

Mechanical Computers

Napier's bones

Pascal's mechanical calculator

Leibniz wheel

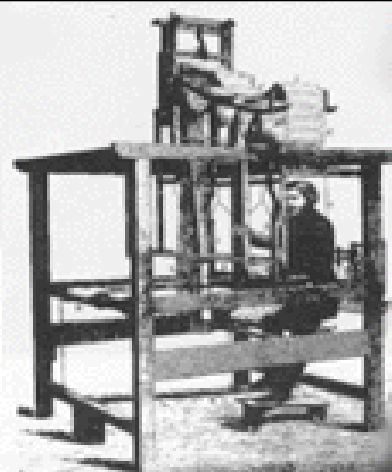
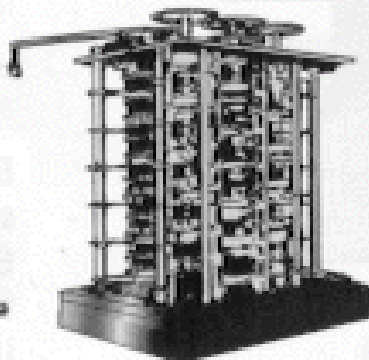
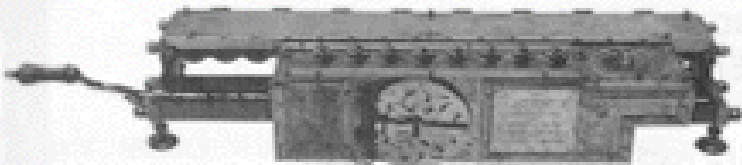
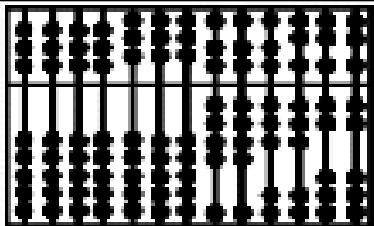
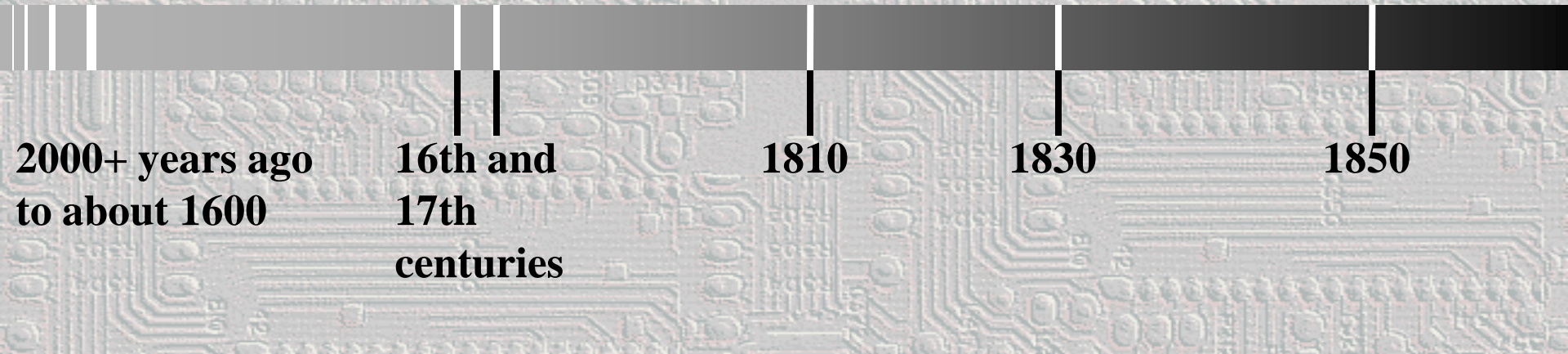
Jacquard loom

Difference Engine

Analytical Engine

Augusta Ada first programmer

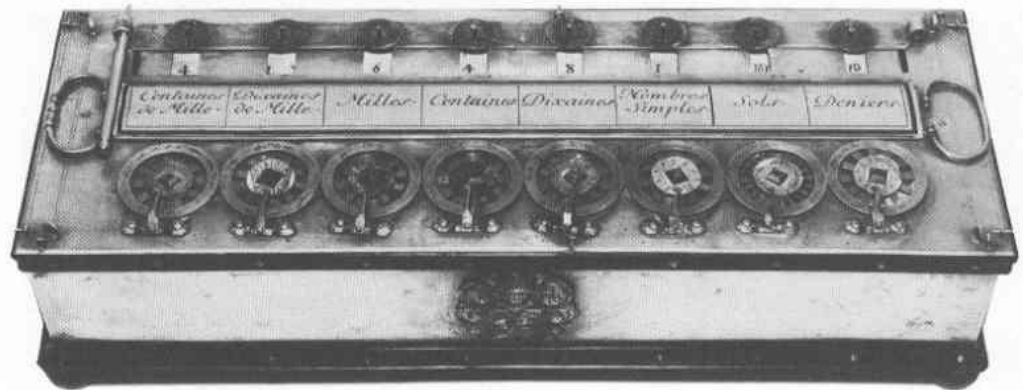
Abacus



Blaise Pascal



Calculating Machine (1642)



