

# History of Computers

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Number of words	1050
Computer science content	Low
Math content	Low
English language complexity	Low

## Learning objectives

- to acquire basic knowledge about computer history

## Sub-areas covered

- Computer history

## Keywords

- **punched card** - a card on which data can be recorded in the form of punched holes
- **binary code** - code using a string of 8 binary digits to represent characters

## Summary

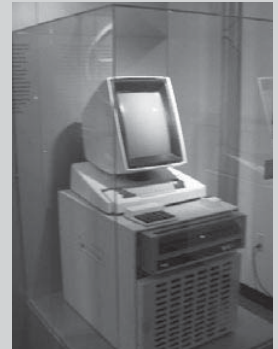
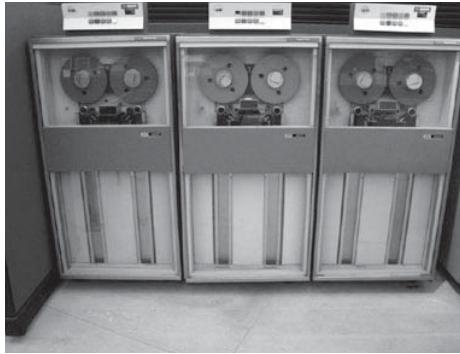
A short article which describes the history of computers and their precursors. It briefly mentions important events from 1600 up to the times when the first computer was built. A nice text written in a simple language. It could be used as a lead-in to interesting discussions about the future of computers or the pace of their evolution.

**Krótki** tekst opisujący historię komputerów wraz z tym, co można nazwać ich protoplastami. Pokrótkce opisane są ważniejsze wydarzenia od 1600 roku aż do powstania pierwszego komputera. Przyjemny tekst, napisany nieskomplikowanym językiem. Może być wstępem do ciekawych dyskusji na przykład o przyszłości komputerów lub tempie ich dalszego rozwoju.

## Pre-reading questions

1. Why do so many people not know how the modern computer began?
2. Why do you think the computer has changed more rapidly than anything else?
3. How do you think W.W.II might have been different if the ENIAC, the first all electrical computer, whose first job was to calculate the feasibility of a design for the hydrogen bomb, had not been invented then?

## History of Computers



### Early Start

Computers have been around for quite a few years. Some of your parents were probably around in 1951 when the first computer was bought by a business firm. Computers have changed so rapidly that many people cannot keep up with the changes. One newspaper tried to describe what the auto industry would look like if it had developed at a similar pace to changes in computer technology:

"Had the automobile developed at a pace equal to that of the computer during the past twenty years, today a Rolls Royce would cost less than \$3.00, get 3 million miles to the gallon, deliver enough power to drive (the ship) the Queen Elizabeth II, and six of them would fit on the head of a pin!" These changes have occurred so rapidly that many people do not know how our modern computer got started.

### The First Computing Machines "Computers"

Since ancient times, people have had ways of dealing with data and numbers. Early people tied knots in rope and carved marks on clay tablets to keep track of livestock and trade. Some people consider the 5000-year-old ABACUS - a frame with beads strung on wires - to be the first true computing aid.

As the trade and tax system grew in complexity, people saw that faster, more reliable and accurate tools were needed for doing math and keeping records.

In the mid-600's, Blaise Pascal and his father, who was a tax officer himself, were working on taxes for the French government in Paris. The two spent hours figuring and refiguring taxes that each citizen owed. Young Blaise decided in 1642 to build an adding and subtraction machine that could assist in such a tedious and time-consuming process. The machine Blaise made had a set of eight gears that worked together in much the same way as an odometer keeps track of a car's mileage. His machine encountered many problems. For one thing, it was always breaking down. Second, the machine was

### punched card

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slow and extremely costly. And third, people were afraid to use the machine, thinking it might replace their jobs. Pascal later became famous for math and philosophy, but he is still remembered for his role in computer technology. In his honor, there is a computer language named Pascal.

The next big step for computers arrived in the 1830s, when Charles Babbage decided to build a machine to help him complete and print mathematical tables. Babbage was a mathematician who taught at Cambridge University in England. He began planning his calculating machine, calling it the Analytical Engine. The idea for this machine was amazingly like the computer we know today. It was to read a program from punched cards, figure and store the answers to different problems, and print the answer on paper. Babbage died before he could complete the machine. However, because of his remarkable ideas and work, Babbage is known as the Father of Computers.

