

TOPIC: HISTORICAL DEVELOPMENT OF COMPUTERS

- Content:**
- i. History Of Computer: Early Counting Methods – Fingers, Stones, Pebbles, Grains Etc
 - ii. Mechanical counting and calculating devices: Abacus, Slide rule etc.

Sub-Topic 1: Early Counting Methods

The history and development of computer can be traced back to the studies of Mathematics which started with counting. The history of Mathematics is the history of civilization. Early man counted by means of matching one set of object with another set i.e. stones and sheep, the use of finger and toes, pebbles and grain etc. The problems posted by these early counting and data processing method were enormous. The major problem with these devices was that they could not be used for counting large numbers efficiently.

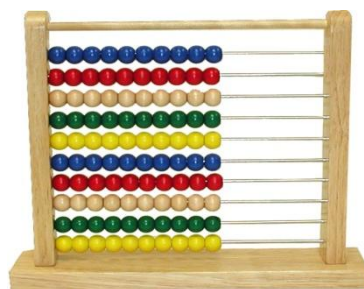
These has led to various computing inventions in search for a tool that could enable man meet his computational and data processing needs until we have the computer today.

Stone Age: This was a period when stone was used for making different kinds of tools. For example, clay was used for pottery while basalt and sandstone was used for making grinding stones.

Sub-Topic 2: Early Mechanical counting and calculating devices

THE ABACUS

The Abacus was made up of beads threaded on iron rods. The iron rods were fixed on a rectangular wooden frame. The Abacus was used for addition and subtraction. It could not carry out complex mathematics. The Abacus was early used for arithmetic tasks. The Abacus was developed in China about 5000 years ago. The Abacus was successful that its use spread from china to many other countries.



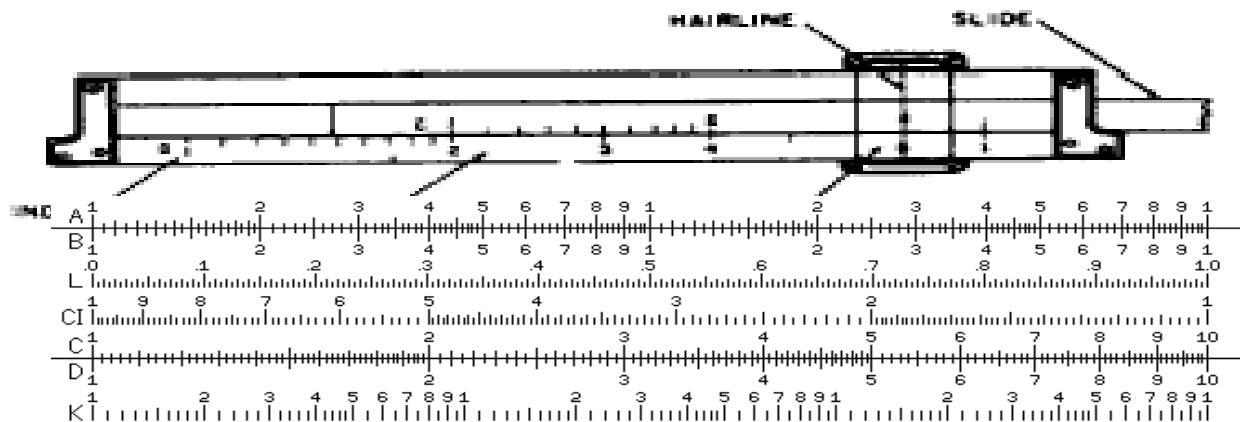
ABACUS

SLIDE RULE

The slide rule also known as a slip-stick is a mechanical analogue computer. The slide rule is used primarily for multiplication, division, and also functions such as roots, algorithms and trigonometry, but is not normally used for addition or subtraction.

Slide rules come in diverse range of styles and generally appear in a straight or circular form with a standardized set of markings (scales) essential to performing mathematical computations.

William Oughtred and others developed the slide rule in the 1600s based on the emerging work on logarithms by John Napier. The use of slide rule continued to grow through the 1950s and 1960s even as digital computing devices were being gradually introduced.



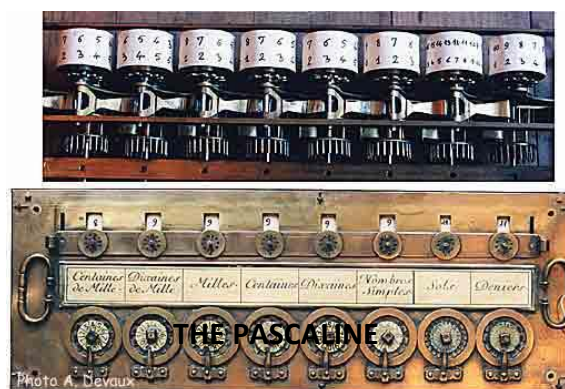
NAPIER'S LOGARITHM

John Napier discovered that multiplication and division of numbers could be performed by addition and subtraction respectively, of logarithm of those numbers. While producing the first logarithmic tables, Napier needed to perform many multiplications, and it was at this point that he designed Napier's bones, an abacus-like device used for multiplication and division.