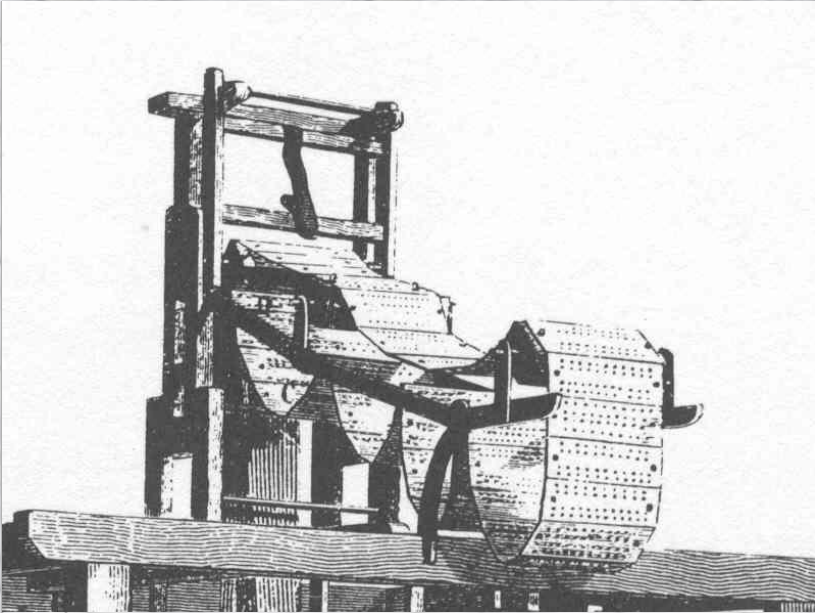
The Jacquard Loom



The weaving industry gave birth to the idea of programmable machines.

The Jacquard loom creates exact, repeating designs through the use of punched cards.

Joseph Jacquard (1752-1834)



Programmed using
holes in cards



Charles Babbage

Created the first real computer, making use of the idea of punched cards.

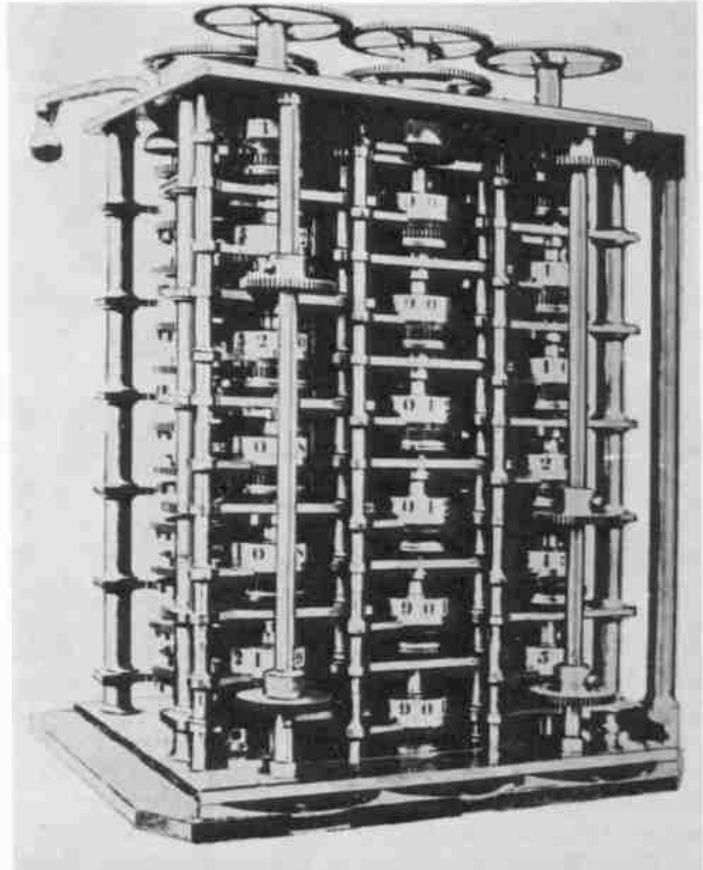
Charles Babbage



The Analytical Machine

The Analytical Machine contained the main parts found in modern computers:

- Input device
- Processor
- Memory
- Output



Lady Lovelace, the first programmer

An enthusiastic supporter of Charles Babbage's Analytical machine, Augusta Ada, Countess of Lovelace made several innovations that are important to programming today.

