ΓΜ
9	ΓΙΙΙΙ				

𝍠 𝍡 𝍢 𝍣 𝍤 𝍥 𝍦 𝍧 𝍨 𝍩

0 1 2 3 4 5 6 7 8 9

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯

٠ ١ ٢ ٣ ٤ ٥ ٦ ٧ ٨ ٩

〇 一 二 三 四 五 六 七 八 九

零 壹 贰 参 肆 伍 陆 柒 捌 玖

— I II III IV V VI VII VIII IX

Represent number using number system

The earliest known number systems date back thousands of years, and include:

Sumeria

Around 3400 BC, the Sumerians invented the first known numeral system and a system of weights and measures.

Egypt

Around 3100 BC, Egypt introduced the earliest known decimal system, which allowed for indefinite counting.

Indus Valley civilization

Around 2800 BC, the Indus Valley civilization used decimal ratios in their weights and measures.

Mesopotamia

Around 2000 BC, the Babylonians used a base-60 decimal system.

Represent number using number system

Main number systems are

1. Binary (Base-2)
2. Octal (Base-8)
3. Decimal (Base-10)
4. Hexadecimal (Base-16)

What about computing?

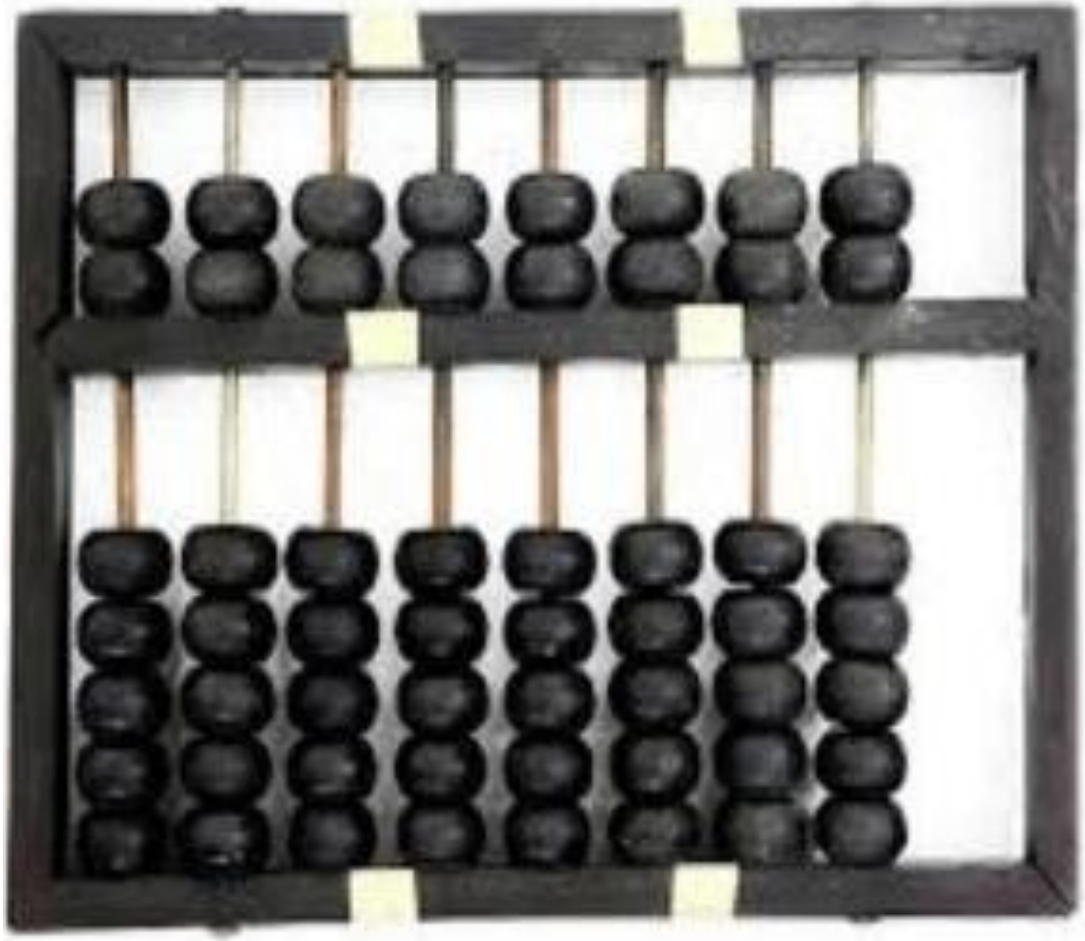
Here are some
Computational operation:

1. Add
2. Subtract
3. Division
4. Multiplication, ……etc.

What is computer?

A machine that can compute.

