

Computer Today & Yesterday

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Computers have gone through many stages before becoming what they are today. Some would say that the process goes all the way back to the beginning of humankind, but we will begin more recently. Hopefully this section will give you a better idea of why computers are the way they are today. The topics are found below, but feel free to start in our first, 1642 and advance through to the end.

1642 - Blaise Pascal creates the first numerical Calculating machine

1822 - Charles Babbage designs the Difference Engine

1884 -Herman Hollerith receives a patent for his automatic punch card tabulator

1926 - Dr. Julius Lilienfield filed for a patent on a transistor being used as an amplifier

1939 - The first automatic digital computer is designed

1944 - The first large scale automatic computer, the Mark I, is completed

1946 - The ENIAC is created

1946 - EDVAC is designed

1954 - FORTRAN is created

1958 - The first integrated circuit is created

1964 - BASIC is created

1970 - Integrated circuits become widely used

1971- The world's first microprocessor was created

1974 - The first truly general purpose microprocessor is created

1975 - First Altair is sold

1981 - IBM launches its first PC

Since 1982 - Internet

Since 1982 - New Technology

Since 1982 - Companies

1642 - Blaise Pascal creates the first numerical Calculating machine :

Pascal's calculating machine was the first automated calculator. He created the machine to help his father add sums of money. The machine could only add, but it could simulate division by adding the complement of a number. This technique is often used in computers today. It took Pascal two years to develop his machine, but once it was developed, he created nearly fifty copies, which he sold. Pascal was a mathematician and physicist, but also a theologian. His name is immortalized by the computer language Pascal, which is slowly being made obsolete by C++, a more powerful computer language.

1822 - Charles Babbage designs the Difference Engine

The Difference Engine was conceived to aid in the creation of tables, which were used by the banking and trading industries. The machine would shorten the length of the work immensely and would require less manpower. Babbage never actually constructed his Difference Engine, but laid out an elaborate plan for it. The machine was eventually completed in 1990 by London's Science Museum. The completed engine, made according to Babbage's plans, worked as he had planned.

Babbage began working on his Analytical Engine, an advanced version of the Difference Engine, before the Difference Engine was complete. The analytical engine would have been capable of taking instructions from punch cards, and would

have been the most powerful computer constructed up to that date. Babbage could not overcome the technical difficulties of the machine, and it was never constructed. Some historians have predicted that had he perfected his design, the computer age would have dawned much sooner. The difference would have been that it would have been mechanical instead of digital.

1884 -Herman Hollerith receives a patent for his automatic punch card tabulator

The census of 1890 created a new problem for the government. If it was done by traditional methods, the census would take years of work and incredible expense due to the fact that the population of the United States had reached 62 million people. It was predicted that the data would still be being tabulated by the time of the 1900 census. Herman Hollerith, an American inventor, developed a solution. He decided to develop a system of punch cards that could be tabulated and sorted by an automatic machine. The machine detected the presence of a hole by using a spring and a nail that would pass through holes and connect an electrical current. The machine could count the number of people with very specific statistics, such as all single women with two children in Oklahoma.

The machine turned out to be useful in all sorts of industries, and Hollerith founded the Tabulating Machine Co., which changed its name to International Business Machines in 1924.

1926 - Dr. Julius Lilienfeld filed for a patent on a transistor being used as an amplifier

Lilienfeld's transistor was the first sign for progress away from vacuum tubes in computers. The second great breakthrough came in 1947, when the first point-contact germanium transistor was created by three physicists at Bell laboratories. This transistor was much smaller than vacuum tubes, and cheaper to maintain. In 1950, one of these same physicists, William Shockley, invented the bipolar junction transistor, which is more reliable than the point-contact versions. Shortly after this, the germanium in transistors was changed to silicon, since silicon was cheaper and easier to work with. The use of semiconducting materials was one of the key technologies involved in transistors.

Transistors act as switches to an electrical current. They are much smaller in scale than the vacuum tubes they replaced, as well as many times more powerful. The ever decreasing size of the transistor is one of the key reasons that processors continue to become more powerful.

1939 - The first automatic digital computer is designed

Atanasoff-Berry Computer, prototyped in 1939 by John Atanasoff and Clifford Berry

1944 - The first large scale automatic computer, the Mark I, is completed

Howard Aiken, a Harvard professor, was the primary developer for the computer. The Mark I was more powerful than any machine that came before it. This early computer could add, subtract, multiply or divide two numbers up to 23 digits in length, all in a few seconds. The machine consisted of over 750,000 pieces and weighed over 5 tons. The machine functioned by operating dozens of calculators at the same time. Previously these numbers would have been nearly impossible to manipulate for any practical purpose. The Mark I allowed for many new possibilities in science and government analysis. One disadvantage was that the Mark I operated using switches and relays, whereas most other computers were beginning to use vacuum tubes. The immense size of the computer was restrictive, though that was a problem that would not be solved for thirty more years.

1946 - The ENIAC is created

The Electronic Numerical Integrator and Computer, the ENIAC, was constructed between 1943 and 1946 at the University of Pennsylvania. It was the most powerful computer up to that point but was the largest as well, weighing over 30 tons. Additionally it required that almost 50 vacuum tubes be replaced everyday. While operating the ENIAC used almost 150 kilowatts of power, which is equivalent to what many small towns used at that time. The ENIAC was important because of its power, but its many drawbacks made it unrealistic for common use. One of these drawbacks was that it had no memory. The same researchers who created the ENIAC then set out to create a similar computer that allowed for the storing of programs.

1946 - EDVAC is designed

The EDVAC, the electronic discrete variable computer, was the successor to the ENIAC. It contained only 4000 vacuum tubes to the ENIAC's 18,000 but was more powerful primarily because of its ability to store programs. This was accomplished through mercury delay. The architecture that the EDVAC was based on is the same that is used in the majority of computers today.

Although the EDVAC was not completed until 1952, the other computers completed around this time, including the UNIVAC and the EDSAC, were all based off of its design. The EDVAC is important because it allowed for the storing of programs and developed an architecture that has been used in nearly every digital computer since that time.

1954 - FORTRAN is created

FORTRAN was the first computer language and remained in use for the next fifteen years. John Backus invented FORTRAN while working for IBM. The first program was run by Harlan Herrick in the same year.

1958 - The first integrated circuit is created

Jack Kilby, an employee of Texas Instruments, successfully attached several components to a single piece of semiconductor. This allowed the size of computers to be potentially decreased immensely by placing greater power on each piece of semiconductor. This idea had first been discussed by a British radar expert, G.W.A. Drummer in 1952. Kilby was the first person to successfully create an integrated circuit. Fairchild, an electronics company, began the mass marketing of integrated circuits in 1962, using many techniques that would later become common in these circuits.

1964 - BASIC is created

BASIC, Beginners All Purpose Symbolic Instruction Language, was created by Tom Kurtz and John Kemeny, both professors at Dartmouth. BASIC remained in use for the next twenty five years. One unique quality of basic was that it was developed to be easier to understand than previous computer languages. Even someone not familiar with the language could understand some of what was happening by simply looking at the code. This made programming easier for the mainstream and made it more like speaking commands in plain English. BASIC was the beginning of intuitive programming.

1970 - Integrated circuits become widely used

Busicom was one of the first companies to widely use integrated circuits in calculators. This allowed a dramatic decrease in the size of electronic calculators, and eventually led to the replacement of the slide rule. This came about due to the popularity of electronic desktop calculators.

1971- The world's first microprocessor was created

Marcian Hoff was working on developing an integrated circuit for desktop calculators when he decided to develop a general purpose circuit that would function as a computer processor. He dubbed this circuit the 4004 because it had a 4 bit data path. The chip was part of a system which also included a 256 byte ROM, a 32 bit RAM and a shift register. The 4004 contained over 2,000 transistors. At the time the intent was to use the 4004 in a variety of devices in which it could be modified for whatever purpose. Unfortunately for Hoff, the chip was originally rejected by companies who did not realize how much more powerful Hoff's chip was.