- Subroutine
- Loops
- Conditional Jumps

Ada Augusta



Early Electric Computers

Hollerith creates
Automatic Card
Reader for U.S.
census

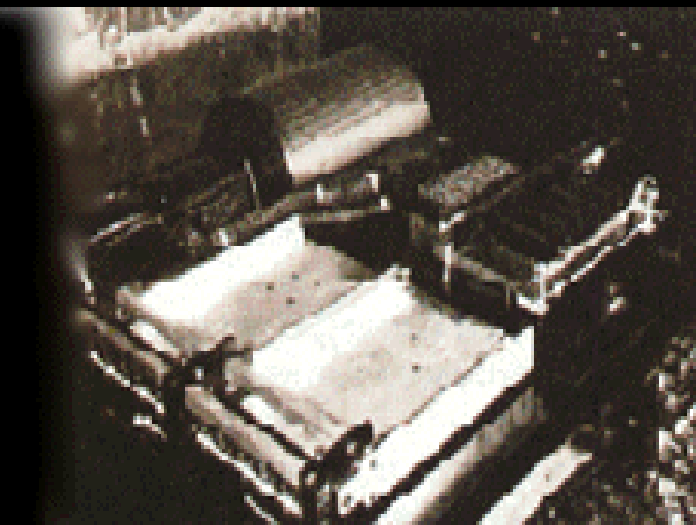
1890

IBM
founded

1924

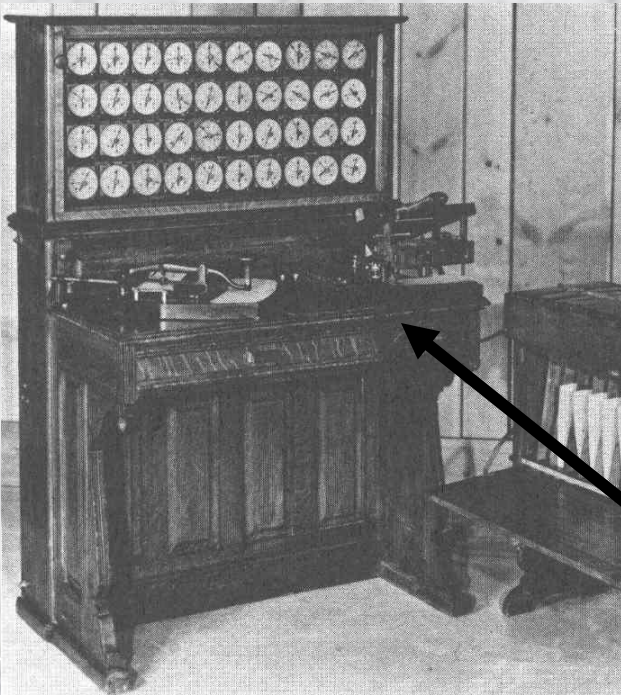
First electronic
binary computers
Z1 and Z2

1930

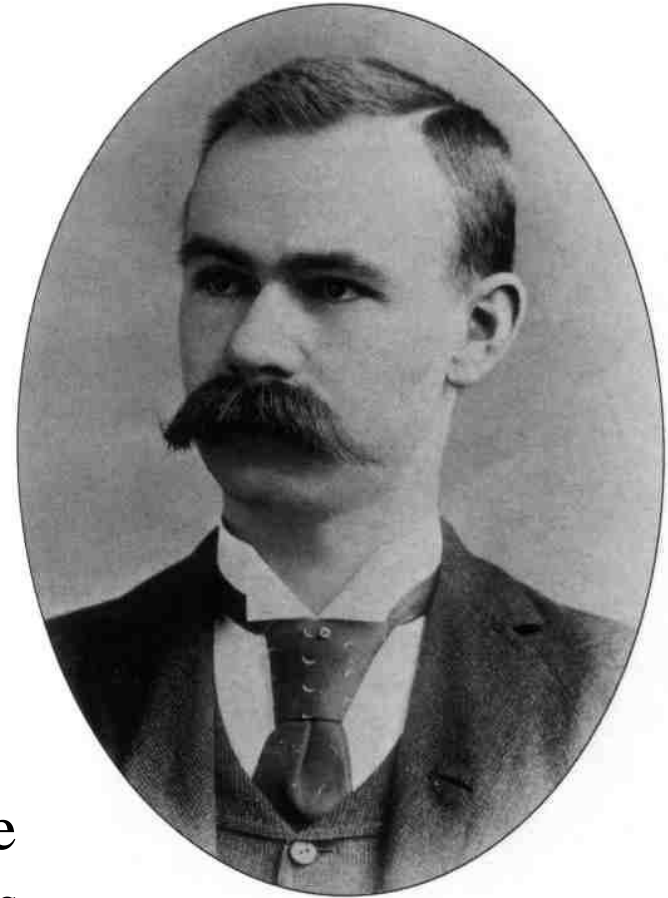


Herman Hollerith

Herman Hollerith won a competition to find an easier way to calculate census data back in the 1880's.

