HISTORY OF COMPUTER

EGCO103 INFORMATION TECHNOLOGY IN THE DAILY LIFE

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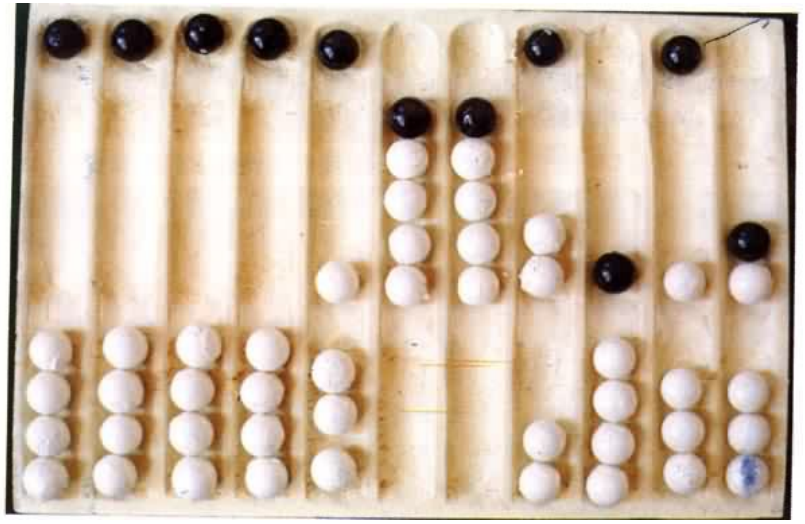
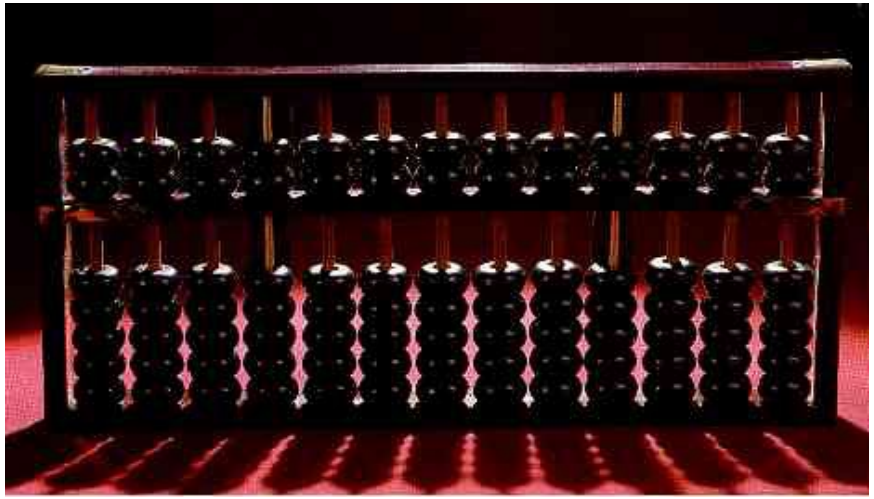
WHAT IS COMPUTER ?

- Computation is a mathematical term meaning the action of mathematical calculation.
- Today, a computer is an electronic programmable device that is used for processing information and is capable of calculating and storing information.

EARLY COUNTING TOOLS

- The first computer were people!
- The abacus was an early aid for mathematical computations.

