Computer Generations

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What is a Computer?

- A **computer** is a programmable machine that receives input, stores and automatically manipulates data, and provides output in a useful format.
- A computer does not need to be electric, nor even have a processor, nor RAM, nor even hard disk. The minimal definition of a computer is anything that transforms information in a purposeful way.

Computer Generations

- Each generation of computers is characterized by a major technological development that fundamentally changed the way computers operate, resulting in increasingly smaller, cheaper, more powerful and more efficient, and reliable devices.

Computer Generations

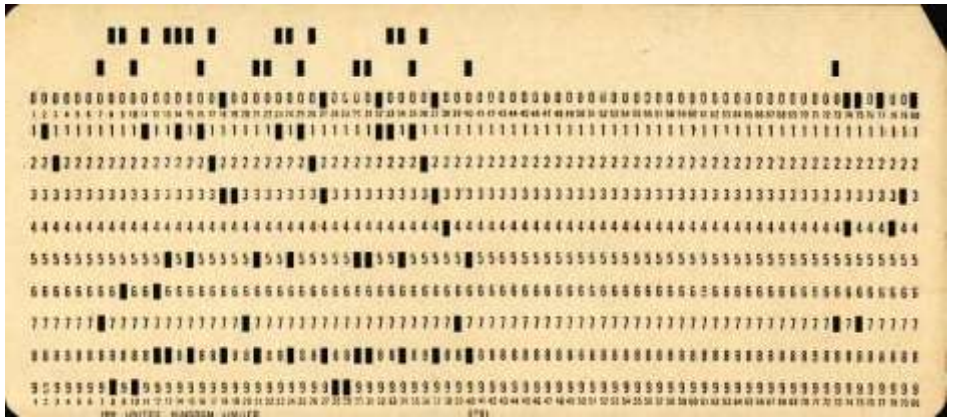
- First Generation (1940-1956) *Vacuum Tubes*
  - The first computers used vacuum tubes for circuitry and magnetic drums for memory, and were often enormous, taking up entire rooms.
  - First-generation computers relied on machine language, the lowest-level programming language understood by computers, to perform operations, and they could only solve one problem at a time.

Computer Generations

- First Generation (1940-1956) *Vacuum Tubes*
  - The UNIVAC and ENIAC computers are examples of first-generation computing devices. The **ENIAC**, which became operational in 1946, is considered to be the first general-purpose electronic computer.

Computer Generations

- Second Generation (1956-1963) *Transistors*
  - Transistors replaced vacuum tubes and ushered in the second generation of computers.
  - The transistor was far superior to the vacuum tube, allowing computers to become smaller, faster, cheaper, more energy-efficient, and more reliable than their first-generation predecessors.
  - Second-generation computers still relied on punched cards for input and printouts for output.



Computer Generations

- Third Generation (1964-1971) *Integrated Circuits*
  - The development of the integrated circuit was the hallmark of the third generation of computers.
  - Transistors were miniaturized and placed on silicon chips, called semiconductors, which drastically increased the speed and efficiency of computers.
  - Instead of punched cards and printouts, users interacted with third generation computers through keyboards and monitors and interfaced with an **operating system**, which allowed the device to run many different applications at one time with a central program that monitored the memory.

Computer Generations

- Fourth Generation (1971-Present) *Microprocessors*
  - The microprocessor brought the fourth generation of computers, as thousands of integrated circuits were built onto a single silicon chip.
  - The Intel 4004 chip, developed in 1971, located all the components of the computer - from the central processing unit and memory to input/output controls - on a single chip.
  - In 1981 IBM introduced its first computer for the home user, and in 1984 Apple introduced the Macintosh.

Computer Generations

- Fifth Generation (Present and Beyond) *Artificial Intelligence*
  - Fifth generation computing devices, based on artificial intelligence, are still in development, though there are some applications, such as voice recognition, that are being used today.
  - The use of parallel processing and superconductors is helping to make artificial intelligence a reality.
  - The goal of fifth-generation computing is to develop devices that respond to natural language input and are capable of learning and self-organization.