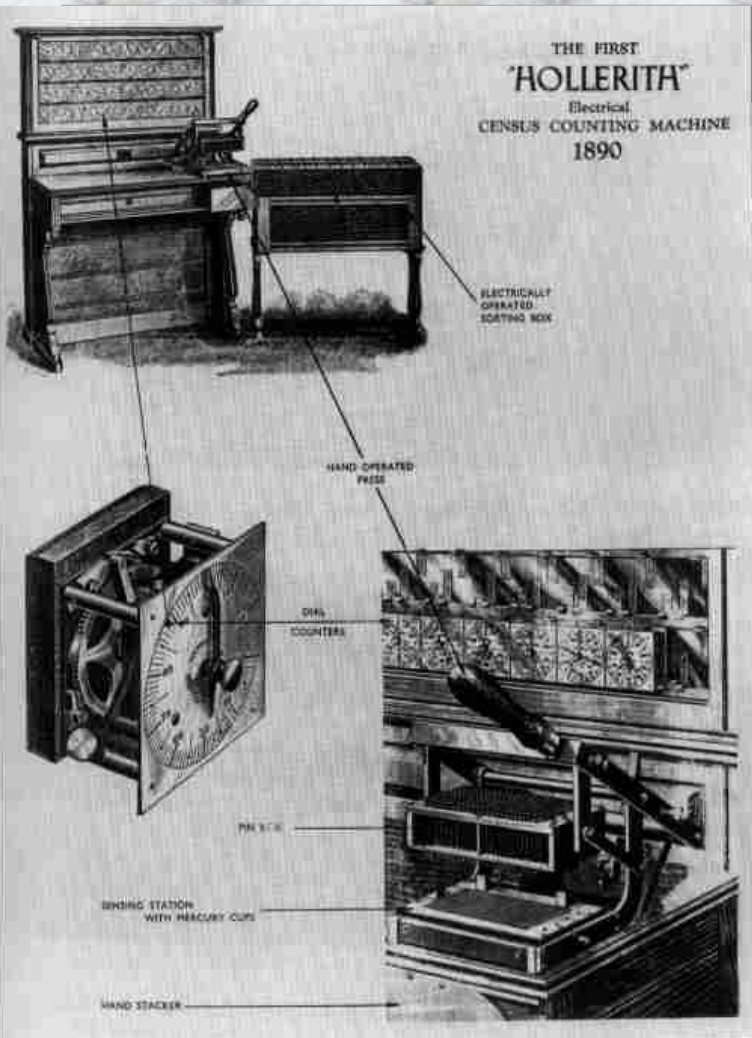


Used to tabulate the 1890 Census



Herman Hollerith

Hollerith's Census Counting Machine



Hollerith's Census Counting machine used an Automatic Card Reader to input information.

If a pin passed through an opening in a card, it completed the electrical circuit.

The company he founded later became International Business Machines or IBM for short.