BLAISE PASCAL'S CALCULATING MACHINE

Blaise Pascal was a French man who developed the first true adding machine in 1642. He was a mathematical as well as a philosopher. In 1642, he began working on calculating machines and after 3 years invented the mechanical calculator. He built 20 of these machines (called the Pascaline) in the following 10 years.

Blaise Pascal was born in France in 1623 and died in Paris in 1662. His machine was based on Abacus principle.



EVALUATION

1. List two types of computing instruments known to you.
2. The slide rule was invented by _____

READING ASSIGNMENT

Read on Electro-mechanical counting devices, 'A hand book on computer studies Chapter 6, Pages 41-42

THEORY

1. What was the major problem of the Abacus?
2. Describe any two of the following: (i) Abacus (ii) Logarithm (iii) The Pascaline

WEEK 8

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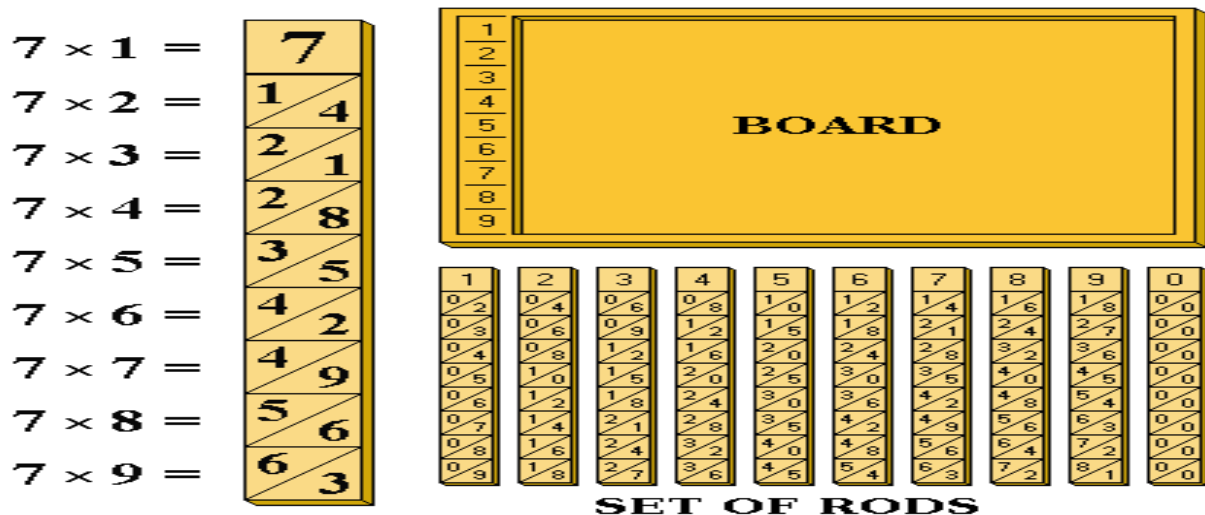
Content: i. Electro-mechanical counting devices: John Napier bone, Gottfried Leibniz machine, Herman Hollerith, Joseph Jacquard loom, Charles Babbage etc.

Sub-topic 1: Electro-mechanical counting devices: John Napier bone, Gottfried Leibniz machine, Herman Hollerith.

Gottfried W. Von Leibnitz carried out further development on the work of Blaise Pascal so that multiplication and division could be carried out directly. He invented a machine called "THE STEPPED RECKONER" in 1694. The machine is a mechanical calculator which can do multiplication, division and calculate square roots.

JOHN NAPIER BONE

While producing the first logarithmic tables, Napier needed to perform many multiplications, and it was at this point that he designed Napier's bones, an abacus-like device used for multiplication and division.



