Concept Overview:

The history of computer development is often referred to in reference to the different generations of computing devices. **The development of computers took place in five distinct phases known as computer generations.** This term is also used in the different advancements of new computer technology. With each new generation, the circuitry has gotten smaller and more advanced than the previous generation before it. As a result of the miniaturization, speed, power, and computer memory has proportionally increased. New discoveries are constantly being developed that affect the way we live, work and play.

Each generation of computers is characterized by major technological development that fundamentally changed the way computers operate, resulting in increasingly smaller, cheaper, more powerful and more efficient and reliable devices.

First Generations of Computers:

The first generation computers were developed during 1945 to 1956. First generation computers used vacuum tubes as the active electronic components and were therefore very large. These tubes consumed large quantities of electric power, generated a great deal of heat, and had short lives. The vacuum-tube diode was first developed by the English physicist Sir John Ambrose Fleming. And the triode was invented in 1906 by the American engineer Lee De Forest. They were restricted to scientific and engineering applications.

The examples of first generation computers were Universal Automatic Computer (UNIVAC), Electronic Numerical Integrator and Calculator (ENIAC), Electronic Delay Storage Automatic Computer (EDSAC) and Electronic Discrete Variable Automatic Computer (EDVAC).

Features:

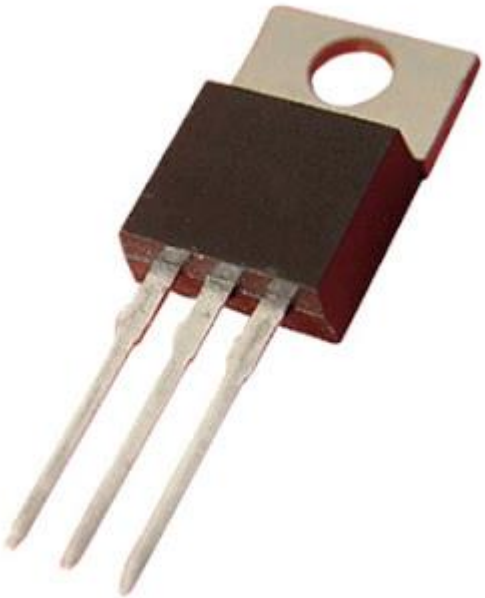
- These machines used electronic circuitry in the form of vacuum tubes.
- They were extremely large and occupied a very large space.
- They were very expensive, used a great deal of electricity and generated a lot of heat.
- The operating speed was measured in milliseconds.
- These computers had low levels of accuracy and reliability.
- Machine level language was used to program computers.

Second Generations of Computers:

The second generation computers were developed between 1956 to 1964. The invention of the transistor by three scientists of Bell Telephone Laboratories in 1947 greatly changed the development of computers. The three Bell Lab scientists, **John Burdeen**, **Walter Brattain**, and **William Shockley**, working for Bell Labs invented the transistor in 1947. The examples of the second-generation computers were IBM 1620, IBM 1401, Control Data and LEO Mark III.

Features:

- These computers used transistors.
- They were faster, smaller, cheaper and more energy efficient.
- They required less electricity and produced less heat than vacuum tubes.
- They were more reliable and accurate than the first-generation computers.
- The operating speed was measured in microseconds.
- Assembly language was used to program computers.

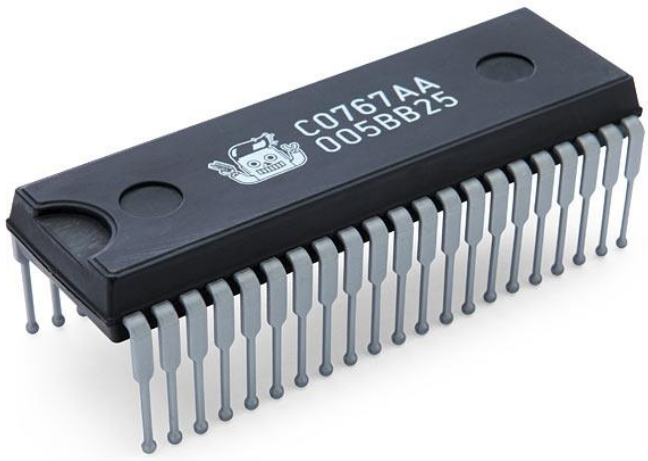


Third Generations of Computers:

The third-generation computers were developed during 1965 to 1971. The development of Integrated Circuit (IC) signalled the beginning of the third-generation computers. The first integrated circuit was developed in 1958 by Jack Kilby of Texas Instruments and Robert Noyce of Fairchild Semiconductor. The examples of third generation computers were IBM system/360, National Cash Register Century Series, ICL 1900 series, DATA GENERAL range and IBM 370 series.

Features:

- These computers used integrated circuits.
- These computers were smaller in size and more reliable than the previous generation of computers.
- Operating systems were developed.
    - The operating speed was measured in nanoseconds.
- Keyboards and monitors were introduced for input and output of data.
- Magnetic disks were used for secondary storage.



Fourth Generations of Computers:

The fourth-generation computers were developed during 1971 to 1990.These generation of computers are presently in use. The major technical advantage that characterizes the fourth generation is the tiny microprocessor. The first microprocessor called Intel 4004 was developed by American Intel Corporation in 1971. The examples of fourth-generation computers are IBM PC, Apple/Macintosh, IBM system/370 and SUPERBRAIN.

Features:

- These computers use LSI (Large Scale Integration) and VLSI (Very Large Scale Integration) technologies.
- The computers are highly reliable and accurate.
- They have a larger memory and high functional speed.
- Microcomputers are also introduced.
- The operating speed was measured in picoseconds.
- Magnetic disk is the common source of external storage.
- Application software for microcomputers has become popular.

Fifth Generations of Computers:

The fifth-generation computers were invented after 1991. This generation is marked by the evolution of computers that use newer, faster technologies to carry out a broader variety of tasks. The fifth generation computer project conducted jointly by several Japanese computer manufacturers under the sponsorship of the Japanese government emphasized artificial intelligence, focusing on such matters as machine reasoning and logic programming languages **(e.g. Prolog**).

Features:

- These computers will be using Ultra Large-Scale Integration (ULSI) technology.
- These computers will use super conductor technology. The two future devices are Gallium Arsenide (GaAs) chips and Biochips.
- The goal of fifth generation computers is to develop machines that will be able to think and take decisions.
- The operating speed was measured in femtoseconds.
- These computers will have parallel processing (use of more than one CPU), leading to very high processing speed.