The next huge step for computers came when Herman Hollerith entered a contest organised by the U.S. Census Bureau. The contest was to see who could build a machine that would count and record information the fastest. Hollerith, a young man working for the Bureau, built a machine called the Tabulating Machine that read and sorted data from punched cards. The holes punched in the cards matched each person's answers to questions. For example, married, single, and divorced were answers on the cards. The Tabulator read the punched cards as they passed over tiny brushes. Each time a brush found a hole, it completed an electrical circuit. This caused special counting dials to increase the data for that answer.

Thanks to Hollerith's machine, instead of taking seven and a half years to count the census information it only took three years, even with 13 million more people since the last census. Happy with his success, Hollerith formed the Tabulating Machine Company in 1896. The company was later sold in 1911 and in 1912 his company became the International Business Machines Corporation, better known today as IBM.

### The First Electric Powered Computer

What is considered to be the first computer was made in 1944 by Harvard Professor Howard Aiken. The Mark I computer was very much like the design of Charles Babbage's Analytical Engine, having mainly mechanical parts but with some electronic parts. His machine was designed to be programmed to do many computing jobs. This all-purpose machine is what we now know as the PC or personal computer. The Mark I was the first computer financed by IBM and was about 50 feet long and 8 feet tall. It used mechanical switches to open and close its electric circuits. It contained over 500 miles of wire and 750,000 parts.

**ENIAC**  
Electronic  
Numerical Integrator  
and Computer

**EDVAC**

Electronic

Discrete Variable Computer

## The First All Electronic Computer

The first all electronic computer was the ENIAC (Electronic Numerical Integrator and Computer). ENIAC was a general purpose digital computer built in 1946 by J. Presper Eckert and John Mauchly. The ENIAC contained over 18,000 vacuum tubes (used instead of the mechanical switches of the Mark I) and was 1000 times faster than the Mark I. In twenty seconds, ENIAC could do a math problem that would have taken 40 hours for one person to finish. The ENIAC was built at the time of World War II and as its first job had to calculate the feasibility of a design for the hydrogen bomb. The ENIAC was 100 feet long and 10 feet tall.

## More Modern Computers

A more modern type of computer began with John von Neumann's development of software written in binary code. It was von Neumann who began the practice of storing data and instructions in binary code and initiated the use of memory to store data, as well as programs. A computer called the EDVAC (Electronic Discrete Variable Computer) was built using binary code in 1950. Before the EDVAC, computers like the ENIAC could do only one task; then they had to be rewired to perform a different task or program. The EDVAC's concept of storing different programs on punched cards instead of rewiring computers led to the computers that we know today.

While the modern computer is far better and faster than the EDVAC of its time, computers of today would not have been possible without the knowledge and work of many great inventors and pioneers.

## Exercises

### Comprehension questions

**1. Why was Pascal honored with a computer language named for him?**

- This programming language was named as a tribute to Blaise Pascal, because of his contribution to computer development. He was the first to build a precursor of the modern computer-an adding and subtraction machine that could assist in tedious and time-consuming computational process.

**2. Who was the first to invent a machine whose operating principle is very similar to present-day computers? Describe these similarities.**

- Charles Babbage, whose idea was remarkably similar to the way modern computers work: read program from punched cards (input), figure and store the answers to different problems, and print the answer on paper (output)

**3. In which process was Hollerith's machine involved and what was its role?**

- Hollerith's machine helped with the counting of census information. It took three years, instead of seven and half, even with 13 million more people since the previous census. "The machine read and sorted data from punched cards. The holes punched in the cards matched each person's answers to questions. For example, married, single, and divorced were answers on the cards. The Tabulator read the punched cards as they passed over tiny brushes. Each time a brush found a hole, it completed an electrical circuit. This caused special counting dials to increase the data for that answer.

**4. Describe all the technical parameters of the first electric powered computer.**

- 50 feet long, 8 feet tall, electrical circuits are opened and closed by mechanical switches, contained 500 miles of wire and 750 000 parts

**5. What were the differences between the Mark I and the ENIAC?**

- Mark I - electric powered, 50 feet long and 8 tall, used mechanical switches to open/close electrical circuits
- ENIAC - all electronic computer, used 18,000 vacuum tubes instead of mechanical switches, 1000 times faster than Mark I, 100 feet long and 10 feet tall

**6. What is the main advantage of using binary code in storing data and instructions?**

- First computers like the ENIAC could do only one task, then they had to be rewired to perform a different task or program. The binary code concept of storing different programs on punched cards instead of rewiring computers led to computers that we know today.

### Possible topics for discussion

1. Future of computers.

### Possible difficulties

This is a fairly easy to text to encourage a reader to study a bit more advanced articles. There should not be any problems with understanding this article.