IT200 – Intro to Programming

Computer History
& Languages

History of Computers

- 2400 BC The abacus – 1st known calculator probably invented by Babylonians
- …
- 1936 the “Turing” machine
- 1940s: Era of 1st Digital Computers

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History of Computers
Review: 1936 the “Turing” machine

- Alan Turing described the concept of an "a(utomatic)-machine".
- Not a practical computing technology
- Thought experiment representing a computing machine.

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1940s: Era of 1st Digital Computers

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Name	1st operational	Numeral system	Computing mechanism	Programming	Turing complete
Zuse Z3 (Germany)	May 1941	Binary floating point	Electro-mechanical	Program-controlled by punched 35 mm film stock (but no conditional branch)	Yes (1998)
Atanasoff–Berry Computer (US)	1942	Binary	Electronic	Not programmable—single purpose	No
Colossus Mark 1 (UK)	February 1944	Binary	Electronic	Program-controlled by patch cables and switches	No
Harvard Mark I – IBM ASCC (US)	May 1944	Decimal	Electro-mechanical	Program-controlled by 24-channel punched paper tape (but no conditional branch)	No
Colossus Mark 2 (UK)	June 1944	Binary	Electronic	Program-controlled by patch cables and switches	No
Zuse Z4 (Germany)	March 1945	Binary floating point	Electro-mechanical	Program-controlled by punched 35 mm film stock	Yes
ENIAC (US)	July 1946	Decimal	Electronic	Program-controlled by patch cables and switches	Yes
Manchester Small-Scale Experimental Machine (Baby) (UK)	June 1948	Binary	Electronic	Stored-program in Williams cathode ray tube memory	Yes
Modified ENIAC (US)	September 1948	Decimal	Electronic	Read-only stored programming mechanism using the Function Tables as program ROM	Yes
EDSAC (UK)	May 1949	Binary	Electronic	Stored-program in mercury delay line memory	Yes
Manchester Mark 1 (UK)	October 1949	Binary	Electronic	Stored-program in Williams cathode ray tube memory and magnetic drum memory	Yes
	November				

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US History of Computers

- 1940s: **ENIAC**
  (One of world’s 1st digital electronic computers)
- June 30, 1945:
  1st Draft of EDVAC by John von Neumann

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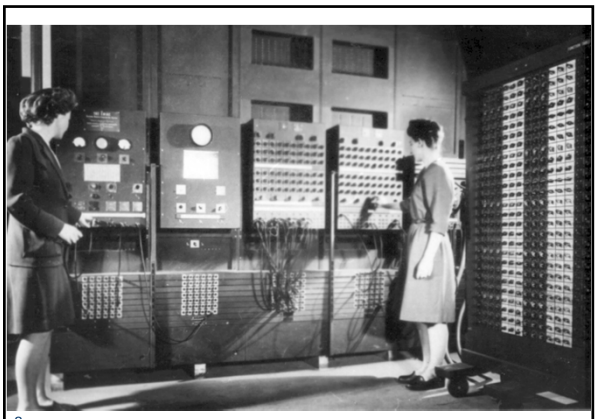

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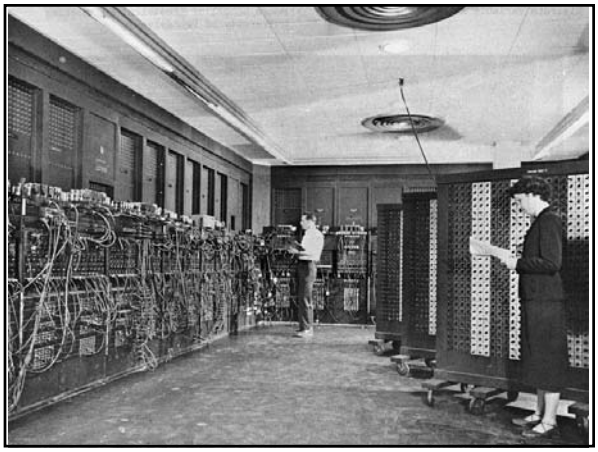

History of Computers

- 1950s: IBM sells first business computers
- 1960s: Time-sharing computers
- 1970s: Networking takes hold
- 1980s: Many PCs, LANs become popular
- 1990s: Explosion in computer use
  - Internet becomes prevalent (from ARPANet)
- 21st century: Ubiquitous computing

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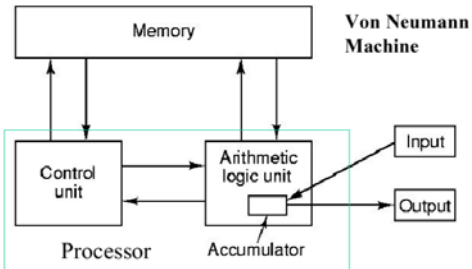
Von Neumann Architecture



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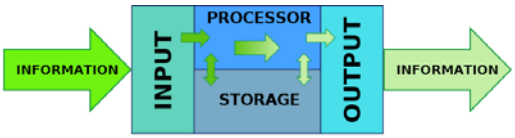
Something goes in → Something goes out
GIGO



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Programming Languages

- **Generation 1—machine languages:**

  Program data entered directly as 1s and 0s
  - Using switches and, later, punch cards
  - Error prone, tedious, and slow
  - PDP8 Example

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Programming Languages

- **Generation 2—assembly languages:**

  Mnemonic symbols represent instructions and data.
  - One-to-one correspondence with machine-language instructions
    - **Assembler:** Translates to machine language
    - **Loader:** Loads machine language into memory

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Programming Languages

- **Generation 3—high-level languages:**

  Designed to be easy to write, read, and manipulate.

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High-Level Languages – The Big 4

- **Imperative or Procedural** **(Fortran, Pascal, C)**
- **Functional** **(Lisp, ML)**
- **Rule based** **(Prolog, Jess)**
- **Object-oriented** **(C++, Smalltalk, Java)**

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Programming Languages

We will focus on:

- **Java: Procedural Aspects**
- **Java: Object-oriented**