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The History of Computers

Computers have become an incredibly important part of our everyday lives, controlling every part of the world and our personal lives. It is said that the average American spends 7 hours and 4 minutes looking at a screen each day, which is about ¼ of the day. This could mean scrolling on social media, doing work on the computer, looking at a screen to order food, or even a touchscreen in a car. But how did this all start? It may seem ludicrous now, but the world was once fully analog and people had to actually do math by hand, not on the calculator app. I for one could not imagine such a thing. Especially now in 2024, most kids and young people are glued to their phones, with no regard or knowledge of how they even came to be. In this paper I will be exploring how computer models developed over time, the influential figures that shaped computer science, and giving a timeline to help understand where this all fits into history.

It all started with Charles Babbage, who I will introduce later in this paper, but he was the catalyst who in the early 1820s created the Difference Engine. It was a mechanical computer that could produce basic computations. It was steam powered and was used to solve numerical tables such as logarithms. Then in 1830 he created the Analytical Engine. Then came Hewlett-Packard, a company founded in a Palo Alto, California garage. Their first product was a HP 200A Audio Oscillator. It quickly became a very popular piece of test equipment for engineers all over the world. The model garnered national attention by its ability to fit the needs of multiple different industries. Walt Disney even utilized the new technology by testing the 200b model for his recording equipment. Which would go on to be used in the 1940 film “Fantasia”.

Throughout the 1940s, we would see a rapid growth in the interest of new technology. The most advanced computer up to its time in 1941 was the Z3. Produced by German engineer Konrad Zuse, the Z3 was used for advanced arithmetic calculations. It was destroyed during the air raid of Berlin in 1943, halting Zuse’s progress. Meanwhile, across the pond The Complex Number Calculator was completed by the Bell Telephone company. Designed by George Stiblitz in 1941, the calculator is credited as the very first example of remote access computing, or the ability to access a device from a network in any location.

Moving further into the decade, computers became a useful tool in combating the axis forces in World War II. Encrypted messages and stealth warfare became incredibly prominent during this time. The ability to send messages without them being intercepted by enemy forces was vital in combating the fascist rise in Europe. Britain developed the first ever Bombe, designed by Alan Turning and Harold Keen of the British Tabulating Machine Company. The machine was used to decode German messages during the second world war and aided the allied forces heavily during the conflict. Britannica states, “​​Each *bomba* took about two hours to identify the day key, allowing the communications for the rest of the day to be easily decoded. It was a revolutionary solution.”

The Bells laboratory also utilized the new technology to aid the effort in defeating the Axis powers in Europe, creating the Relay Interpolator. This was a machine that aimed large weapons at specific targets and was useful in combating air attacks. Another advancement in war time technology was the Colossus, developed by British engineer Tommy Flowers. This device was used to break the complex Lorenz ciphers utilized by German forces. It is of the belief that the Colossus helped to end the war in a shorter time frame, revealing the intentions and thought process of enemy forces during the late stages of the war.

Technology played a key role in ending one of the bloodiest conflicts in human history. Without these machines, the war could have dragged on for far longer, costing the lives of thousands if not millions more. Massive amounts of credit has to be bestowed open to the men and women who helped make these advances in computer technology possible.While it may seem like a net negative for humanity as a whole to create such machines for the sake of warfare, many of them were used a preventive measures against a much greater evil. This time period in computer history cannot be overlooked, as it paved the way for different societies to use technology in combating the oppression of powerful people.

Moving into the later part of the 1940s, we started to see computers being used for more academic purposes, something they were originally intended as. In 1948, the Whirlwind project was created to simulate and train fighter pilots before they took to the air. Despite not being successful on its first run, the simulator and the advancements made from it are credited as one of the most influential machines in the history of computing. Other notable events that took place during this time is the first ever computer program being run by a group of scientists at the University Of Manchester. The SSEM, or better known as the “Baby”, ran a test to experiment with a new form of memory technology. It was credited as the first ever high speed electronic random access memory for computers. Following the instructions written by Tom Kilburn, it was the first of its kind to run completely on digital, electronically stored memory.

We also started to see computer technology being revealed to the public for the first time during this period. The SEC, led by IBM engineer Wallace Ekert, was a large calculator based system that helped space exploration in its later years. The ENIAC, also a gigantic machine used for calculations, was revealed to the public in 1950. It was historic for using electronic configurations to run unprecedented speeds for the time. Computers started to become more of a public figure during this time, however they still were relegated to the science labs and war rooms of the country. Another big achievement during this year was built by Remington-Rand, and was named the ERA 1101. It held one million bits on an internal magnetic drum. It is noted as one of the world’s first commercially produced computing systems.

