

# Generations of Computers

The modern computer took its shape with the arrival of your time. It had been around 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. 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)**

Before there are graphing 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: Vacuum Tubes (1940-1956)**

The technology behind the primary generation computers was a fragile glass device, which was called vacuum tubes. These computers were very heavy and really large in size. These weren't very reliable and programming on them was a really tedious task as they used high-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 rot of electricity.

#### **Main first generation computers are:**

**ENIAC:** Electronic Numerical Integrator and Computer, built by J. Presper Eckert and John V. Mauchly was a general-purpose computer. It had been very heavy, 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.

## **Main characteristics of first generation computers are:**

- 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 in size (often taking up entire room).

Examples of the first generation - IBM 650, IBM 701, ENIAC, UNIVAC1, etc.

## **Second Generation Computers: Transistors (1956-1963)**

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. 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.

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).

Main characteristics of second generation computers are:-

- 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, low power consumption, and generated less heat (in comparison with the first generation computers).

Examples of second generation - PDP-8, IBM1400 series, IBM 7090 and 7094, UNIVAC 1107, CDC 3600 et

### **Third Generation Computers: Integrated Circuits. (1964-1971)**

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 the speed and reliability. IC was made from silicon and also called silicon chips. 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.

**Main characteristics of third generation computers are:**

- 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 third generation - IBM 360, IBM 370, PDP-11, NCR 395, B6500, UNIVAC 1108, etc.

### **Fourth Generation Computers: Micro-processors (1971-Present)**

In 1971 First microprocessors were used, the large scale of integration LSI circuits built on one chip called microprocessors. The most advantage of this technology is that one microprocessor can contain all the circuits required to perform arithmetic, logic, and control functions on one chip. The computers using microchips were called microcomputers. This generation provided the even smaller size of computers, with larger capacities. That's not enough, then Very Large Scale Integrated (VLSI) circuits replaced LSI circuits. The Intel 4004chip, 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. 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

### **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 medicines, and entertainment. Within the field of games playing also it's shown

remarkable performance where computers are capable of beating human competitors. The speed is highest, size is that 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.

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

### **Main characteristics of fifth generation computers are:**

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 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 fifth generation - Desktops, laptops, tablets, smartphones, etc.

Thank you