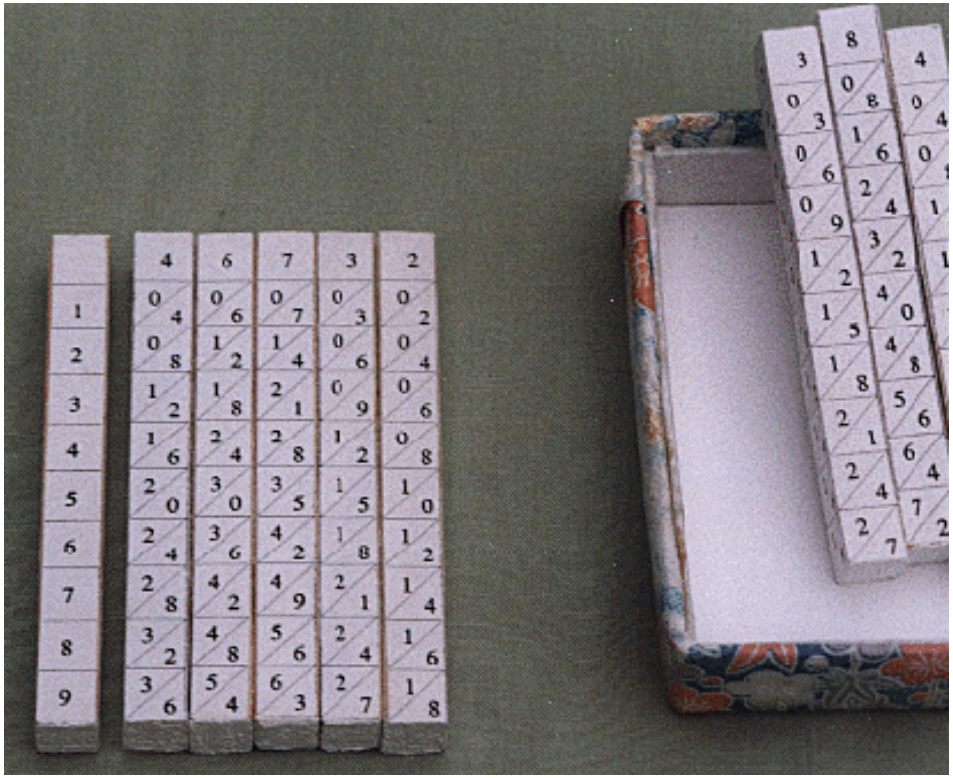


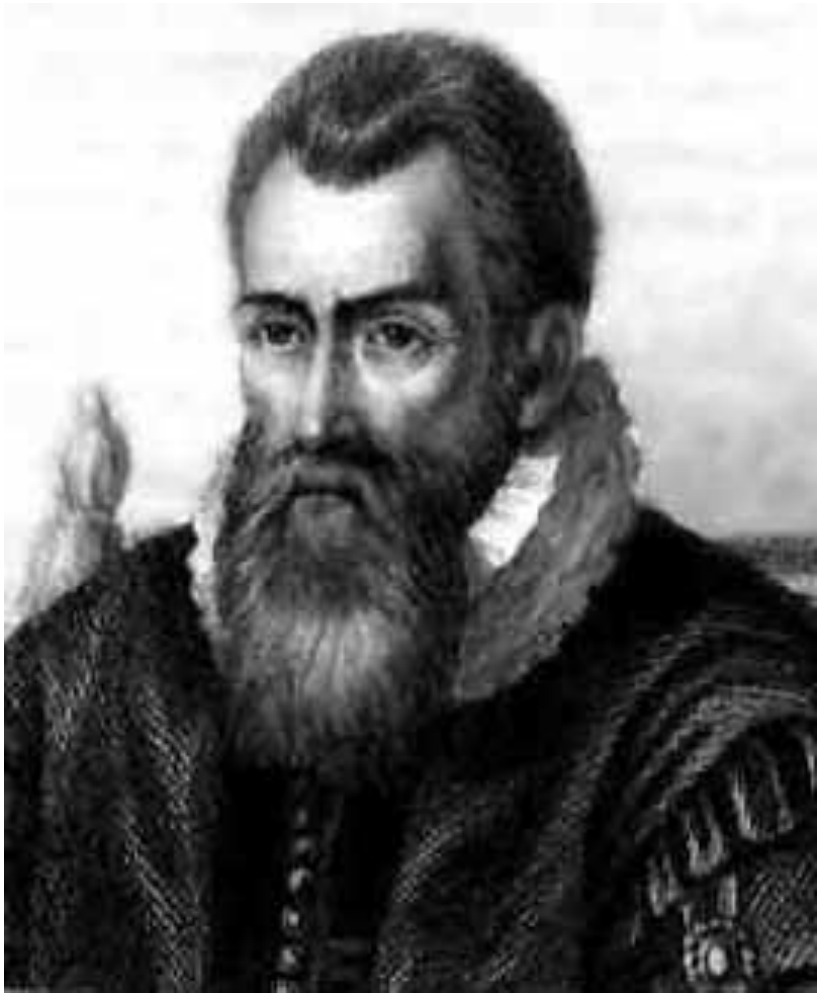


* http://www.computersciencelab.com/ComputerHistory/History.htm

JOHN NAPIER & NAPIER'S BONES (1)

- In 1617, John Napier invented Napier's Bones



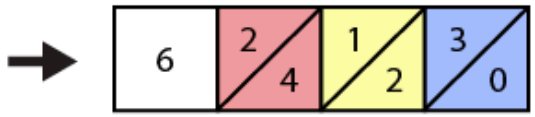


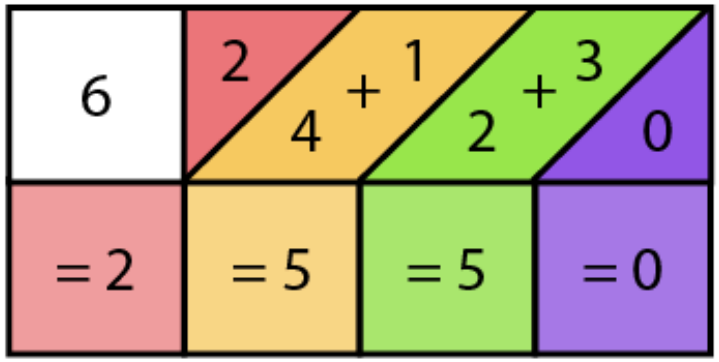
* http://www.computersciencelab.com/ComputerHistory/History.htm

JOHN NAPIER & NAPIER'S BONES (2)

- Example: Multiply 425 by 6 equal ?

1	4	2	5
2	0 / 8	0 / 4	1 / 0
3	1 / 2	0 / 6	1 / 5
4	1 / 6	0 / 8	2 / 0
5	2 / 0	1 / 0	2 / 5
6	2 / 4	1 / 2	3 / 0
7	2 / 8	1 / 4	3 / 5
8	3 / 2	1 / 6	4 / 0
9	3 / 6	1 / 8	4 / 5

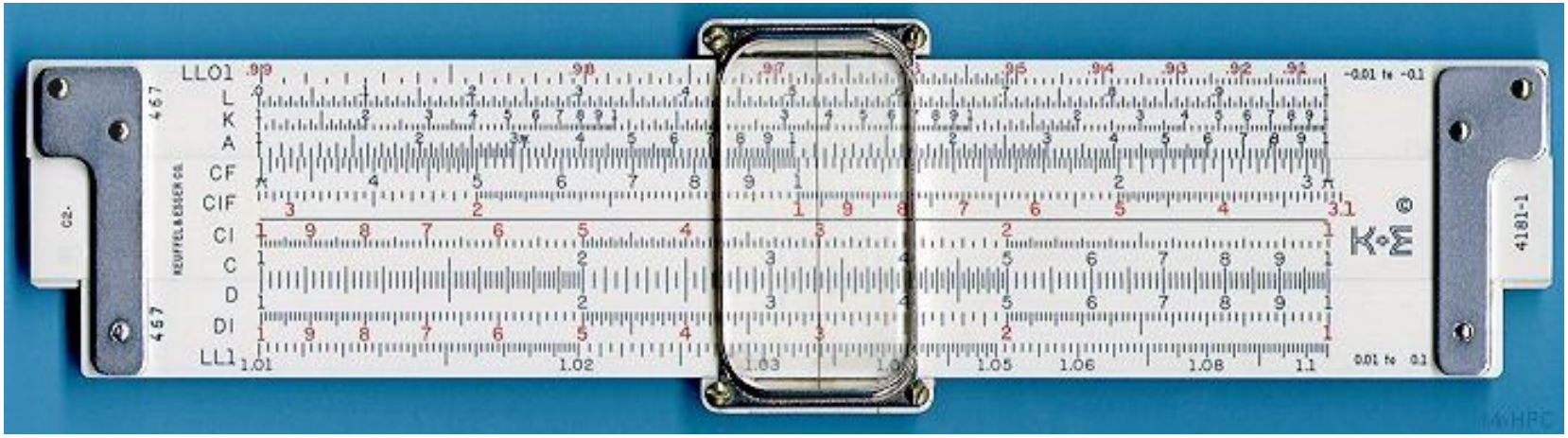




* https://en.wikipedia.org/wiki/Napier's_bones

JOHN NAPIER & NAPIER'S BONES (3)