History Of Computers



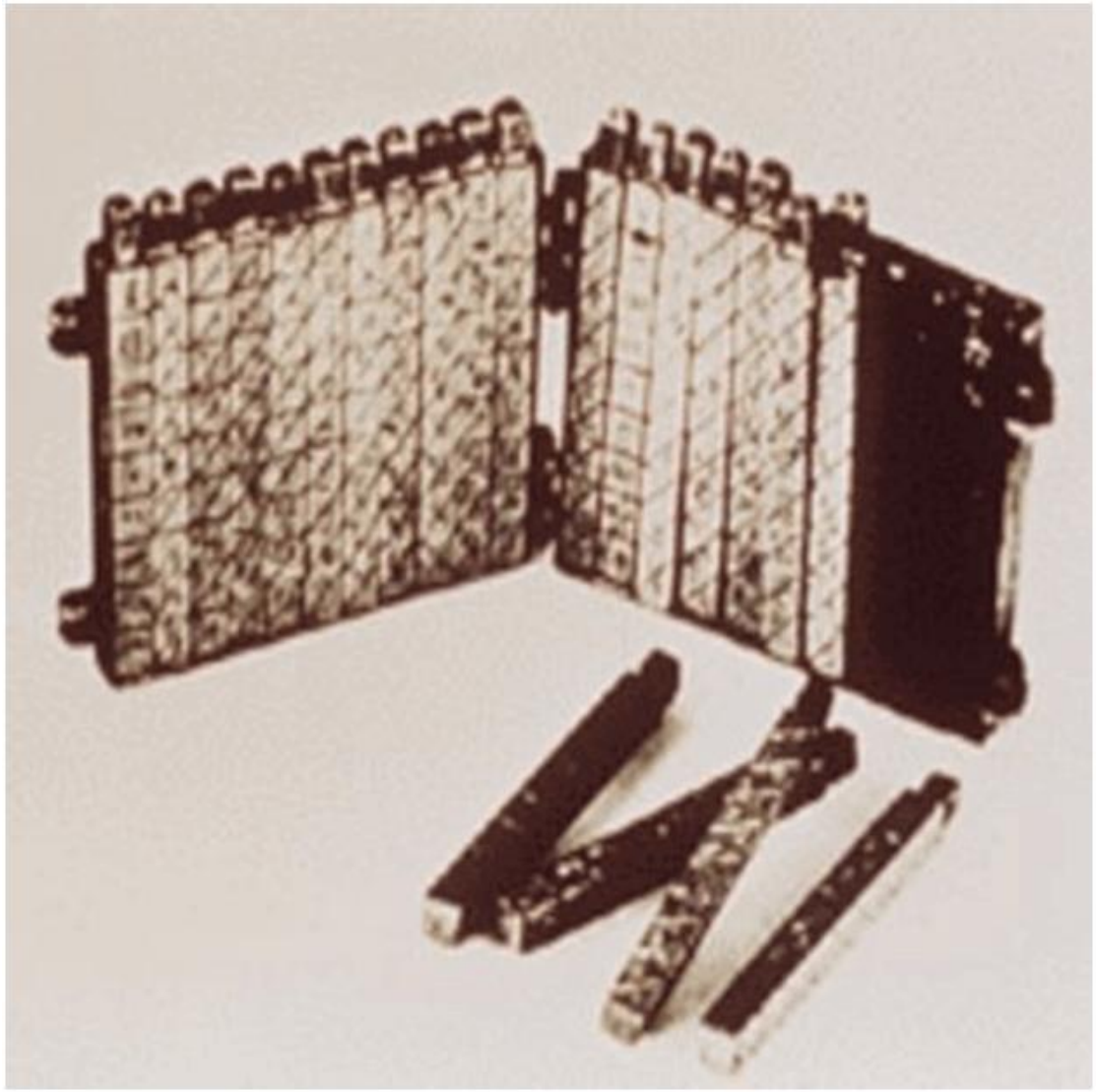
Abacus

- around 4,000 years ago.
- invented by Chinese
- the first computer

The first computational tool.

Napier's Bones

- published **in 1617**
- invented by John Napier
- the first use the decimal point



Pascaline

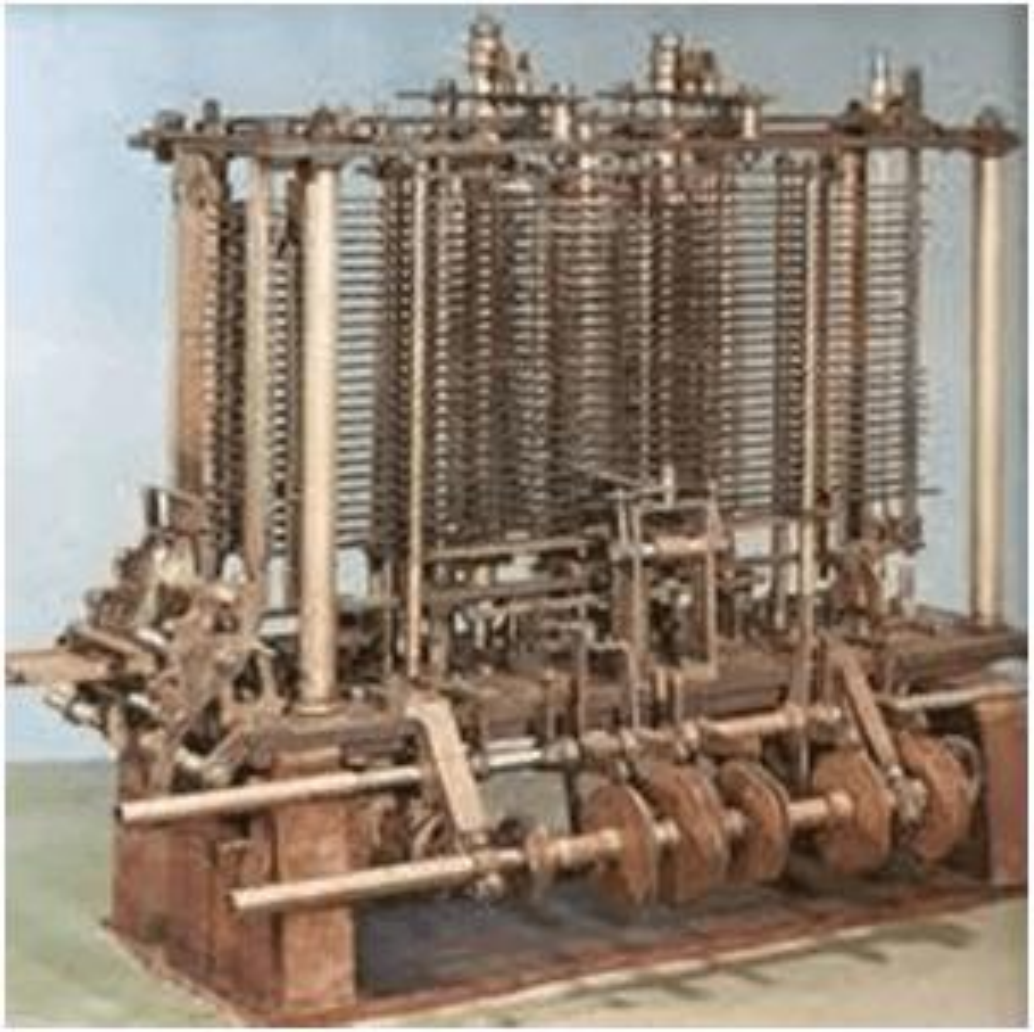
- in between 1642 and 1644
- invented by Biaise Pascal
- the first mechanical calculator

Leibnitz wheel

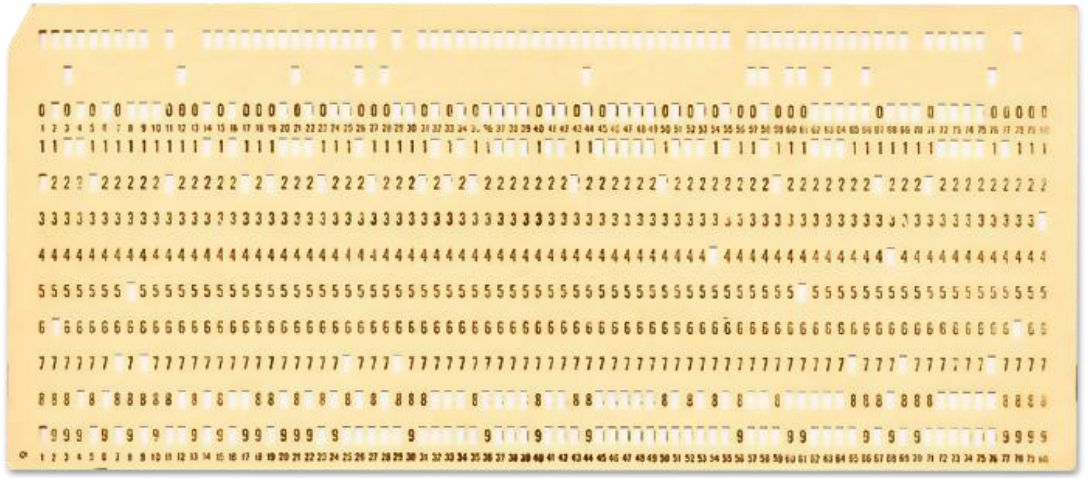
- in 1673
- invented by Gottfried Leibnitz
- a digital mechanical calculator

