

Generations of Computer: The modern computer took its shape with the arrival of your time. It had been around the 16th century when the evolution of the computer started. The initial computer faced many changes, obviously for the betterment. It continuously improved itself in terms of speed, accuracy, size, and price to urge the form of the fashionable day computer.

Basic Terms Related to Computers

The basic terms related to generations of computers are listed below.

1. **Vacuum Tube:** Vacuum tubes have the functionality of controlling the flow of electronics in a vacuum. Generally, it is used in switches, amplifiers, radios, televisions, etc.
2. **Transistor:** A transistor helps in controlling the flow of electricity in devices, it works as an amplifier or a switch.
3. **Integrated Circuit (IC):** [Integrated circuits](#) are silicon chips that contain their circuit elements like transistors, resistors, etc.
4. **Microprocessors:** [Microprocessors](#) are the components that contain the CPU and its circuits and are present in the Integrated Circuit.
5. **Central Processing Unit (CPU):** The [CPU](#) is called the brain of the computer. CPU performs processing and operations work.
6. **Magnetic Drum:** Magnetic Drum is like a cylinder that stores data and cylinder.
7. **Magnetic Core:** Magnetic cores are used to store information. These are arrays of small rings.
8. **Machine Language:** Machine Language is the language that a computer accepts (in the form of binary digits). It is also called low-level programming language.
9. **Memory:** Memory is used to store data, information, and program in a computer.
10. **Artificial Intelligence:** [Artificial Intelligence](#) deals with creating intelligent machines and behaviours.

Phases of Computer Generations

This long period is often conveniently divided into the subsequent phases called computer generations.

- [First Generation Computers \(1940-1956\)](#)
- [Second Generation Computers \(1956-1963\)](#)
- [Third Generation Computers \(1964-1971\)](#)
- [Fourth Generation Computers \(1971-Present\)](#)
- [Fifth Generation Computers \(Present and Beyond\)](#)

Generations of Computer	Time-Period	Evolving Hardware
First Generation	1940s – 1950s	Vacuum Tube Based

Generations of Computer	Time-Period	Evolving Hardware
Second Generation	1950s – 1960s	Transistor Based
Third Generation	1960s – 1970s	Integrated Circuit Based
Fourth Generation	1970s – Present	Microprocessor Based
Fifth Generation	Present – Future	Artificial Intelligence Based

Before the generation of computers, we used calculators, spreadsheets, and computer algebra systems, mathematicians and inventors searched for solutions to ease the burden of calculation.

Below are the 8 **Mechanical Calculators** before modern computers were invented.

1. Abacus (ca. 2700 BC)
2. Pascal's Calculator (1652)
3. Stepped Reckoner (1694)
4. Arithmometer (1820)
5. Comptometer (1887) and Comptograph (1889)
6. The Difference Engine (1822)
7. Analytical Engine (1834)
8. The Millionaire (1893)

First Generation Computers

The technology behind the primary generation computers was a fragile glass device, which was called a vacuum tube. These computers were very heavy and really large. These weren't very reliable and programming on them was a tedious task as they used low-level programming language and used no OS. First-generation computers were used for calculation, storage, and control purpose. They were too bulky and large that they needed a full room and consume a lot of electricity. Punch cards were used for improving the information for external storage. Magnetic card used . Machine and assembly language is developed.

Examples of some main first-generation computers are mentioned below.

- **ENIAC:** Electronic Numerical Integrator and Computer, built by J. Presper Eckert and John V. Mauchly was a general-purpose computer. It had been cumbersome, and large, and contained 18,000 vacuum tubes.
- **EDVAC:** Electronic Discrete Variable Automatic Computer was designed by von Neumann. It could store data also as instruction and thus the speed was enhanced.

- **UNIVAC:** Universal Automatic Computer was developed in 1952 by Eckert and Mauchly.



Vacuum Tube

Characteristics of First-Generation Computers

Characteristics	Components
Main electronic component	Vacuum tube.
Programming language	Machine language.
Main memory	Magnetic tapes and magnetic drums.
Input/output devices	Paper tape and punched cards.
Speed and size	Very slow and very large (often taking up an entire room).
Examples of the first generation	IBM 650, IBM 701, ENIAC, UNIVAC1, etc.

