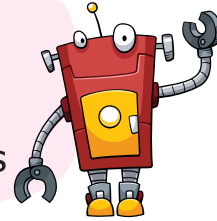




Evolution of Computers

Learning in this chapter

- History of Computer
- Early Calculating Devices
- Generations of Computers



History of Computers

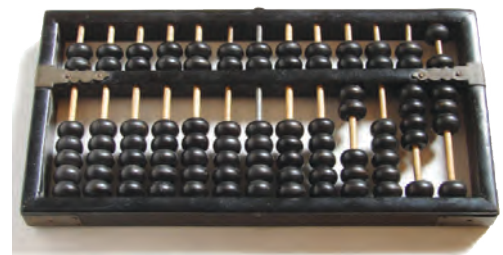
The history of computing is longer than the history of computing hardware and modern computing technology. The computer was formed long ago. The computer as we know it today had its beginning with a 19th century, not as our modern day computer, more old-fashioned one. Present day computer is a result of many improvements over a period of time.

Early Calculating Devices

Computer is a modern calculating device. It has evolved from calculating devices which people had developed in the past. Let us learn about some early calculating devices to understand the history and evolution of modern computers.

Abacus

Abacus was the first mechanical device for calculations. It is made up of wooden frame with rods each having beads. The frame is divided into two parts **Heaven** and **Earth**. Each rod in heaven has **2 beads** and the earth has **5 beads**. It was used to 'count', 'add' and 'subtract' by moving the beads up and down.



Abacus

Do you Know?

Abacus was developed in 3000 BC in China. It was also called a **counting frame**.

Pascaline

Pascaline is known as the first successful **mechanical calculator**. The principle of



Pascaline is used even today in watermeter, odometer, and speedometer.

Pascaline, also called **Arithmetic Machine**, was the first calculator or adding machine to be produced in any quantity and actually used. The Pascaline was designed and built by the French mathematician-philosopher **Blaise Pascal** between 1642-1644. Gears, wheels and dials were used in it..

Do you Know?

Blaise Pascal's system of wheels and dials is still used in cars' odometers to track a car's mileage.

Leibnitz's Calculator

In 1671, the German mathematician-philosopher **Gottfried Wilhelm Von Leibnitz** designed a calculating machine called the **Step Reckoner**. (It was first built in 1673). The Step Reckoner expanded on Pascal's ideas and did multiplication by repeated addition and shifting.



Leibnitz Calculator

Difference Engine and Analytical Engine

Charles Babbage, a mathematics professor, designed an automatic calculating machine in 1822. He called it **Difference Engine**. It uses punched cards to store information and do calculations upto 20 decimal places. This machine had five units – Input, Output, Store, Mill and Control. This is the basic concept of the modern computers.



Charles Babbage



Difference engine



Remember

- Analytical engine was the first mechanical computer.

In 1833, he thought of a mechanical construction which was known as **Mechanical Digital Computer**. Babbage called it as **Analytical Engine**. Charles Babbage is rightly called the '**Father of Computers**'.

Do you Know?

Augusta Ada worked with Babbage and created a program [using Binary Data (0 and 1) storage instead of decimal number system] for Analytical Engine. She is known as the **first computer programmer**.



Tabulating Machine

In 1889, an American named **Herman Hollerith** invented a counting machine called **Tabulating machine** to count the population of USA. To take the input it used punched cards. It was capable of reading data, processing it and giving the desired output.



Tabulating Machine

Do you Know?

Herman Hollerith was the founder of the world's largest computer company **IBM** (**International Business Machines**).



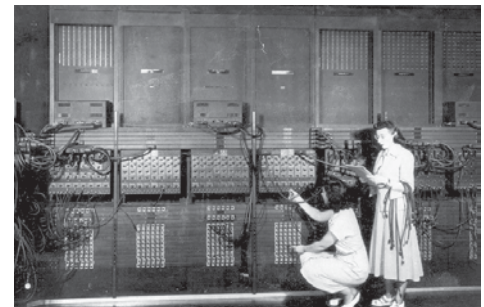
Mark - I

Mark - I

Howard Aiken was the primary engineer in **IBM**, who developed the first automatic sequence controlled calculator the **Mark - I**. It was made in 1944. It did not need any human intervention once started.