Difference Engine

- in early 1820
- invented by **Charles Babbage**
- first mechanical computer



Example of a punch card



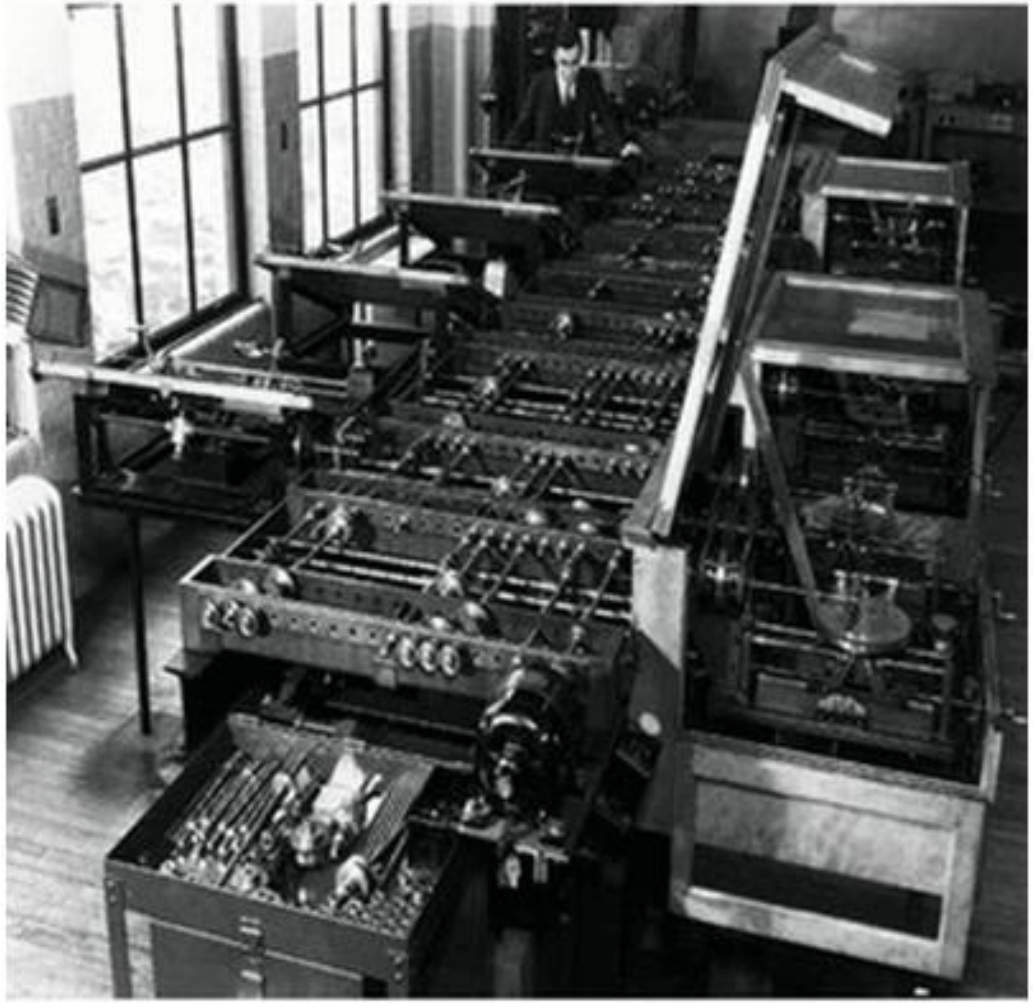
Analytical Engine

- in 1830
- invented by **Charles Babbage**
- used punch-cards as input
- storing information as a permanent memory

Tabulating Machine

- in 1890
- invented by Herman Hollerith

Tabulating Machine Company which later became International Business Machine (IBM) in 1924.



Vacuum tubes

Differential Analyzer

- in 1930
- invented by Vannevar Bush
- uses vacuum tubes

Mark I

- in 1944
- invented by IBM and Harvard
- first programmable digital computer

Generation Of Computers

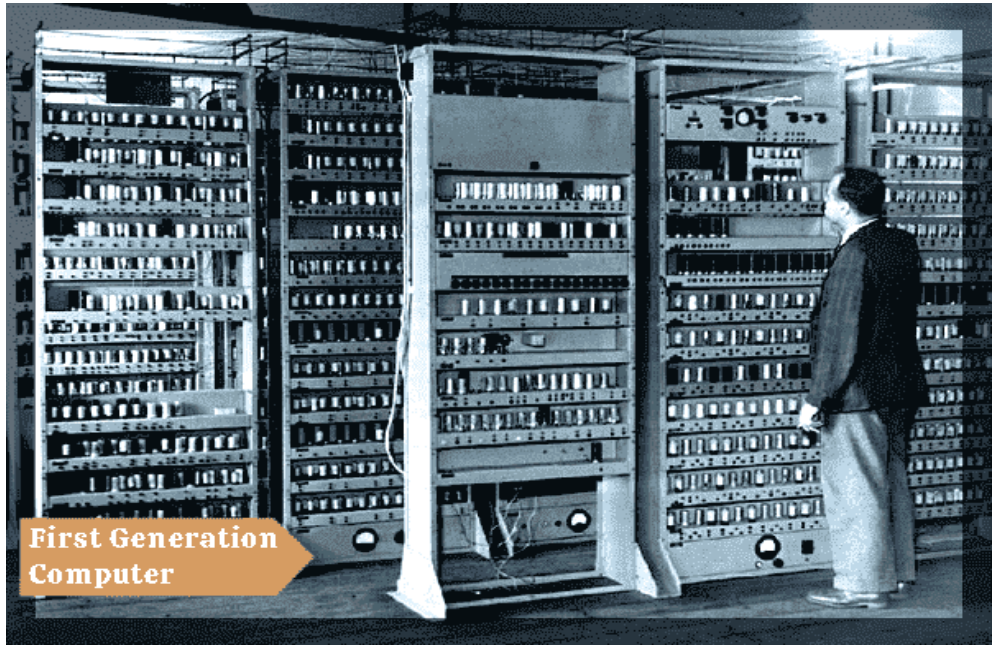
First Generation Computers

1946-1959

- uses vacuum tubes
- slow, huge and expensive

Examples

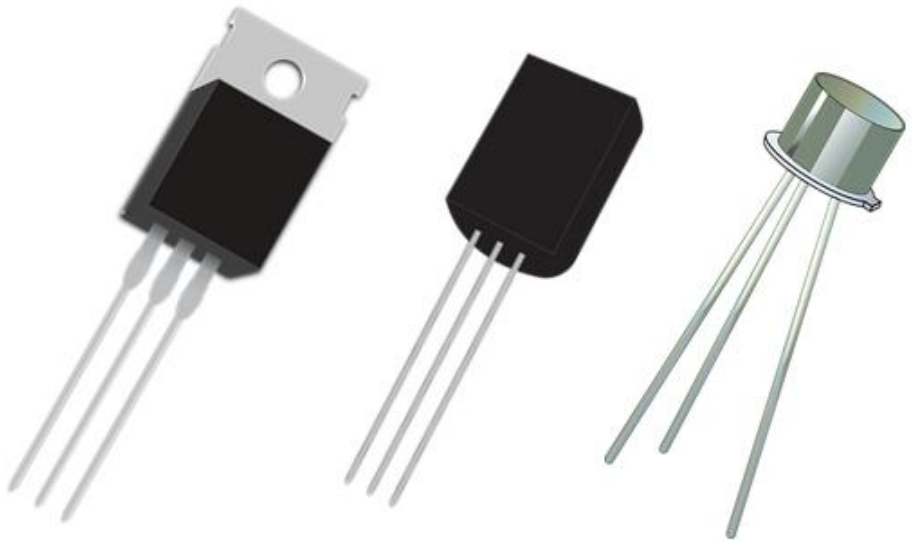
- ENIAC (Electronic Numerical Integrator and Computer)
- EDVAC(Electronic Discrete Variable Automatic Computer)
- UNIVACI(Universal Automatic Computer)
- IBM-701
- IBM-650



