1 Evolution of Computers

The word "computer" has been derived from the word "compute" which means to calculate. The initial objective for inventing the computer was to create such a device that could perform fast calculations. But now it is not limited to perform calculations only. In fact, 80% of the work performed by the computer today is non-mathematical.

EVOLUTION OF COMPUTERS

Today, you see a computer as a small but fast system. But in the earlier days, computers were very big in size, which generated so much heat that they needed to be kept in air-conditioned rooms. They were bulky and slow in processing. Various computing devices were developed in different periods in different places. Some of the early calculating devices have been discussed below.

ABACUS E I (a)

It was invented by the Chinese thousands of years ago. It was the first calculating device that could perform counting, addition, and subtraction. It consists of a wooden frame having rods with beads. The frame is divided into two parts: Heaven and Earth. Heaven has two beads in each rod and Earth has five beads

FACT FILE

Tim Cranmer invented the Cranmer abacus, which is commonly used by the blind. It has a piece of rubber behind the beads so that they do not move the beads accidentally.

DIFFERENCE ENGINE E I ⓑ

In 1822, Charles Babbage invented a machine called the Difference Engine. This was an automatic calculating machine that was used to prepare mathematical tables and carry out complex calculations.

ANALYTICAL ENGINE E I ⓒ

It was invented by Charles Babbage in 1833. It was the world's first general purpose computer that had five units- Input, Output, Store, Mill and Control. All the computers used nowadays are based on this machine. Input and Output units are used to enter data and display results respectively. Store is used to store the data. Mill is used to perform calculations and the Control Unit is used to control the overall working.
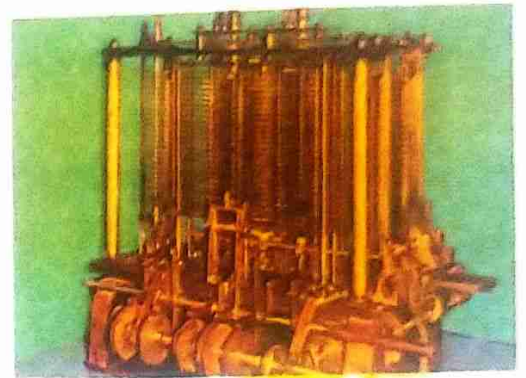
FACT FILE

Due to his path-breaking contribution to computing, Charles Babbage is known as the father of modern computers.

TABULATING MACHINE

It was invented by Herman Hollerith in 1888. Punched cards were used to input and store data and information. It could read the data, process it, and produce the output.

MARK I

MARK I was invented by Howard Aiken in 1941. It worked automatically and did not require work to be done by hand. It was capable of executing long calculations automatically.

FACT FILE

Augusta Ada Lovelace was the first the programmer who suggested binary data storage (0 and 1) instead of a decimal number system.

ENIAC (Electronic Numerical Integrator And Computer)

It was invented by Mauchly and Eckert in 1943. It was the first general purpose electronic digital computer. It consisted of 20000 vacuum

Fourth Generation (1972- Present day)		Keyboard, Mouse, Joystick, etc	Monitor, Printer, Speaker, etc.	Magnetic Disk with higher capacity.	C++, PHP, Python, etc.	IBM Systems 370 and hp 300
Fifth Generation (Present and Future)		Optical fiber technology to handle artificial intelligence, capacity to think & reason.	Voice Recognition systems, Speech Recognition Systems.	Speech or Action	Prolog, Mercury	Robotics

ADVANTAGES AND DISADVANTAGES OF GENERATIONS OF COMPUTERS

Generation	Advantages	Disadvantages
First Generation	1. Vacuum tubes made the advent of electronic digital computer possible. 2. Computers could perform calculations in milliseconds.	1. Vacuum tubes produced a lot of heat and burnt out frequently. 2. Systems needed to be kept in air-conditioned rooms. 3. Bulky in size and non-portable.
Second Generation	1. Generated less heat. 2. Computations were performed in microseconds.	1. Air-conditioning was required. 2. Frequent maintenance was required.
Third Generation	1. Smaller in size as compared to previous generations. 2. Produced less heat. 3. Calculations were performed in nanoseconds.	1. Air-conditioning was required. 2. Highly sophisticated technology was required to manufacture integrated circuit chips.
Fourth Generation	1. Smaller in size. 2. No air-conditioning is required. 3. Fast calculation and not expensive.	1. Highly sophisticated technology was required to manufacture integration chips.
Fifth Generation	1. Able to think and reason. 2. Machines with genuine I.Q.	1. Highly sophisticated technology was required.

Activity

Fill in the blanks:

1. The word computer has been derived from a word .... Computer.
2. The full form of UNIVAC is Universal ....
3. Tabulating Machine was invented in ....

Answer in one word:

1. Who was the first programmer?
   ....
2. Name the first digital computer.
   ....
3. Give one example of the fifth generation computer.
   ....

TYPES OF COMPUTERS

After the development of Personal Computer (PC), there has been no looking back. Many new features and properties are being included and many components are being changed to bring the best every time. Different computers even look different from each other. We can classify them into the following types:

MICRO COMPUTERS

❖ Micro computers are designed for personal use.