Wartime Computers

Enigma

**Colossus
first digital
computer**

**U.S. team
builds Mark I
computer, 8
feet tall and
50 feet long**

**Mauchly and
Eckert complete
the ENIAC, a
vacuum tube
digital computer**

**Transistor
developed**

1940

1941

1943

1946

1947



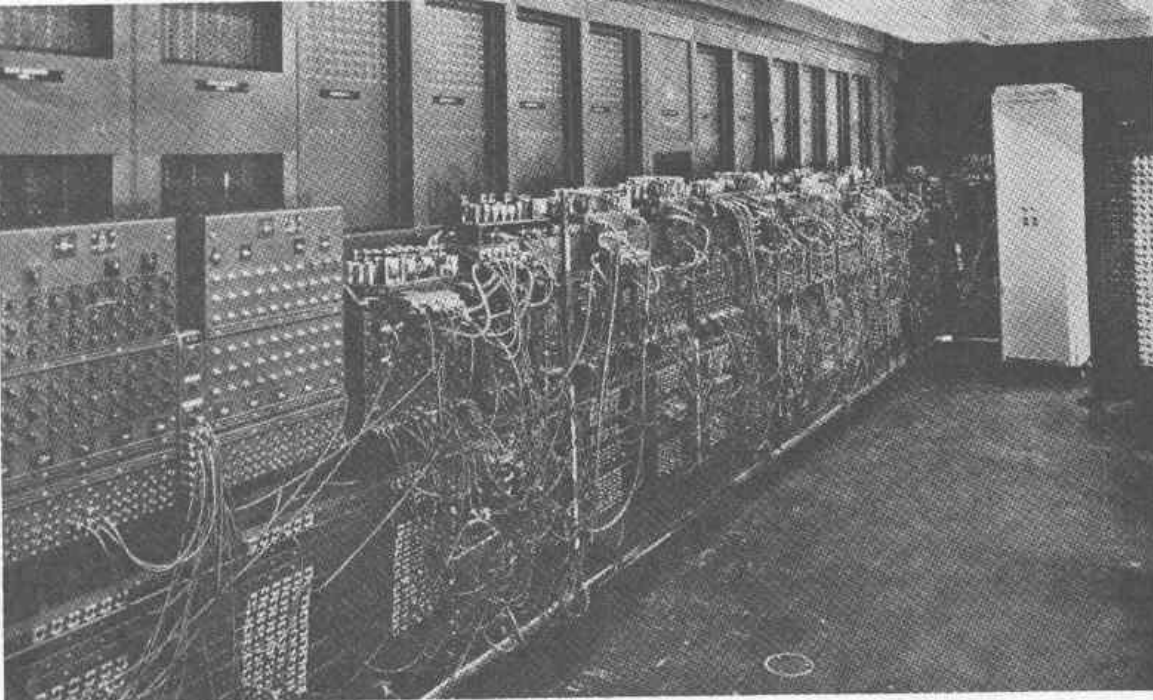
WWII and the advance of computer technology

Polish secret service stole German machine, the ENIGMA, used to encrypt communications. British secret service group (containing Alan Turing) formed to decipher German codes encrypted by Enigma machines, built the Colossus the first all-electronic digital machine. Colossus used vacuum tubes.

U.S. Army built the ENIAC (Electronic Numerical Integrator and Calculator) to calculate projectile trajectories.

The Mark I, built by IBM scientists, Harvard University and the U.S. War Dept., used relay switches instead of vacuum tubes. This machine made defense calculations for the U.S. Navy.

The ENIAC



It weighed over 60,000 lbs., and was over eighty feet long.

To change a program on the ENIAC, programmers had to rewire the machine by hand.

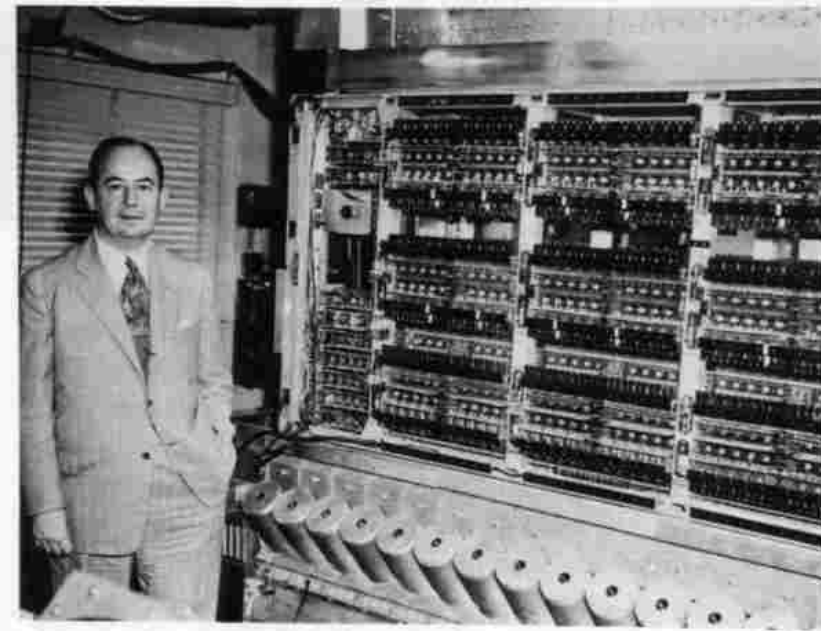
The first electronic digital computer was the ENIAC, which was built by the Moore School of Engineering at the University of Pennsylvania for the U.S. Army. It used 19,000 vacuum tubes and hundreds of thousands of other electrical parts.

Stored Program Concept

Von Neuman solved programmability by giving the computer instructions as well as data for input.

He reasoned that the computer could be fed instructions as binary numbers and stored in memory.

The UNIVAC (Universal Automatic Calculator) was one of these stored-program computers. One was bought by the General Electric company which was the start of computers in business.



Dr. John von Neumann stands next to his MANIAC (*M*athematical Analyzer, *N*umerical Integrator and *C*omputer) at Princeton, New Jersey.