Second Generation Computers

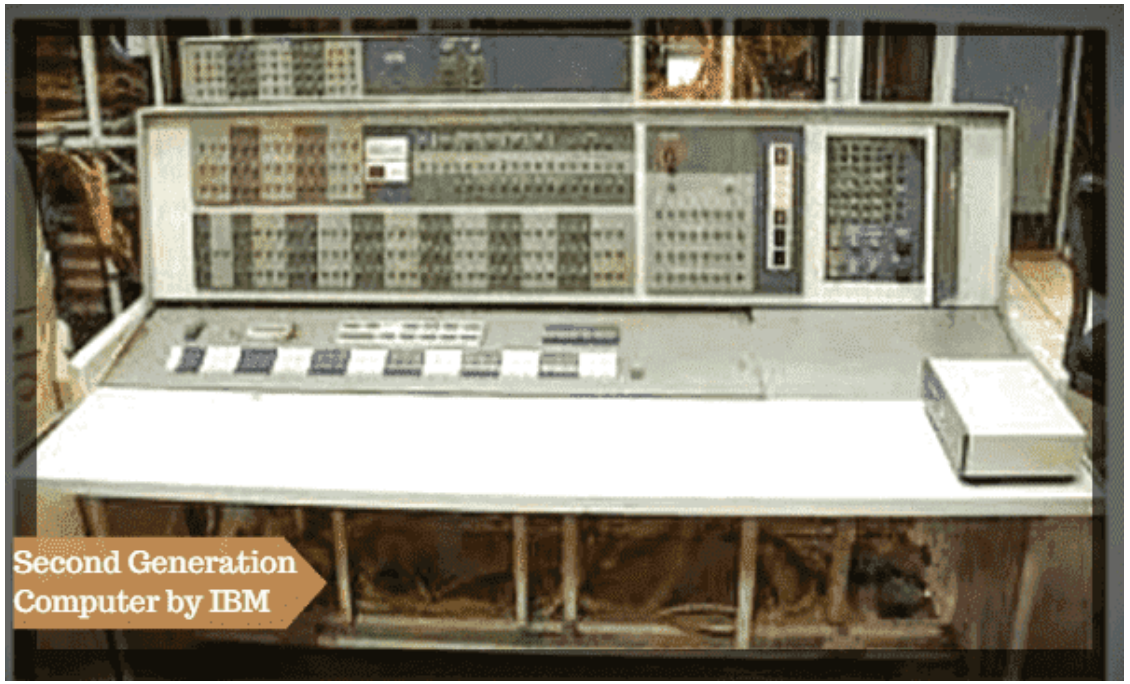
1959-1965

- Uses transistor
- cheap, compact, and consuming less power



Examples

- IBM 1620
- IBM 7094
- CDC 1604
- CDC 3600
- UNIVAC 1108



Third Generation Computers

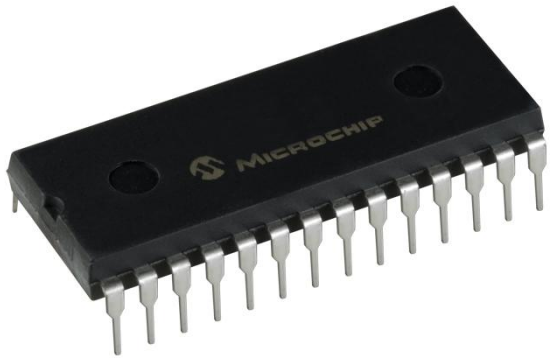
1965-1971

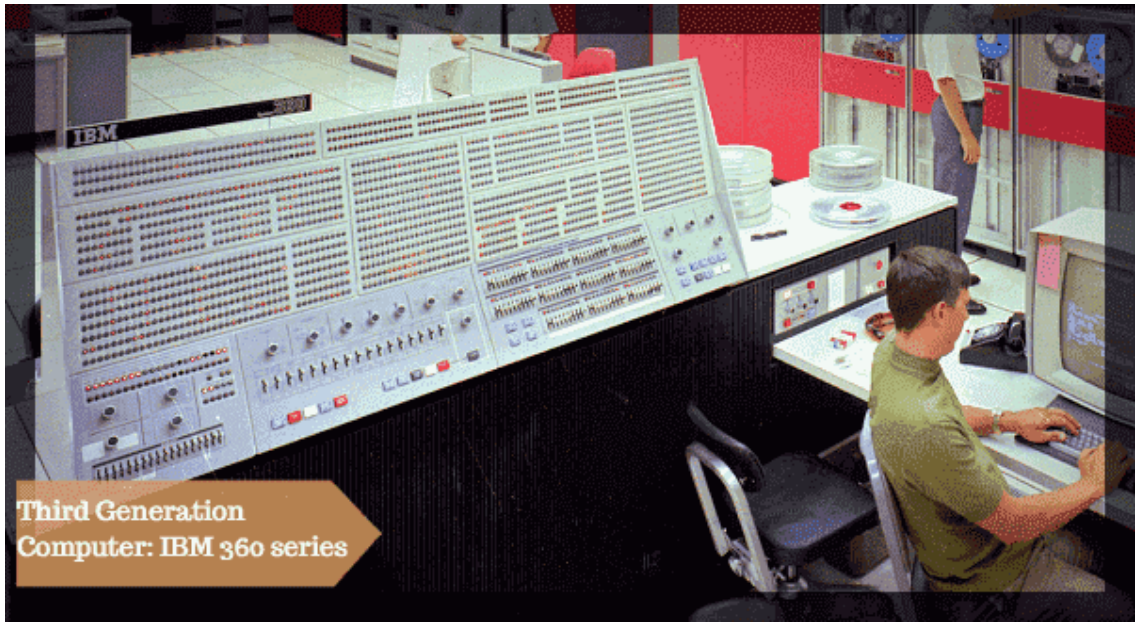
- used integrated circuits(ICs)
- increased the power of a computer and reduced the cost

Examples

- IBM-360 series
- Honeywell-6000 series
- PDP(Personal Data Processor)
- IBM-370/168
- TDC-316