1974 - The first truly general purpose microprocessor is created

Intel released the 8080, a 8 bit chip, in 1974. It contained nearly 5,000 transistors and was powerful enough to power early home computers. This chip was followed by a variety of similar chips from companies such as Motorola and Zilog. These chips made the first personal computers possible.

1975 - First Altair is sold

The Altair was a computer kit based on the 8080 processor. It could be assembled by anyone and was very inexpensive compared to everything that had come before it, as it cost only \$439. The Altair was not very powerful as it contained only 256 bytes of RAM and had to be programmed using switches. Bill Gates and Paul Allen developed a version of BASIC for the Altair, which was to be the beginning of Microsoft.

1981 - IBM launches its first PC

The first IBM PC was priced at \$1,365, and showed the world that personal computers were important. IBM had previously sold only mainframes, but was seen as one of the leaders in the industry.

Since 1982 - Internet

Since 1981, computers have increased dramatically in speed. Their reach has spread to nearly every household. The biggest advance has been the internet. Users had begun to use bulletin boards in the early eighties, but was not until the mid-nineties that the internet truly took off.

The primary invention that led to this phenomena was the world wide web. Tim Berners-Lee, a researcher in Switzerland, developed the web to make the information on the internet easier to read and understand. This allowed the internet to be used much easier by the general public. People began using the internet for email, shopping and for finding information. To many it became a way of life. Computers became a part of nearly every home, or at least the home that everyone pictures as average.

Since 1982 - New Technology

There has been an abundance of new technology in the 1980's and 1990's. The scanner, modem and mouse all became commonplace. The computer of this period is what we use today – only today's are faster and more user friendly. Software such as Microsoft Windows has made computers easier for all users by eliminating the need to learn text commands and allowing a graphical interface.

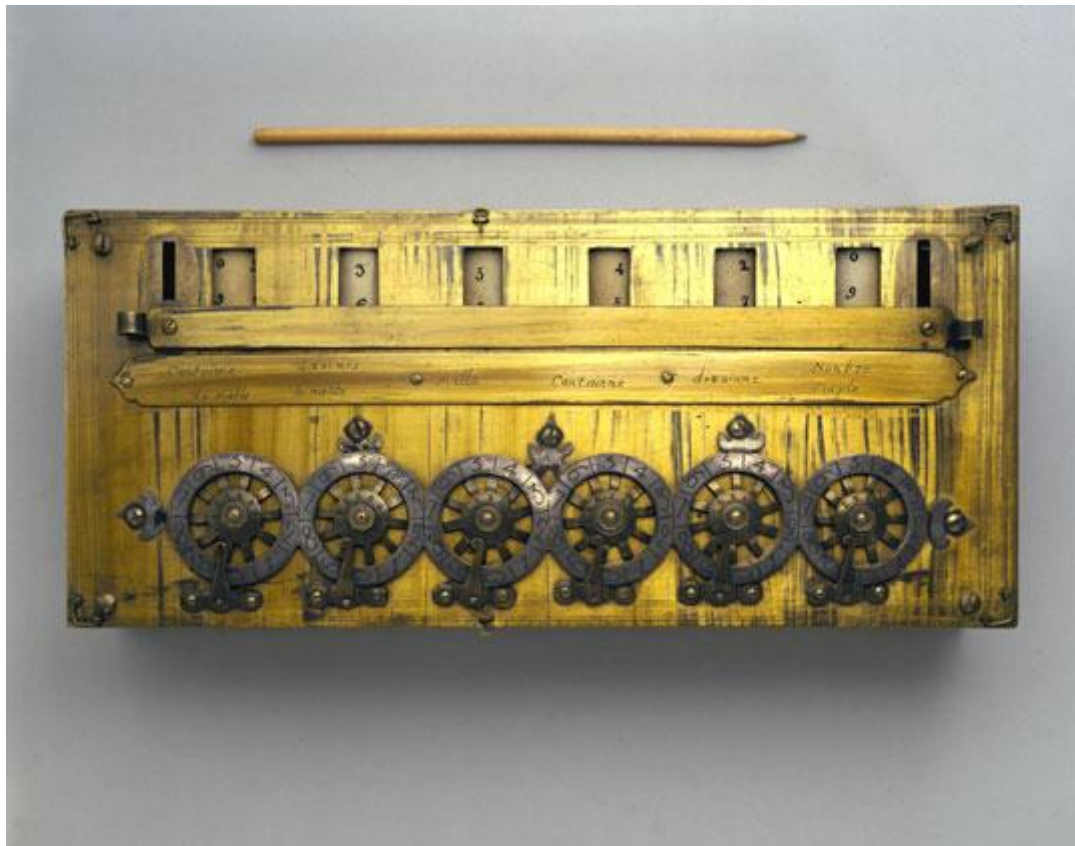
Since 1982 - Companies

The companies of today are different than those of twenty years ago. Microsoft and America Online have gradually become the most powerful forces in the industry due to their reach and size. Microsoft provides the operating system to nearly every new computer manufactured, and America Online provides the internet connection for over 16 million people. Other companies, such as Amazon, have become extremely well known but have failed to become as profitable. Currently Amazon is worth more on the stock market than General Motors, although General Motors' assets are worth over ten times what Amazon's are. The companies of today are worth fortunes on the stock exchange but are often valued simply on their potential future profit rather than their current earnings.

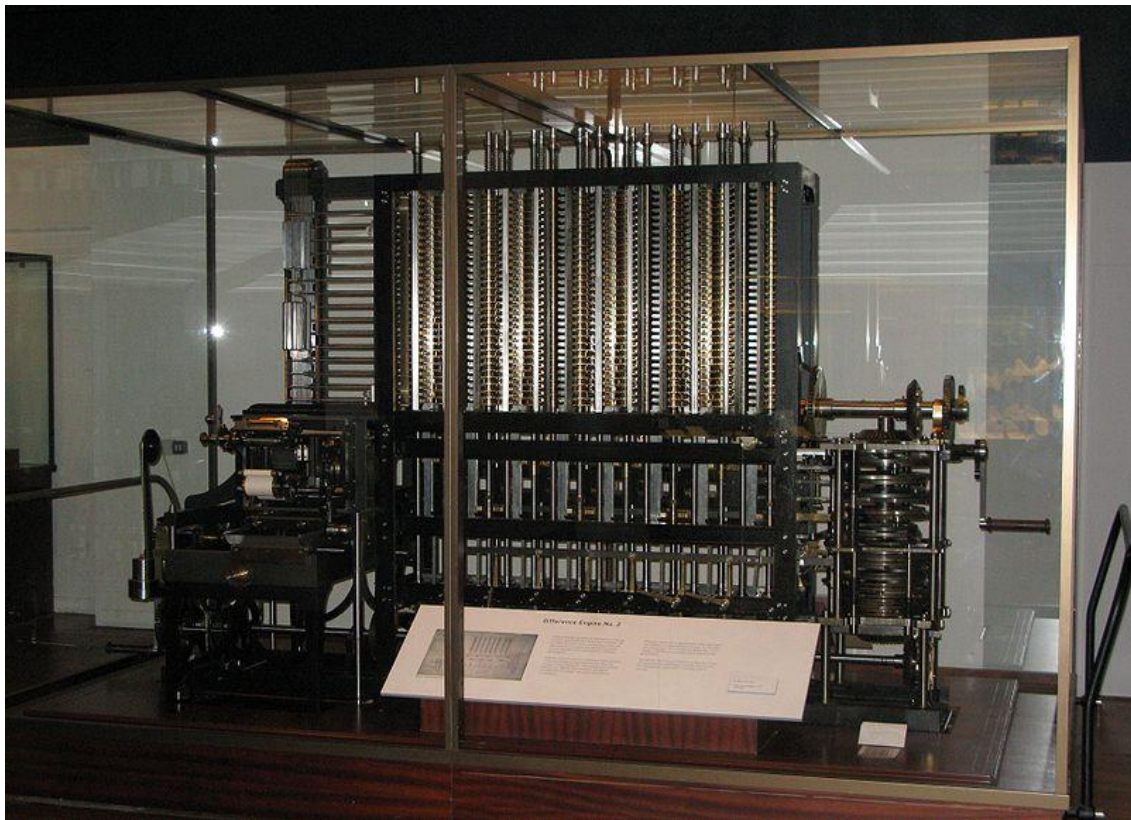
Computer Machine Gallery :