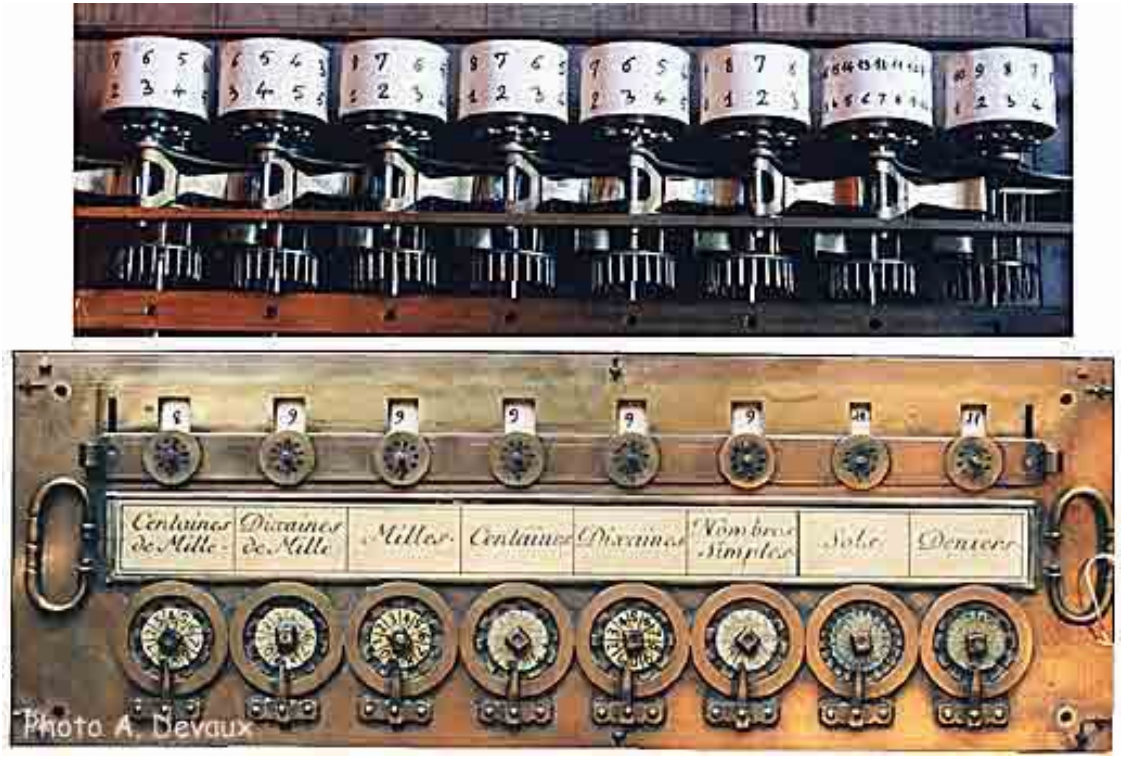
- In 1632, William Oughtred invented Slide Rule, first build in England and still use in the 1960's by the NASA engineers of Mercury, Gemini, and Apollo programs

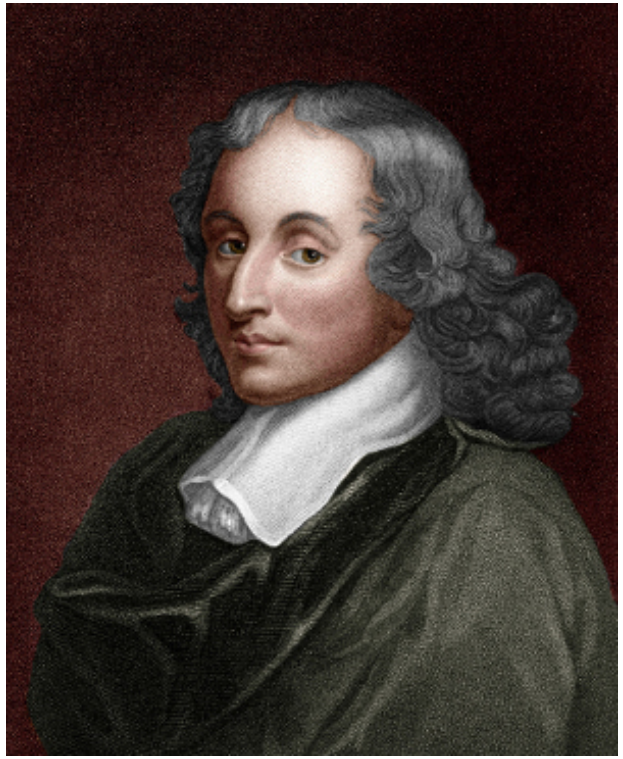


* http://www.computersciencelab.com/ComputerHistory/History.htm

GEAR-DRIVEN MACHINES (1)

- In 1642, Blaise Pascal, at age 19 invented the Pascaline as an aid for his father who was a tax collector.





* http://imgkid.com/blaise-pascaline.shtml

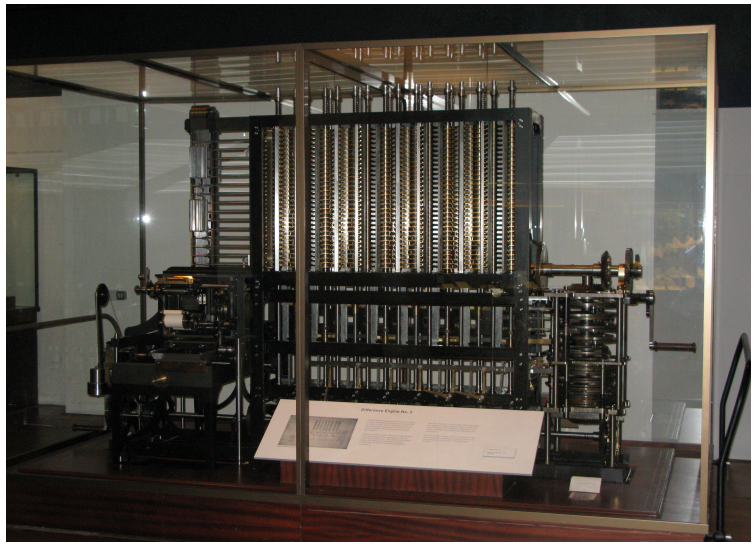
GEAR-DRIVEN MACHINES (2)

- In 1801 the Frenchman Joseph-Marie Jacquard invented the Jacquard's Loom and Punched Card

* http://en.wikipedia.org/wiki/Jacquard_weaving

CHARLES BABBAGE & HIS ENGINES

- In 1822 the English mathematician Charles Babbage invented the Difference Engine.
- Augusta Ada Byron, Countess of lovelace, when she was only 19, she was fascinated by Babbage's ideas and thru letters and meetings with Babbage she learned enough about the design of the Analytic Engine to begin fashioning “programs” for the still unbuilt machine.



* http://en.wikipedia.org/wiki/Jacquard_weaving

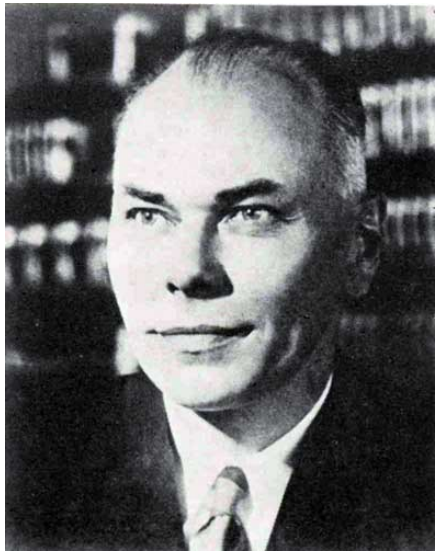
ELECTRO-MECHANICAL MACHINES (1)

- In 1890, 50 years after Charles Babbage's death, Hollerith invented a machine called the “Tabulating Machine”

* http://www.vintage-computer.com/vcf6_de.shtml

ELECTRO-MECHANICAL MACHINES (2)