Napier's bone

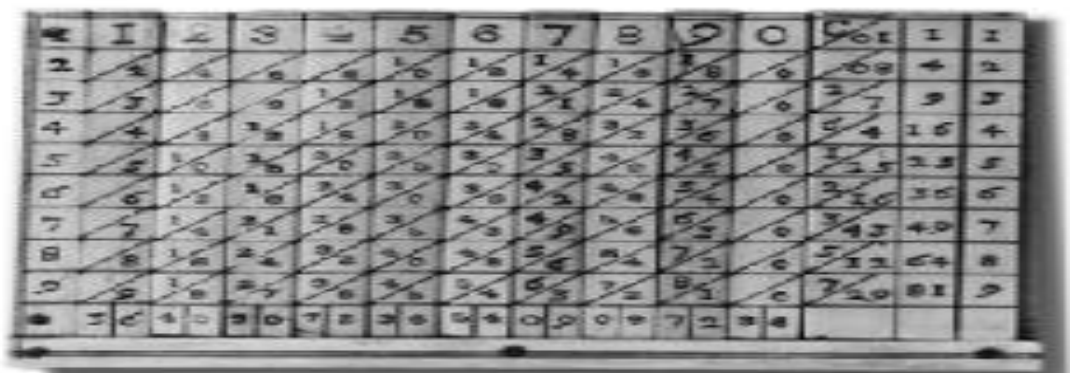
Herman Hollerith

Hollerith was born at Buffalo, New York in 1860 and died in Washington in 1929. He developed the "PUNCHED CARD" in 1890. He used punched cards and a tabulating machine to collate the 1890 census in the United States of America. This was the first basic input medium. He joins his company with two other companies to form the Computing Tabulating and Recording Company, which in 1924 is known as International Business Machine (IBM) Corporation.

Sub-Topic 2: Electro-mechanical counting devices: Joseph Jacquard loom, Charles Babbage, Lady Augusta Ada Lovelace etc.

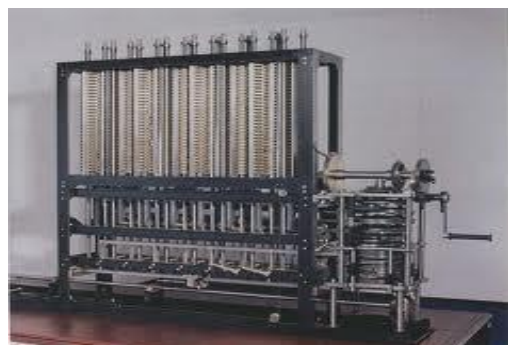
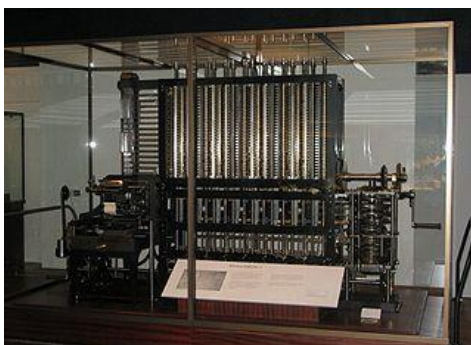
JOSEPH JACQUARD LOOM

Jacquard Loom is a mechanical loom invented by Joseph Marie Jacquard in 1801. The loom simplifies the process of manufacturing textiles with complex patterns such as brocade and damask. The loom is controlled by paste board cards with punched holes, each row of which corresponds to one row of the design. Multiple rows of holes are punched on each card and the many cards that compose the design of the textile are strung together in order. The Jacquard loom was the first machine to use punch cards to control a sequence of operations.



CHARLES BABBAGE ANALYTICAL MACHINE

He was the first person to design a computer that is different from a calculator. In 1822, he developed 'difference engine' that could perform intricate calculations correctly and rapidly on the principle that anticipated the modern electronic computer. In 1837, the 'analytical engine' was developed and it could be programmed. That means it can receive instructions and solve problems given to it. Charles Babbage is referred to as the father of modern day computers because all his ideas are contained in modern computers.



LADY AUGUSTA ADA LOVELACE

Ada Lovelace was an English Mathematician and a friend to Charles Babbage. She documented the work of Babbage in her 'observation' on Mr. Babbage's Analytical Engine, her contributions to Babbage's work was by convincing him to use binary system in his analytic engine which Babbage never completed by Lovelace. She was a forerunner of modern computer program. And historians have credited her as the first lady programmer.

Evaluation

1. Explain two points on each of the following
 - i. Jacquard Loom
 - ii. Charles Babbage
 - iii. Ada Lovelace

READING ASSIGNMENT

Read on Electronic counting devices, 'A hand book on computer studies Chapter 6, Pages 43-46

WEEK 9

DATE.....

TOPIC: HISTORICAL DEVELOPMENT OF COMPUTERS

Content:

- i. Electronic counting devices and modern computer: William Bill Gate, Philip Emeagwali, John Von Neuman etc
- ii. Generation of Computers – First, second, third, fourth and fifth generations.

