

It's all about information sections/1/its-all-about-information

Simplification through Standartisation sections/2/simplification-through-standartisation

Countess, weaving patterns and count machines

Ancient calculators

So, essentially, what is a computer? And yes, there is a definition from Merriam-Webster dictionary in the first page

I want to devote this section to a brief historical overview of computers. Please, keep in mind, that it is a *vast* topic

But where should we start? Well, since computer was oversimplified to rather big calculator, I suggest we start with

Abaci in different cultures

However, those are purely mechanical and manual devices, main principle of which is very similar to how we convert
lh0.3 [scale=0.1]images/persons/person_blaise_pascal.jpgBlaisePascal

The first successful automation attempt is attributed to Blaise Pascal, with his *Arithmetic Machine* which is also called Pascaline. There are several pascalines still intact nowadays, most of the remaining ones are in European museums. Being the first Pascaline wasn't a computer, but it was first in many ways — first calculator, which was afterwards commercialized. Luddites' nightmare

r0.3 [scale=0.2]images/persons/person_joseph_jacquard.jpgJosephMarieJacquard

The next machine of our interest is not a computer either. It isn't even a calculator — it's a loom. I cannot say much about the beginning of the 19th century is pretty much a middle of industrial revolution. New fancy industrial looms are produced.

r0.5 [scale=0.2]images/devices/device_jacquard_loom.jpgJacquardLoom

So, amidst all this revolution going, we could see how a work, that was being done by 100 men before can be done by one.

The main purpose of Jacquard's attachment was an *pattern weaving automation*. It used a chain of special cards laid out in a row.
l0.5 [scale=0.2]images/misc/luddites.jpg 1844's depiction of Luddites destroying the loom

This machine would *drastically* impact efficiency, since it was no longer required to be of high skill to weave complex patterns.

Steam, calculators and British Government
l0.3 [scale=0.2]images/persons/person_charles_babbage.pngCharlesBabbage

Well, the idea of using automation in weaving patterns have touched deeply not only the Luddites, but also at least one other person.

Charles Babbage was an inventor of 2 machines, that are of interest in this essay: *Difference Engine* and *Analytical Engine*.
r0.5 [scale=0.25]images/devices/device_babbage_difference_engine.jpgPartofBabbage'sDifferenceEngine

The Difference Engine, essentially was a giant mechanical calculator, that was powered by steam and printed results.

One copy of this letter did reach a Lord of Treasury, who referred it to the Royal Society. After receiving an endorsement.

In 1833 Charles Babbage threw a party, where he demonstrated his guests, mostly members of high society, a part of his work.

Photo by Karoly Lorentey, sourced from Wikimedia Commons, under Creative Commons Attribution 2.0 Generic license.

As was mentioned before, Difference Engine project did end up exceeding given funding. Charles Babbage wasn't able to finish it.

Analytical Engine was designed to consist of four major elements: the mill, the store, the reader and the printer. For the first time.

So, that's where an inspiration from Joseph Jacquard really kicks in! The principle behind punch cards, used in Jacquard's loom.

So, operating with those cards would give to one an ability to code necessary instructions for Analytical Engine to perform a task.

Enchantress of Numbers and Italy's Prime-Minister

Using punch cards as a format of input data not only have fascinated Babbage, but Ada Byron too. For the next 10 years.

Babbage gave lectures about his inventions sometimes. On one of such occasions he had a very special listener — Lady Ada Lovelace.

Ada decided to translate Menabrea's work in English, titled 'Sketch of the Analytical Engine invented by Charles Babbage'.

She also illustrated in her notes a sequential solution of various problems, through input in a form of punch cards in a way that could be automated.

Countess of Lovelace

Although there are some disputes regarding the title of the 'first programmer ever'²³, there is one thing virtually no one can deny.

However, the history of Analytical Engine have ended due to a lack of funding, and it remained mostly on paper for the rest of the century.

Charles Babbage continued to work on his machine until his death in 1871. As was said, machine was never finished.