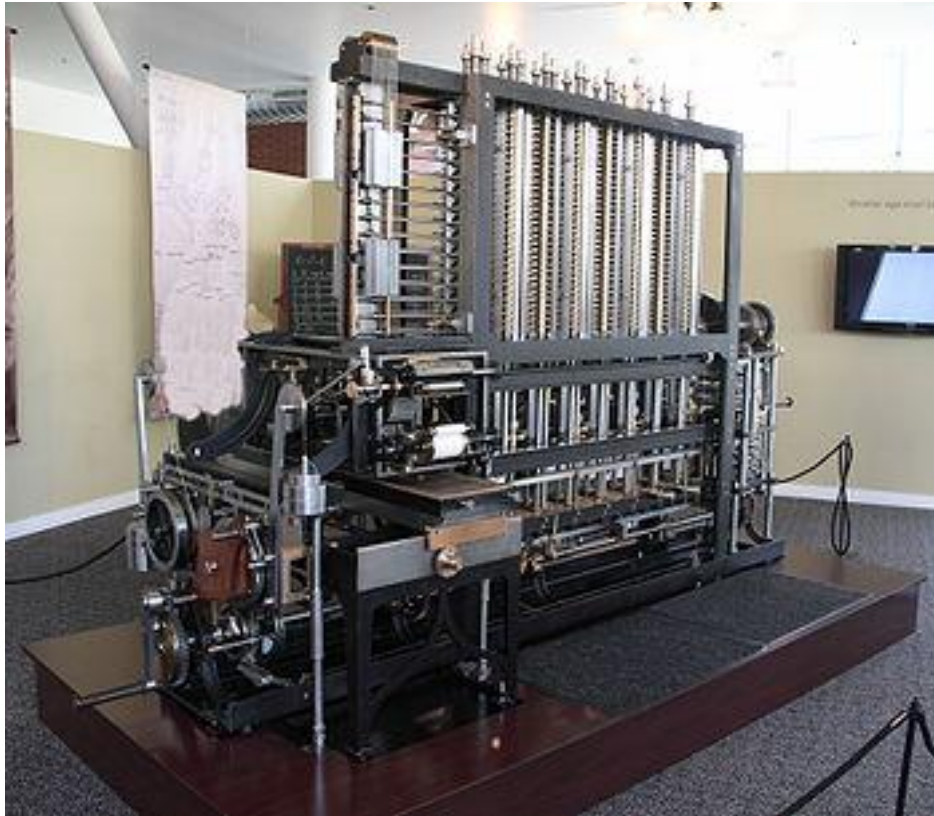
Pascal Calculating Machine





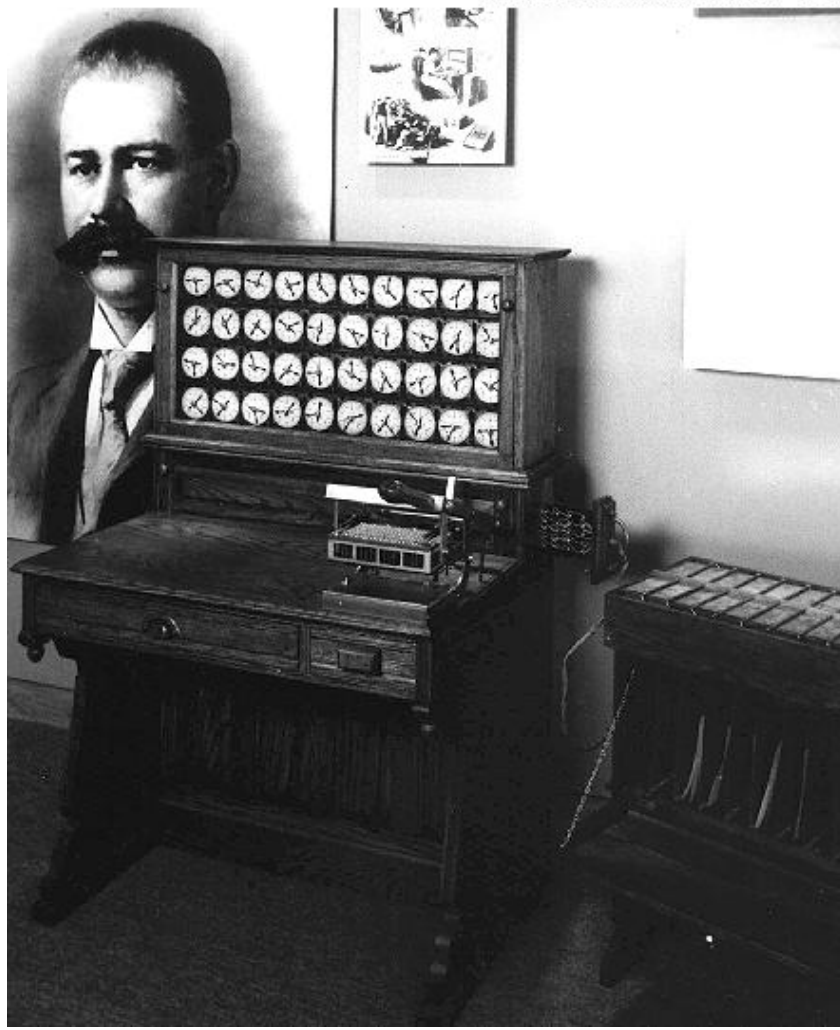
Difference Engine :