Second Generation Computers

Second-generation computers used the technology of transistors rather than bulky vacuum tubes. Another feature was the core storage. A transistor may be a device composed of semiconductor material that amplifies a sign or opens or closes a circuit.



Second Generation Computer

Transistors were invented in Bell Labs. The use of transistors made it possible to perform powerfully and with due speed. It reduced the dimensions and price and thankfully the warmth too, which was generated by vacuum tubes. Central Processing Unit (CPU), memory, programming language, and input, and output units also came into the force within the second generation.

The programming language was shifted from high level to programming language and made programming comparatively a simple task for programmers. Languages used for programming during this era were FORTRAN (1956), ALGOL (1958), and COBOL (1959).



Transistor

Characteristics of Second-Generation Computers

Characteristics	Components
Main electronic component	Transistor.
Programming language	Machine language and assembly language.
Memory	Magnetic core and magnetic tape/disk.
Input/output devices	Magnetic tape and punched cards.
Power and size	Smaller in size, had low power consumption, and generated less heat (in comparison with the first-

Characteristics	Components
Examples of the second generation	generation computers). PDP-8, IBM1400 series, IBM 7090 and 7094, UNIVAC 1107, CDC 3600, etc.

Third Generation Computers

During the third generation, technology envisaged a shift from huge transistors to integrated circuits, also referred to as IC. Here a variety of transistors were placed on silicon chips, called semiconductors. The most feature of this era's computer was speed and reliability. IC was made from silicon and also called silicon chips.



Third Generation Computers

The computer programs was designed to make the machine work. Operating system was a program designed to handle a machine completely. Because of the operating system machine could execute multiple jobs simultaneously. Integrated circuits were used to replace many transistors used in the second generation.

A single IC has many transistors, registers, and capacitors built on one thin slice of silicon. The value size was reduced and memory space and dealing efficiency were increased during this generation. Programming was now wiped out Higher level languages like BASIC (Beginners All-purpose Symbolic Instruction Code). Minicomputers find their shape during this era.



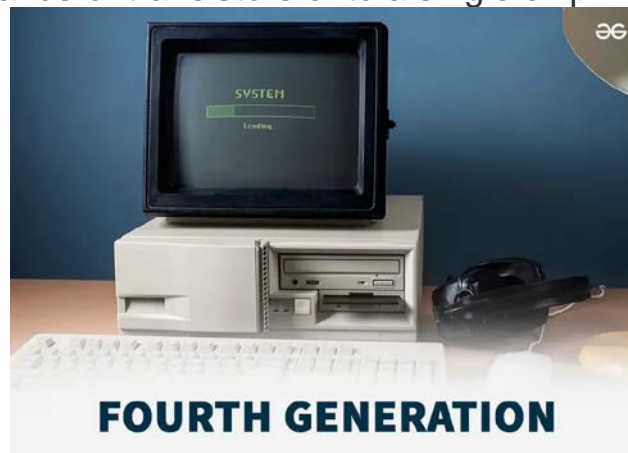
Integrated Circuit

Characteristics of Third-Generation Computers

Characteristics	Components
Main electronic component	Integrated circuits (ICs).
Programming language	High-level language.
Memory	Large magnetic core, magnetic tape/disk.
Input/output devices	Magnetic tape, monitor, keyboard, printer, etc.
Examples of the third generation	IBM 360, IBM 370, PDP-11, NCR 395, B6500, UNIVAC 1108, etc.

Fourth Generation Computers

In 1971 First microprocessors were used, the large-scale of integration LSI circuits built on one chip called microprocessors. The advantage of this technology is that one microprocessor can contain all the circuits required to perform arithmetic, logic, and control functions on one chip. LSI placed thousands of transistors onto a single chip.



Fourth Generation Computer

The computers using microchips were called microcomputers. This generation provided even smaller size of computers, with larger capacities. That's not enough, then Very Large Scale Integrated (VLSI) circuits replaced LSI circuits. The Intel 4004 chip, developed in 1971, located all the components of the pc from the central processing unit and memory to input/ output controls on one chip and allowed the dimensions to reduce drastically. VLSI placed several hundred thousand transistors on a single silicon chip. This silicon chip is known as the micro processor.