ENIAC

In 1942, **Electronic Numeric Integrator And Calculator** was built by **John Mauchly** and **J. Presper Eckert**. It was the first general purpose computer.



ENIAC

Do you Know?

ENIAC used Vacuum Tubes for its circuitry and magnetic drums for memory. Punched cards were used to input data, and the printer was the primary output device.



Generation of Computer

'Generation', in computer terminology means a change in technology a computer is using. The computers in the past were not just like computers today. In the starting computers were with less features. Day-by-day, the technology developed, new features were added and the computer became smaller and faster.

Computers can be divided into different generations. Let us learn more about the various computer generations.



Features	Generations				
	Ist 1951-59	IInd 1959-65	IIIrd 1965-71	IVth 1971-Present	Vth Future
Circuitry	Vacuum tubes	Transistors	Integrated circuits (IC)	LSI and VLSI	With artificial intelligence
Input	Punched cards	Punched cards, Magnetic tapes	Key boards	Mouse, Scanners, Sound etc.	
Storage	Magnetic tapes, very less	Magnetic tapes, Increased	Magnetic disks, Increased	Magnetic disks with higher capacity	Extremely big
Cost	Very high	Relatively less	Less	Less	Very less
Limitations	Emitted a lot of heat	Emitted some heat	None	None	None
Language	Machine language	Assembly language	High level language	High level language	High level language
Examples	ENIAC, EDUAC, UNIVAC, IBM 701	IBM 7090, IBM 7094, ATLAS	IBM 360, IBM 370	IBM P-4, HP 3000	Robots

Classification of Fourth Generation Computers

Microcomputers

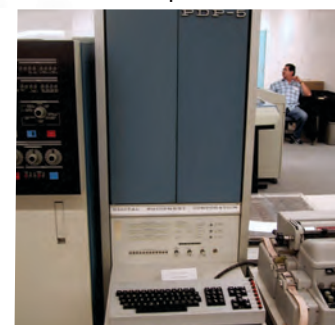
Microcomputers or personal computers (PCs) are meant to be used by a single person at a time. Desktop computers, Laptop computers, Palmtop computers and Tablets are different types of microcomputers.



Microcomputers

Minicomputers

Minicomputers are more powerful than microcomputers. They are multi-user systems and allow more than one user to work on them at a time. Web servers that are used for hosting websites are examples of modern minicomputers.



Minicomputers

Icon-X-5



Mainframe Computers

Mainframe computers are large and much more powerful than minicomputers. They too, are multi-user systems and allow hundreds of users to work on them at a time. IBM 704 and IBM ZSeries 800 are examples of mainframe computers.



Mainframe Computers

Supercomputers

Supercomputers are the biggest and the most powerful computers in the world today. They are used for doing very complex calculations and for controlling complex processes. **Cray 1, Deep Blue** and **Param 10000** are examples of supercomputers.



Supercomputers

Do you Know?

Many modern devices like digital televisions and cars have small computer chips embedded inside them. These are called the **embedded computers**.

Activity

Read the clues and name the computer :

1. Also known as personal computers or PCs
2. Most powerful computers in the world today
3. Use transistors in their circuits
4. Use vacuum tubes technology for their circuit



POINTS to Recall

- Computers started with a need to calculate.
- Abacus was the first calculating device used for calculations.
- Charles Babbage is considered as the father of computers. He was the first person to design a computer with memory to store results.
- Pascaline is known as first successful mechanical calculator.
- Analytical engine was the first mechanical computer.
- Augusta Ada was the first lady programmer.



- The technology used in first generation computers was Vacuum Tube, second generation used Transistor, third generation used Integrated Circuits.
- The technology used in fourth generation computer was large scale Integration (LSI) and Very Large Scale Integration (VLSI) and in fifth generation will be Artificial Intelligence.
- Fourth generation computers can be classified into four main types– Microcomputers, Minicomputers, Mainframe computers and Supercomputers.
- Fifth generation refers to the future breed of computers which will be based on Artificial Intelligence.



TERMS to Learn

- **Microcomputer** : A small computer with a microprocessor as its Central Processing Unit (CPU).
- **Minicomputer** : A computer of medium power, more powerful than a microcomputer but less powerful than a mainframe computer.
- **Mainframe computer** : A very powerful computer used by large organizations for their data processing needs.
- **Supercomputer** : Most powerful computers on the earth today. They are usually thousands of times faster than microcomputers.
- **Punched Cards** : A paper card having several holes punched into it represent data. They were used to store and input data/instructions into the computer.
- **Embedded computers** : Small computer chips fixed inside other modern devices like cars, refrigerators, washing machine, etc.