An integrated circuit(IC) contains tiny transistors on a silicon wafer



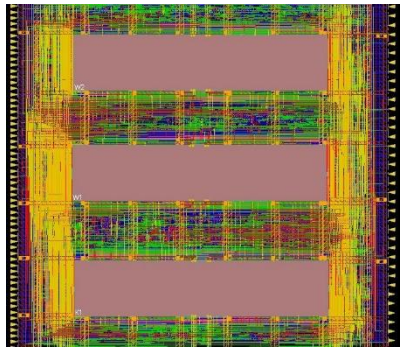


Fourth Generation Computers

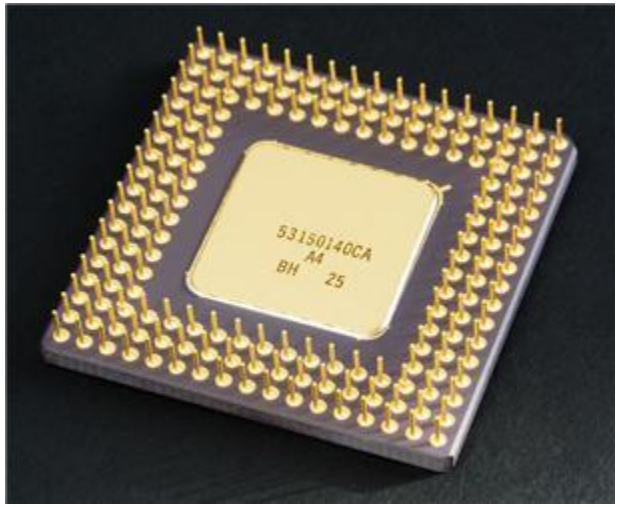
1971-1980

- used very large scale integrated (VLSI) circuits
- more compact, powerful, fast and affordable

- **DEC 10**
- **STAR 1000**
- **PDP 11**
- **CRAY-1(Super Computer)**
- **CRAY-X-MP(Super Computer)**



VLSI

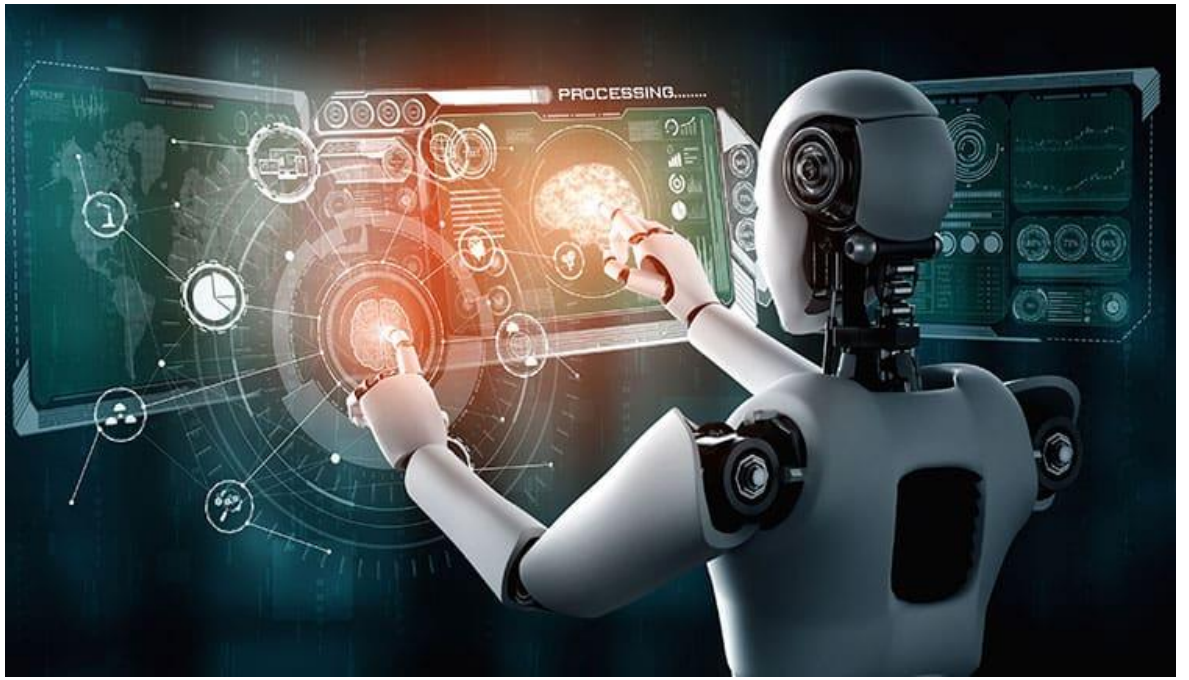


Fifth Generation Computers

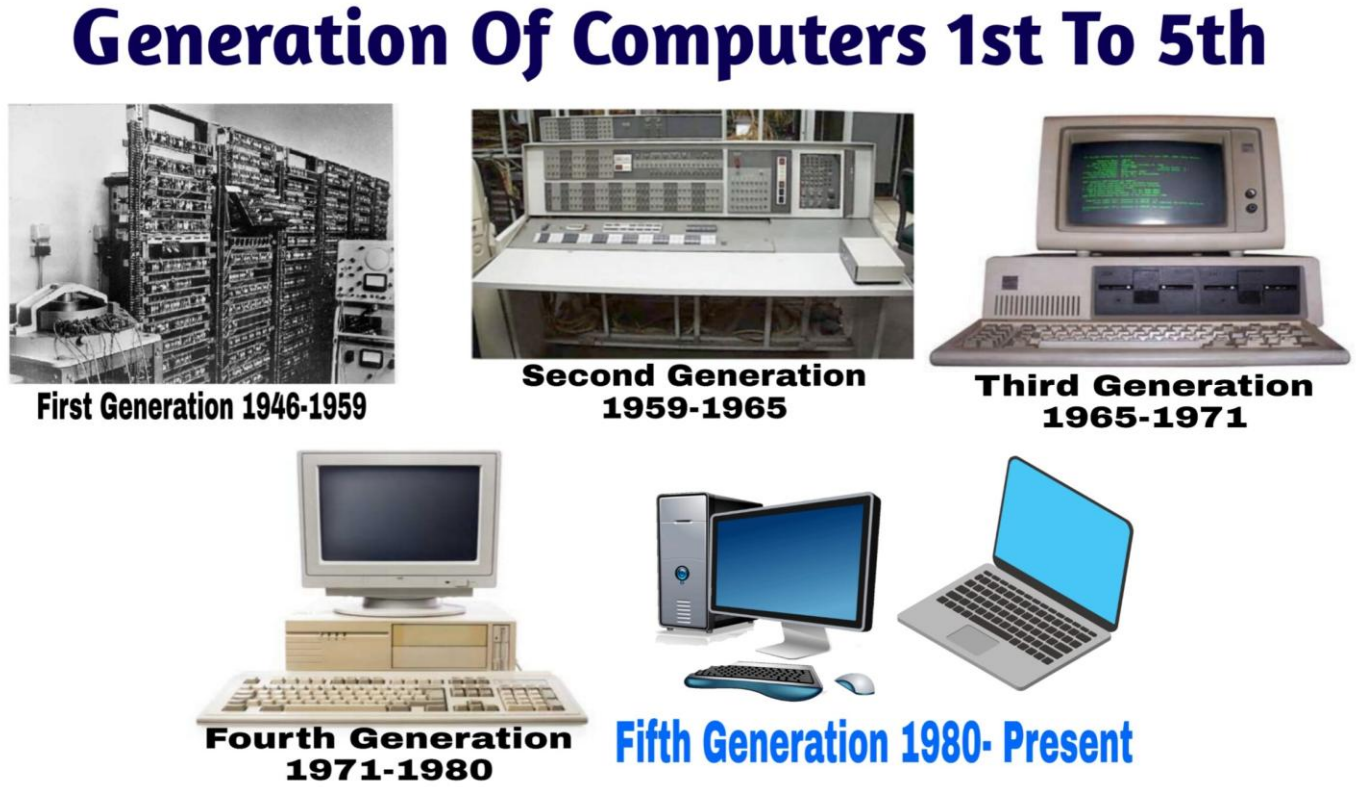
1980-till date

ULSI(Ultra Large Scale Integration)

