

HISTORY AND EVOLUTION OF COMPUTERS

Long before machines existed people counted on their fingers or arranged stones in piles and rows. They made scratches on ground or cut notches in sticks or tied knots in strings in order to track on quantity of things.

As their needs to calculate increased, they thought of tools to help them. The oldest known mechanical aid for calculations is the **ABACUS**.

Abacus is a portable device that consists of beads, strung on wires or wooden rods. - No one is sure when the first abacus appeared. Historians agree that the abacus is between **2000** and **5000** years old and that it had its origins in ancient **China, Egypt** and **Greece**.

Early Calculating Machines

In **1614**, **logarithm** as an aid for calculations was invented by a Scottish mathematician known as **John Napier**. He subsequently invented the **Rod of Bones** in **1617**. Napier also made common the use of the decimal point in arithmetic and mathematics.

In **1620**, **William Oughtred**, an English mathematician invented the **Slide Rule**. Slide rule is a mechanical Analog computer used in multiplications and divisions. The slide rule was developed based on emerging work of logarithm by John Napier.

In **1623**, the idea of using **binary numbers** to represent characters what was described as **binary codes** was invented by **Francis Bacon**.

In **1642**, a French mathematician called **Blaise Pascal** invented the first calculating machine called **Pascaline**. Pascal's invention consisted of interlocking wheels and gears. Pascaline could only add and subtract.

In **1671-1694**, a German mathematician named Gottfried Leibnitz invented a mathematical calculator called Stepped Reckoner. Leibnitz's machine used cylinders and it could add, subtract, multiply, divide and find out square roots of numbers. **Start of Computer age**.

The next important stage in evolution of computer started in nineteenth century. One of the creative thinkers was British mathematician **CHARLES BABBAGE**.

Babbage designed the first programmable computer in **1830's** and called it **Analytical Engine**. According to his design, Analytical Engine could have been able to receive instructions, performs calculations and produce printed output.

Unfortunately, Analytical Engine never worked because of the technological problems of that time. Because of his work, **Charles Babbage** is considered by many to be the **father of modern computers**.

LADY ADA AGUSTA LOVELANCE

Ada advised Babbage to use binary numbers instead of decimal system. She also thought of programming a machine so that it could repeat the same set of instructions if certain conditions existed. This technique is still used today.

Because of her contribution, she is considered by many to be the **first computer programmer**.

Mechanical Tabulator

Herman Hollerith (February 29, 1860 – November 17, 1929) was an American statistician who developed a mechanical tabulator based on punched cards to rapidly tabulate statistics from millions of pieces of data. He was the founder of one of the companies that later merged and became IBM.

NOTE:

- ✎ No person is considered to have invented the computer.
- ✎ Computers evolved gradually over the period of years!!!

The First True Computers

It was during the first half of the twentieth century that the first true computers appeared. These machines were more than mechanical calculators that solved simple arithmetic.

These were electronic machines capable of solving complex problems. The computers that evolved in the mid of twentieth century had two key features that the early calculating devices did not:

- i. They could be programmed to carryout sequence of instructions or perform several kinds of tasks.
- ii. They could store information in memory.

COMPUTER GENERATIONS

Computer Generations describe the various stages that took place in developing computer technology and each stage being more advanced than the previous ones.

First Generation of Computers (1946 – 1956)

Characteristics

- They relied on **Vacuum Tubes**, the technology used to process information.
- They used **magnetic drum** memories.
- They used **punched cards** for input and output data.

- Programming was done in **machine code** language.
- The output was displayed on printouts.

Short backs of first generation Include:

- ☞ They had limited primary memory.
- ☞ They consumed great deal of power
- ☞ They were short lived and needed a standby technician.
- ☞ They had very large physical devices (about 30 tones) occupying a very large space.

Examples of 1st Generation of Computers include:

- ENIAC – Electronic Numerical Integration and Computers.
- EDVAC – Electronic Discrete Variable Automatic Computer.
- UNIVAC – Universal Automatic Computer.

2nd Computer Generation (1957 -1963)

Characteristics

- They relied on **Transistor** Technology
- They used **magnetic core** memories.
- Programming was done in symbols named as **assembly languages**
- The introduction of high level programming languages e.g. FORTRAN & COBOL.
- Transistors were much more reliable and faster than the vacuum tubes
- They generated less heat and consumed less power compared to first generation of computers.

☞ Research about examples of 2nd generation computers.

3rd Computer Generation (1964 – 1976)

Characteristics

- They used **Integrated Circuits (IC)** which are made by combining several transistors.
- Magnetic disk was developed for storage purposes.
- The introduction of first microcomputers.
- The introduction of operating system e.g. *Multics*.
- The introduction of simple programming languages e.g. *BASIC*.

4th Generation of Computers (1977 – 1989)

- They used **Large Scale Integrated Circuits (LSIC)** and very large scale integration (VLI)
- Memories used include magnetic disk, bubble memories, and optical disks.
- Introduction of **Limited Artificial Intelligence** and **Expert Systems**.
- Development of microprocessors.
- The introduction of wide variety of software.

- Computers became common and widespread.
- Computers became more powerful and cheap.

☞ Look for examples of 4th Generation computers