Brief timeline of the computer history

Computer history is filled with many significant occasions since 19th century. As was said, it is indeed a vast topic, so I will try to cover the most important ones.

p0.2p0.8 Year Details

1941 Konrad Zuse finishes first programmable, electric digital computer, called Z3. Basically, all the Babbage wanted, but couldn't build.

1945 John von Neumann described an architecture, that is the basis for virtually all of the computers we have today. The von Neumann architecture.

1948 Claude Shannon formulated his first thoughts regarding what will be regarded as 'Information Theory' in the future.

(r)2-2 First computer program ran on the computer

1952 Grace Hopper invented first high-level programming language, A-0. It will evolve into COBOL later.

1956 Keyboard was successfully connected to computer. Prior to this point, all programming had to be done by punch cards.

1957 FORTRAN created, *first widely used high-level language*.

1958 LISP developed

1960 COBOL developed. COBOL *still* highly in use today, especially in financial sector. Up to 80% of the world's daily transactions are processed by COBOL.

(r)2-2 ALGOL-60 developed

1969 ARPANET first online. ARPANET is a direct predecessor for the *Internet* we know today

(r)2-2 Kenneth Thompson and Dennis Ritchie developed UNIX. It's not too much of a stretch to say, that it is one of the most influential operating systems.

1970 First ATM can be used by general public.

(r)2-2 Pascal programming language developed.

1972 C language developed. C is one of the *most influential* programming language there is. It's average popularity, by the way.

1973 First handheld cellular mobile phone invented. Start of a mobile network we know today.

(r)2-2 First successful inter-network communications. Birth of the Internet as we know it today.

1977 Apple II computer is developed by Steve Wozniak and marketed by Steve Jobs. One of the first computers, intended for home use.

(r)2-2 Atari video game console released. One of the first game consoles in history

1978 First Multi-User Domain games appeared. They allowed for multiple players play against each other. One of the first examples of multi-user games.

(r)2-2 First Computer Worm created.

1983 Internet officially launched

(r)2-2 Microsoft Word officially launched

1985 C++ released

1987 Basic parameters for GSM standard agreed. GSM is the main standard used in mobile network today.

(r)2-2 Perl developed

1990 First commercially successful Windows OS version released, Windows 3.0

(r)2-2 Photoshop initially released

1991 Linus Torvalds released Linux kernel

(r)2-2 Charles Babbage's Difference Engine #2 is constructed at London Museum.

1993 First online ads appeared

1995 Java 1.0 introduced

(r)2-2 Javascript released

1999 WiFi routers started to gain popularity for in-home usage.

Modern computers Hardware every computer needs

This section is mostly devoted to computers as we know them today. We are surrounded by computers. Our PCs³⁷

Well, first of all — they all have different *hardware*. Hardware — is all of the computer's tangible parts or compo

Hardware is the basis of any computer. Once you got limited by hardware, there is not much you can do without c

So, *hardware often acts as a physical limit of what your computer can do*. If you absolutely need to save 100 GB of

You cannot change hardware without physically installing/reinstalling some computer component. It cannot be don

So, what hardware every computer needs? Well, maybe not every little one of them, but the majority? What will b

CPU³⁹

Central component, 'brain' of the computer, doing all the actual computing.

PSU⁴⁰

Anything that provides whole system with electric power. Batteries, accumulators and such.

RAM⁴¹

The type of memory to hold partial results of something. It's something like a bank's cash register, where all today's ca

Persistent Memory storage

Acts as a 'long-term' memory storage. Similar to a vault in the bank — it's not convenient to get your hand in it every

GPU⁴²

Special type of processors with a specific purpose of showing something on display. Without it you can use your comput

Motherboard

Component that acts as a medium for all other components to communicate

And finally, it all should be mounted and secured in some case. Usually end-user interacts and associate hardware with

The list of possible hardware some computer may utilize in some form is just enormous. It makes no sense to try a

It's worth noting, that each and every one piece of hardware described here is a complex technological device. To u

CPU

As was said before — CPU is a 'brain' of the computer. In the end, all operations, that somehow process any data

So... that's it? To learn programming — means simply to learn those machine code instructions and find some way

Memory GPU Motherboard and PSU