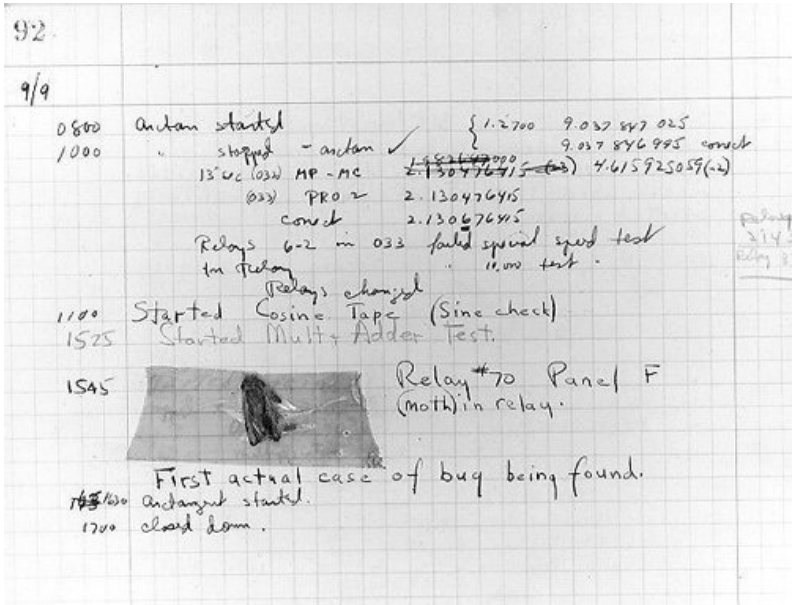
- In 1937, Howard Aiken outlined a plan for a machine that could perform math problems involving very large numbers. Because it handled distinct amounts or numbers, it was a digital (rather than analog) device.
- In 1944, IBM paid engineers to build Aiken's machine. Called the Mark I



* http://histinf.blogs.upv.es/2010/10/28/biografia-de-howard-h-aiken/

ELECTRO-MECHANICAL MACHINES (3)

- Grace Hopper found the first computer "bug": a dead moth that had gotten into the Mark I and whose wings were blocking the reading of the holes in the paper tape.
- The word "bug" had been used to describe a defect since at least 1889 but Hopper is credited with coining the word "debugging" to describe the work to eliminate program faults.

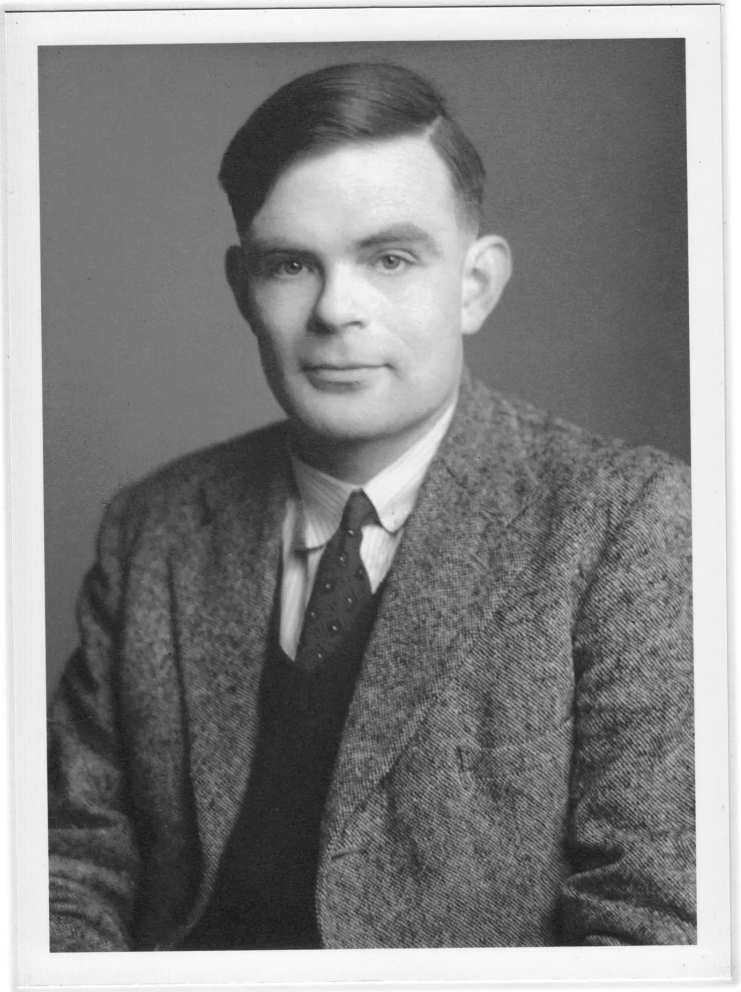


* http://www.computersciencelab.com/ComputerHistory/HistoryPt3.htm

ELECTRONIC DIGITAL COMPUTERS (1)