Multiple Choice Questions :

A. Tick (✓) the correct answer :

1. Heaven and Earth are the parts of :

- (a) Pascaline (b) Abacus (c) Jacquard Loom

2. Which of the following machine consist of gears, wheels and dials?

- (a) Difference engine (b) Pascaline (c) Mark 1

3. Herman Hollerith invented _____ .

- (a) Tabulating machine (b) Abacus (c) Mark 1



4. Technology used in third generation computers was :
 (a) Vacuum Tubes (b) Transistors (c) Integrated Circuits
5. ATLAS is the example of _____ generation computers.
 (a) First (b) Second (c) Third

B. Fill in the blanks with the help of given hints :

HINTS : ENIAC, Charles Babbage, Calculating, Microprocessors, Odometers

- The computer is basically a _____ device.
- Blaise Pascal's system of wheels and dials are still used in cars _____ .
- _____ is known as the 'Father of Computers'.
- The _____ was the first general purpose electronic computer.
- Modern computers use _____ .

C. Write (T) for True and (F) for False statements :

- In abacus heaven has 2 beads and earth has 5 beads.
- Mark 1 was invented to count the population of USA.
- ENIAC was the first general purpose computer.
- First generation computers was emitted a lots of heat.
- Storage capacity of Fifth generation computers will be very less.

D. Match the columns correctly :

- | | |
|---|-----------------------|
| 1. Pascaline | (a) Mark 1 |
| 2. Analytical Engine | (b) 1947, at Bill Lab |
| 3. The first programmer | (c) Intel 4004 |
| 4. First automatic sequence controlled calculator | (d) 1833 |
| 5. Transistors | (e) Lady Augusta |
| 6. First Microprocessor | (f) 1642 |

E. Name the inventors of the following :

- Napier Bones _____
- Jacquard Loom _____
- Pascaline _____
- Difference Engine _____
- International Business Machines (IBM) _____
- ENIAC _____



F. Write the full form of :

- 1. IBM : _____
- 2. ENIAC : _____
- 3. IC : _____
- 4. VLSI : _____
- 5. EDVAC : _____

G. Very short answer questions :

- 1. Which device is known as counting frame?

- 2. Name the founder of Mark I.

- 3. Name the technology used in IIInd generation computers.

- 4. Write an example of Super computers.

- 5. Who invented tabulating machine and for what purpose?

H. Short answer questions :

- 1. Who is the founder of IBM? What did he developed?

- 2. What are microcomputers?

- 3. Write any two differences between third and fourth generation computers.



Activity Time

A. Mention period and give 2 examples of each generation :

Generation	Period	Example
Ist	_____	_____
IIInd	_____	_____
IIIrd	_____	_____
IVth	_____	_____
Vth	_____	_____

B. Read the clues to solve the crossword :

				3 M			
	1 T			2 E			A C
						N	
4 P		S		5 A			N E
	N					C	
	I			C			
						P	
				S		U	
	O						
	R					E	
				6 M			K I

CLUES :

Across:

- 2. First successful general purpose computer.
- 4. Blaise Pascal invented this calculating device.
- 6. Computer invented by Howard Aiken.

Down:

- 1. Technology used in the 2nd generation computers.
- 3. A computer more powerful than micro-computers but less powerful than mainframe computers.
- 5. First calculating device made by man.



Lab Time

1. Find out the place where an Abacus is still used to teach.
2. Collect the pictures of scientist who invent the various computers.
3. Ask your parents to download pictures of different generation computers and their main circuit components like vacuum tubes, transistors, ICs, microprocessor, etc. Use the pictures and your own brief description to create a Power Point presentation about different generation of computers. Also paste the pictures of main circuits in the space given below.



Vaccum tube



Transistor



Integrated circuit



Mircoprocessor

4. Similarly create a presentation about different types of computers using pictures downloaded from the Internet.
5. Prepare a chart showing evolution of computers. Include one line description of the different calculating devices which preceded the birth of the computer along with their pictures.