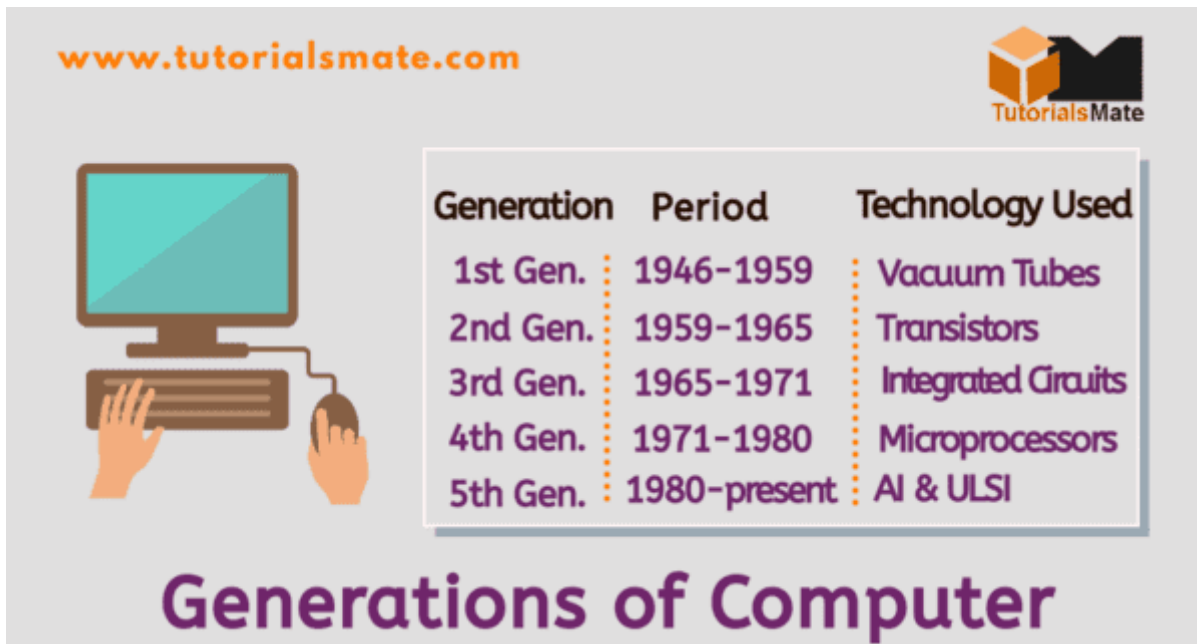


Generations of Computer: 1st to 5th

Nowadays, the computer is one of the essential parts of our day to day activities. Computers are so smart that they can also do many tasks automatically according to the data given to them. However, computers were not like this before. There were constant developments and innovations in computer technology that made computers so powerful and useful. All such developments are divided into different generations of computers.



The infographic features the website URL 'www.tutorialsmate.com' at the top left and the 'Tutorialsmate' logo at the top right. On the left side, there is an illustration of a computer monitor, keyboard, and mouse with hands interacting with them. The central part of the infographic is a table with three columns: 'Generation', 'Period', and 'Technology Used'. Below the table, the title 'Generations of Computer' is written in a large, bold, purple font.

Generation	Period	Technology Used
1st Gen.	1946-1959	Vacuum Tubes
2nd Gen.	1959-1965	Transistors
3rd Gen.	1965-1971	Integrated Circuits
4th Gen.	1971-1980	Microprocessors
5th Gen.	1980-present	AI & ULSI

This article discusses the generations of computers, the duration of each generation, the technology used, advantages and disadvantages. Before we discuss generations of computers, let us first understand what the generations of computers are and how many generations of computers are there.

What are the generations of computers?

Generations of computers are mainly divided according to the development of computer technology. Each generation defines the major technological developments on which computer systems were/are based.

In the early days of development, the 'generation of computers' was intended solely to illustrate the differences between hardware technologies. However, nowadays the term is the conclusion of both hardware and software changes involved in the path of computer development. In particular, the term 'generation' refers to development that changes the way computers work. Moreover, frequent improvements were made to make computer devices more compact in size, cheaper in price, more powerful and smarter, etc.