- Alan Turing (1912-1954)
- The Universal Machine

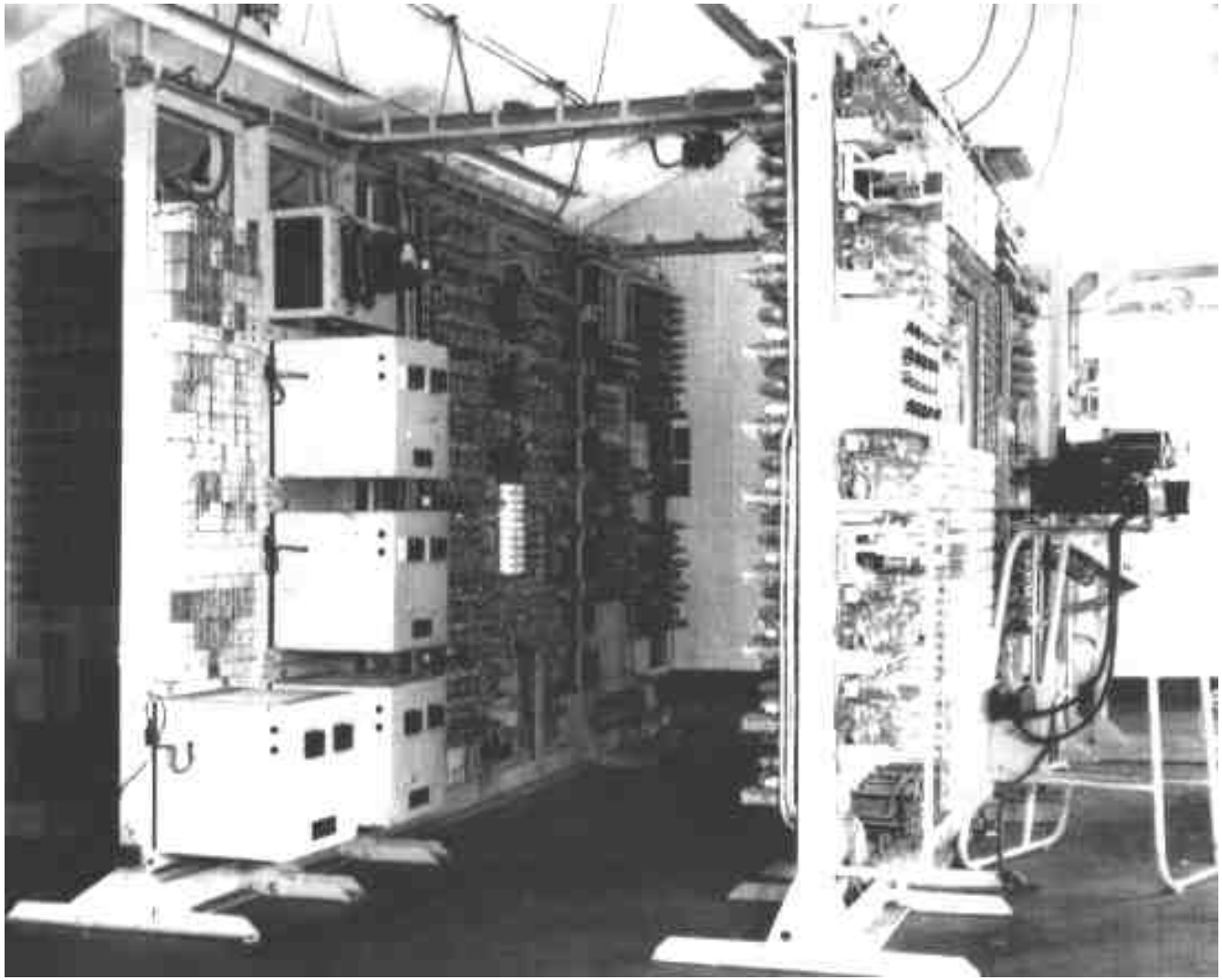
Enigma



* Picture from New York Times

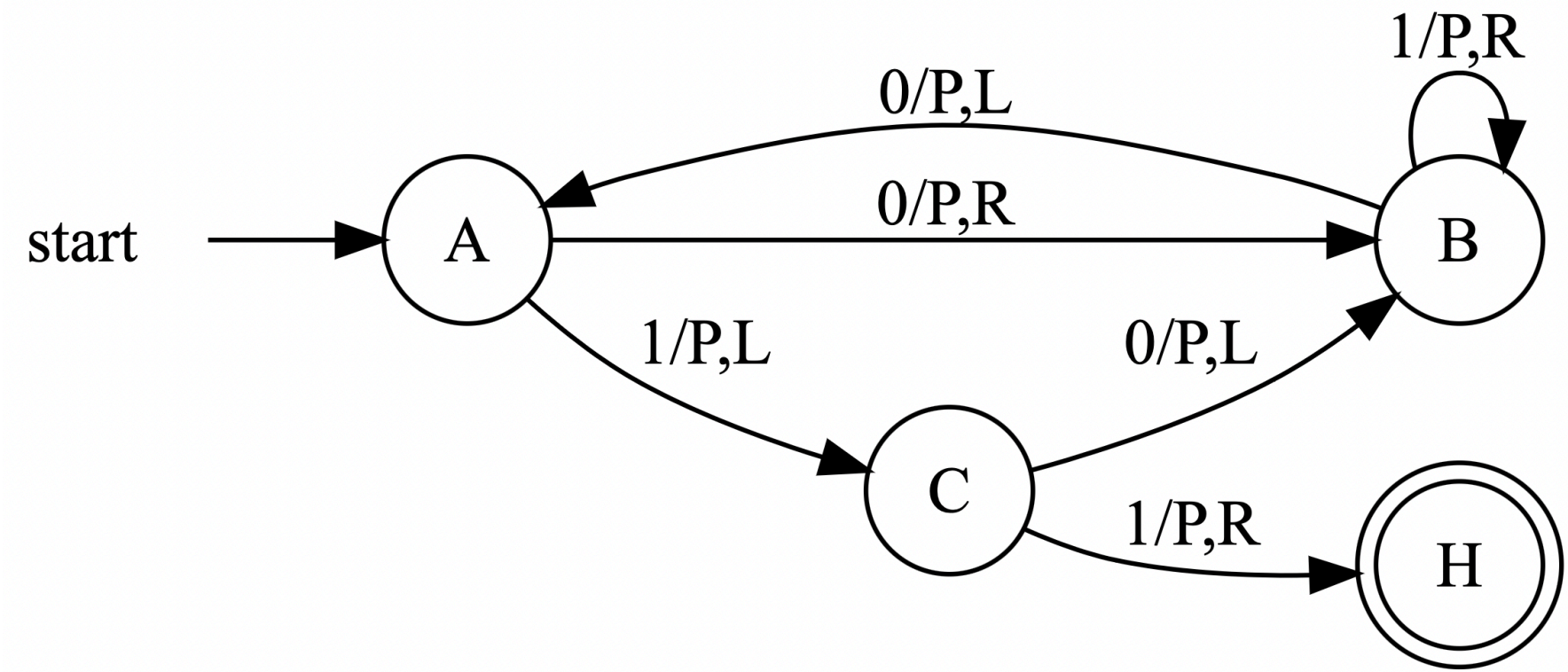
ELECTRONIC DIGITAL COMPUTERS (2)

- Bletchley Park's Colossus (1943)



ELECTRONIC DIGITAL COMPUTERS (2)

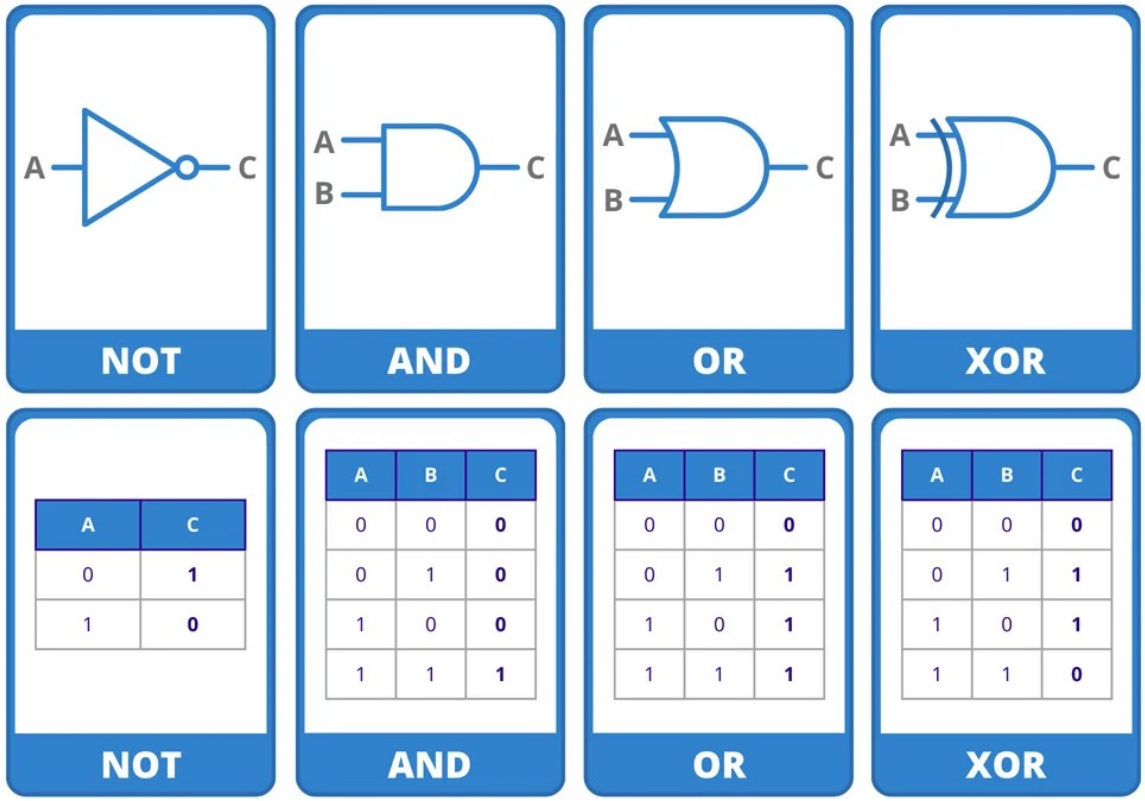
- Turing machine in finite-state representation

