

Fundamentals of Information Technology

Unit 1 - Introduction to Computers

Unit 2 - Interaction with Computers

Unit 3 - Computer Number System

Unit 4 - Computer Network

Unit - 1 INTRODUCTION TO COMPUTER

Computer → It is an electronic device, which takes the data, stores it, processes it and gives the output.

Also called "Data Processor"?

Q. Why called data processor?

Ans. It takes in data as raw facts, observations & processes it into useful, meaningful information.

→ Information → Processed Data

Data Processing Tasks

Data → 1. Store the data

2. Manipulate / Provide some operations (Processing)

3. Output the results

↓
Information (Output) Result

↓
Knowledge → Wisdom

Knowledge → Application of information towards different fields.

Applications of computer system

- Education System
- Military
- Industry
- Research
- Medical

Basic Organisation of computer system.

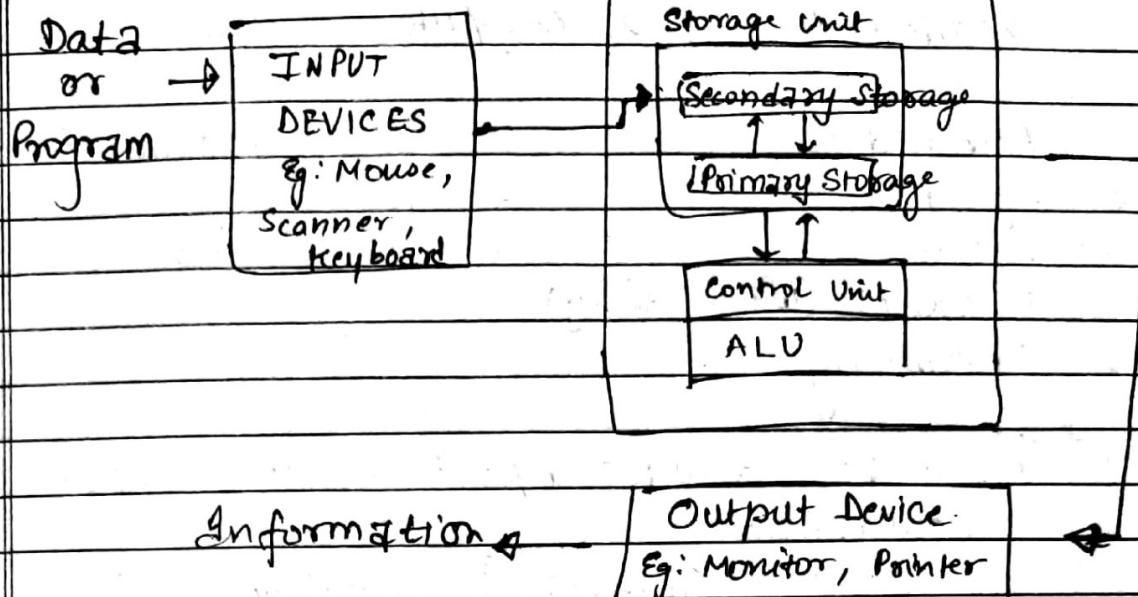
↳ How every component of computer system is connected to each other.

5 types of tasks

1. Inputting the data as program through input devices
2. Storing data into memory
3. Processing / Manipulating
4. Controlling
5. Outputting the results through output devices

CPU (main part)

↓
control unit (CU) Arithmetic & Logical Unit (ALU)
↓
to supervise the
different components
that are connected to
the computer system.



~~INPUT Devices~~

Main / Primary Memory

Secondary Memory

- | | | |
|----|---|-------------------------|
| 1. | Volatile | Non-volatile |
| 2. | very fast bcoz
made of semi conductor devices | Not very fast |
| 3. | Very expensive | less expensive |
| 4. | more ^{less} storage more space | more storage space |
| 5. | Eg: RAM | Eg: Hard disk, Pendrive |

Output Device

→ converts the digital form into human readable form.

Input Device

→ takes raw facts as data from the outside world by default through the keyboard.

Characteristics of a Computer System

1. Automatic
2. Speed
3. Accuracy
4. Diligence (without tiring)
5. Versatility
6. Power of Remembering
7. No IQ
8. No Feelings

⇒ Accuracy always depends upon computer architecture.

GIGO → Garbage In Garbage Out

Generation of Computer

(Grap in Technology) → Grap in hardware + software

→ It provides a framework for growth of computer industry.

Five Generations of Computer

First Generation

Period :- 1942 - 1955

Hardware - VACUUM tube

→ single program based : until one program gets completed & executed, we can't work on another program

For input / Input device - Punch Card

Memory - Electromagnetic Relay Memory

→ programming was done using machine coding (using symbols 0 & 1)

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→ Assembly language was also used.