❖ They are also called Personal Computers.

❖ They are small and cost effective.

❖ They use a microprocessor, graphics processing unit, network chips and memory.

❖ They are used in homes, offices, schools, shops, etc.

❖ Example: Cell phone, Palm Computer, Tablet, Laptop, Desktop computer

Some Micro Computers have been explained below:

a) **Laptop Computers:** These computers are large in size. They can be placed on the lap. These are battery operated and portable. We can perform all the tasks as we do on a desktop. But laptops are more expensive than desktop computers. These computers are mainly used by business travelers. We can fold down the screen of the laptop

on the keyboard when not in use. Laptops usually come in a 13 to 15-inch screen.

b) **Desktop Computers:** Desktop Computers are kept on a desk or table and commonly found in schools, banks, offices, railways, airports, hospitals, etc. They come with an input unit (keyboard and mouse), output unit (monitor and printer), and processing unit (CPU).

c) **Tablet Computers:** These computers are smaller and lighter than laptop computers but bigger than smart phones. Instead of keyboard and mouse, tablets use touch sensitive screen for typing and navigation. Tablets have 7 inch, 8 inch or 10 inch screen. Tablets are suitable for reading e-books, watching movies, browsing net etc.

MINI COMPUTERS

* Mini Computers are larger and more powerful than Micro Computers.
* They provide higher processing speed.
* Quite expensive as compared to Micro Computers.
* They are capable of supporting 4 to 200 users at a time.
* They are commonly used in universities and big organizations.
* Example: DEC PDP and VAX series

> **FACT FILE**
>
> IBM developed its first mainframe computer, ASCC in 1994.

MAINFRAME COMPUTERS

* They are very powerful and expensive.
* They are capable of supporting more than hundreds of users at a time.
* They are commonly found in large business organizations, universities, scientific laboratories, etc.
* Example: IBM Z series.

SUPER COMPUTERS

* A Super Computer is the most efficient and fastest computer.
* It has multiple microprocessors in it to perform complex tasks.
* They are used in space, under sea, defense activities, satellite control, etc.
* Example: PARAM, CRAY-1, CRAY-2, Tianhe-2, Sunway Taihulight, etc

- The word "computer" has been derived from the word "compute" which means to calculate.
- Abacus was probably the first calculating device.
- Pascaline was invented by Blaise Pascal in 1642, which used gears, wheels and dials.
- Difference Engine and Analytical Engine were developed by Charles Babbage.
- ENIAC, EDVAC and UNIVAC are the first-generation computers.
- First Generation computers used vacuum tubes which produced a lot of heat and burnt out frequently.
- Third Generation Computers used Integrated chips. They were smaller in size as compared to previous generations.
- Micro computers are designed for personal use like Desktop, Laptop, etc.
- A Super computer is the most efficient and fastest computer. It has many microprocessors to perform complex tasks.

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Answer Time

A. Tick (✓) the right answer :

1. Which one of these was the first digital computer invented by the Chinese ?

   a. Pascaline ☐   b. Abacus ✓   c. Analytical Engine ☐

2. Who developed Difference Engine ?

   a. Charles Babbage ✓   b. John Napier ☐   c. Ada Lovelace ☐

3. Laptop is a type of ……………….. computer.

   a. Mini ✓   b. Super ☐   c. Micro ✓

4. Which one of the following computer generations used vacuum tubes which produced a lot of heat and burnt out frequently ?

   a. First Generation ✓   b. Second Generation ☐   c. Third Generation ☐

5. ……………………. computer fits in the hand and can be carried in the pocket.

   a. Desktop ☐   b. Palmtop ✓   c. Laptop ☐

B.   Fill in the blanks :

1.   ……………………. is also known as the "Father of Computer". (Charles Babbage/ Herman Hollerith)

2.   Leibniz Calculator was developed by Gottfried Von Leibniz in …………………… (1673/ 1667)

3.   …………………… computer is the most efficient and fastest computer. (Mini/ Super)

4.   …………………… generation computers use Artificial Intelligence. (Fourth/ Fifth)

5.   ENIAC and EDVAC are considered to be the ……………….. generation computers. (First/ Second)

C.   Write 'T' for True and 'F' for False statements :

1.   Abacus is still used in many countries.   `T`

2.   Leibniz Calculator can be used to compute only addition.   `F`

3.   Mainframe computers are large and bulky in size.   `T`

4.   Mark I was invented by Howard Aiken in 1951.   `F`

5.   Third Generation computers used integrated circuit chips.   `T`

D.   Match the following figures with correct computer :

1.   a)   UNIVAC

2.   b)   Abacus

3.   c)   Napier's Bones

4.   d)   Pascaline

5.   e)   Tabulating Machine

E. **Answer the following questions:**

1. Explain the following machines:

    a) Abacus:

    b) Difference Engine:

    c) Analytical Engine:

2. Give the advantages and disadvantages of fourth generation of computers.

3. What do you mean by Micro Computer? Give some examples.

4. What is the difference between Mini Computers and Mainframe Computers?

5. Explain Super Computers with example.

Activity Time