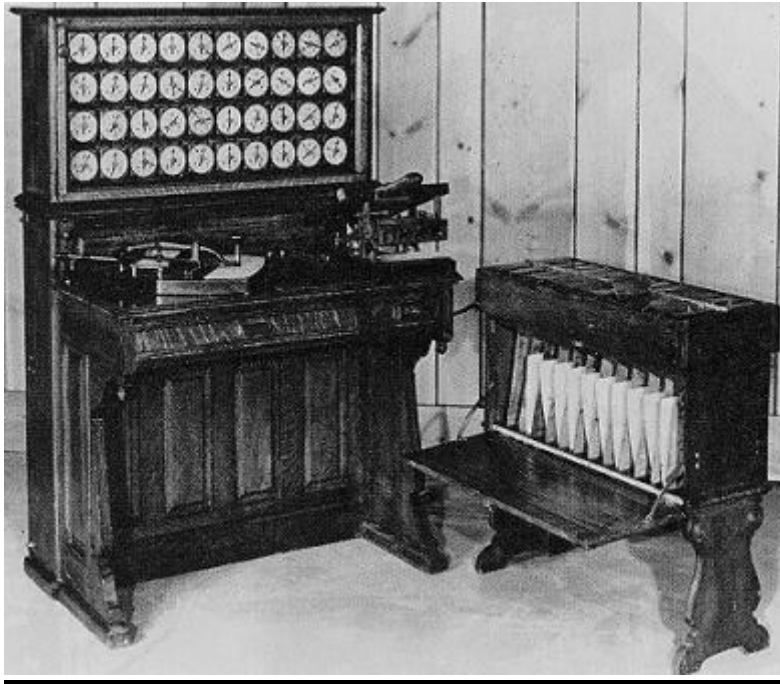




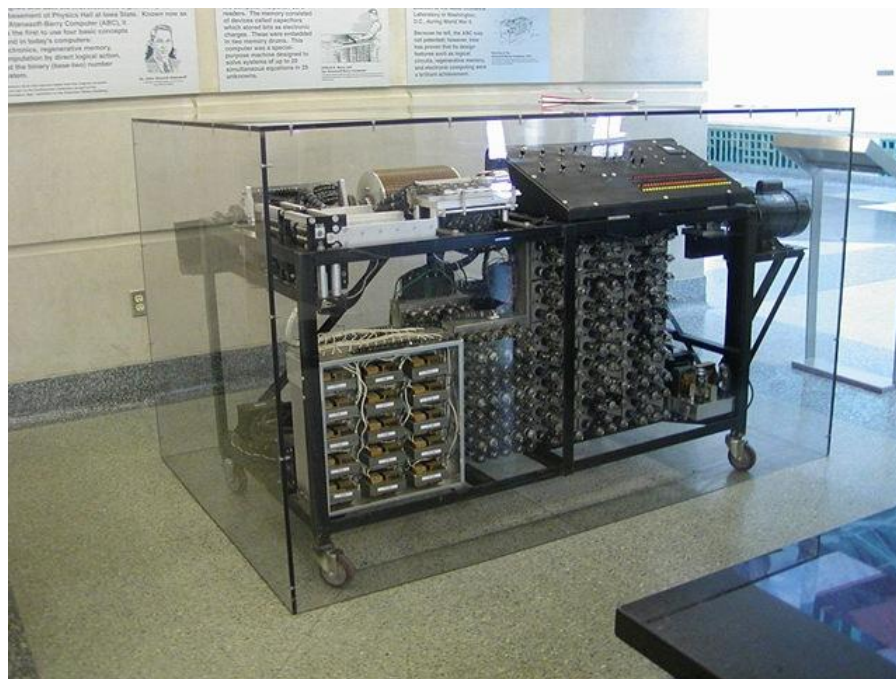
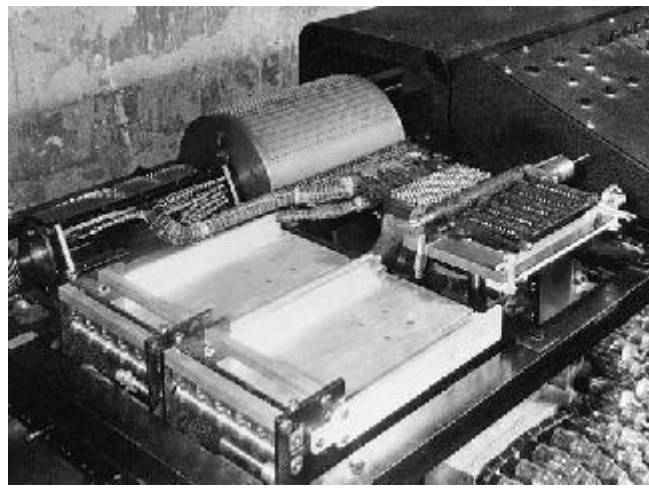
Automatic Punch Card Tabulator :

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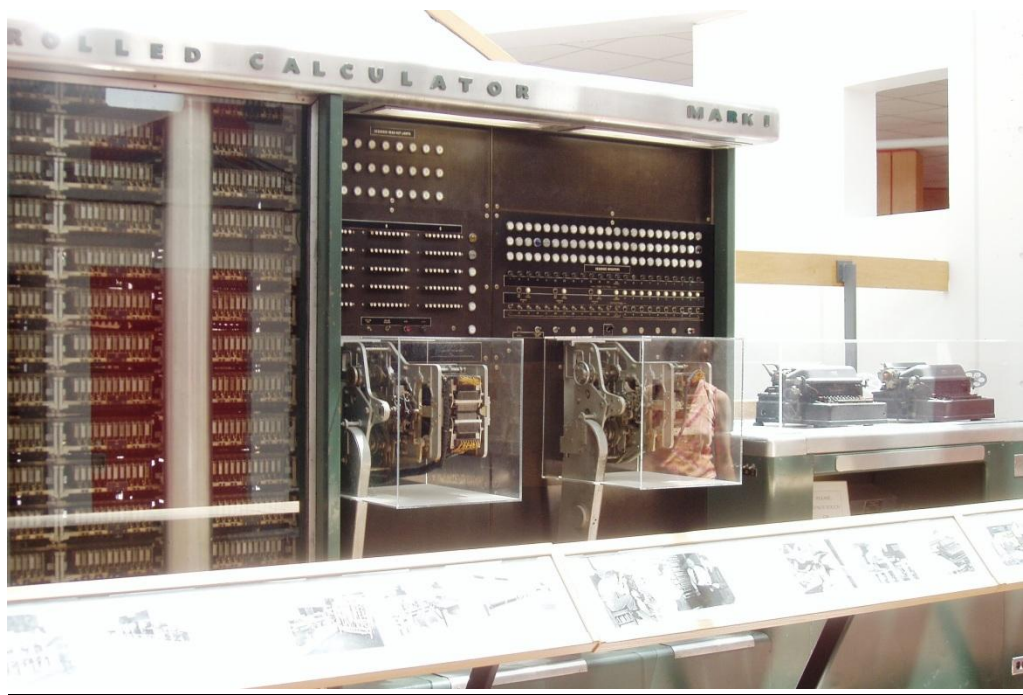


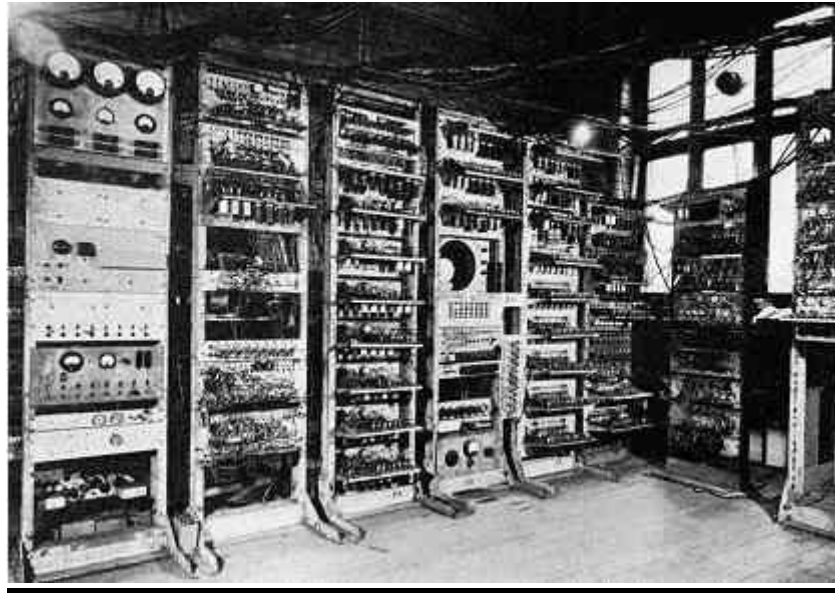


The First Automatic Digital Computer :