How many generations of computers are there?

Although the development of computer technology was started in around 1940, the evolution of this technology began around 1946 with the first generation of computer and continuously evolving ever since. As of now, there are **five generations of the computer**.

What are the five generations of computers?

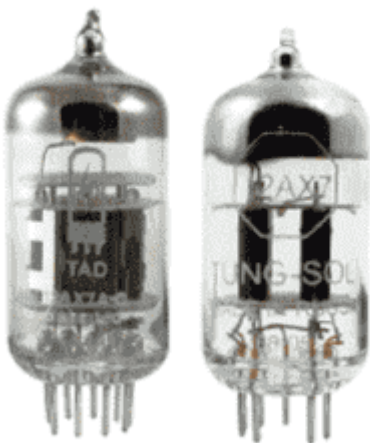
The five generations of computers are listed below:

Each of these generations of computers is also discussed below with the necessary details and relevant images. Let us discuss each generation in detail:

First Generation (1946 – 1959)

This is the earliest generation of computers, known as the first generation of computers. The first generation period is considered from 1946 to 1959. During the first generation, computers were developed using vacuum tubes as the core technology. First-generation computers used the machine language, the lowest-level programming language so that it could be easily processed and understood by computers.

First Generation of Computer (1946-1959)



Vacuum Tubes



First Generation Computer - ENIAC

ENIAC, short for Electronic Numerical Integrator and Calculator, is the most popular example of the first generation computer. Other examples include UNIVAC, EDVAC, EDSAC, IBM-650, IBM-701, Manchester Mark 1, Mark 2, Mark 3, etc.

Advantages of the First Generation Computers

The following are the main advantages of first-generation computers:

- Vacuum tubes were used in first-generation computers, and the generation helped introduce computer devices.
- Due to the use of machine languages, computers of this generation were faster as early development.
- Computers were able to perform calculations in milliseconds.

Disadvantages of the First Generation Computers

The following are the main disadvantages of first-generation computers:

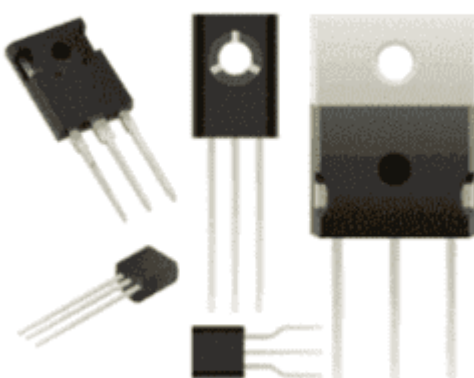
- First-generation computers were very large and could also cover an entire room.
- Computers of this generation generated too much heat and required a large cooling system.
- Storage capacity in computers was very low in this generation.

Second Generation (1959 – 1965)

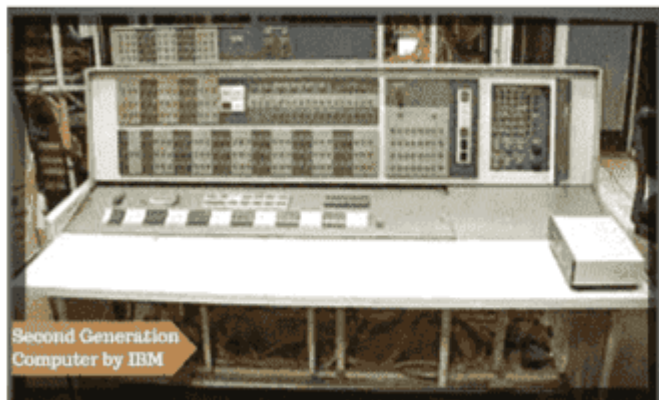
The second generation of computers began with the widespread use of transistors. In this generation, vacuum tubes were no longer the main piece of technology. They were replaced by transistors. The second-generation period is considered from 1959 to 1965. Magnetic cores (as primary memory devices) and magnetic tapes (as secondary storage devices) were also used for memory requirements in computers.

