Computers in Engineering COMP 208

A Historic Perspective

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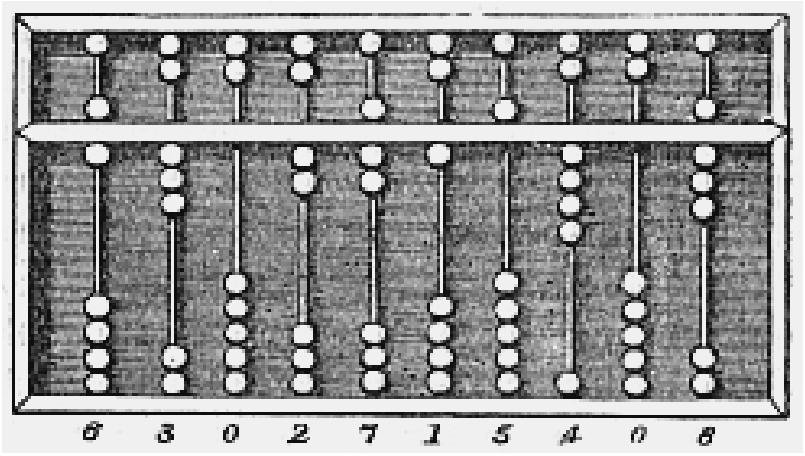
A “Brief” History

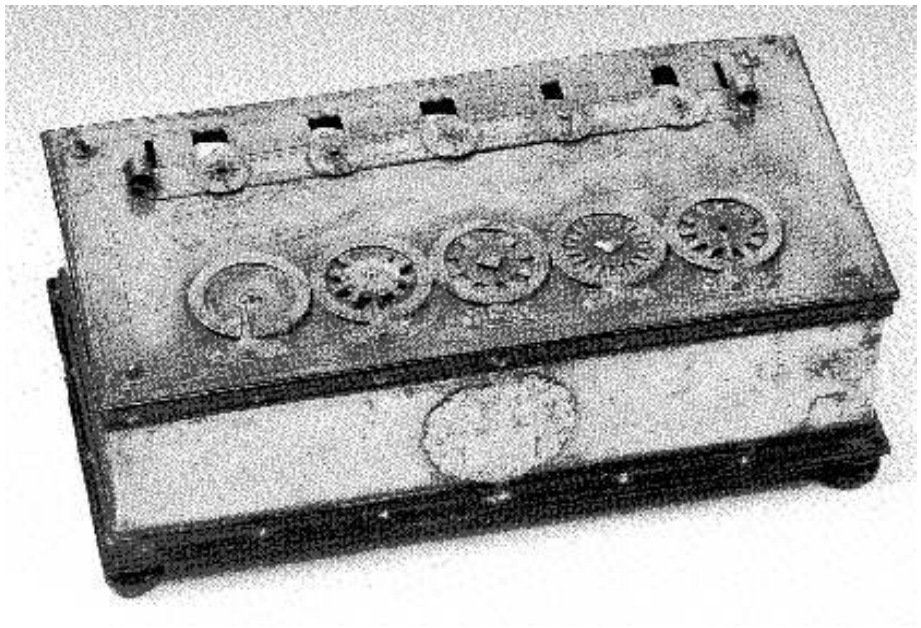
- Abacus considered first mechanical computing device
- Used beads and rods to count numbers



Mechanical Calculators

- 1612 – John Napier used floating point arithmetic and invented the logarithm
- 1622 – William Oughtred created the slide rule based on Napier's logarithms. This was the primary calculator used by engineers until the 1960's.
- 1642 – Blaise Pascal created a machine that could add and subtract, automatically carrying numbers
- 1673 – Gottfried Leibnitz built a calculator that could multiply as well