*Von Neumann proposed the concept of a stored program in a report written for the ENIAC project in 1945. Many people in the computer field feel that Mauchly and Eckert should share the honors for this invention.

The Transistor Age

The invention of the transistor allowed computers to be built that were smaller, more reliable and used less electricity than computers with vacuum tubes and relays.

By the mid-1970's hobbyists could build their own small computers based on microprocessors.

In 1976 Steve Jobs and Steve Wozniak built the Apple II computer which could be programmed in BASIC with a built-in keyboard and could display text and color.

Electronic and Digital Computers

**Remington
Rand builds
UNIVAC 1
first stored
memory**

**IBM 650
created; IBM
also ships the
first electronic
computer, the
mainframe 701**

**Minicomputers
marketed by Digital
Equipment
Corporation; Fortran
programming
language created**

**Integrated
circuit
created**

**AT&T
creates first
commercial
modem**

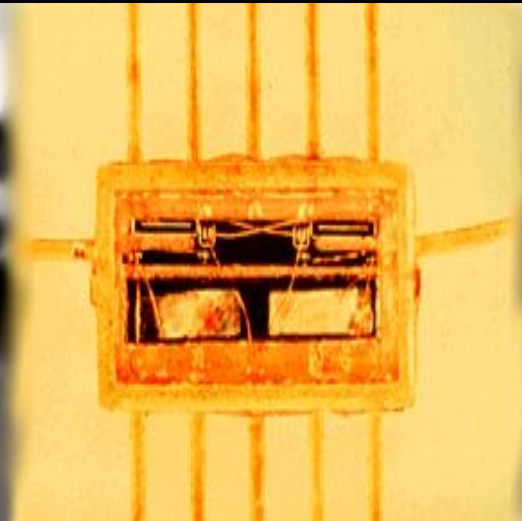
1950

1953

1957

1958

1960

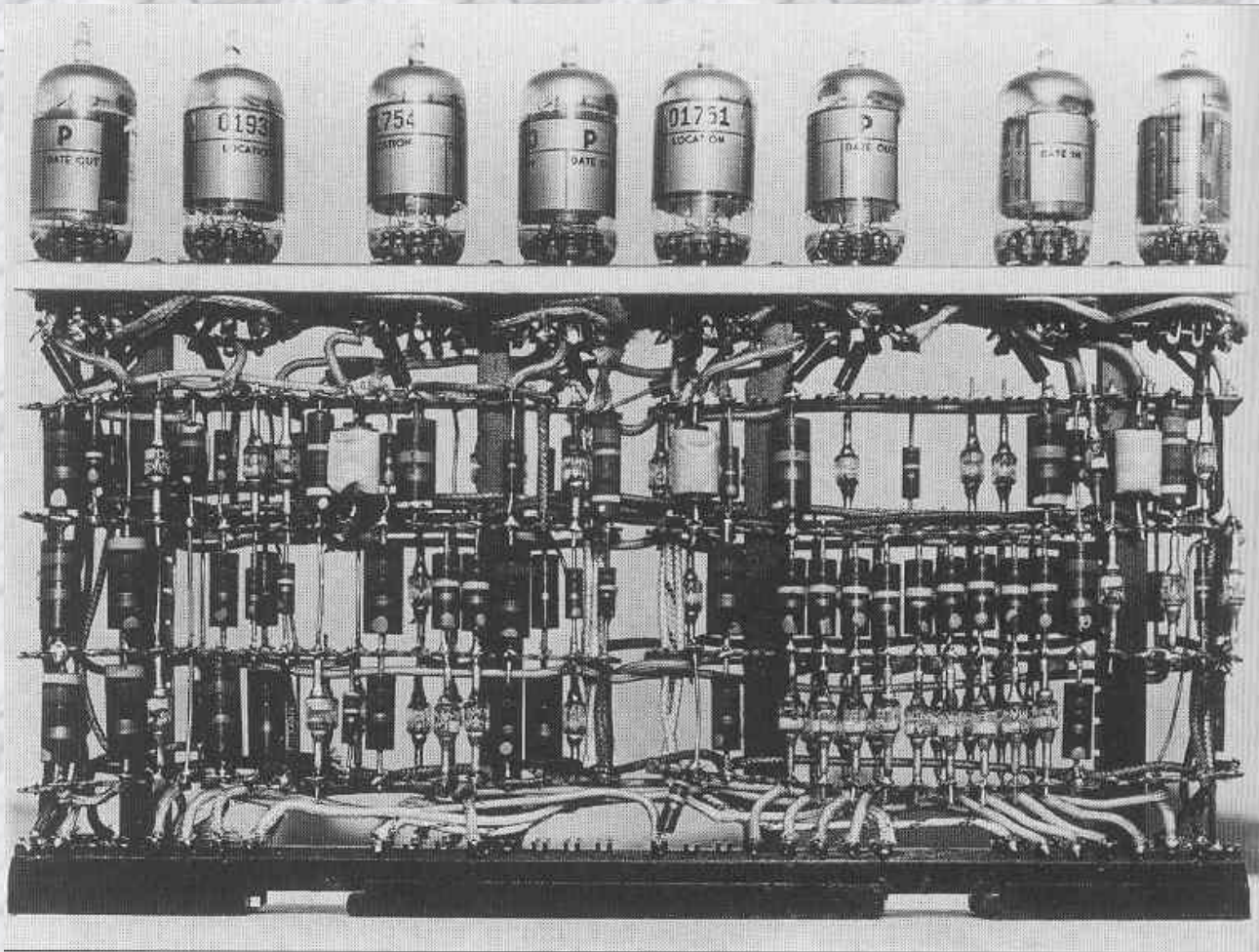


IBM 701



IBM 701, 1952 (*IBM Archives*)

IBM 701 circuit board



▲ Vacuum tubes for the IBM 701, ca. 1950

