Introduction to Information and Communication Technology

Week 1: Lecture 3
Generations of Computer

Computer Generations

There are five generations of computer:

- **First generation** – 1946 - 1958
- **Second generation** – 1959 - 1964
- **Third generation** – 1965 - 1970
- **Fourth generation** – 1971 - today
- **Fifth generation** – Today to future

The First Generation

- The first computers used **vacuum tubes** for circuitry and **magnetic drums** for memory, and were often enormous, taking up entire rooms.

- They were very expensive to operate and in addition to using a great deal of electricity, generated a lot of heat, which was often the cause of malfunctions.

Vacuum tube

The First Generation (Cont.)

- Eckert and Mauchly developed the 1st electronic computer ENIAC in 1946 in the USA.

- Vacuum tube was used in it.

- The time period was 1946 – 1959.

- Punched-card and Paper-tape were used as a secondary storage.

- Limited internal storage capacity and slow I/O operations.

- It is not portable.

- Consume lot of electricity.

- It supports only machine language for programming.
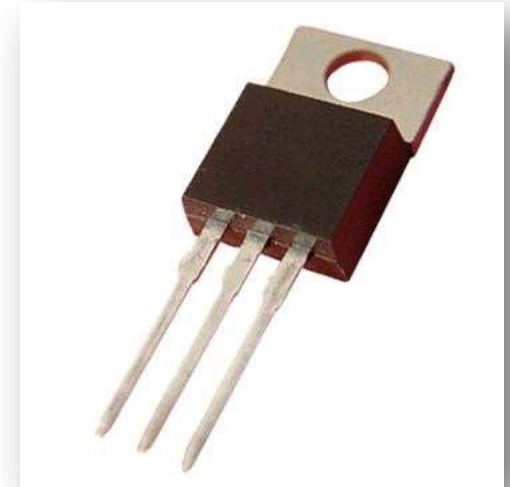
History of Computers

The First Generation (Cont.)

- Computers developed in 1st generation are:

    - ENIAC

    - EDVAC

    - EDSAC

    - UNIVAC-I

The Second Generation

Transistor

- Transistors replaced vacuum tubes and accompanied in the second generation of computers.

- One transistor replaced the equivalent of **40 vacuum tubes**.

- Allowing computers to become smaller, faster, cheaper, more energy-efficient and more reliable.

- Tapes and magnetic disk was used for secondary storage.

- High level language FORTRAN & COBOL were used for programming.

Figure 1.6
A transistor, replacing the vacuum tube *Courtesy of Dr. Andrew Wylie*

The Second Generation

- Computers developed in second generation are:
  - IBM-700
  - ATLAS
  - ICL 1901

IBM-700 series

The Third Generation

- The development of the **integrated circuit** was the hallmark of the third generation of computers.

- Integrated circuits were used.

- Time period: 1965-1971

- Much smaller and cheaper compared to the second-generation computers.

- It could carry out instructions in billionths of a second.

- Magnetic disks were used for secondary storage.

Integrated Circuit

History of Computers

The Third Generation

- Development of minicomputers.

- High Level Programming languages like below were used to developed third generation computers.

  - FORTRAN-II to IV

  - COBOL

  - PASCAL

  - ALGOL-68

The Third Generation

- IBM-360, NCR 395, TDC-316 are the 3rd generation computers developed by Jack Kilby.

- In this generation Operating System was developed.

  - Real-Time OS

  - Multi-programming OS

The Fourth Generation

- The **microprocessor** brought the fourth generation of computers, as thousands of integrated circuits were built onto a single silicon chip.

- As these small computers became more powerful, they could be linked together to form networks, which eventually led to the development of the Internet.

Microprocessor

- Fourth generation computers also saw the development of GUIs, the mouse and handheld devices.
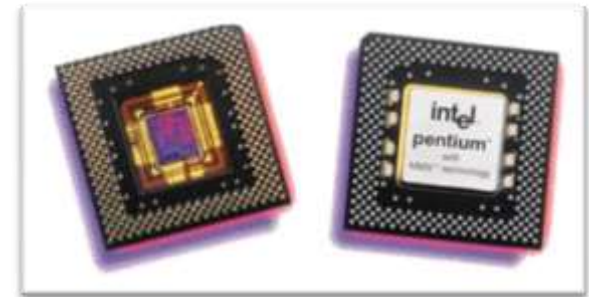
The Fourth Generation

- Time period: 1971 – 1985
- Semi-conductors were used for primary storage.
- Application development by users.
- To develop 4th generation computers, below languages were used.
  - C
  - C++
  - DBMS

History of Computers

The Fifth Generation

- Time period: 1985 – till date

- RAM and ROM are used for primary storage.

- HDD and SSD are used for secondary storage.

- Below languages were used:

  - C

  - C++

  - Java

  - Python

  - .Net

The Fifth Generation

- Based on Artificial Intelligence (AI).

- Still in development.

- The use of parallel processing and superconductors is helping to make artificial intelligence a reality.

- The goal is to develop devices that respond to natural language input and are capable of learning and self-organization.

- There are some applications, such as voice recognition, that are being used today.

3. Did you have a computer in the home as you were growing up? If so, how did it influence your education to this point? If not, how did the lack of one influence your education to this point?