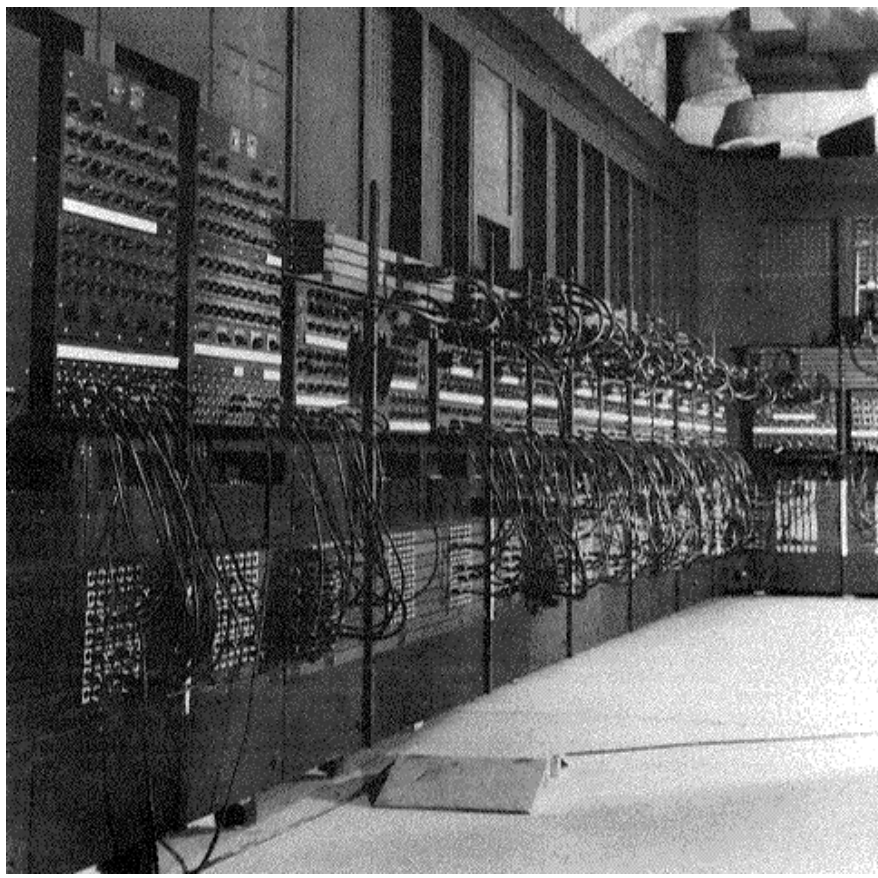
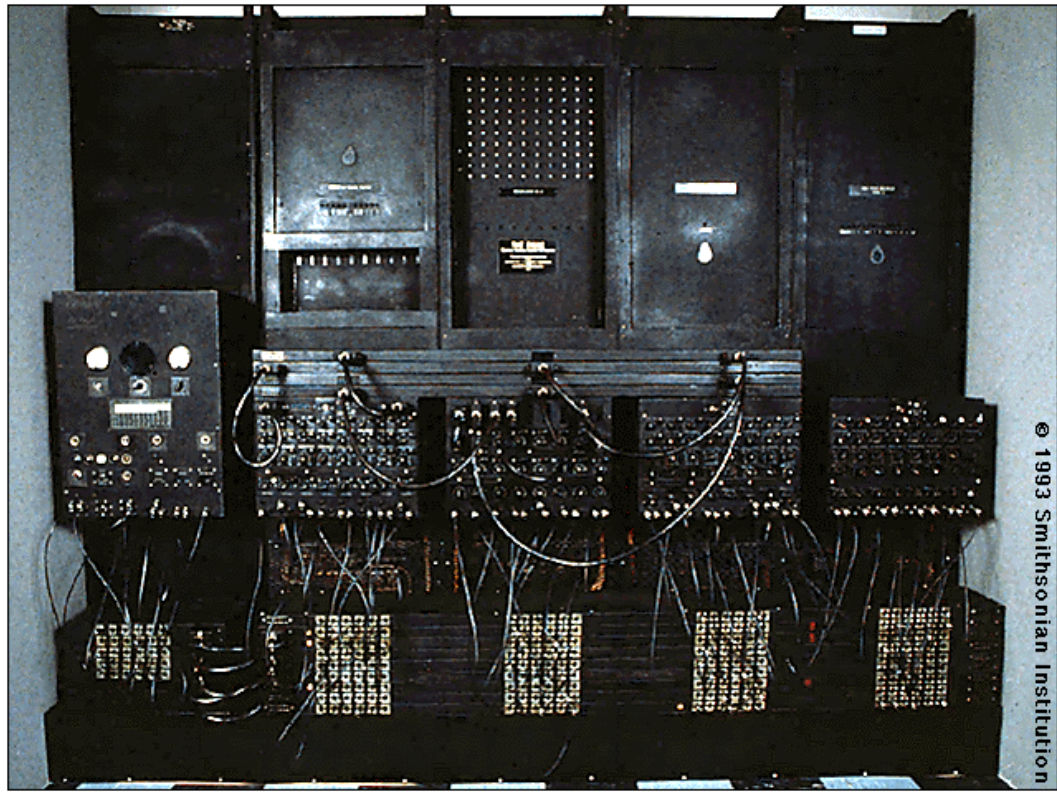


Mark I :



