CIS11011

ESSENTIALS OF ICT AND PC APPLICATIONS

Generations & Classifications of Computers

Lesson 3

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Emerge of Computer System

- 5000 years ago- **Abacus device** was invented
- 1614- **Logarithm** concept by John Napier
- 1642- **Adding machine** by Blaise Pascal
- 1671/1673- Improved Pascal's machine by Gottfried Von Leibnitz.
  - *Able to do multiplication and division*
- 1800s- Invention of **punch card**
- 1804- **Mechanical loom** using Punch card by Joseph Jacquard
- 1822- **Difference Engine** by Charles Babbage

Emerge of Computer System (contd.)

- **1837**- **Analytical Engine** using punch card concept by **Charles Babbage** including the concepts of input, store, process and output.
  - *Successor of Difference engine*
  - *Father of Computer*
- **1840s**- **First programmer** of Analytical engine was Madam Ada Augusta Lovelace
- **1944**- Automatic Sequence Control calculator –**MARK 1** by Howard Aiken (Harvard university with IBM)
- **From 1940s** we can categorize the history into different **generations**

Revolution in Computer and Communication

- 18th centaury- Great Mechanical system
- 19th centaury- Steam Engine
- 20th centaury- Computer and Communication
  - *For information gathering, processing and distributing*
  - *Single old model computer replaced by separated multiple computers, but interconnected*
    - Worldwide Telephone Networks
    - Radio and Television
    - Computer Industry
    - Computer Network (The first network was ARPANET)
    - Satellite Technology

Generations of Computers

- From 1940s we can categorize the history of computers into different generations
  - *1st Generation (1946-1959)*
  - *2nd Generation (1959-1965)*
  - *3rd Generation (1965-1971)*
  - *4th Generation (1971-1980)*
  - *5th Generation (1980-Present)*

1st Generation Computers (1946-1959)

- **Vacuum tubes** were used
- **Punch card** was used to store data
- **Machine Languages** were used
- Very large in size
- More in cost, but less performance
- Needs a lot of energy and generates more heat
- Skilled people needed
- E.g.
  - *ENIAC*
  - *EDVAC*
  - *UNIVAC*

2nd Generation Computers (1959-1965)

- **Transistors** were used
- **Floppy disk and tapes** were used to store data
- **Machine and Assembly Languages** were used (also FORTRAN, COBOL)
- Smaller but faster than 1st Generation
- Less electric power needed
- E.g.
  - *IBM 1620*
  - *CDC 1604*
  - *UNIVAC LARC/ 1108*

3rd Generation Computers (1965-1971)

- **Integrated Circuits (IC)** were used
  - *It has number of transistors, capacitors and resistors*
- **High capacity disk**, keyboard and mouse were used
- **Some High level Languages** were used (BASIC, COBOL, PASCAL PL/1, FORTRAN-II to IV)
- Smaller but faster than 2nd Generation
- Less power needed and generates less heat
- E.g.
  - *Honeywell-6000 series*
  - *PDP(Personal Data Processor)*
  - *IBM-360 series*

4th Generation Computers (1971-1980)

- **Large Scale Integrated (LSI)** and Very Large Scale Integrated (VLSI) circuits were used
  - *It has compacted electronic parts*
  - ***Microprocessors** were introduced*
- **Optical disk** were introduced
- **Many High level Languages** were used (C, C++, DBASE)
- Network and Internet concept were introduced
- Cheaper than previous generations
- Small, portable and fast
- Used as personal computers
- E.g.
  - *IBM PCs*
  - *Apple II*

5th Generation Computers (1980- Present)

- **Ultra Large Scale Integrated (ULSI)** circuits were used
  - *Advanced in microprocessors development*
- **Many High level Languages** were used (Java, Python, .NET)
- Artificial Intelligence were introduced
  - *Neural network, Expert systems, Natural languages and Robotics*
- Parallel processing and advanced GUI
- Compact, portable and high performance
- E.g.
  - *Desktop*
  - *Laptop*
  - *Notebook*
  - *Ultrabook*

Generations of Computers (contd.)