The Pascaline -- 1642



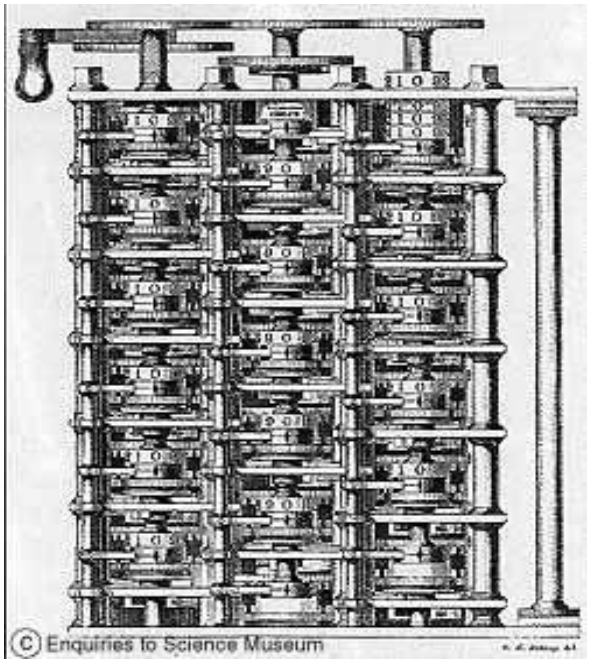
The Industrial Age

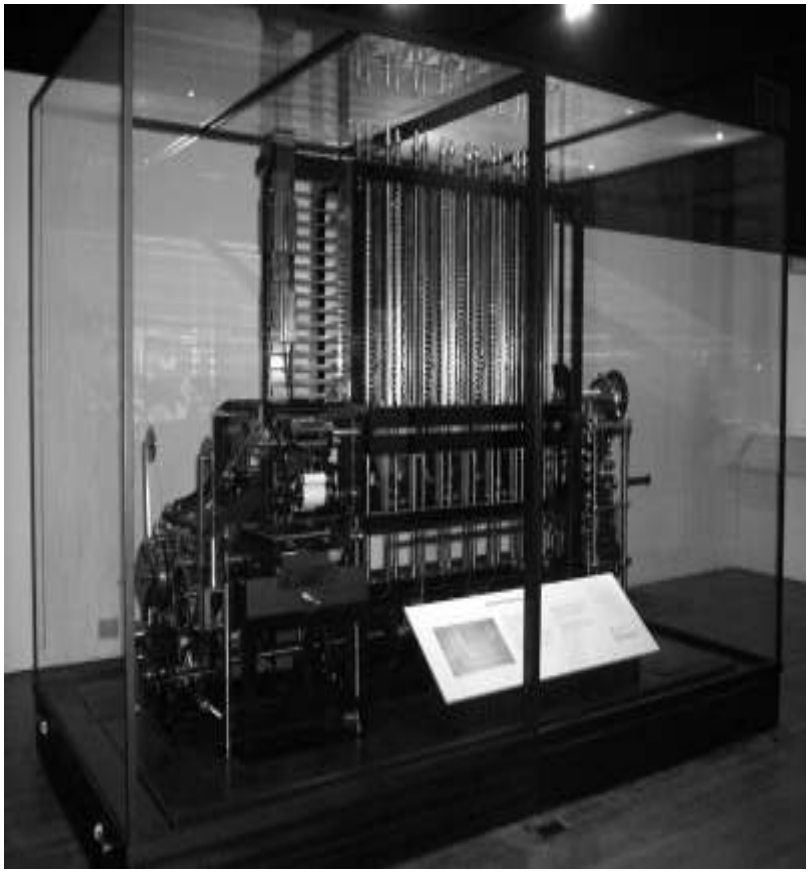
- Joseph-Marie Jacquard invented an automatic loom using punched cards to control patterns in the fabrics.
- Lead to riots against people being replaced by machines.

Charles Babbage

- 1822 – Charles Babbage designed the Difference Engine for computing navigational tables
- 1833 – Designed the Analytical Engine that had the basic components used in a modern computer
- 1847-1849 – Work on Difference Machine but technology too primitive to build it. In 1991 the Science Museum in London built it

The Difference Engine



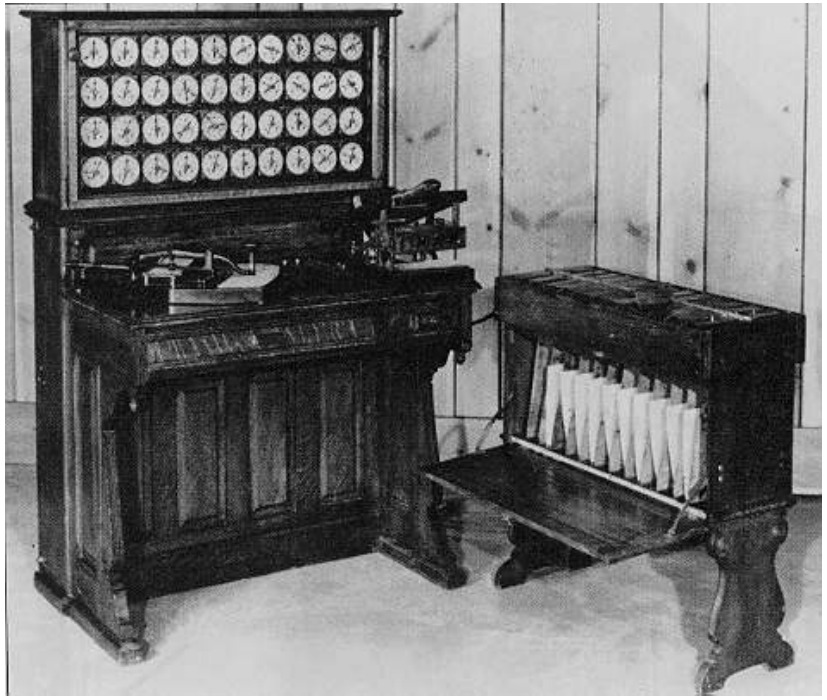


World's First Programmer

- Ada Augusta King, Countess of Loveless
- Added notes and documentation to Babbage's Analytical Engine
- She wrote the first program
- Has a Programming Language Named After Her

