



# 1

## EVOLUTION OF COMPUTERS



### CHAPTER

#### OBJECTIVES

- History and Generations of Computers.
- Characteristics of a Computer.
- Advantages and Disadvantages of a Computer.
- Wearable Gadgets.

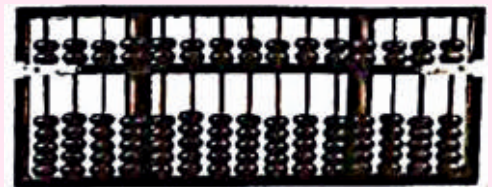
There has been a major evolution in the field of computers. Come let me tell you about the history and generations of computers that led to the development of modern day computers.

### HISTORY OF COMPUTERS

The computer is one of the greatest inventions of mankind. Computers are playing an important role in our everyday life. There were computers that used to occupy the whole room and nowadays there are computers that can be worn. Some of the early calculating devices such as Abacus, Napier's Bones, Pascaline Calculator and Difference Engine have played a crucial role in laying the foundation of present-day computers.

#### Quick Notes

The abacus was one of the earliest counting devices. An abacus is a device consisting of frames having rods with easily sliding beads on them. Calculations are done on an abacus by sliding the beads along the wires.



The development of present-day computers can be studied in reference to the different generations of computing devices. In each generation, technological improvements changed the way computers operated. The computers became


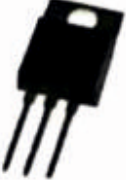





smaller, cheaper, more powerful and more efficient and reliable with each generation. Let us learn about the generations of computers that led to the development of the present-day computers

## GENERATIONS OF COMPUTERS


The following table lists down the key features of the five generations of computers.

Timeline	Technology	Examples of Computer	Features
<b>FIRST GENERATION</b>			
1940 - 1956	Vacuum tubes 	ENIAC, EDVAC, UNIVAC - 1. MARK - 1	<ul style="list-style-type: none"> <li>• They occupied a lot of space.</li> <li>• They were expensive to operate.</li> <li>• They used a lot of electricity and generated a large amount of heat.</li> <li>• The speed of these computers was very low.</li> </ul>
<b>SECOND GENERATION</b>			
1956 - 1963	Transistors 	UNIVAC III, IBM 1401 IBM 700 AND NCR 300 Series	<ul style="list-style-type: none"> <li>• They were smaller and faster compared to the first-generation computers.</li> <li>• They were cheaper to maintain compared to the first-generation computers.</li> </ul>
<b>THIRD GENERATION</b>			
1964 - 1971	Integrated Circuits (ICs) –An IC, also called a chip, could contain thousands of transistors. 	IBM 360, ICL 1900. UNIVAC 1108 and UNIVAC AC 9000	<ul style="list-style-type: none"> <li>• They were faster and efficient than second generation computers.</li> <li>• The users communicated with the computers using keyboards and monitors.</li> <li>• They used operating systems, allowing many different applications to run at one time.</li> </ul>






## FOURTH GENERATION

1972 - Present	<p>Microprocessors— Microprocessors were/are developed by combining together thousands of integrated circuits into a single silicon chip using <b>VLSI</b> (Very-Large- Scale Integration) and ULSI (Ultra-Large-Scale Integration) techniques.</p> <div style="text-align: center; margin-top: 20px;">  </div>	<p>Desktop computers, Apple Macintosh and IBM PC</p>	<ul style="list-style-type: none"> <li>• They are smaller, energy efficient and more reliable than the earlier generation of computers and storage capacity is very large.</li> <li>• They are extremely powerful and can process millions of instructions in a fraction of a second.</li> <li>• The present-day computers can be linked together to form computer networks. This laid the development of a worldwide network called the Internet.</li> </ul>
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## FIFTH GENERATION

Present And Beyond	<p>Artificial Intelligence— Artificial Intelligence is that branch of computer science that deals with making the computers think and take decisions like human beings.</p> <div style="text-align: center; margin-top: 20px;">  </div>	<p>Robotics</p>	<ul style="list-style-type: none"> <li>• These computers are still in the developmental stages.</li> <li>• The fifth generation computers will have the power of human intelligence and reasoning.</li> <li>• The advantage of these generation of computers will be that they will be able to understand natural language (spoken words) and will be able to respond to their surroundings using different types of sensors.</li> </ul>
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### Important Notes

Cleverbot is a web application that is based on the principles of artificial intelligence. It is programmed to have conversations with humans. The users chatting using this application will get a feel as if they are talking to their friend.



## PRACTICE AREA

**in** Match the following component/feature with the generation in which they were/are used.



Generation of Computer	Component Used
First	Transistors 
Second	Microprocessor 
Third	Artificial Intelligence 
Fourth	Vacuum tubes 
Fifth	Integrated Circuits 





Let us now learn about the advantages and disadvantages of a computer.