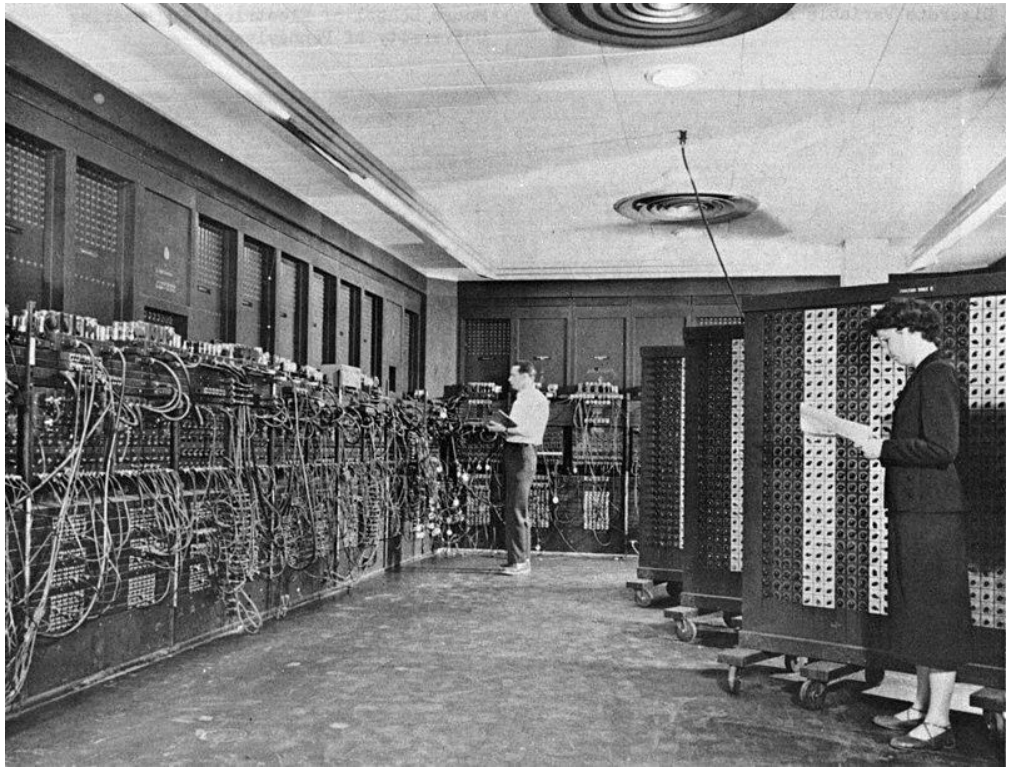
- **Desktop**
- **Laptop**
- **NoteBook**
- **UltraBook**
- **ChromeBook**

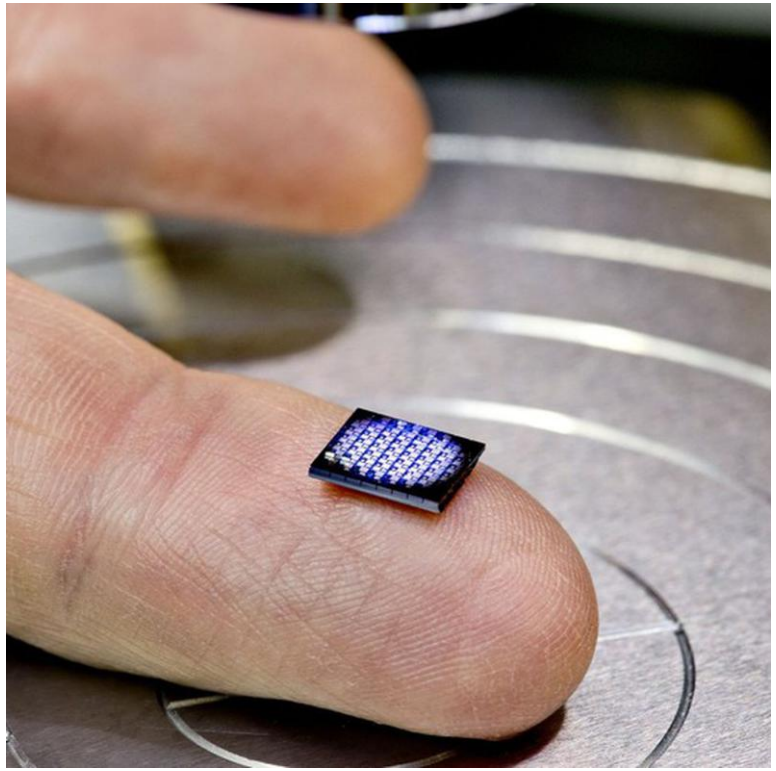


Summary


Generation Of Computers 1st To 5th
First Generation 1946-1959
Second Generation
1959-1965
Third Generation
1965-1971
Fourth Generation
1971-1980
Fifth Generation 1980- Present

From the Beginning to Where We are!





Types Of Computers

On the basis of Purpose

- General purpose computer
- Special purpose computer

General purpose computer

A general-purpose computer is a computer that is designed to be able to carry out many different tasks.

Desktop

Laptop

Special purpose computer

Special-purpose computers are designed for one specific task or class of tasks and wouldn't be able to perform general computing tasks.
Examples: Router, Server, TV, ATM machine.

a router is a special-purpose computer designed to move data around a network

ATM machine

On the basis of data handling capabilities

- Analogue Computer
- Digital Computer
- Hybrid Computer

Analogue Computer

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

Examples
operational amplifiers, mechanical integrators, slide rules, tide predictors, electric integrators

Digital Computer

Digital computer, any of a class of devices capable of solving problems by processing information in discrete form

Examples
Personal computers/Laptops/Notebooks, Smartphones/tablets, Digital Weighing Machine, Automated Teller Machine – ATM, Calculators

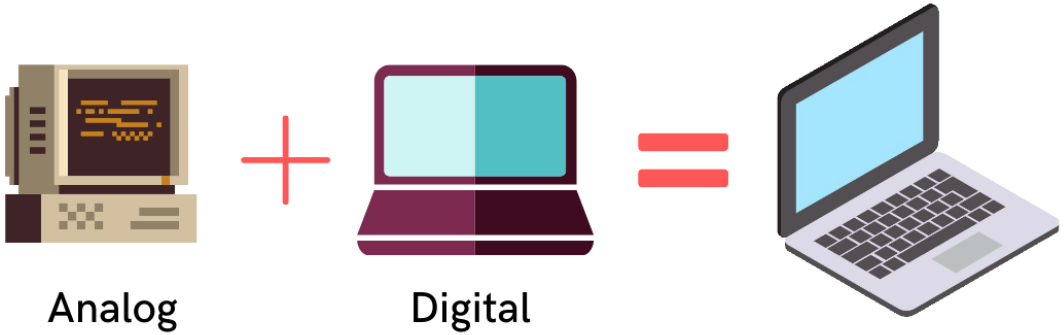
Laptop

Desktop

Hybrid Computer

Hybrid computers are computers that exhibit features of analog computers and digital computers.

Examples
Electrocardiogram Machine, Ultrasound Machine, Monitoring Machine



Analog Computer

Digital Computer

Hybrid Computer

On the basis of Size

- Supercomputer
- Mainframe computer
- Minicomputer
- Workstation
- PC (Personal Computer)

Supercomputer

A supercomputer is a computer with a high level of performance compared to a general-purpose computer.

Examples
Belle, Deep Blue, and Hydra for playing chess

Mainframe computer

A mainframe computer, informally called a mainframe or big iron, is a computer used primarily by large organizations for critical applications like bulk data processing for tasks such as censuses, industry and consumer statistics, enterprise resource planning, and large-scale transaction processing.

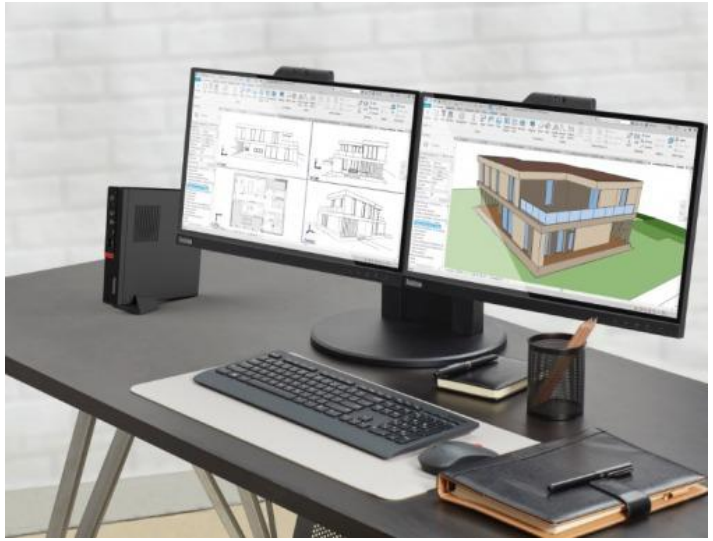
Examples
ENIAC (Electric Numerical Integrator and Calculator), UNIVAC, ASCC (Automatic Sequence Control Computer).

Minicomputer

minicomputer, a computer that was smaller, less expensive, and less powerful than a mainframe or supercomputer but more expensive and more powerful than a personal computer. Minicomputers were used for scientific and engineering computations, business transaction processing, file handling, and database management.

Workstation

workstation, a high-performance computer system that is basically designed for a single user and has advanced graphics capabilities, large storage capacity, and a powerful central processing unit



PC (Personal Computer)/ Microcomputer

A personal computer (PC) is a multipurpose microcomputer whose size, capabilities, and price make it feasible for individual use.

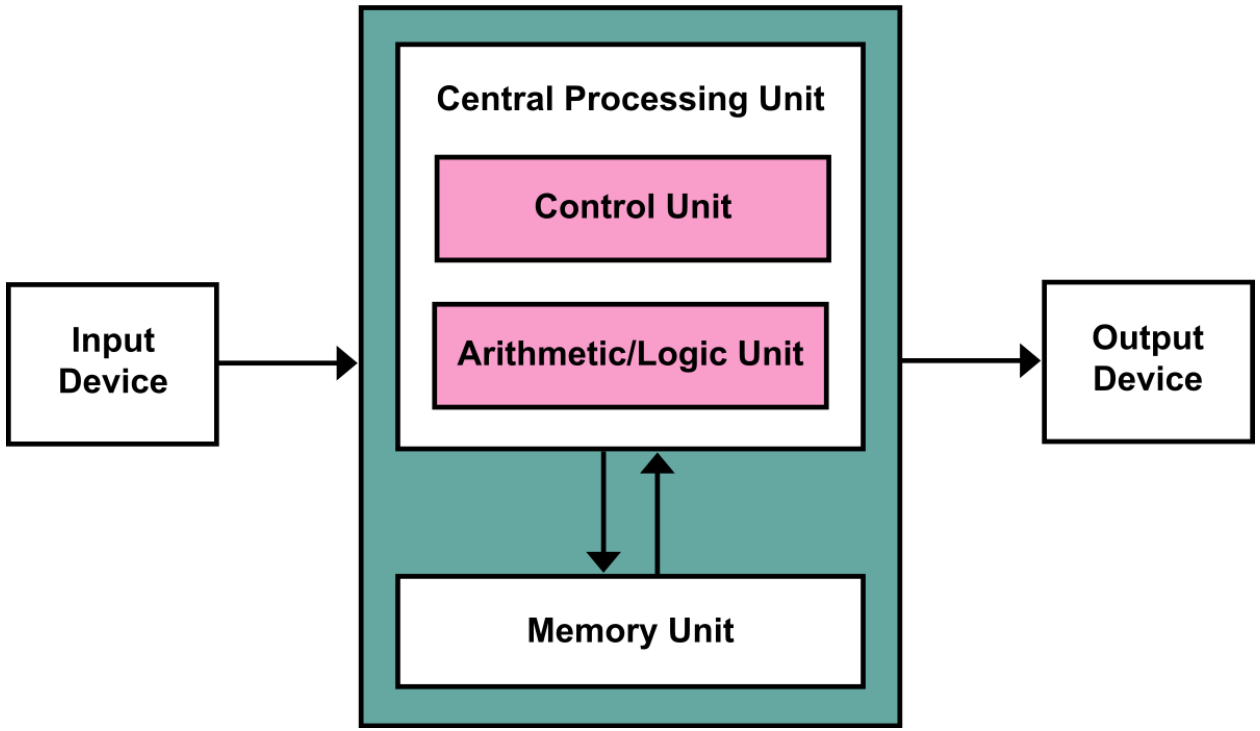
Laptop

Desktop

Application of Computers/ Why Study computers/ Importance of computers

- Education
- Government
- Banking
- Business
- Environmental Science
- Marketing
- Insurance
- Communication
- HealthCare
- Military
- Engineering Design

