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COMPUTER

CHAPTER 1

Fundamentals of Computers

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COMPUTER · CHAPTER 1

Fundamentals of Computers

ਫੰਡਾਮੈਂਟਲਜ਼ ