I would like to start my presentation with a brief biography of Charles Babbage.

He was born on 26 December 1791, probably in London, the son of a banker. The father of Charles was a rich man, so it was possible for Charles to receive elementary education from several elite schools and teachers. But Charles Babbage was often unwell as a child and was educated mainly at home.

By the time he went to Cambridge University he was very interested in mathematics. He had a big culture - he knew Lagrange, Leibniz, Lacroix, Simpson... and he was seriously disappointed about the math programs available at Cambridge. So he, with J.Herschel, G.Peacock, and other friends, decided to form the Analytical Society, whose object was to introduce developments from the European continent into English [mathematics](https://www.britannica.com/science/mathematics).

Then, after graduation, Charles Babbage married Georgiana Whitmore. They had 8 children, but only 3 of them became adults.

Let’s now talk about Babbage's inventions. In Babbage's times there was a really high error rate in the calculation of math tables. And that’s why Babbage planned to find a new method that could be used to make the calculation mechanically, removing the human error factor.

Babbage presented something that he called "difference engine" to the Royal Astronomical Society in 1822. The difference engine was able to calculate polynomials by using a differences method. The Society approved the idea, and the government granted him to construct it.

The scale of the work was truly incredible. Babbage and a handful of assistants created 500 large design drawings, 1000 sheets of mechanical notation, and 7000 sheets of scribbles.

However technology level of that time and deaths of his farther, wife and one of his sons in 1827, did not give Babbage the opportunity to make his idea come true. As a result, the government stopped financing the creation of the difference engine.

Then Babbage began to think about an improved calculating engine. Between 1833 and 1842 he tried to build a machine that would be programmable to do any kind of calculation, not just ones relating to polynomial equations. The first breakthrough came when he redirected the machine's output to the input for further equations. He described this as the machine "eating it’s own tail”.

The mature analytical engine used punched cards to specify input and the calculations to perform. The engine consisted of two parts: the mill and the store. The mill, analogous to a modern computer's CPU, executed the operations on values retrieved from the store, which we would consider memory. It was the world's first general-purpose computer.

But Babbage constructed only small test parts for his new engine and was never able to assemble the engine completely, due to repeated failures to obtain funding.

[Charles Babbage](https://en.wikipedia.org/wiki/Charles_Babbage) first met Ada Lovelace in June 1833, through their mutual friend Mary Somerville, who translated the mathematician and astronomer Pierre-Simon Laplace work “[Celestial Mechanics](https://en.wikipedia.org/wiki/Celestial_Mechanics)” from French and was a teacher and the role model for Ada.

Let’s see some facts from Lovelace’s biography. Augusta Ada Byron, Countess of Lovelace—better known as "Ada Lovelace"—was born in London on December 10, 1815.

Lovelace was the only legitimate daughter of Lord Byron, the famed poet. Anna Isabella Byron’s husband gave her the nickname “Queen of the Parallelograms” because of her passion for mathematics. Byron abandoned his wife and new-born daughter when she was only one month old.

Ada Lovelace was educated by a succession of governesses, in a rigorous system created and closely supervised by her mother, Lady Byron. Ada was very interested in mathematics and science and was fascinated by all things mechanical as well. Her educational and social exploits brought her into contact with many scientists (like for example Michael Faraday) and with the author [Charles Dickens](https://en.wikipedia.org/wiki/Charles_Dickens).

When she was as a 17-year-old , during her first ‘season’ in society, she formed part of a group to which Babbage demonstrated a prototype of the difference engine. This seemed to spark a friendship between them that lasted until her death in 1852, at age 36.

In 1840, Babbage was invited to give a seminar at the [University of Turin](https://en.wikipedia.org/wiki/University_of_Turin) about his Analytical Engine. [Luigi Menabrea](https://en.wikipedia.org/wiki/Luigi_Menabrea), a young Italian engineer, transcribed Babbage's lecture into [French](https://en.wikipedia.org/wiki/French_language). Ada translated Menabrea’s paper into English and added extensive notes, more than tripling its length. Ada Lovelace spent the better part of a year doing this, assisted with input from Babbage.

Ada Lovelace's notes were labelled alphabetically from A to G. In note G, she describes an [algorithm](https://en.wikipedia.org/wiki/Algorithm) for the Analytical Engine to compute [Bernoulli numbers](https://en.wikipedia.org/wiki/Bernoulli_number). It is considered to be the first published algorithm ever specifically tailored for implementation on a computer, and Ada Lovelace has often been cited as the first computer programmer for this reason.

In her notes, she predicted that, just like a Jacquard loom can weave flowers and leaves, the analytical machine is able to create algebraic formulas, and in the future - to write music, draw pictures - and tell “science the ways we did not even dream”.

Though Lovelace is referred to as the first computer programmer, some biographers, computer scientists and historians of computing claim otherwise.

[Doron Swade](https://en.wikipedia.org/wiki/Doron_Swade), a specialist on [history of computing](https://en.wikipedia.org/wiki/History_of_computing) known for his work on Babbage, analyzed four claims about Lovelace:

1. She was a mathematical genius
2. She made an influential contribution to the analytical engine
3. She was the first computer programmer
4. She was a prophet of the computer age

According to him, only the fourth claim had "any substance at all". He explained that Ada was only a "promising beginner" instead of genius in mathematics, and that she only published the first computer program instead of actually writing it. But he agrees that Ada was the only person to see the potential of the analytical engine.

Babbage died at home in London on October 18, 1871. His son Henry continued Babbage's work, but like his father, Henry was unable to build a completely functioning machine.

Only 73 years after Charles Babbage's death , the Mark-I was built, which was called "Babbage's dream come true." Mark-I was a general purpose [electromechanical](https://en.wikipedia.org/wiki/Electromechanical) [computer](https://en.wikipedia.org/wiki/Computer) that was used in the war effort. The resulting machine "brought Babbage’s principles of the Analytical Engine almost to full realization, while adding important new features."The performance of the MARK-I was only ten times higher than the calculated speed of the Analytical Engine.

Finally, I’d like to say, that Charles Babbage is considered a significant figure in 19th century. And he was one of the most influential figures in the development of technology.