Features :- 1. Bulky in size

2. Unreliable

3. More / Large heat emission

4. Large room for vacuum tube

Examples :- ENIAC, EDVAC, UNIVAC, IBM701

ENIAC - Electronic numerator, integrator and computer

Second Generation

Period :- 1955 - 1964

→ Introduction to transistors

Memory - Magnetic Disk, Magnetic Tape

Software - : Introduction to FORTRAN, COBOL, ALGOL

COBOL - Common Business Oriented Language

Features :-

Examples :- IBM7030, Honeywell, CDC

Third Generation

Period :- 1964 - 1975

Use of integrated circuit (IC) Technology which is made up of different no. of components.

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IC Technology



SSI



MSI

Small Scale Integrated Circuit

10 to 20 components

(Transistors, diodes, etc.)

(100 components)

Software Technology → High Level Language (HLL)

Features :-

1. Faster
2. More reliable
3. More storage
4. Cheaper

Examples:- IBM 360 / 370

Fourth Generation

Period:- 1975 - 1989

Hardware Used:- 1. IC's with LSI & VLSI technology

large scale
(30,000 components)
were inbuilt into a
single chip)

very large scale
(1 million
components)

2. RAM, Cache Memory used for primary memory
3. Large Sized Secondary storage devices
4. Floppy Disk, Magnetic Tapes were used for portable media.

- Software Used :-
- * Operating system is Multi ~~tasking~~ ^{processing}, Multitasking of MS windows
 - * UNIX OS
 - * MS - DOS
 - * High speed computer networking software. (LAN, WAN) technologies.
 - * C language became very popular
 - * Development of Graphical User Interface (GUI)

{ - Personal computers
} - Super computers with parallel processors
↳ Hardware

Examples :- ~~for example~~ IBM PC, VAX 9000,
CRAY-1, CRAY-2

Fifth Generation

Period :- 1989 - Present

- Hardware Used :-
- * Introduction to VLSI (Ultra large scale IC's)
↳ (10 million electronic components)
 - * Increase in capacity in Main Memory, hard disk
 - * Optical disk introduction (CD - ROM)
compact Disk - Read Only Memory
 - * Powerful Desktops, PCs & workstations
 - * Powerful mainframes
 - * Internal ~~feature~~ facility.

Software Used :- www, e-commerce, mail, multimedia applications

Examples :- IBM notebook, Pentium PCs, SUN Microsystem, PARAM 10000

Classification of Computers

Based on size

and performance wise

Technology wise

Purpose wise

1. micro computers

- PCs

- laptops

- Workstations

- PDA (Personal

Digital Assistant)

2. Mini Computers

3. Mainframes

4. Super Computers

1. Digital Computers

2. Analog Computers

3. Hybrid Computers

1. Specific purpose

2. General purpose

* MODEM (Modulator Demodulator)

Modulator → Analog to Digital

Demodulator → Digital to Analog

* LCD → Liquid Crystal Display

Size & Performance wise Digital computers are classified into the following four types:-

* Micro Computer → A micro computer is a computer whose CPU is a micro processor. It is a processor where all components elements (electronic components) are inbuilt into a single IC chip. These are also called desktop machine as it is a single user system.
Eg: IBM PC's, DELL PC's, etc..

→ Micro computers are further divided into following types :- ✓

1. Personal Computer :- It is a desktop machine. It is not very expensive and easy to use in any organisation as well as at home.
Eg:- ~~Pentium~~ Pentium III, Pentium IV, etc.
2. Laptop :- Laptop Computers are called mobile computers. It is single user system powered with battery also. Mostly it uses similar types of hardware as of PC but for displaying purpose it uses LCD instead of video monitor.
3. Workstations :- They are also called desktop machine but are more powerful and speed is about 10 times faster than the PC. These machines are largely used by engineers, architect and another professionals who needs detailed graphic
Eg: SUN Microsystems, IBM DEC

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4. Personal Digital Assistants : They are much smaller than PCs and laptops and can be held in palm. It is basically used for scheduling system and address book. It doesn't have a disk drive. It has limited memory and is less powerful.
Eg: Tablets, Palm top

* Mini Computers → These are also called mid range servers. They are more powerful than micro computers (in terms of processing power and capabilities). They are multiuser systems where many users (4-20) simultaneous work on that system. Eg:- PDP - 11, VAX

* Mainframe Computers → The term 'mainframe' is used for large and very powerful system. These are multiuser, multi-processing and high performing computers. It has very large storage (as compared to mini-computers). They are used in Banks, railway reservations, etc.
Eg:- IBM 4381, CDC 6800, VAX 8842

* Super Computers : - They are the most powerful computers among all the digital computers. They have high processing speed as compared to other systems. They ~~use~~ use parallel processors and do complex tasks.

The speed of super computers ~~are~~ generally measured in ~~F~~ FLOPS (Floating Point operation per second)

Eg :- 1 Tera FLOPS \leftarrow ~~speed~~ $= 2^{40}$ FLOPS

Eg :- (PARAM, ANURAG, PARAM PADMA)
 \hookrightarrow C-DAC (Pune)

Purpose wise :-

1. Specific Purpose \rightarrow Not versatile
2. General purpose \rightarrow versatile