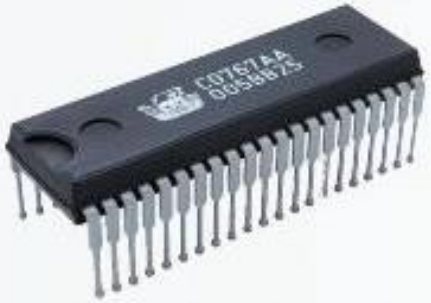
First Generation

Vacuum Tubes

Second Generation

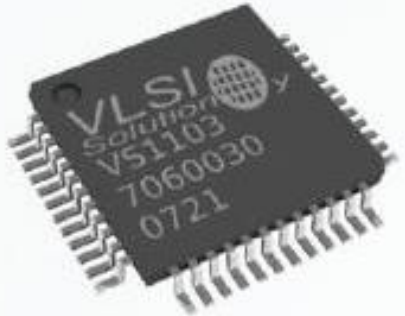
Transistors

Third Generation



Integrated Circuit

Fourth Generation



Very large scale integration

Fifth Generation

Ultra large scale integration

What Next ?????

Quantum computing ?

Classification of Computer

- Computers can be categorized based on different criteria
  - *Based on the **Size** of the computer*
  - *Based on the **Technology** used in the computer*
  - *Based on the **Purpose***

Classification of Computer (contd.)

- Based on the size
  - *Super computers*
  - *Mainframe computers*
  - *Mini computers*
  - *Personal computers/ micro computers*

Super Computers

- Large in size and expensive
- Powerful computing performance
- Used to solve complicated mathematical and scientific problems
- E.g.
  - *Research institutions*
  - *Military*
  - *Large scale business*

Mainframe Computers

- Less performance and expensive than super computers
- It has many terminals to connect number of users
- Use in large scale commerce
- E.g.
  - *e-Business*

Mini Computers

- Less performance and expensive than mainframe computers
- Used for common purposes
- Few number of terminals connected to centralized computer
- E.g.
  - *Banking system*

Micro/ Personal Computers

- Small in size and portable
- Less capacity and performance when comparing with other categories
- Used for multi purposes
- Designed for personal use
- Work with less power
- E.g.
  - *Desktop*
  - *Laptop*

Classification of Computers (contd.)

- Based on the Technology
  - ***Analog*** *computers*
  - ***Digital*** *computers*
  - ***Hybrid*** *computers*

Analog Computers

- Use Analog technology or signal
- Work with environmental phenomenon
- Temperature, Pressure, velocity and Directions
- E.g.
  - *Meteorological devices*
  - *Speedometers*

Digital Computers

- Use Digital technology or signal
- Represent data in Digital format
- E.g.
  - *PCs*

Hybrid Computers

- Use both Analog and Digital technology/ signal
- Generally acquire data in Analog format and convert it to digital format to process and analyse
- E.g.
  - *ECG Machine*

Classification of Computers (contd.)

- Based on the Purpose
  - ***General*** *purpose computer*
  - ***Special*** *purpose computers*

General Purpose Computers

- General computers perform common tasks
  - *Word processing letter*
  - *Recording*
  - *Financial analysis*
  - *Printing documents*
  - *Calculations with accuracy, and consistency*
- Instructions required to perform task is not stored permanently
- E.g.
  - *All microcomputers*

Special Purpose Computers

- Designed to perform specialized tasks
- It incorporates the instruction stored when designing the computer
- Perform tasks with simple commands
- Efficiently in specialized fields
  - *Weather forecasting*
  - *Space research*
  - *Agriculture*
  - *Engineering*
  - *Meteorology*
  - *Satellite operation*
- E.g.
  - *Traffic Controller System*
  - *ATM (Auto teller machine)*

Special Characteristics of a Computer

- Speed
  - *Can solve complex problems faster than a human*
- Accuracy
  - *Provide correct and more accurate result for given data and instruction*
- Persistency
  - *Can work for long time continuously without creating error*
- Versatility
  - *Can do many different tasks simultaneously*

Special Characteristics of a Computer (contd.)

- Storage
  - *Can store large number of data to retrieve later as needed*
- Memory power
  - *Has the ability to memorize and recall instruction and data even after a long time*
- No Intelligence
  - *Does not have intelligence, works according to the instructions*
- No Feeling
  - *Does not have emotions or experience*

Thank You