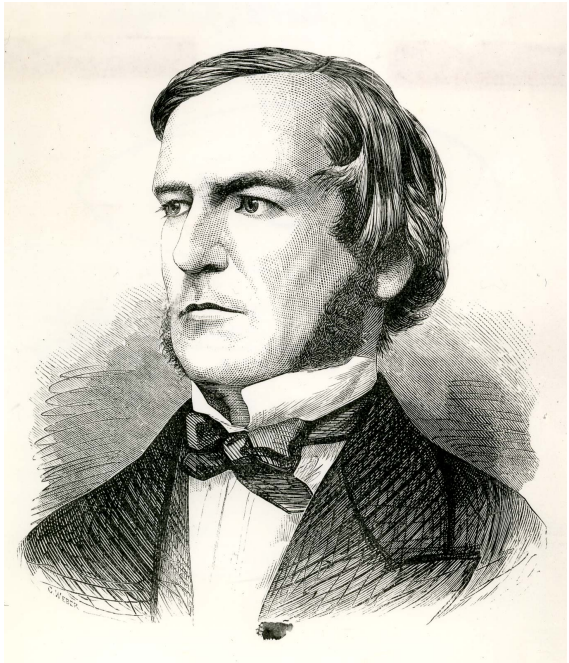


https://en.wikipedia.org/wiki/Turing_machine

HOW IS COMPUTER CALCULATED (1)

- George Boole (Boolean Algebra)

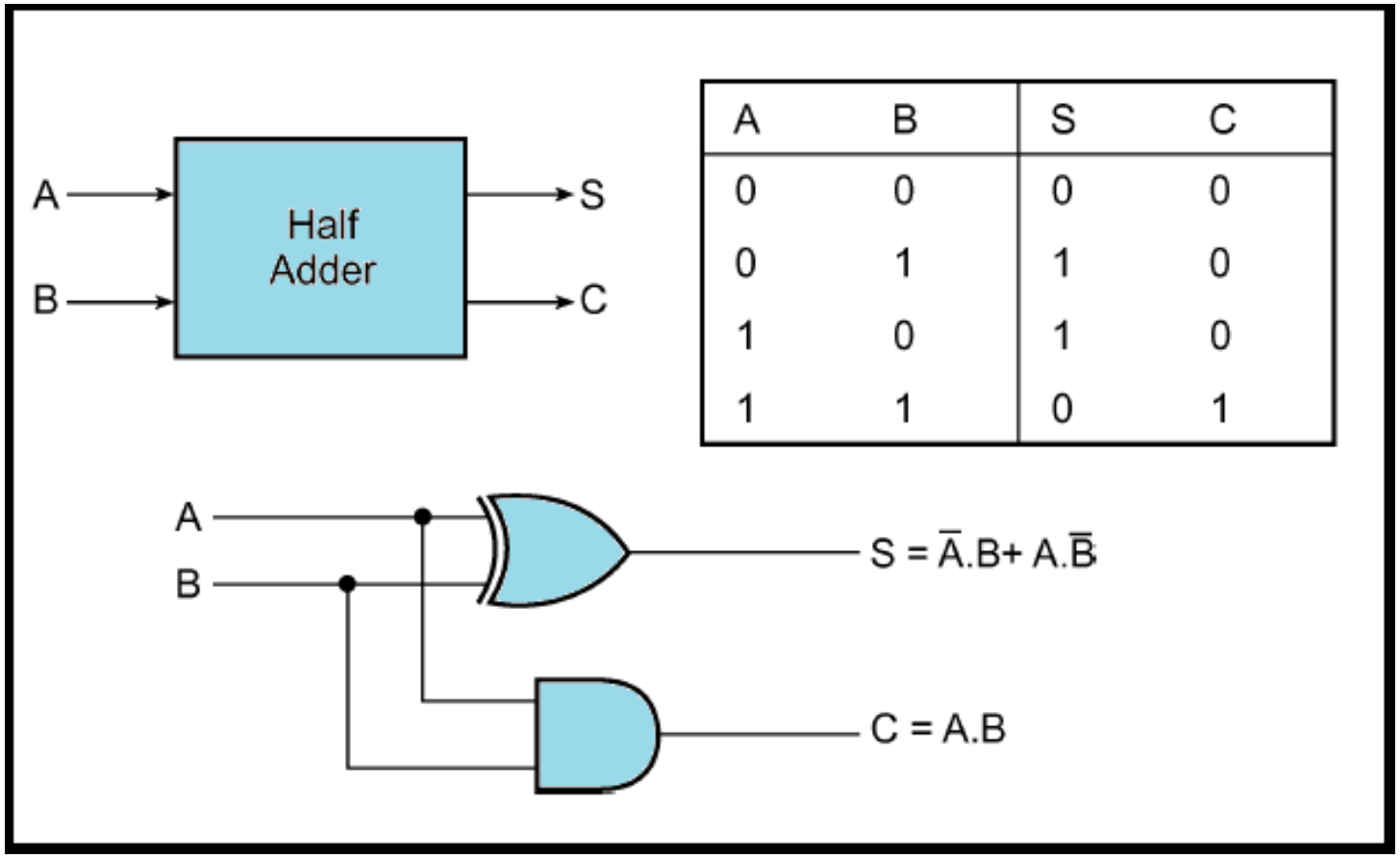




https://www.britannica.com/biography/George-Boole

HOW IS COMPUTER CALCULATED (2)

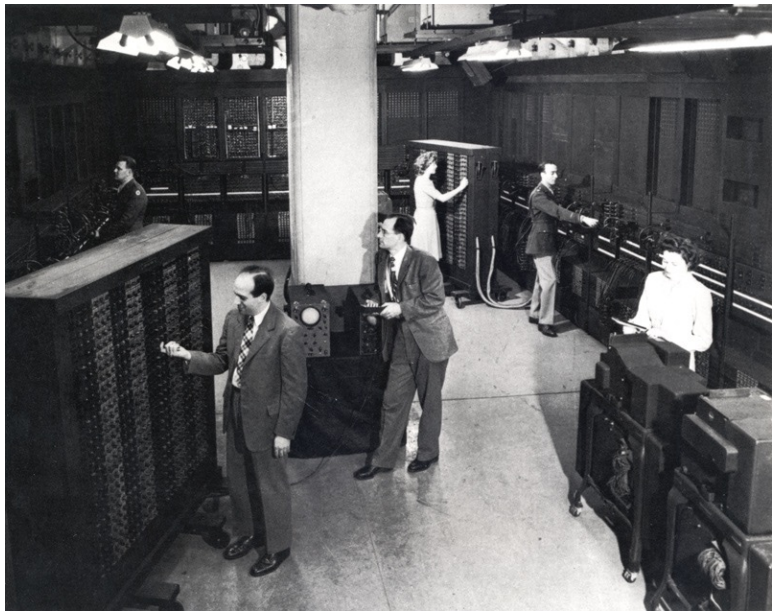
- Half Adder - Truth Table & Circuit



A	B	S	C
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

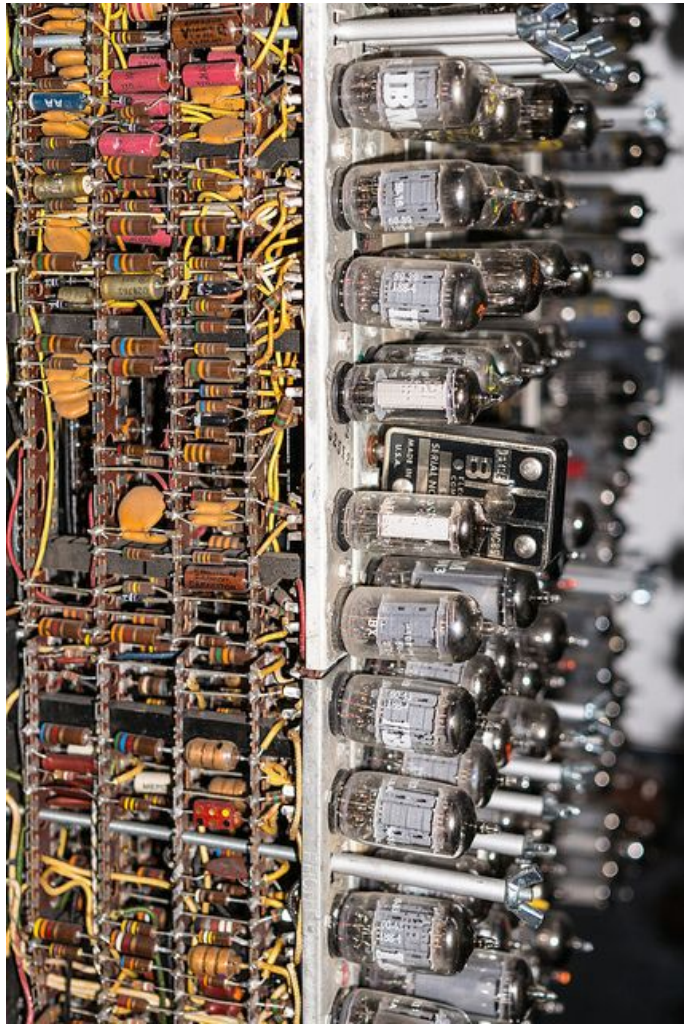
THE FIRST GENERATION: 1945-1956 (THE VACUUM TUBE YEARS)

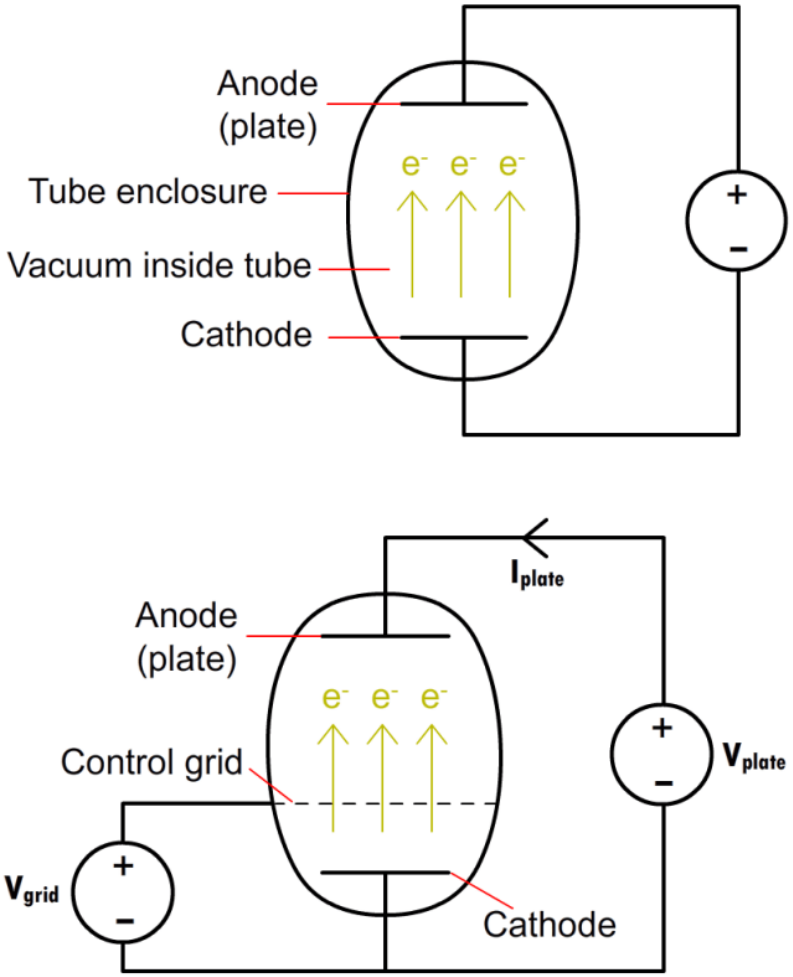
- In 1946 two Americans, Presper Eckert, and John Mauchly built the ENIAC (Electronic Numerical Integrator and Computer) electronic computer which used vacuum tubes instead of the mechanical switches of the Mark I.
- In 1951, Eckert and Mauchly designed another computer called the UNIVAC (UNIVersal Automatic Computer)