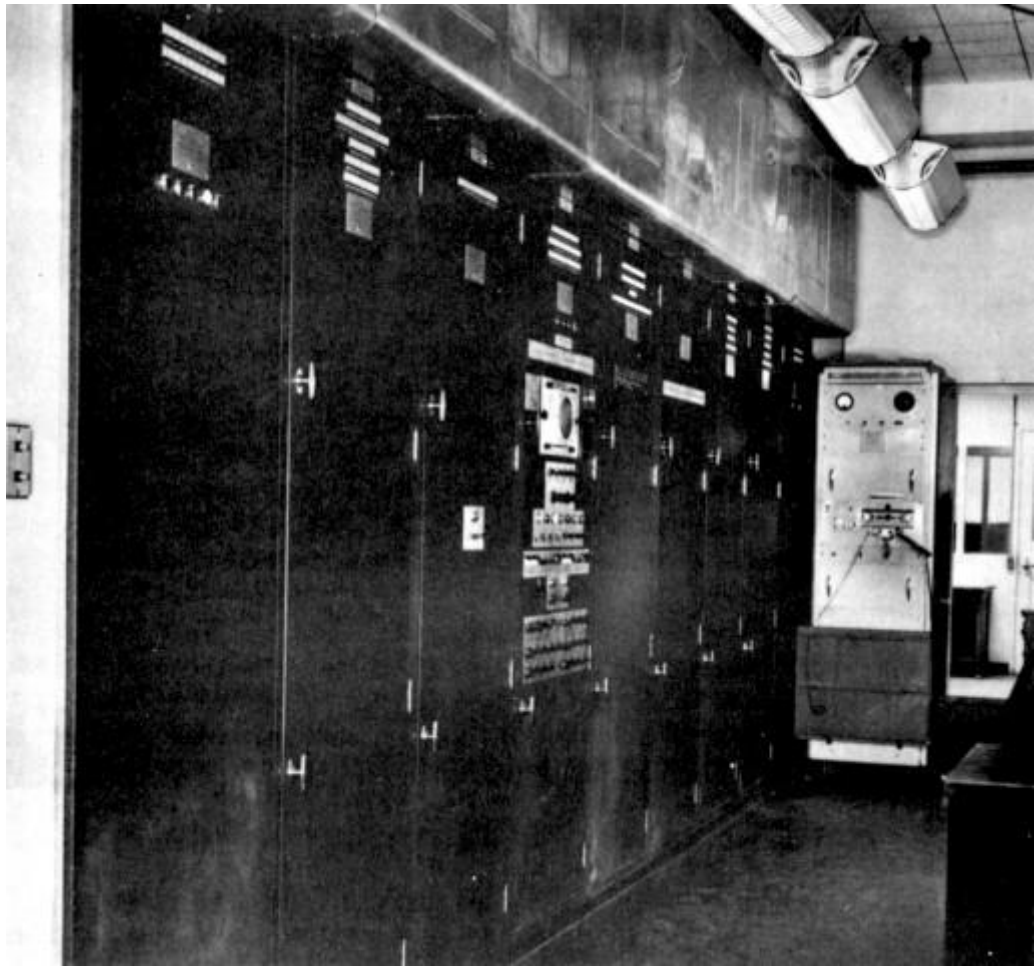


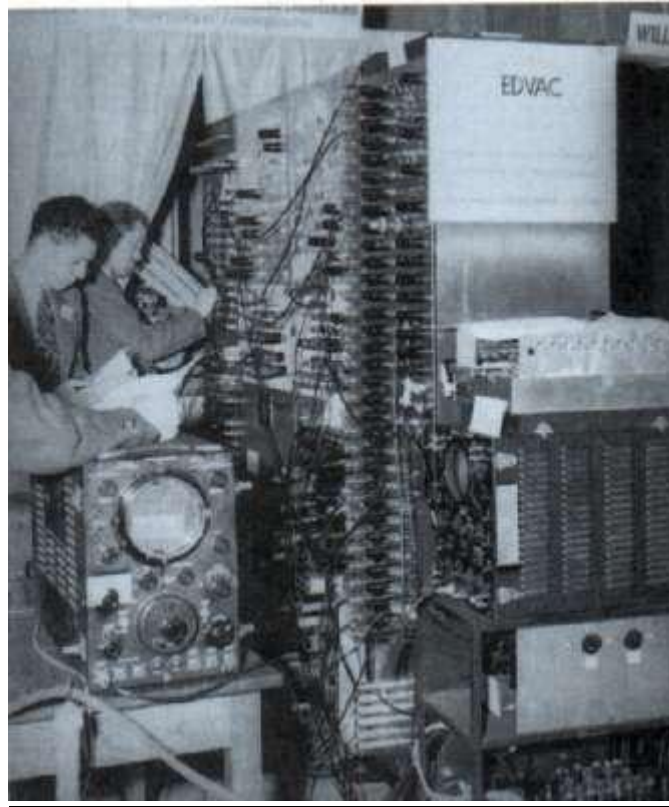
ENIAC :



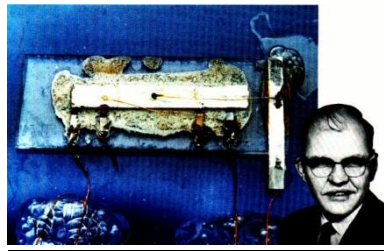


EDVAC :





First Integrated Circuit :



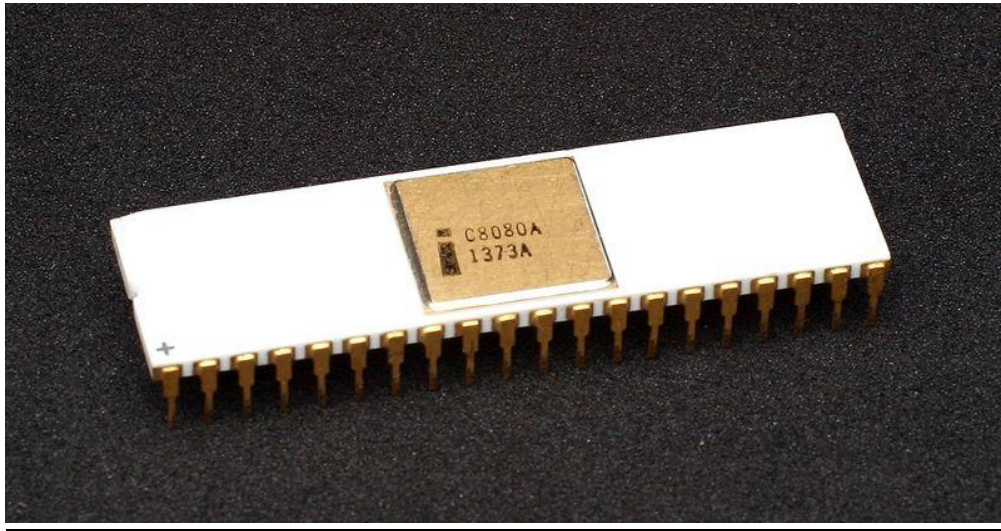
Busicom :



First Microprocessor (4004) :



First General Purpose Microprocessor (8080):



Altair :



IBM First Computer 1975 After Altair (IBM 5100):



First IBM PC 1981 :



Today's Computer:

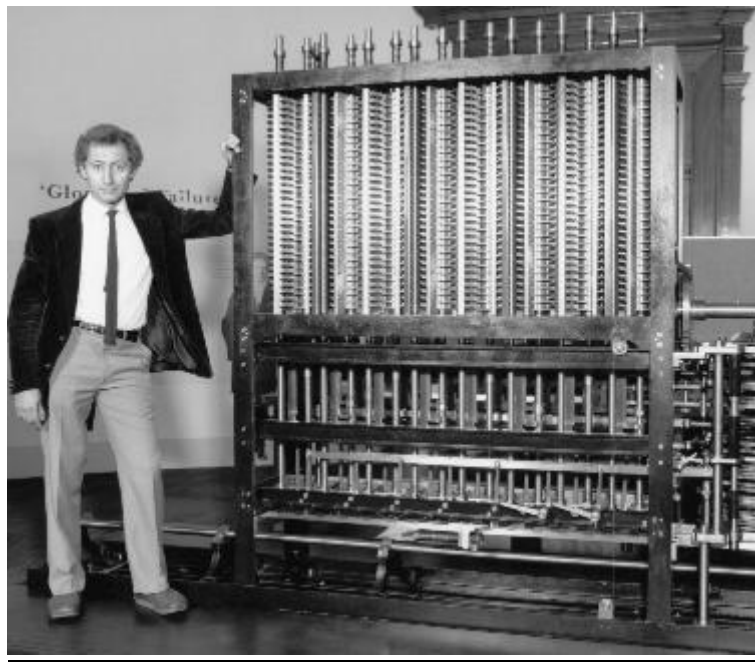


Stars in Computer Sky :