During the second generation, computers used assembly languages instead of binary machine languages. Besides, early versions of high-level languages, such as COBOL and FORTRAN, were also introduced in this generation.

Second Generation of Computer (1959-1965)



Transistors



Second Generation Computer by IBM

The CDC-3600 and IBM-7094 are the most popular first-generation computers. Other examples include UNIVAC-1108, IBM-7070, CDC-1604, IBM-1400 series of computers, IBM-1600 series, IBM-7000 series,

Honeywell-400, etc.

Advantages of the Second Generation Computers

The following are the main advantages of the second generation computers:

- The transistor helped to make the second generation computer slightly smaller than the first generation computer.
- Due to magnetic core technology, computers of this generation could store instructions in memory.
- Computers became faster, reliable, and were able to perform calculations in microseconds.

Disadvantages of the Second Generation Computers

The following are the main disadvantages of the second generation computers:

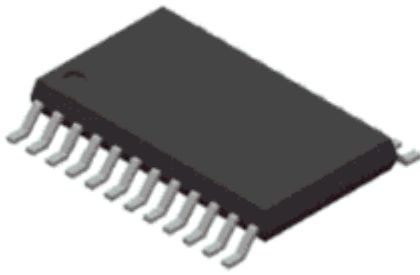
- A cooling system was still needed in the second generation.
- Second-generation computers required maintenance at regular intervals.
- The cost of the computer was still high; however, less than the first generation computer.

Third Generation (1965 – 1971)

The third generation of computers was characterized by the use of integrated circuits (ICs) in computers rather than transistors. The third generation period is considered from 1965 to 1971. In this generation, integrated circuits were used as the main piece of technology. The integrated circuits were very small in size and helped to make the computer smaller than its predecessor.

Besides, advanced input-output devices, such as a mouse, keyboard, and monitor were introduced in this generation. Before these devices, computers used punch cards and printouts. In terms of languages, third-generation computers used higher-level languages such as COBOL, BASIC, ALGOL-68, PASCAL PL / 1, FORTRAN-II to IV, etc.

Third Generation of Computer (1965-1971)



Integrated Circuit



Third Generation Computer by IBM

Computers developed under the IBM-360 family series are the best examples of third-generation computers. Other examples include PDP-8, PDP-11, TDC-316, Honeywell-6000 series, ICL 2900 etc. Besides, integrated circuits are still in use in today's generation of computers.

Advantages of the Third Generation Computers

The following are the main advantages of the third generation computers:

- Third-generation computers were smaller than previous-generation computers, making second-generation computers portable and available for commercial use at relatively low prices.
- Computers were fast, reliable, and could perform calculations in nanoseconds. They also had more storage availability.
- Computers in the third generation produced less heat and became more energy efficient than the previous generation.

Disadvantages of the Third Generation Computers

The following are the main disadvantages of the third generation computers:

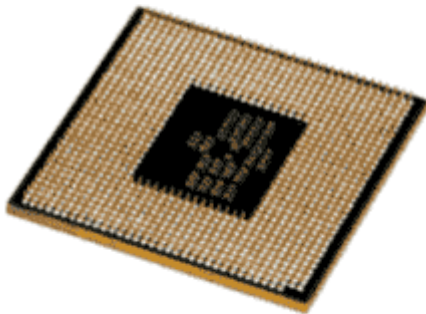
- Third-generation computers also required a cooling system.
- Production and maintenance of integrated circuits were difficult at that time.
- The price of third-generation computers was still high for personal needs.

Fourth Generation (1971 – 1980)

The fourth-generation period is considered from 1971 to 1980. During this generation, computers were developed using the microprocessor as the main component of the technology. Microprocessors were also based on LSI (Large Scale Integration) and VLSI (Very Large Scale Integration) technologies. They were developed by assembling several integrated circuits on a single silicon chip.

Microprocessors not only helped make computers smaller but also made them so powerful and reliable. Due to their compact size, computers became available for personal use during the fourth generation. Besides, high-level programming languages such as C, C ++, DBASE, etc. were used in computers of this generation. Time-sharing, network-based, distributed operating systems were also used in computers of this generation.