Miniaturization, Automation and the Space Age

PDP-1, first digital mini-computer with video display; first industrial robot put to use by GM

IBM creates the System/360 series of computers; first supercomputer is developed

PDP-8 becomes the first successful mini-computer

SRI builds the first moving robot with artificial intelligence

Apollo 11 lands on the moon, guided by the Apollo guidance computer

Intel micro-processor; first micro-computer

1960

1964

1965

1970

1969

1971



MIT'S Altair

By the mid 70s, computer hobbyists were able to build their own small computers. One of the most popular being the ALTAIR Computer.



▲ The MIT'S Altair 8800, assembled
COURTESY OF INTEL CORP.



Personal and Multimedia Computers

Apple
computer
created

DOS
becomes the
industry
standard

IBM
first micro-
computer

Macintosh
computer
created

IBM
introduces
first laptop
computer

IBM and
Microsoft
release the
OS/2
operating
system

Microsoft
releases
Windows
3.0

Multimedia
computers
and personal
data
assistants
developed

1976

1980

1981

1984

1986

1988

1990

1994



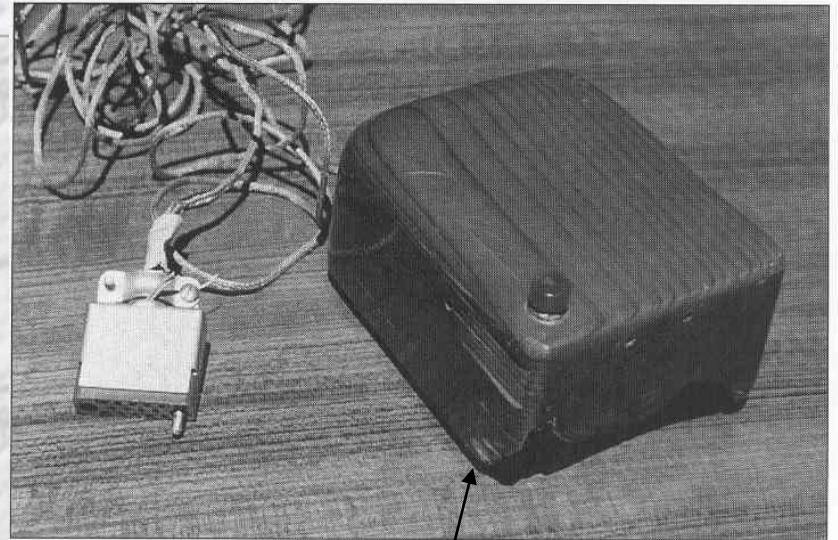
Steve Wozniak and Steve Jobs



▲ *Steve Wozniak and Steve Jobs in Jobs's garage, ca. 1975*

COURTESY OF APPLE COMPUTER, INC.