* Picture from Wikipedia

VACUUM TUBES: THE WORLD BEFORE TRANSISTORS





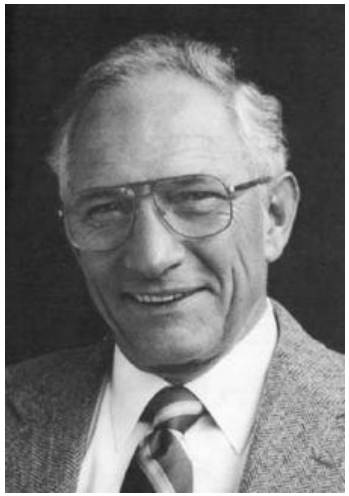
* https://www.engineering.com/story/vacuum-tubes-the-world-before-transistors

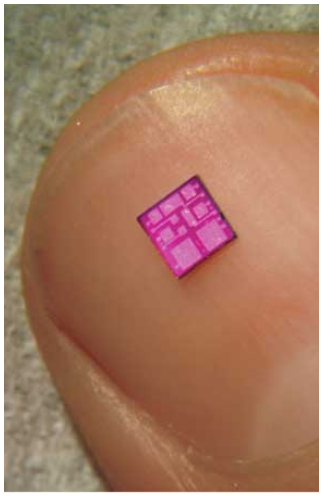
THE SECOND GENERATION: 1956-1963 (THE ERA OF THE TRANSISTOR)

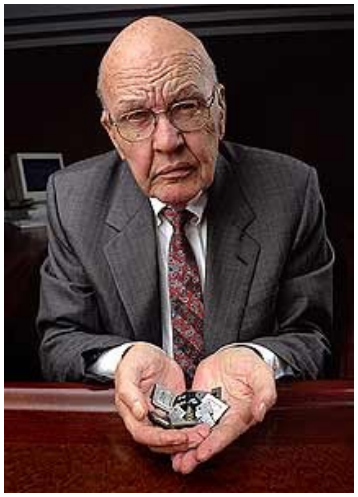
- In 1947 three scientists, John Bardeen, William Shockley, and Walter Brattain working at AT&T's Bell Labs invented what would replace the vacuum tube forever. This invention was the transistor which functions like a vacuum tube in that it can be used to relay and switch electronic signals.
- One transistor replaced the equivalent of 40 vacuum tubes. these transistors were made of solid material, some of which is silicon, an abundant element found in beach sand and glass. Therefore, they were very cheap to produce. Transistors were found to conduct electricity faster and better than vacuum tubes.

THE THIRD GENERATION: 1965-1970 (THE ERA OF THE INTEGRATED CIRCUITS)

- Robert Noyce of Fairchild Corporation and Jack Kilby of Texas Instruments independently discovered the amazing attributes of integrated circuits. Placing such large numbers of transistors on a single chip vastly increased the power of a single computer and lowered its cost considerably.



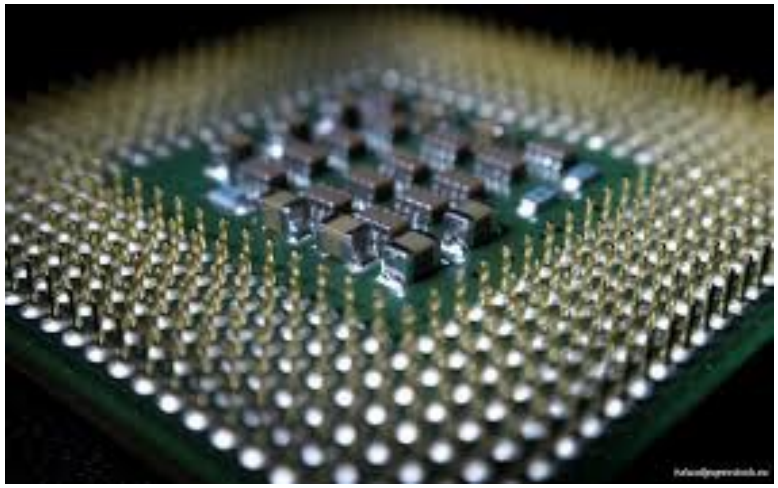


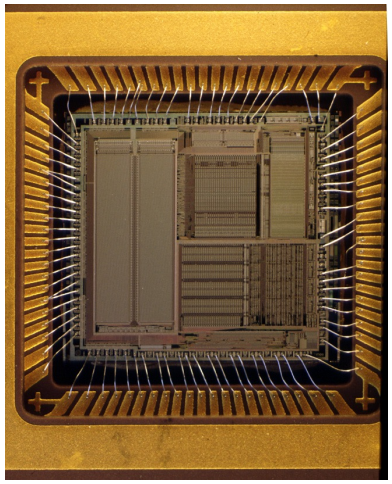


* http://www.ptc.dcs.edu/Moody/comphistory/comphistory_print.html

THE FOURTH GENERATION: 1971-TODAY (THE MICROPROCESSOR)

- Ted Hoff, employed by Intel (Robert Noyce's new company) invented a chip the size of a pencil eraser that could do all the computing and logic work of a computer. The microprocessor was made to be used in calculators, not computers. It led, however, to the invention of personal computers, or microcomputers.





http://www.ptc.dcs.edu/Moody/comphistory/comphistory_print.html

WHY CPU IS IMPORTANT ?

- CPU is stand for Central Processing Unit
- A microprocessor is an integrated circuit (IC) which incorporates core functions of a computer's central processing unit (CPU).
- CPU takes instructions from a program and performs a calculation.
- This process breaks down into three key stages: Fetch, decode, and execute.
- A CPU fetches the instruction from RAM, decodes what the instruction actually is, and then executes the instruction using relevant parts of the CPU.

ALTAIR 8800

- 1975 – debut of first personal computer (PC)
- Switches for input and Lights for output
- Bill Gates and Paul Allen were among the first owners
- Wrote compiling program for the Altair

APPLE I & APPLE II

- Built by Steve Jobs and Steve Wozniak
- Used Motorola processor
- Apple II was first fully contained microcomputer

Apple I - 1976

Apple II - 1977

IBM - PERSONAL COMPUTER (PC)

- Until 1980, IBM made mainframe computers
- In 1981, entered small-computer market
- IBM PC
  - 64 KB of memory, expandable to 256 KB
  - Started at $1,565

http://www.extremetech.com/computing/92640-ibm-personal-computer-its-30-year-legacy-slideshow

OTHER IMPORTANT ADVANCEMENTS

- During 1970s and 1980s personal computer hardware was developing
- Advances were also made in:
  - Programming Languages
  - Operating Systems
  - Application Software
- Led to more useful and powerful machines

THE INTERNET BOOM

- 1993 – Mosaic was introduced
- 1994 – Netscape was developed
- 1995 – Internet Explorer introduced by Microsoft
- 1998 – Netscape moves to open source

EMBEDDED SYSTEMS

- An embedded system is a computer system with a dedicated function within a larger mechanical or electrical system, often with real-time computing constraints. It is embedded as part of a complete device often including hardware and mechanical parts.
  Embedded systems control many devices in common use today.

INTERNET OF THINGS

EXAMPLES OF IOT

- Smart Home
- Autonomous Farming Equipment
- Wearable Health Monitoring
- Logistics Tracking
- Smart Factory Equipment