Herman Hollerith

- 1890 Hollerith won competition for developing data processing equipment for the US Census
- Founded Hollerith Tabulating Company which became IBM in 1924

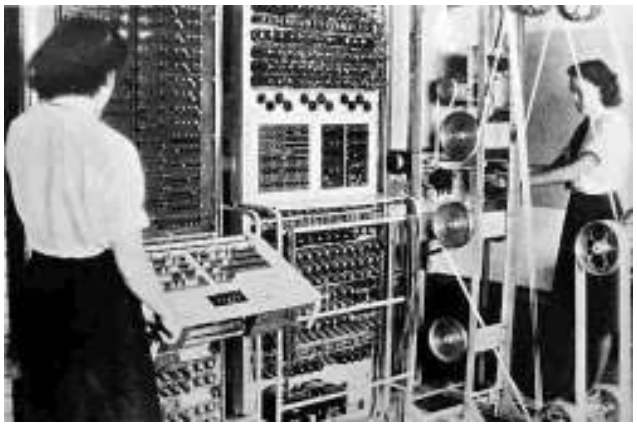


Early Modern Machines

- 1935-38 Konrad Zuse developed Z-1 and Z-2 mechanical computers using binary arithmetic (1Hz)
- 1936-39 John Vincent Atanasoff and John Berry built ABC computer for solving linear systems in Physics. Introduced ALU and rewriting memory.

Early Modern Machines

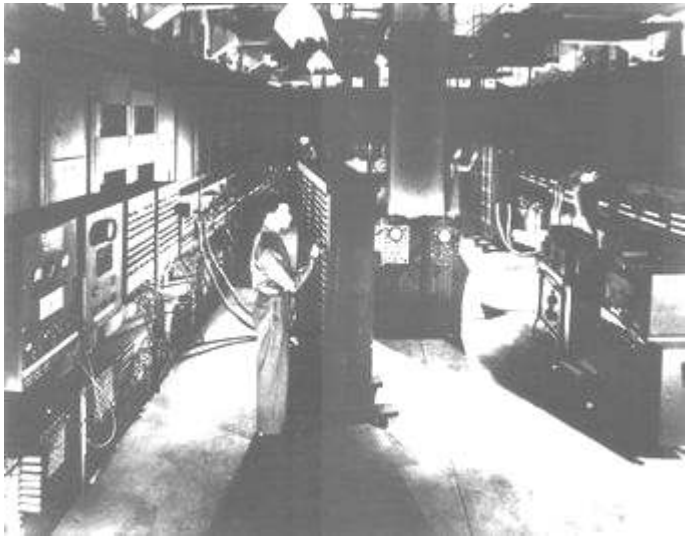
- 1943 – Alan Turing built Colossus used to break German codes encrypted using ENIGMA machine
- 1944 – Harvard Mark 1 used to compute artillery and navigation tables



ENIAC The First Electronic Computers

- 1943 Work started on ENIAC at University of Pennsylvania under John Mauchly and J. Presper Eckert with Herman Goldstein
- A general purpose computer used for computing artillery tables

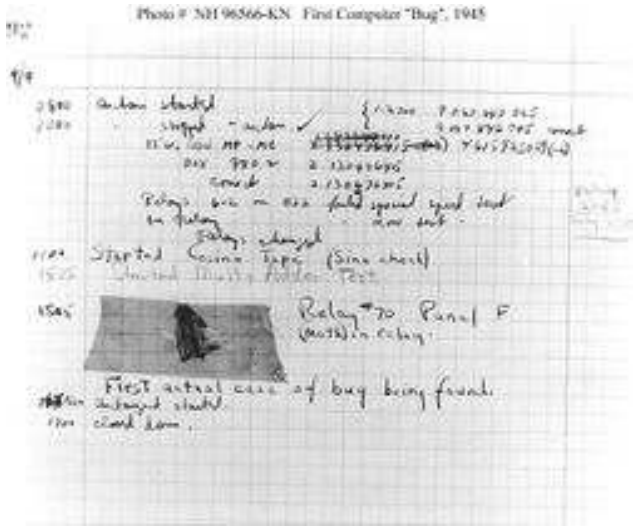
Electronic Numerical Integrator And Computer