The graphical user interface is born



▲ *The first mouse, carved out of wood, which Doug Engelbart invented at SRI in 1964 as part of an experiment to point and click on display workstations*

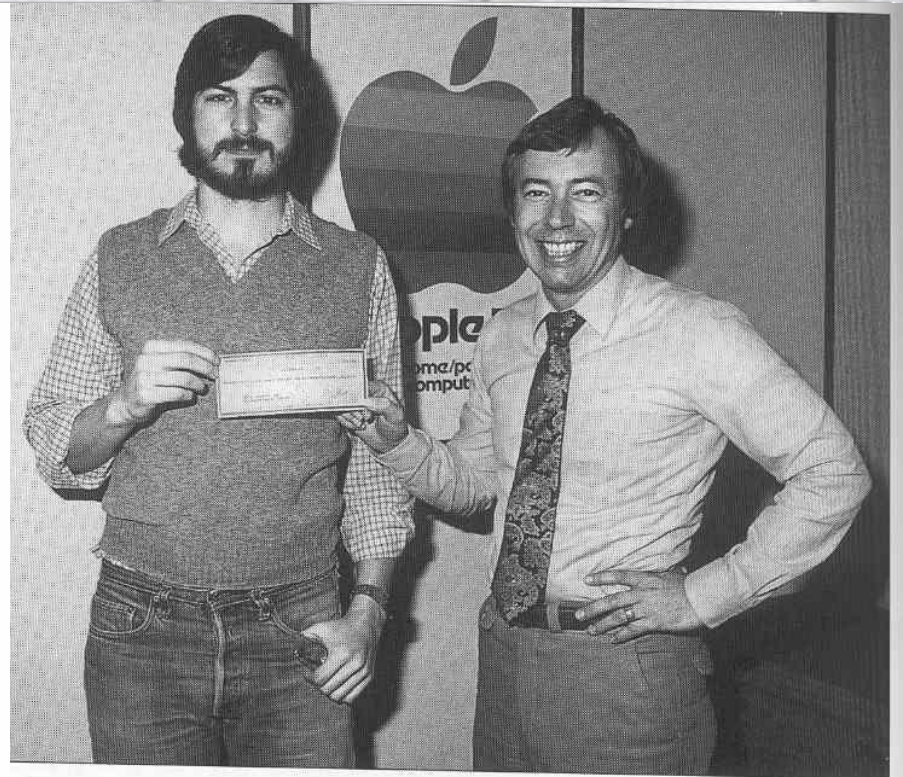
COURTESY OF DOUG ENGELBART

The first mouse

The Apple Lisa - 1983



Apple II - 1977



▲ Mike Markkula presenting Steve Jobs with a check for \$92 million from his stock offering after Apple Computer went public in December 1980

COURTESY OF APPLE COMPUTER, INC.

◀
COURTESY OF APPLE COMPUTER, INC.

IBM - 1981



▲ *The IBM PC in 1981, which gave the computer industry the stamp of approval it needed, changing it forever*

COURTESY OF IBM ARCHIVES

The Apple Macintosh - 1984



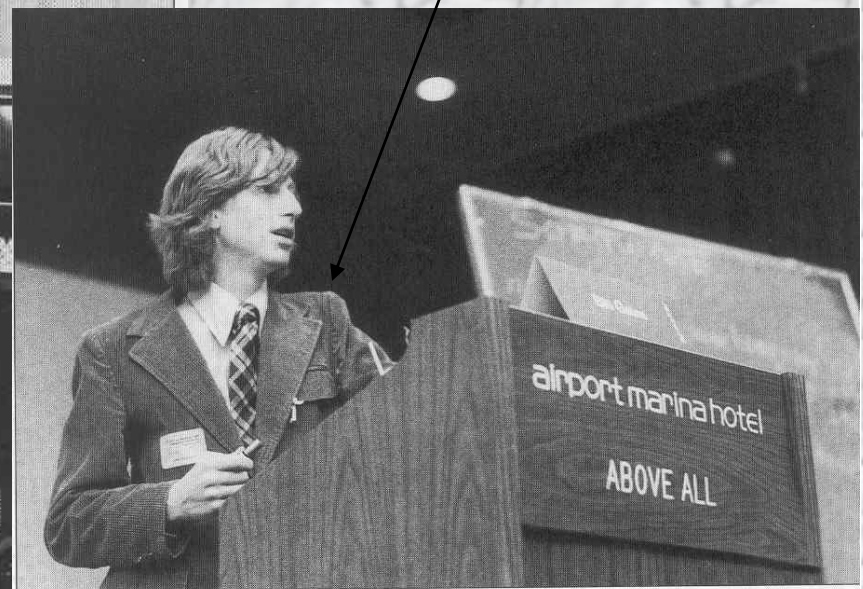
▲ *Apple Computer's original Macintosh, 1984*

COURTESY OF APPLE COMPUTER, INC.

The IBM PC gets *Software*



Bill Gates



▲ Bill Gates at the World Altair Computer Convention, 1976

COURTESY OF DAVID H. AHL

▲ Paul Allen and Bill Gates surrounded by personal computers on October 19, 1981, shortly after signing a contract with IBM to write software for the IBM PC

COURTESY OF SARAH HINMAN, MICROSOFT MUSEUM

For more information on old computers
go to:

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- <http://www.old-computers.com/history/timeline.asp>
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