Von Neumann Architecture



Input output Device

Peripherals and Interfacing Devices

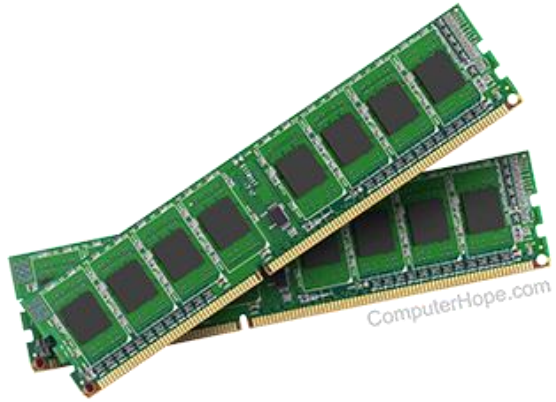
Memory Devices

Based on Volatility

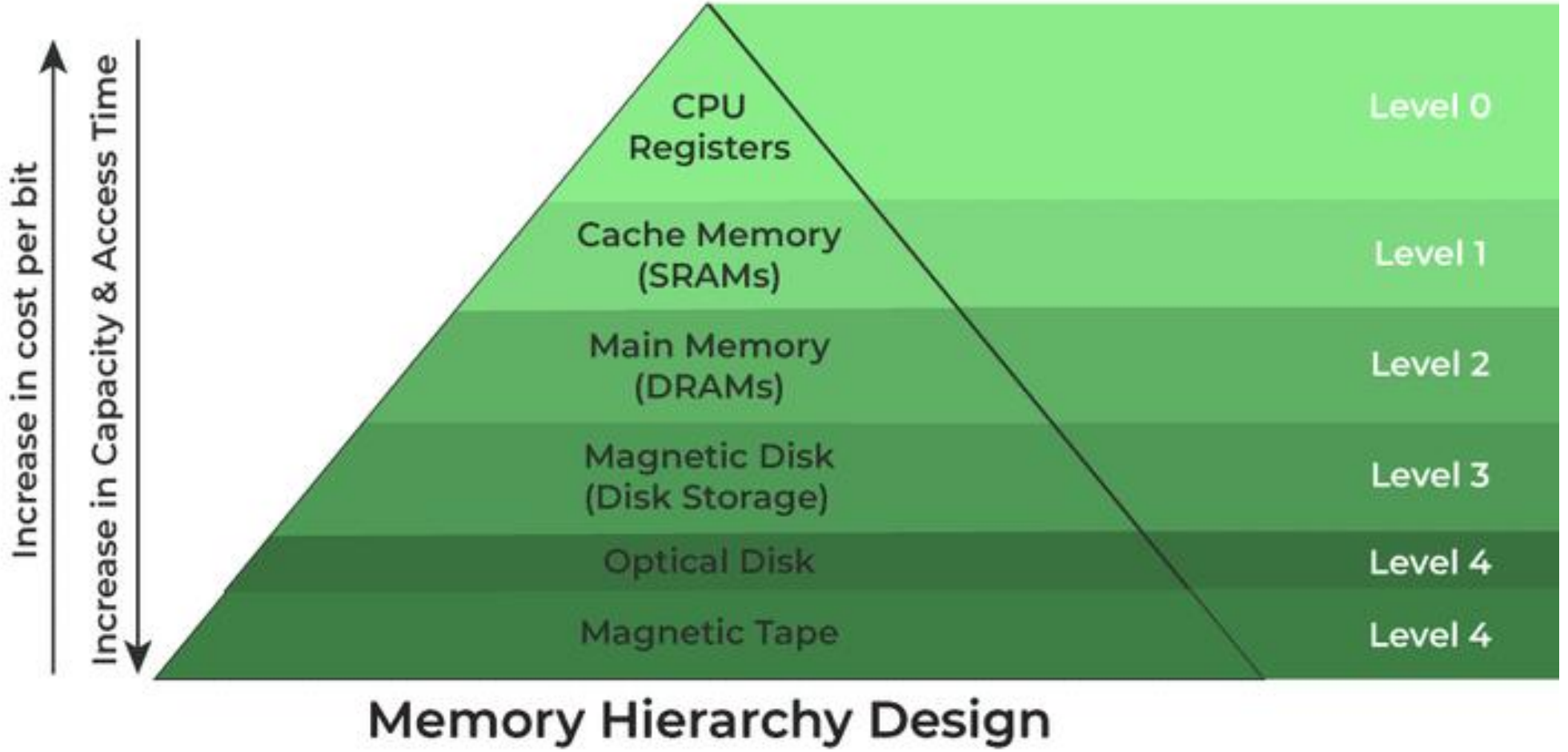
- Volatile (RAM, CACHE)
- Non-Volatile (ROM, HDD, SSD)

Based on Accessibility

- Primary (RAM, ROM)
- Secondary (HDD, SSD)

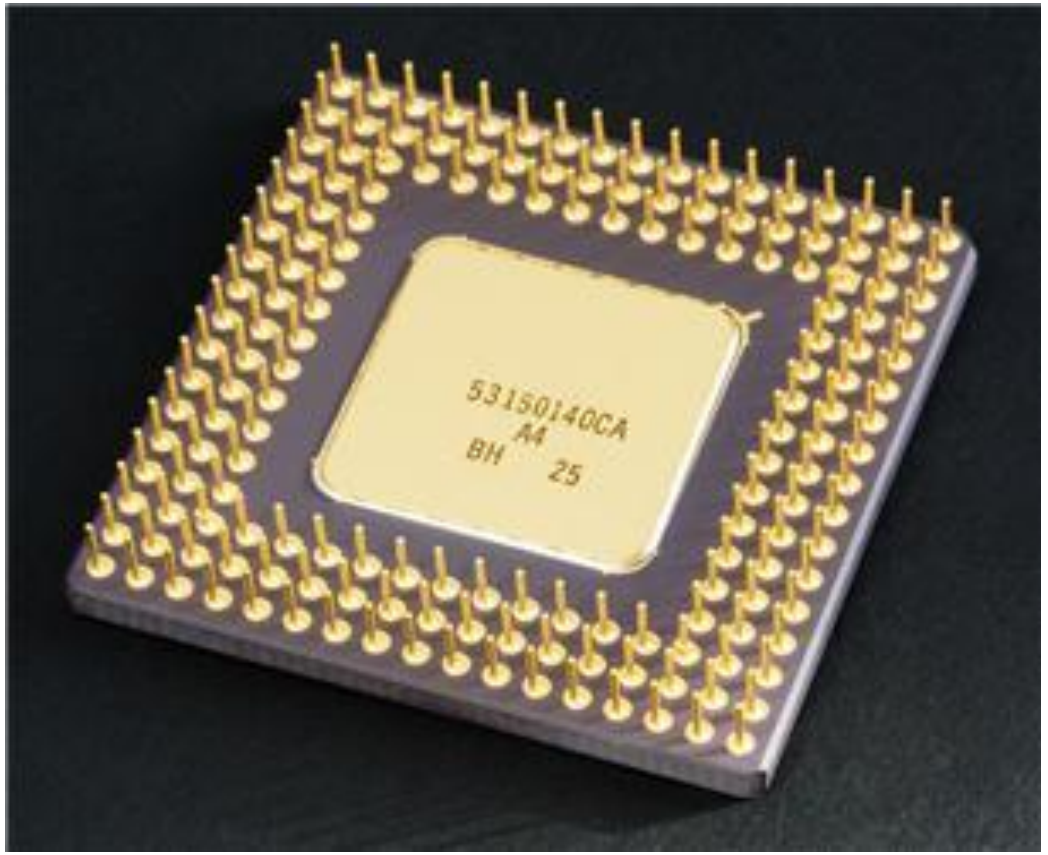


Memory Hierarchy



Central Processing unit

- Control Unit(CU)
- Arithmetic Logic Unit(ALU)



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