- Used 18,000 vacuum tubes
- U shaped, 25m long, 2.5m high, 1m wide
- Programmed by plugging cables and setting switches
- From 1 hour to 1 day to program

The First Computer Bug

- 1947 Grace Murray Hopper found bug killed in jaws of electromechanical relay on Mark II computer at Harvard
- Term used with Radar in WWII



Von Neumann Computer

- 1944 – John von Neumann joined ENIAC team.
- Credited with the idea of storing programs as numbers
- 1945 – von Neumann proposed a stored program computer called EDVAC

The Late 1940's

- 1947 – William Shockley, John Bardeen, Walter Brattain invent the transistor
- 1949 – Maurice Wilkes at Cambridge developed EDSAC, the first large scale, fully operational stored program computer
- 1951 – Remington-Rand sold Univac 1 to US government for $1,000,000
  - Weighed 13 metric tons
  - Ran at speed of 2.25MHz

The 1950's

- IBM produces series of computers with Jean Amdahl as chief architect
- Memory upgraded to magnetic core memory, magnetic tapes and disks with movable read/write heads
- 1957 – Fortran introduced
- 1958 – Integrated Circuit invented

The 1960's

- 1963 – ASCII code introduced
- 1965 – IBM/360 Mainframe introduced using integrated circuits
- 1965 – DEC introduced PDP-8, first minicomputer
- 1969 – Work began on ARPAnet (the predecessor of the internet)

The Early 1970's

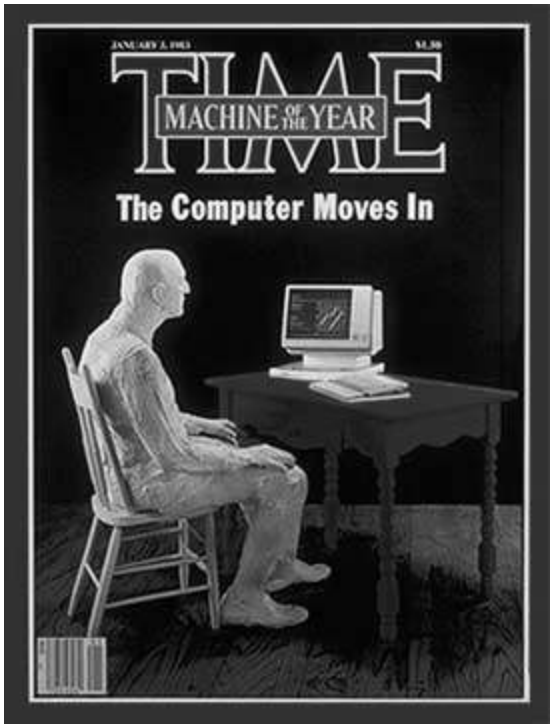
- 1971 – Intel 4004 the first microprocessor and the first floppy disk introduced
- 1973 – Xerox invents Ethernet
- 1975 – First PC, MITS Altair 8800 (no keyboard, no display, no auxilliary storage)
- Bill Gates and Paul Allen wrote a BASIC compiler for the Altair, their first product

The Later 1970's

- 1976 – Steve Jobs and Steve Wozniak develop Apple I in their parent's garage
- 1976 – Cray-1: First supercomputer announced
- 1977 – TRS-80 released by Tandy Corporation

IBM PC

- 1981 – IBM enters market with IBM PC based on Intel 8088 chip
- Release of Microsoft DOS for the PC
- 1982 – Computer chosen by Time Magazine as “Man of the Year”



First “Portable” Computer

- Released in 1981
- “Osborne 1”
- Weighed 24 lbs
- 5” Screen

The Retail Home Computer

- 1982 – Commodore 64 released
- Sold in Retail Stores
- 10,000 commercial software titles
- Best-selling single personal computer model of all time

PDAs

- First PDA released in 1983
- Had 8K of RAM
- Cost $199.95 (US)
- About 425$CAN Today

Apple Macintosh

- 1984 – Macintosh introduced, based on Xerox Alto.
- "Point-and-click" with mouse became the main tool for interacting with computers

The Modern Age

- 1991 – First 64bit Microprocessor produced by MIPS Technologies – R4000
- 2000 – IBM Releases first "Dual-Core" CPU – Power4
- 2003 – 64 bits brought mainstream with AMD64
- 2004 – Intel follows with EMT64
- 2005 – Intel releases Pentium D Dual-Core 64 bit processor

The Future

- Is up to you…