Blaise Pascal

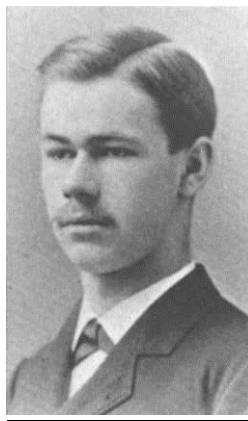


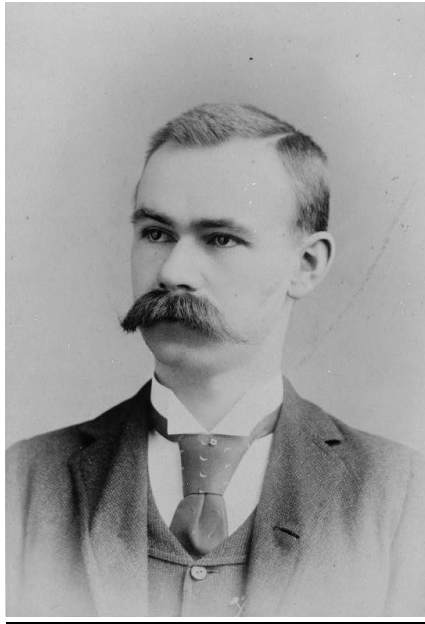
Charles babbage





Herman Hollerith

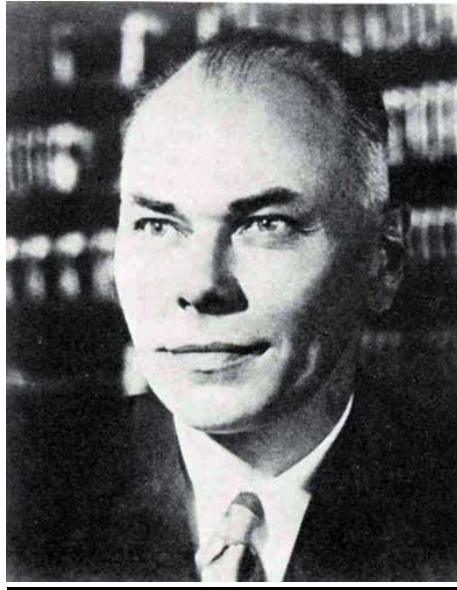




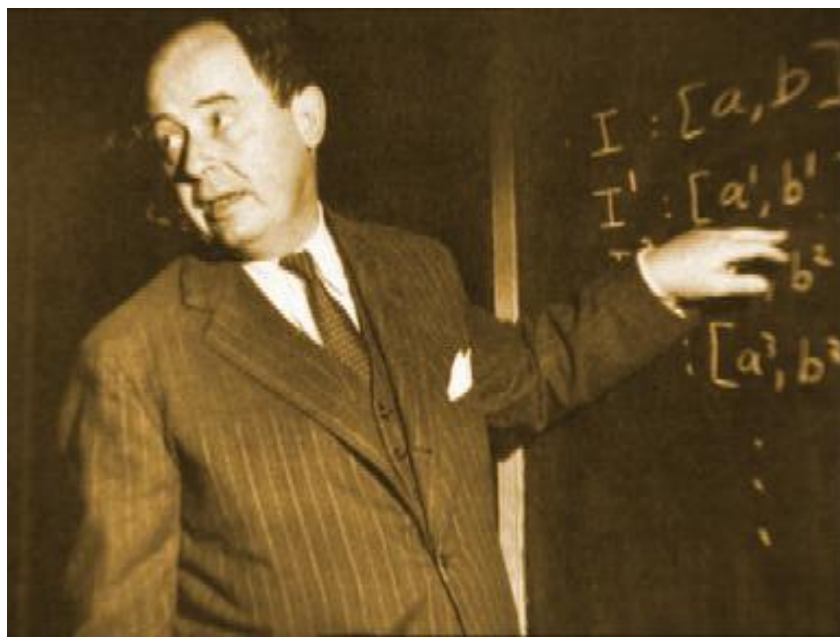
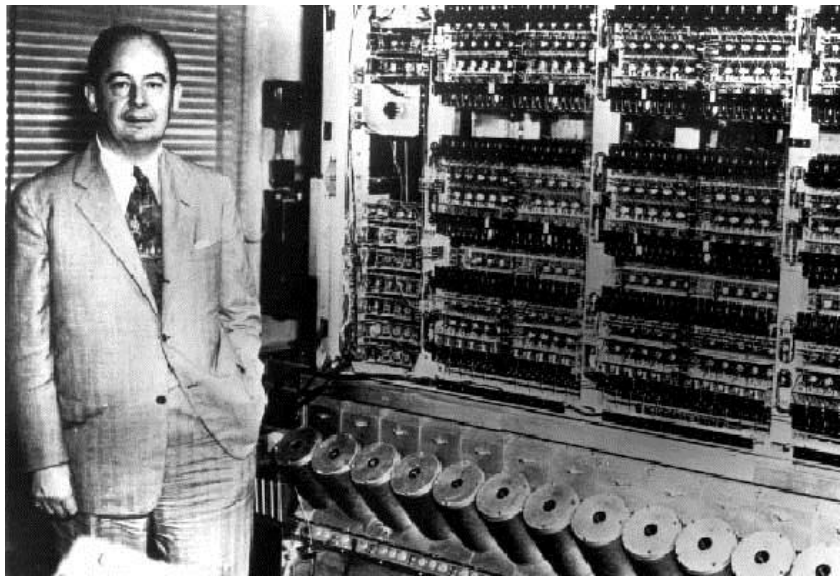
John Atanasoff and Clifford Berry