The next big thing was MIT’s achievement of creating a programmable computer with transistors. Transistors are defined as “the main component of the microchips used in computers. Computers operate on a binary system, which uses only two digits: 0 and 1. In a computer microchip, transistors act as switches, letting current through to represent the binary digit 1, or cutting it off to represent 0.” (PBS 1999). The following year, the SAGE system was created for the purpose of detecting hostile missiles approaching the U.S., which connected 23 separate sites throughout the United States and Canada. Next, in 1960 the DEC PDP-1 came out. It featured extensive novelties, such as requiring no air conditioning, or operator, containing a cathode ray, tube graphic display, which all became a standard going forward. An interesting fact is that the first computerized video game was created on this computer by hackers at MIT.

As you can see, things are moving incredibly fast at this point in time, and new developments are coming out one after another, revolutionizing this industry. When the IBM 1400 Series was introduced, demand was recognized for general-purpose computers, instead of the specialized systems that had dominated before. 1962 produced the Atlas, which was crowned the fastest computer in the world and spearheaded the concept of virtual memory, which meant that a disk or drum is used as an extension for memory. Then came along the DEC PDP-8, which exposed the issues with past computers, such as most of them requiring government funding to acquire. It was the first mini-computer to sell on a much higher volume at a far lower price. It was about the size of a modern PC, without its storage and other add-ons.

Next was the IBM PC, which followed 16 years behind the original. It beat out Apple II and many other computers at the time. It was important because businesses saw the value in investing their money in these computers, and they helped to streamline operations. It was released in 1981 and sold for $1,565. Also in 1981 was the Sinclair ZX81, which began the competitive market, causing an influx of copycats who all wished to replicate IBM. This computer only cost $75, a significant drop in price from the IBM PC, and it took over the world. This computer contained an 8-bit processor with a monochrome output to a TV set. It displayed only 24 lines of text and used a cassette recorder for storage. And finally in 1984, the Apple Mac came along. It was the first to use graphical icons and present information in windows on the screen. It was the first mass-produced computer that was shipped alongside a mouse and graphical user interface. From there computers took over the world, developing into what we see today in every person’s hand.

Another aspect of computer development is the actual developers who spearheaded these operations. The most notable historical figure is Charles Babbage, who is widely regarded as the “Father of Computing” he invented the first programmable computer in history, and even created plans for the first printer. Unfortunately, he did not live to see his designs come to fruition. Another, more recognizable figure is Bill Gates, who is the founder of Microsoft, which created and developed Windows, the widely respected system that is regarded as “the most successful operating system ever, and used by the majority of people the world over.” (NCI Technologies). He is also one of the richest men in the world, with a net worth of over $91 billion dollars.

In conclusion, there is much, much more to learn about the history of computers, which have become a crucial part of our society, economics, and personal lives. From the very first Difference Engine from Babbage, to Steve Jobs with Apple, we have come a very long way. I believe it is very important to learn about where our computers came from to better understand and respect the industry and mastermind behind them. I don’t feel too confident that I could invent something so revolutionary, so I have a lot of respect for those who did it for me! Overall, computers may be fairly new in the grand scheme of things, but they still have a long way to go and the potential is unlimited. I can only imagine what new technology is being cooked up by these incredible minds, and I am excited to see!

Models through time

* <https://www.computerhistory.org/timeline/computers/>
* Abstract: This site provides a detailed timeline of all important computers developed from 1937 to 2015. Provides necessary information such as dates, information about the computers, and the people involved. Outlines how these computers affected the world around them and their contributions to science.
* <https://www.bookyourdata.com/blog/computers-changed-history>
* <https://www.ncitech.co.uk/media/2_1174_Original_Famous_People_in_Computer_History_1deb09.pdf>
* <https://www.britannica.com/topic/Bombe>
* Abstract: Provides important dates and information describing the development of computers from the original “Model K” to the Apple Watch in 2015. Also provides links to additional information needed to understand the way these machines affected the field.
* <https://www.pbs.org/transistor/teach/teacherguide_html/lesson3.html#:~:text=Transistors%20are%20the%20main%20component,it%20off%20to%20represent%200.>

Influential figures

* <https://www.gcu.edu/blog/engineering-technology/famous-computer-scientists-throughout-history>
* <https://www.uopeople.edu/blog/famous-computer-scientists-inspiring-careers-contributions/>

Timeline of events

* <https://www.computerhistory.org/timeline/1933/>
* <https://pandorafms.com/blog/computer-history/>