Fourth Generation of Computer (1971-1980)



Microprocessor



Fourth Generation Computer by IBM

The IBM-5100, Altair-8800, and Micral are the most popular computers of the fourth generation computers. Other examples include PDP-11, DEC-10, IBM-4341, STAR-1000, CRAY-1, CRAY-X-MP etc. Besides, microprocessors are still in use in today's generation (fifth generation of computers). However, they are not considered a core technology in the current generation.

Advantages of the Fourth Generation Computers

The following are the main advantages of the fourth generation computers:

- Due to the compact size, the computer became widely available for commercial and personal use. It also led to the revolutionary use of personal computers (PCs).
- Fourth-generation computers were faster, smaller, reliable, more energy-efficient than their predecessors. Also, fourth-generation computers had more storage availability.
- The amount of heat in fourth-generation computers was greatly reduced. The heat produced was almost negligible and hence the air conditioner system was no longer needed.

Disadvantages of the Fourth Generation Computers

The following are the main disadvantages of the fourth generation computers:

- The construction of VLSI circuits, and microprocessors, was complex and required highly sophisticated technology and advanced technical skills.

- A cooling fan was included in computers instead of an air conditioning system. These cooling fans made noises with intense use of computers.
- Fourth-generation computers still used integrated circuits and therefore high technical skills were required to construct and assemble these ICs.

Fifth Generation (1980 to Present)

Fifth-generation computers are based on ULSI (Ultra Large Scale Integration) technology, AI (artificial intelligence) software, and parallel processing hardware. ULSI has revolutionized the development of microprocessors. Now, about ten million electronic devices can be assembled on a single microprocessor chip. On the other hand, AI is helping computers to react efficiently against natural languages.

The fifth-generation period is believed to have started in 1980 and is continuing. This means that the current generation is the fifth generation of computers. Fifth-generation computers are still using integrated circuits to meet various needs. However, the main technology is AI where there is still room for improvement.

Fifth Generation of Computer (1980-Present)



Artificial Intelligence



Fifth Generation Computer - Desktop

In the fifth generation, computers are particularly based on logic programming and massively parallel computing. All high-level languages are supported in this generation. Some such languages include C, C++, Java, .NET, etc. Besides, multi-threaded and distributed operating systems are in use. Common examples of fifth-generation computers are Desktop, Laptop, Notebook, Chromebook, Ultrabook, Tablet, etc.

Advantages of the Fifth Generation Computers

The following are the main advantages of fifth-generation computers:

- Fifth-generation computers are available in different sizes and they can now fit on the palm as well.

- Computers have become so fast that they can handle multitasking easily. Also, if the data given by the user is correct, then fifth generation computers are almost 100% accurate in calculations.
- With the use of AI in the fifth generation, computers have become so smart that they can understand human language and recognize pictures of individuals and things. However, all these data are input on the computer or they do so with the help of the internet. They do not have the ability to think as human beings.

Disadvantages of the Fifth Generation Computers

The following are the main disadvantages of the fifth generation computers:

- With advanced features and accuracy, computers have also replaced humans in various fields, increasing unemployment. They are also ruining humans' ability to think and learn.
- Due to the widespread use of computers in the fifth generation, the amount of wastage of computers and their parts is increasing significantly. It negatively affects the environment.
- Computers have also become a threat to personal use and businesses as there are various types of cybercrimes that can cause damage to personal details as well as financial losses.

Summary

- The period of the first generation of computers is 1946 – 1959, and the main technology used in computers was vacuum tubes.
- The period of the second generation of computers is 1959 – 1965, and the main technology used in computers was transistors.
- The period of the third generation of computers is 1965 – 1971, and the main technology used in computers was integrated circuits.
- The period of the fourth generation of computers is 1971 – 1980, and the main technology used in computers was the microprocessor.
- The fifth-generation period of computers is 1980 - current, and the main technologies used in computers are ULSI, AI software, and parallel processing hardware.

