

Computers have evolved over time with improvements in **speed, size, cost, storage, and performance.**

This development is divided into **five generations**, based on the **technology used.**

1 First Generation of Computers (1940–1956)

◆ Technology Used:

- **Vacuum Tubes**

◆ Features:

- **Very large in size**
- Consumed **huge electricity**
- Generated **excessive heat**
- **Very slow processing**

- Required **air conditioning**
- Programming was done in **machine language**
- Very **expensive** and not reliable

◆ **Input/Output:**

- Input: Punched cards
- Output: Printed sheets

◆ **Examples:**

- ENIAC
- EDVAC
- UNIVAC-I
- IBM-701

◆ **Limitations:**

- Frequent hardware failure

- Difficult to maintain
 - Limited storage capacity
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2 Second Generation of Computers (1956–1963)

◆ Technology Used:

- **Transistors** (replaced vacuum tubes)

◆ Features:

- Smaller size than first generation
- Less heat generation
- More reliable
- Consumed less power
- Faster processing

- Used **assembly language** and **early high-level languages**

◆ **Programming Languages:**

- COBOL
- FORTRAN

◆ **Examples:**

- IBM-1401
- IBM-7094
- CDC-1604

◆ **Advantages:**

- Cheaper than first generation
 - Improved speed and accuracy
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3 Third Generation of Computers (1964–1971)

◆ Technology Used:

- **Integrated Circuits (ICs)**

◆ Features:

- Much smaller in size
- Faster processing
- Less power consumption
- High reliability
- Better storage capacity
- Introduction of **operating systems**
- Supported **multiprogramming**

◆ Programming Languages:

- BASIC
- COBOL
- FORTRAN
- Pascal

◆ **Examples:**

- IBM-360
- IBM-370
- PDP-11

◆ **Advantages:**

- Reduced cost
 - Better performance
 - User-friendly compared to earlier generations
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4 Fourth Generation of Computers (1971– Present)

◆ Technology Used:

- **Microprocessors**
- **VLSI (Very Large Scale Integration)**

◆ Features:

- Very small size (personal computers)
- Very high speed
- Very low power consumption
- Large storage capacity
- Affordable and portable
- Use of **GUI (Graphical User Interface)**

◆ Devices Introduced:

- Desktop computers
- Laptops
- Tablets

◆ **Programming Languages:**

- C
- C++
- Java
- Python

◆ **Examples:**

- IBM PC
 - Apple Macintosh
 - Modern PCs and laptops
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5 Fifth Generation of Computers (Present & Future)

◆ Technology Used:

- **Artificial Intelligence (AI)**
- Machine Learning
- Neural Networks
- Quantum Computing (in development)

◆ Features:

- Intelligent systems
- Can learn and make decisions
- Natural Language Processing
- Speech recognition
- Image recognition

- Very high speed and accuracy

◆ **Applications:**

- Robotics
- Virtual assistants (Siri, Alexa)
- Self-driving cars
- Expert systems

◆ **Examples:**

- AI-based systems
 - Supercomputers
 - Quantum computers (experimental)
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Summary Table (Quick Revision)

Generation	Technology	Key Feature
First	Vacuum Tubes	Very large and slow
Second	Transistors	Smaller and faster
Third	Integrated Circuits	Better speed and reliability
Fourth	Microprocessors	Personal computers
Fifth	Artificial Intelligence	Smart and intelligent systems

✓ **Conclusion:**

The evolution of computers from **vacuum tubes to artificial intelligence** has made them **faster, smaller, cheaper, and smarter**. Today, computers are an essential part of **education, business, healthcare, communication, and daily life**.