

# CLISc-Paper 6- Information Technology

## Unit2- Evolution, Generation & Types of Computers

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# Information Technology

- Technology has been defined as “systematic knowledge and action, usually of industrial process but applicable to any recurrent activity”
- Technology is a codified communicable procedure for solving problems.
- Manfred Cohen observed the impact of technology in 3 stages
  - It enable us to do what we are now doing , but better faster & cheaper
  - I tenable us to do what we cannot do now
  - It changes our life styles
- Mc Millan dictionary of IT defines IT “as the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a micro-electronic combination of computing and telecommunications”
- It involves 6 distinct modern technologies-
  - computer technology-hardware and software, Communication tech, Reprographic and Micrographic technology , Electronic and photonic tech, including CD ROM technology Artificial intelligence, human machine interface tech.

# Computer

- The word **computer** has been derived from the Latin Word "**Computere**" - to calculate.
- Hence the term computer can be logically be applied to ***any calculating device***.
- However, in technical parlance, the term has come to refer specifically an ***electronic computer*** (uses electronic devices like transistors, resistors, diodes etc)
- **A computer is a fast and accurate electronic symbol manipulating system that has been designed to automatically accept and store input data, process them and produce output results under the direction of a stored program of instructions**

# Evolution of Computer

1. Charles Babbage first devised the idea of a general purpose computing machine- **Analytical engine** (middle of 19<sup>th</sup> century). He introduced the concept of
  1. **stored program control**-basis for all modern computer
  2. Introduced the idea of **separate storage and arithmetic units**
  3. Input program and data on **punched cards**
2. Herman Hollerith developed –**Electro Mechanical Calculating machine** (1890)
  1. Punched card input , **performed simple arithmetic calculations**
  2. **Card storing operations** controlled by hand wired control panels
3. In 1920's and 30's significant advances in punched card equipments resulted in machines- **Accounting machine**-
  - not only additions, subtraction and multiplications but also record keeping and accounting functions .

# Evolution of Computer

4. In 1939-42 a model **electronic digital computer** was built by John Atanasoff
  - Use binary over decimal arithmetic for computation
5. In 1944 Howard Aiken of Harvard University designed **Automatic Calculator known as Mark1**
  - Electro Mechanical device
  - used for computations of tables and mathematical functions
6. In 1946 **ENIAC (Electronic Numerical and Integrator and Calculator)** designed by J.P.Eckert and J.W Mauchly
  - Perform a multiplication in (1/3000) of a second
  - Huge machine with 18,000vacuum tubes occupied more space,No internal memory
7. It was John Von Newman's Principles paved the way for the development of first stored program computer. In 1949 a group of experts Cambridge university designed **EDSAC (Electronic Delay Storage Automatic Computer)**
8. In 1950 **EDVAC (Electronic Discrete variable Automatic Computer)** built at Pennsylvania University
9. In 1951 **UNIVAC-1 (Universal Automatic Computer )** built by J.P.Eckert and J.W Mauchly

# Evolution of Computer

<b>Year</b>	<b>Inventor</b>	<b>Name of the machine</b>
<b>Early 1600s</b>	John Napier (Scotland)	Napier.s Bones (Calculating device)
<b>1642</b>	Blaise Pascal (French)	Mechanical Calculator
<b>1671</b>	Gottfried Wilhelm von Leibniz	Calculator for all the calculation
<b>1786</b>	J. H. Miller(German)	Difference Engine
<b>1822-32</b>	Ada Augusta Lo Velace	Analytical Engine Base(Computer Programme)
<b>1942</b>	John Vincent and Clifford Berry	ABC
<b>1944</b>	AikeriMH(Harvard)	MARK-1
<b>1947</b>	J.P Eckert and J.P Mauchly	UNIMAR-I

# Computer Generations

The term generation used to distinguish between varying hardware technologies. 5 distinct phases known as generations

## First generation ( 1940-50)

Used **vacuum tubes** for the central processor, had very small internal memory based on relays and magnetic drums, magnetic core devices for main memory. The interface between man and machine through machine languages. Later point of time use mnemonic symbols known as assembly languages. These computers are giant, special purpose, high power consumption, slow in operations, limited computing capacity, intense air conditioning required. ENIAC, EDSAC, EDVAC, UNIVAC-I falls in this category.

## Second Generation (Early 1960's)

**Transistors**- semi conductor devices that are functionally equivalent to vacuum tubes but are smaller in size. Occupied less space, micro computers, High level languages like FORTRAN, less hardware failures and better portability, magnetic core internal memory. IBM 1620, IBM-1401, Honey Bell 200 etc.

# Computer Generations

## Third generation ( Early 1970's)

Based on integrated circuits and semi conductor memory. Many transistors integrated on a single wafer.

More flexible disk oriented i/o devices Reduce power consumption and size. High Level languages like ALGOL, COBOL. Availability of OS developed to provide multi programming and time sharing. Usability of online processing. Portable. Inexpensive storage medium such as magnetic drums, disks, tapes etc.

