History of the computer

Arithmetical aids

Abacus (5000 BC)

One of the earliest apparatus that was used for calculations was the abacus. The apparatus is still used today in certain countries by retailers. It is a frame with vertical strings on which beads are manoeuvred. The colour and each position of the bead represents an amount. The abacus was apparently used from 5000 BC as a calculation aid.

Paper on logarithms (1614)

John Napier of Scotland published a paper on the development of logarithms. It is a series of figures used for automating the calculation of more complex calculations, and reduces division to addition and subtraction.

Logarithm tables (1617)

Henry Briggs published logarithm tables for the numbers 1 to 100 000. The tables are used by land surveyors and navigators.

Napier's rods

Napier developed a set of rods with numbers to calculate division and multiplication, and also squares and square roots.

Mechanical Calculating machines

Calculating clock (1623)

Wilhelm Shickard, a Dutch professor, planned and developed a mechanical adder to assist the mathematician and astronomer Johannes Kepler with calculations. The machine was possibly developed according to the rods of Napier, considering that Shickard was familiar with Napier's work and often discussed it with Kepler. During the 1930's war his house was burnt down and the half completed apparatus was destroyed. Eventually in 1960 after letters and diagrams were found between Kepler's documents, a working model of the calculating clock was built.

Pascaline (1642)

Blaise Pascal developed a mathematical adding machine (Pascaline) which worked on a system of gears (crown wheels). Pascal had to help his father - a tax inspector - with endless calculations and he therefore developed a machine to do these calculations. It could add 5 figure numbers but could not do any other calculations. It was very expensive to manufacture and jammed easily. People were sceptical about the use of a machine which could perform calculations, as they believed that the machine would calculate incorrectly. Not more than 10-15 machines were sold.

Stepped Reckoner (1674)

Gottfried Wilhelm Von Leibniz of Germany developed the Stepped Reckoner. The machine could add, subtract and multiply. The principles, according to which it worked, led the way to the development of the first successful mechanical calculator. The principles of the moving of the teeth on the gears which was used in the machine was used in calculators until the 20th century and is still used today in counters such as kWh (electricity) meters and speedometers.

The following machine which could divide, calculate square roots and the square of numbers was planned but never built due to technology not being advanced enough to manufacture the components.

Already in 1666, as a 15 year old, Leibniz wrote "On the Art of Combination" in which he proposed a system by which all reasoning was related to an ordered combination of elements which could be reduced to figures, sound and colours. The dissertation was one of the forerunners of modern logic whereupon the internal working of computers was based. Leibnitz was one of the first mathematicians who studied the binary system. He had an idea of constructing a binary adder, but it was never completed.

Automated weaving machine (1804)

Joseph-Marie Jacquard built a fully automated weaving machine which could handle complicated designs. The weaving machine was programmed with punched cards. Although the weaving machine was not a calculator, it was the first apparatus which could replace input by a human operator. Jacquard had to flee from Lyons due to angry workers who felt that their work was in jeopardy due to his invention.

Difference Engine

Charles Babbage designed the first adding machine where the user did not need to understand the mathematics behind the working of the actual machine. It was called the 'Difference Engine'. In 1834 to 1855 a Difference Engine was built by a Swiss engineer based on Babbage's ideas. The machine calculated Mathematical tables and engraved copper plates. It was used in 1858 in the Dudley Observatory in Albany, New York to calculate the orbits of Mars. In England it was used to calculate tables which were used by Insurance companies.

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