Sub-Topic: Electronic counting devices and modern computer: William Bill Gate, Philip Emeagwali, John Von Neuman

William Bill Gate

Bill H.W. Gates is the founder and the chairman of Microsoft Corporation. Microsoft is a software services and solution industry and the fastest growing company in the PC industry. Bill Gate is the richest businessman in the world today.

He was born on October 28, 1955 to the family of William H. Gates II (father), who was a seattle attorney and his late mother Mary Gates was a schoolteacher. He grew in seattle with his sisters.

He entered Harvard University as a freshman in 1973 and was dropped out of Harvard to create what eventually becomes Microsoft. While at Harvard, Gate developed a version of programming language BASIC for the first microcomputer. His foresight and vision for

personal computing has been the central to the success of Microsoft and the software industry. He was guided by a belief that the computer would be valuable tool on every desktop and in every home; he therefore began to develop software for personal computers.

Philip Emeagwali

He is a Nigerian, a pride of Africa and the Black race was born on August 23, 1954 in Akure and now base in US. In April 1967, he was displaced from school due to the civil war which claimed the lives over 50,000 Igbo indigenes.

Philip was determined and by 1973, he earned his first diploma from the University of London through self study and subsequently got a scholarship to Oregon State University. This marked the beginning of his fine career. Philip Emeagwali has received more than 100 prizes, awards and honours.

He applied the power of networked computers to the analysis of oil field services. In the 1980's, he worked on advanced formulas in networked computers. This achievement led him to win the Gordon Bell Super Computing prize in 1989. Apart from this, he has won several awards including a 1998 Distinguished Scientist Award from the World Bank.

Sub-Topic 2: Generation of Computers – First, second, third, fourth and fifth generations.

GENERATIONS OF COMPUTER:

Generation of computers are the developmental stages that the computer has gone through. There are 5 generations of computers and their accompanying innovations.

1ST GENERATION

First generation computers were those manufactured between 1946 and 1960. The computers used the stored program concept. First generation computers were associated with the vacuum tubes or valves technology.

CHARACTERISTICS:

- They were very bulky and heavy.
- They measured between 50 – 100ft long and about 80ft high.
- The computers weighed up to 200 tons and occupied 3000 cubic ft.
- They used vacuum tubes to store and process data.
- Examples of first generation computers are ENIAC, EDSAC, and UNIVAC.

PROBLEMS OF FIRST GENERATION COMPUTERS

1. The vacuum tubes also generated a lot of heat. Therefore they needed a cooling system.

2ND GENERATION TRANSISTOR

Second generation computers were developed between 1960 and 1964. The computers used transistors. The transistor was invented by William Shockley in 1948. Magnetic tapes were used for storage.

CHARACTERISTICS:

1. They were smaller in size than first generation computers.
2. They occupied smaller space than the first generation computers.
3. Second generation computers used less electricity and generated less heat.
4. The transistors could do all that the vacuum tubes did.
5. The computers were faster and lighter in weight than first generation computers.

Examples of second generation computers are NCR, 315, IBM, 7030.

3RD GENERATION INTEGRATED CIRCUIT

Third generation computers were manufactured between 1964 and 1970.

During this period, the integrated circuit was invented.

They were first used in space ships and electronic military equipment.

CHARACTERISTICS:

1. The computers used integrated circuits.
2. They were faster than second generation computers.
3. They were smaller in size and also more powerful.
4. The computers had fast memory access.

4TH GENERATION VERY LARGE INTEGRATED CIRCUIT

The computers were manufactured between 1974 and 1984. One of the most important results of large-scale integration was the introduction of the microprocessor in the fourth generation by an American company – Intel Corporation. A microprocessor is a central processing unit fabricated on a chip. This generation of computers had optical readers and graphic display terminals. The use of floppy diskette as a storage facility was introduced in this generation.

CHARACTERISTICS:

1. The computers were smaller in size.
2. They were very powerful computers.
3. They had high processing speed.
4. They had high storage capacity.

Examples are Intel 4004, Intel 8085, Pentium 1, 2, 3, etc

5TH GENERATION ARTIFICIAL INTELLIGENCE

From the 1990s, the fifth generation computers entered into the computer world through the application of fibre optics technology. This generation of computers evolved as a result of the need for computers to take decisions in various circumstances. This generation is witnessing the influx of super microcomputers through artificial intelligence whose main attraction over previous computers is speed and power. Expert systems have the capacity of making decisions and judgements.

These are computers that will be able to mimic many things that so far can only be done by human beings. For example, fifth generation computers will be able to accept spoken word instruction (voice recognition) and assist doctors in carrying out diagnosis.

THEORY

1. What do we mean by 'generation of computers'?
2. Compare and contrast the characteristics of the 3rd and 4th generation computers.