## ADVANTAGES OF A COMPUTER

A computer has certain advantages that makes it different from other machines. They are :

- ❖ **Speed** : A computer can perform large number of calculations in a fraction of a second.
- ❖ **High storage** : The present-day computer is capable of storing large amounts of data and programs for future use. This data can be retrieved as and when required.
- ❖ **Accuracy** : A computer always gives correct results. If the data given as input to the computer, is correct, it produces accurate results.
- ❖ **Diligence** : A computer does not get tired. It can keep working for long hours and can do the same work again and again with the same accuracy and speed.
- ❖ **Versatility** : The modern-day computer can perform a variety of different tasks. It is used at various other places such as homes, hospitals, banks, offices and schools for performing various jobs.
- ❖ **Faster communication** : Of late, this has become the most important advantage of computers. Using computers, we can exchange information through Internet, all over the globe.

## DISADVANTAGES OF A COMPUTER

However, a computer being an electronic machine also has some disadvantages. They are :

- ❖ **Zero IQ** : A computer does not have any IQ (Intelligence Quotient) of its own. It works only within the limits of what it has been instructed to do.
- ❖ **Lack of decision-making power** : A computer is not capable of taking any decision on its own. When an unexpected situation arises, it gives incorrect results or abandons the job altogether.





❖ **No heuristics** : Heuristics is the ability to learn from the past mistakes. The computers do not possess any such ability.

## WEARABLE GADGETS



Wearable gadgets is the latest buzz word in the field of technology. Most of the wearable gadgets available these days are wrist worn but there are others that can be hung around the neck or worn as a jewellery, Some of the most popular gadgets in this category are :



### Fitness trackers



Fitness trackers are bands or watches that keep a count of the number of steps you take each day and the calories you burn. Some may monitor parameters such as pulse rates and heart rates. Example : Fitbit.



Fitness Trackers



### Smart Watches.



A Smart Watch

The smart watches connect with the smart phones and keep you updated with notifications and messages. You can make calls, send messages, read news and listen to music. They may also include functions of fitness trackers. Example : Apple watch.



### Head Mounted Displays



A head mounted display also known as HMD is a display device, worn on the head or as part of a helmet, and has a small display area.



A head mounted display



HMDs are used in virtual reality gaming, aviation, military, medical and engineering areas. Example : Google glass.



### Terms to Know



❖ **Integrated Circuits (IC)** : It is a small electronic device with lots of components made from a special material called semiconductor.





- ❖ **Artificial Intelligence** : It is that branch of computer science that deals with making the computers think and take decisions like human beings.
- ❖ **Very-Large-Scale Integration (VLSI)** : It is a technique in which thousands of integrated circuits are combined together onto a single silicon chip to develop microprocessors.
- ❖ **Head Mounted Display (HMD)** : It is a display device, worn on the head or as part of a helmet, and has a small display area.

### Snapshot

- ◆ The development of present-day computers can be studied in reference to the five generations of computers.
- ◆ The first generation computers used vacuum tubes, second generation used transistors, third generation used Integrated Circuits, fourth generation uses microprocessors, and fifth generation is using Artificial Intelligence.
- ◆ Some of the characteristics of a computer are speed, accuracy, diligence, high storage, versatility, and faster communication.
- ◆ Wearable gadgets are computers that can be worn on hand, hung around the neck or worn as a piece of jewellery.
- ◆ Some of the popular wearable gadgets are fitness trackers, smart watches and head mounted displays.

## CHECK YOUR KNOWLEDGE



### A. Tick (✓) the correct option:

1. Name the component that was used in the second generation of computers.

a. Vacuum tubes

b. Integrated Circuits

c. Transistors

d. Microprocessor

2. Which of the following is a characteristic of the fifth generation of computers?

a. They will have the power of human intelligence and reasoning.

b. They will be able to understand natural language (spoken words)

c. They will be able to respond to their surroundings using different types of sensors.

d. All of these.





3. Which of the following fall under the category of wearable gadgets?
- a. Fitness trackers
  - b. Head mounted displays
  - c. Smart watches
  - d. All of these

**B. Fill in the blanks using the appropriate words given below :**

1. .... is an example of first generation of computer.
2. .... were used in fourth generation of computers.
3. .... is the branch of computer science that deals with making the computers think and take decisions like human beings.
4. Microprocessors were/are developed by combining together thousands of integrated circuits onto a single silicon chip using ..... technique.

**C. Tick (✓) the correct statement and cross (×) out the wrong one :**

1. A computer can perform a variety of different tasks.
2. Fourth generation of computers use microprocessors.
3. Wearable gadgets can only be worn on hand.
4. Integrated Circuits are made up of micro-processors.
5. UNIVAC is an example of fourth generation of computers.

**D. Answer the following questions.**

1. Differentiate between second generation of computers and fourth generation of computers.
2. What are the advantages of the fifth generation of computers?
3. What are wearable gadgets? Name any two wearable gadgets.
4. What are the limitations of computers?
5. Third generation computers brought a revolution in the field of computers. Justify the statement.



**Activity Time**

**A. Complete the following table :**

Generation	Technology	Features
Second		
		These computers will have the power of human intelligence and reasoning.
	Micro-processor	

**B. Find out the names of five more wearable gadgets and where they can be worn.**