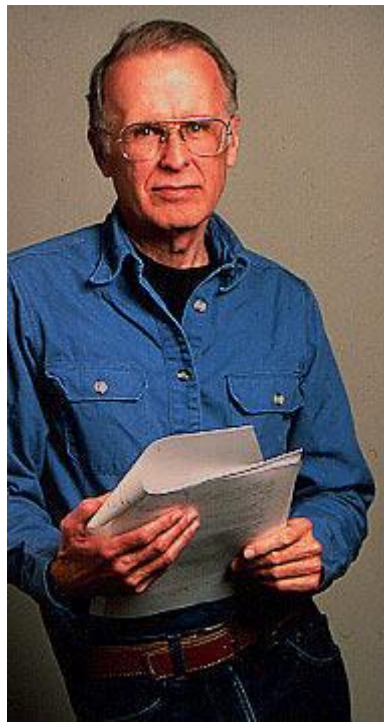
Howard Aiken



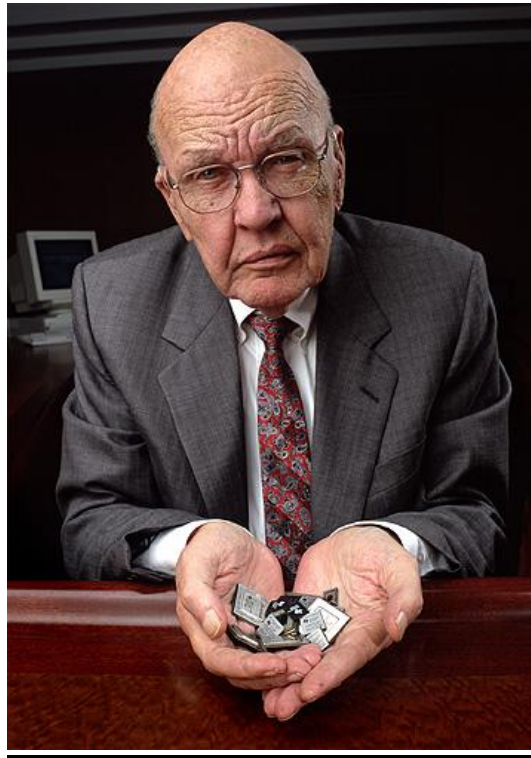
Von Neumann



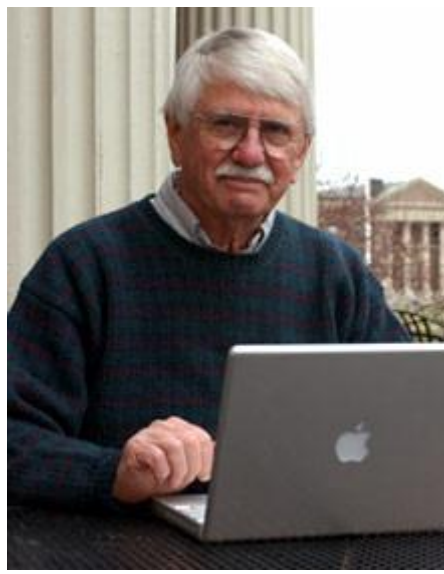
John Backus

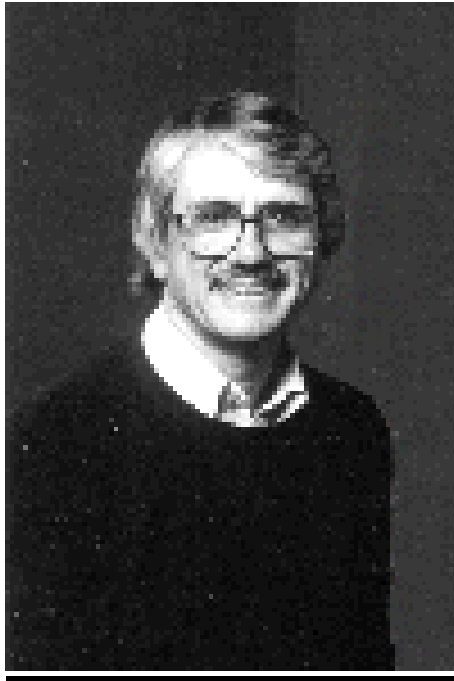


Jack Kilby

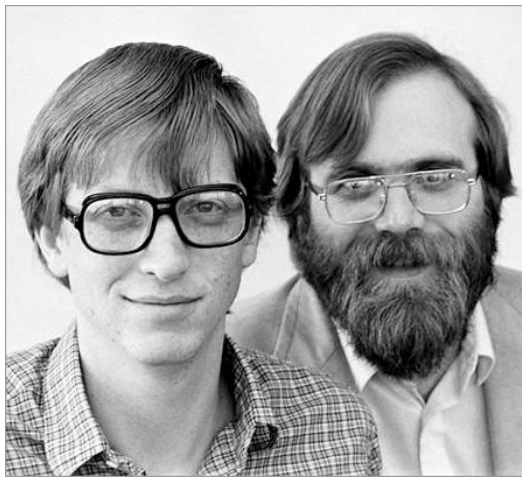


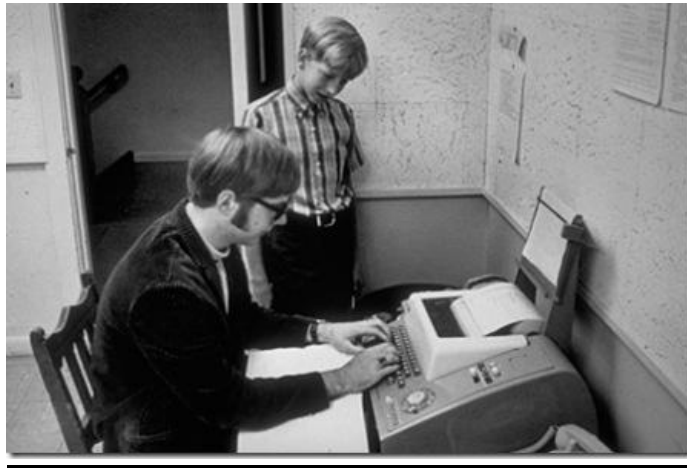
Tom Kurtz & John Kemeny (Left to Right)





Bill Gates & Paul Allen (Left to Right)





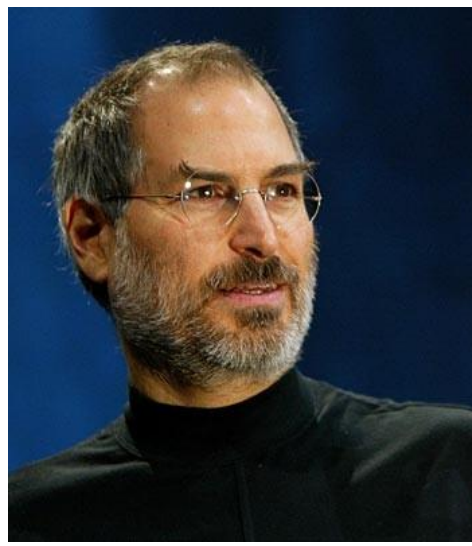


Stars in Computer Sky Today:

Bill gates (Microsoft Chairman)



Steve Jobs (Apple Owner & Excutive Manager)



Richard Stallman (GNU-GPL)



Sir Tim Berners (WWW)



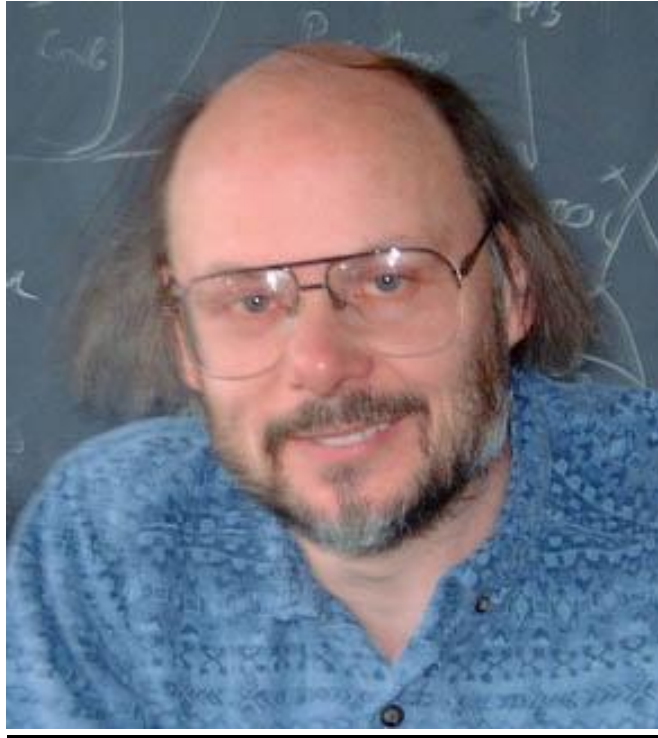
Dennis Ritchie (C Programming Language)



Ken Thompson & Dennis Ritchie (Unix)



Bjarne Stroustrup (C++ Programming Language)



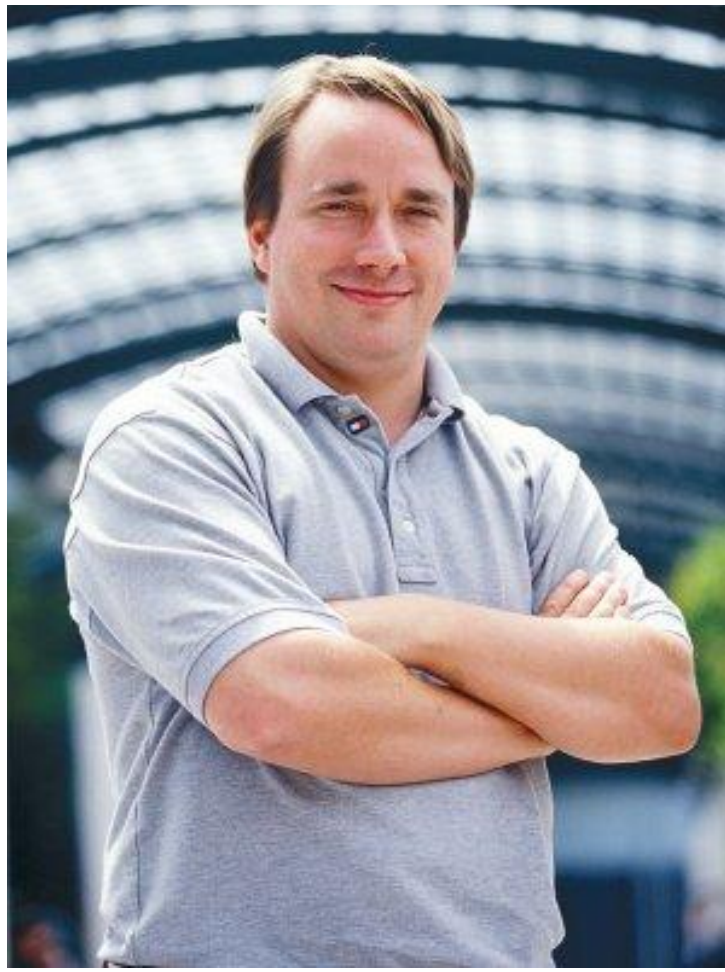
Bill Hewlett & David Packard (HP)



Gordon Moore & Robert Noyce (Intel)



Linus Torvaldis (Linux)



Larry Page & Sergey Brin (Google)



References :

1 - <http://library.thinkquest.org/25485/>

2 – Computer Organization & Architecture 6th Edition

3 – www.wikipedia.com

4 – [google images](#)

5 - <http://www.arabteam2000-forum.com/index.php?showtopic=229600>