

GENERATIONS OF COMPUTERS: EVOLUTION AND KEY FEATURES

A COMPARATIVE TIMELINE & OVERVIEW

1ST GENERATION: VACUUM TUBES

1940 – 1956



MAIN ELECTRONIC COMPONENT



VACUUM TUBES

MEMORY/STORAGE TECHNOLOGY



MAGNETIC DRUMS

PROGRAMMING LANGUAGE

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01101010101010
0010101000010
0110001100010
010101101010
010010111010
```

MACHINE LANGUAGE
(BINARY)

KEY CHARACTERISTICS & EXAMPLES

HUGE SIZE, HIGH HEAT, EXPENSIVE

- Very unreliable
- Difficult to program



ENIAC, EDVAC, UNIVAC I

2ND GENERATION: TRANSISTORS

1956 – 1963



MAIN ELECTRONIC COMPONENT



TRANSISTORS

MEMORY/STORAGE TECHNOLOGY

MAGNETIC CORE (RAM) & MAGNETIC TAPE/DISK



PROGRAMMING LANGUAGE

```
1  <-->
2  <-->
3  <-->
4  <-->
```

ASSEMBLY LANGUAGE
& EARLY HIGH-LEVEL
(FORTRAN, COBOL)

KEY CHARACTERISTICS & EXAMPLES

FASTER, SMALLER, MORE RELIABLE THAN 1ST GEN.

- Used for commercial production
- Easier to maintain



IBM 1620, CDC 1604



DATA
EVOLUTION
GRAPHICS

MASTER THE NOTES? TAKE THE QUIZ

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3RD GENERATION: INTEGRATED CIRCUITS (ICs)

1964 – 1971



MAIN ELECTRONIC COMPONENT



**INTEGRATED
CIRCUITS (ICs)**

MEMORY/STORAGE TECHNOLOGY



**LARGE MAGNETIC
CORE & MAGNETIC
TAPE/DISK**

PROGRAMMING LANGUAGE



**HIGH-LEVEL LANGUAGES
(PASCAL, BASIC,
ALGOL-68)**

KEY CHARACTERISTICS & EXAMPLES

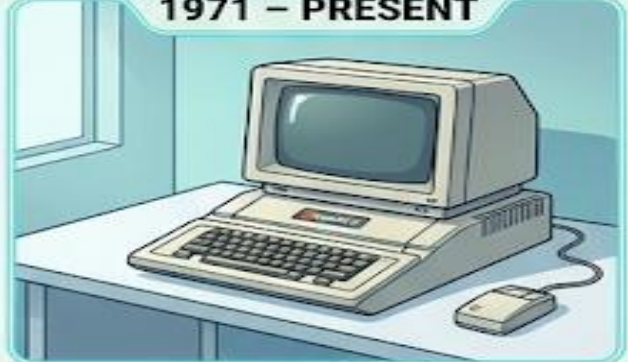
- Use of SSI (Small Scale Integration)
- Significant reduction in size
- Introduction of Operating Systems



IBM-360 series Honeywell-6000

4TH GENERATION: MICROPROCESSORS (VLSI)

1971 – PRESENT



MAIN ELECTRONIC COMPONENT



**MICROPROCESSORS
(VLSI)**

MEMORY/STORAGE TECHNOLOGY

**SEMICONDUCTOR MEMORY
(DRAM), HARD DISKS**



PROGRAMMING LANGUAGE



**C, C++, Java,
Python, SQL**

KEY CHARACTERISTICS & EXAMPLES

- VLSI (Very Large Scale Integration)
- Birth of PCs and Distributed Operating Systems
- Graphic User Interface (GUI)



Apple II

DEC 10

STAR 1000

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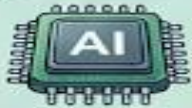
A LOOK AT THE FUTURE

5TH GENERATION: ULSI & AI

PRESENT & BEYOND



MAIN ELECTRONIC COMPONENT



ULSI & AI

MAIN ELECTRONIC COMPONENT



**QUANTUM
COMPUTING
QUBIT**

MEMORY/STORAGE TECHNOLOGY



**Optical Disks
(Blu-ray)**

MEMORY/STORAGE TECHNOLOGY



PROGRAMMING LANGUAGE



**NATURAL LANGUAGE
PROCESSING (NLP)**



PROGRAMMING LANGUAGE



KEY CHARACTERISTICS & EXAMPLES



High-end gaming/Notebook (ND)

KEY CHARACTERISTICS & EXAMPLES

- ULSI (Ultra Large Scale Integration).
- Focus on Parallel Processing and Artificial Intelligence.
- Portable and powerful.



**Laptops, Notebooks, Robotics, Quantum
Computers**