**EVOLUTION OF COMPUTERS**

The generation of classified into five generations:

1. First Generation Computer (1940-1956)
2. Second Generation Computer (1956-1963)
3. Third Generation Computer(1964-1971)
4. Fourth Generation Computer(1971-Present)
5. Fifth Generation Computer(Present and Beyond)

**1. FIRST GENERATION COMPUTER: Vacuum Tubes (1940-1956)**

The first generation of computers is characterized by the use of “Vacuum tubes” It was developed in 1904 by the British engineer “John Ambrose Fleming”. A vacuum tube is an electronic device used to control the flow of electric current in a vacuum. It is used in CRT(Cathode Ray Tube) TV, Radio, etc.

**Examples** are ENIAC(Electronic Numerical Integrator and Computer),

EDVAC(Electronic Discrete Variable Automatic Computer),

UNIVAC-1(Univeral Automatic Computer-1)

**ADVANTAGES**

* These computers were designed by using vacuum tubes.
* These generations’ computers were simple architecture.

**DISADVANTAGES**

* The computer was very costly.
* Very large.
* It takes up a lot of space and electricity
* The speed of these computers was very slow

**2. SECOND GENERATION COMPUTER: Transistors (1956-1963)**

The second generation of computers is characterized by the use of “Transistors” and it was developed in 1947 by three American physicists “John Bardeen, Walter Brattain, and William Shockley”. A transistor is a semiconductor device used to amplify or switch electronic signals or open or close a circuit. It was invented in Bell labs, The transistors became the key ingredient of all digital circuits, including computers.The invention of transistors replaced the bulky electric tubes from the first generation of computers.Transistors perform the same functions as a Vacuum tube, except that electrons move through instead of through a vacuum. Transistors are made of semiconducting materials and they control the flow of electricity.

**Examples** are PDP-8(Programmed Data Processor-8),

IBM1400(International business machine 1400 series),

IBM 7090(International business machine 7090 series),

CDC 3600( Control Data Corporation 3600 series)

**ADVANTAGES:**

* It is smaller in size as compared to the first-generation computer
* It used less electricity
* Not heated as much as the first-generation computer.
* It has better speed

**DISADVANTAGES:**

* It is also costly and not versatile
* still, it is expensive for commercial purposes
* Cooling is still needed
* Punch cards were used for input

**3. THIRD GENERATION COMPUTER: Integrated Circuits (1964-1971)**

The Third generation of computers is characterized by the use of “Integrated Circuits” It was developed in 1958 by two American engineers “Robert Noyce” & “Jack Kilby”. The integrated circuit is a set of electronic circuits on small flat pieces of semiconductor that is normally known as silicon. The transistors were miniaturized and placed on silicon chips which are called semiconductors, which drastically increased the efficiency and speed of the computers. These ICs (integrated circuits) are popularly known as chips. A single IC has many transistors, resistors, and capacitors built on a single slice of silicon.This development made computers smaller in size, low cost, large memory, and processing. The speed of these computers is very high and it is efficient and reliable also.

**Examples** are NCR 395(National Cash Register),

IBM 360,370 series,

B6500.

**ADVANTAGES:**

* These computers are smaller in size as compared to previous generations
* It consumed less energy and was more reliable
* More Versatile
* It produced less heat as compared to previous generations

**DISADVANTAGES:**

* Still, a cooling system is needed.
* It is still very costly
* Sophisticated Technology is required to manufacture Integrated Circuits
* It is not easy to maintain the IC chips.

**4. FOURTH GENERATION OF COMPUTER: Microprocessor (1971-Present)**

The fourth generation of computers is characterized by the use of “Microprocessor”. It was invented in the 1970s and It was developed by four inventors named are “Marcian Hoff, Masatoshi Shima, Federico Faggin, and Stanley Mazor“. The first microprocessor named was the “Intel 4004” CPU, it was the first microprocessor that was invented. A microprocessor contains all the circuits required to perform arithmetic, logic, and control functions on a single chip. Because of microprocessors, fourth-generation includes more data processing capacity than equivalent-sized third-generation computers. Due to the development of microprocessors, it is possible to place the CPU(central processing unit) on a single chip. These computers are also known as microcomputers. The personal computer is a fourth-generation computer. It is the period when the evolution of computer networks takes place.

**Examples** are APPLE II, Alter 8800

**ADVANTAGES:**

* These computers are smaller in size and much more reliable as compared to other generations of computers.
* The heating issue on these computers is almost negligible
* No A/C or Air conditioner is required in a fourth-generation computer.
* In these computers, all types of higher languages can be used in this generation
* It is also used for the general purpose
* less expensive
* These computers are cheaper and portable

**DISADVANTAGES:**

* Fans are required to operate these kinds of computers
* It required the latest technology for the need to make microprocessors and complex software
* These computers were highly sophisticated
* It also required advanced technology to make the ICs(Integrated circuits)

**5. FIFTH GENERATION OF COMPUTERS (Present and beyond)**

These generations of computers were based on AI(Artificial Intelligence) technology. Artificial technology is the branch of computer science concerned with making computers behave like humans and allowing the computer to make its own decisions currently, no computers exhibit full artificial intelligence (that is, can simulate human behavior). In the fifth generation of computers, VLSI technology and ULSI (Ultra Large Scale Integration) technology are used and the speed of these computers is extremely high. This generation introduced machines with hundreds of processors that could all be working on different parts of a single program. The development of a more powerful computer is still in progress. It has been predicted that such a computer will be able to communicate in natural spoken languages with its user. In this generation, computers are also required to use a high level of languages like C language, c++, java, etc.

**Examples** are Desktop computers, laptops, notebooks, MacBooks, etc. These all are the computers which we are using.

**ADVANTAGES:**

* These computers are smaller in size and it is more compatible
* These computers are mighty cheaper
* It is obviously used for the general purpose
* Higher technology is used
* Development of true artificial intelligence
* Advancement in Parallel Processing and Superconductor Technology.

**DISADVANTAGES:**

* It tends to be sophisticated and complex tools
* It pushes the limit of transistor density.