Technologies like multiprocessing, multiprogramming, time-sharing, operating speed, and virtual memory made it a more user-friendly and customary device. The concept of private computers and computer networks came into being within the fourth generation.



Microprocessor

Characteristics of Fourth-Generation Computers

Characteristics	Components
Main electronic component	Very-large-scale integration (VLSI) and the microprocessor (VLSI has thousands of transistors on a single microchip).
Memory	semiconductor memory (such as RAM , ROM , etc.).
Input/output devices	pointing devices, optical scanning, keyboard, monitor, printer, etc.
Examples of the fourth generation	IBM PC, STAR 1000, APPLE II, Apple Macintosh, Alter 8800, etc.

Fifth Generation Computers

The technology behind the fifth generation of computers is AI. It allows computers to behave like humans. It is often seen in programs like voice recognition, area of medicine, and entertainment. Within the field of game playing also it's shown remarkable performance where computers are capable of beating human competitors.



Fifth-Generation-Computers

The speed is the highest, size is the smallest and area of use has remarkably increased within the fifth generation computers. Though not a hundred percent AI has been achieved to date but keeping in sight the present developments, it is often said that this dream also will become a reality very soon.

To summarize the features of varied generations of computers, it is often said that a big improvement has been seen so far because of the speed and accuracy of functioning care, but if we mention the dimensions, it's been small over the years. The value is additionally diminishing and reliability is increasing.



AI-Based Computers

Characteristics of Fifth-Generation Computers

Characteristics	Components
Main electronic component	Based on artificial intelligence, uses the Ultra Large-Scale Integration (ULSI) technology and parallel processing method (ULSI has millions of transistors on a single microchip and the Parallel processing method use two or more microprocessors to run tasks simultaneously).
Language	Understand natural language (human language).
Size	Portable and small in size.
Input/output device	Trackpad (or touchpad), touchscreen, pen, speech input (recognize voice/speech), light scanner, printer, keyboard, monitor, mouse, etc.
Example of the fifth generation	Desktops, laptops, tablets, smartphones, etc.

FAQs on Generations of Computer

What are the 5 types of generation of computer?

The five generations of computers are:

1. *First Generation (1940s-1950s):*
 - *Characterized by vacuum tubes and punched cards.*
 - *Examples: ENIAC, UNIVAC.*
2. *Second Generation (1950s-1960s):*
 - *Transistors replaced vacuum tubes, allowing smaller and more efficient computers.*
 - *Introduction of high-level programming languages.*
 - *Examples: IBM 1401, IBM 7094.*
3. *Third Generation (1960s-1970s):*
 - *Integrated circuits (ICs) replaced transistors, leading to smaller and faster computers.*
 - *Introduction of operating systems.*
 - *Examples: IBM System/360, DEC PDP-11.*
4. *Fourth Generation (1970s-1980s):*
 - *Microprocessors brought computing power to individual users.*

- *Introduction of personal computers.*
- *Examples: IBM PC, Apple Macintosh.*
- 5. *Fifth Generation (1980s-Present):*
 - *Focus on parallel processing, artificial intelligence (AI), and natural language processing.*
 - *Development of supercomputers and expert systems.*
 - *Ongoing advancements in AI and machine learning.*
 - *Examples: IBM Watson, Google's DeepMind.*

What is Gen Z technology?

Gen Z technology encompasses the digital tools and platforms that define the experiences of individuals born roughly between the mid-1990s and early 2010s. This generation is characterized by its seamless integration of smartphones, social media, online collaboration, and video content into daily life, shaping their communication, learning, and entertainment habits.

What is Artificial Intelligence?

Artificial Intelligence (AI) is the simulation of human intelligence in machines. It involves programming computers to think, learn, and perform tasks that traditionally require human intelligence, such as problem-solving and decision-making. AI encompasses subfields like machine learning and natural language processing, with applications ranging from virtual assistants to autonomous vehicles.

What was the First Computer?

The ENIAC (Electronic Numerical Integrator and Computer), completed in 1945, is widely regarded as the first electronic general-purpose computer.

Who is Known as the Father of Computers?

Charles Babbage is known as the Father of Computers for his pioneering work on the concept of a programmable mechanical computer in the 19th century.