## Forth Generation (Early 1980's)

Integrated more and more devices on a single wafer. This led to SSI, MSI, LSI ad VLSI. The development of VLSI resulted in the emergence of **microprocessor** (ie, whole CPU on a singe chip).

Greater versatility, Increased storage and speed. Availability of sophisticated programs, Internal memory semi conductor devices. Micro computers and PC. 2 major manufacturers Motorola (68000, 68020,68030 etc.) Intel (8080,885,80186) Intel Pentium etc. Inel 4004, IBM-PC, Apple Series I and II



# Computer Generations

## Fifth generation ( Yet to come)

Very large scale integration (VLSI) achieved more than 10000 components per chip, and current VLSI chips can contain more than 100,000 components.

- KIPS, Able to think, and make decisions,
- Input include speech and visual recognition.
- Parallel processing , Super conductor, Expert System, Visual input,
- Speech recognition, Artificial intelligence, Pattern recognition, natural language
- Intelligent robots that could 'see' their environment (visual input e.g. a video camera)
- Intelligent systems that could control the route of a missile
- programs that could translate documents from one language to another
- Knowledge processing
- Photonic devices, and computing in the optical domain.

# Types of Computers

Computers can be broadly classified into five based on their speed and computing power. They are :

1. Micro computers or PC (Personal Computer): Single user computer system. Moderately powerful microprocessor.
2. WorkStation: Single user computer system. Similar to Personal Computer but have more powerful microprocessor.
3. Mini Computer: Multi-user computer system. Capable of supporting hundreds of users simultaneously.
4. Main Frame: Multi-user computer system. Capable of supporting hundreds of users simultaneously. Software technology is different from minicomputer.
5. Supercomputer: An extremely fast computer, which can perform hundreds of millions of instructions per second.

# 1. Micro computers or PC (Personal Computer)

The invention of microprocessor (single chip CPU) gave birth to the much cheaper micro computers.

A PC can be defined as a **small, relatively inexpensive computer designed for an individual user**. PCs are based on the microprocessor technology that enables manufacturers to put an entire CPU on one chip. Businesses use personal computers for word processing, accounting, desktop publishing, and for running spreadsheet and database management applications.

At home, the most popular use for personal computers is for playing games and surfing the Internet.

Although personal computers are designed as single-user systems, these systems are normally linked together to form a network. They are further classified into:

- Desktop Computers
- Laptop Computers-They are lightweight computers with a thin screen. They are also called as notebook computers because of their small size
- Handheld Computers(PDAs)-pen-based and also battery-powered. They are small and can be carried anywhere

# Types of Computers

**2. Workstation** is a computer used for engineering applications (CAD/CAM), desktop publishing, software development, and other such types of applications, which require a moderate amount of computing power and relatively high quality graphics capabilities.

Common operating systems for workstations are UNIX, LINUX and Windows NT. Like PC, Workstations are also single-user computers. However, workstations are typically linked together to form a local-area network, although they can also be used as stand-alone systems.

## **3. Minicomputer**

It is a midsize computer. These are intermediate in power and may function as small mainframe computers. These are dedicated to a particular purpose such as database access and support several users at a time. They are less expensive than mainframe computers. A minicomputer is a multi-processing system capable of supporting many users simultaneously.

# Types of Computers

## 4. Mainframe

Mainframe is a very large in size and an expensive computer capable of supporting hundreds, or even thousands, of users simultaneously. Mainframe executes many programs concurrently. Mainframes support many simultaneous programs execution.

## 5. Supercomputer

Supercomputers are one of the fastest computers currently available. Supercomputers are very expensive and are employed for specialized applications that require immense amounts of mathematical calculations (number crunching). For example, weather forecasting, scientific simulations, (animated) graphics, fluid dynamic calculations, nuclear energy research, electronic design, and analysis of geological data (e.g. in petrochemical prospecting).

# Types of computers based on principles of operation

There are three different types of computers according to the principles of operation. -Analog computers, Digital computers and Hybrid computers

**Analog Computer** is a computing device that works on continuous range of values. The results given by the analog computers will only be approximate since they deal with quantities that vary continuously. It generally deals with physical variables such as voltage, pressure, temperature, speed, etc

**Digital computer** operates on digital data such as numbers. It uses binary number system in which there are only two digits 0 and 1. Each one is called a bit. It is designed using digital circuits in which there are two levels for an input or output signal. These two levels are known as logic 0 and logic 1. Digital Computers can give more accurate and faster results. Digital computer is well suited for solving complex problems in engineering and technology

**Hybrid computer** combines the desirable features of analog and digital computers. It is mostly used for automatic operations of complicated physical processes and machines. Now-a-days analog-to-digital and digital-to-analog converters are used for transforming the data into suitable form for either type of computation.

Thank You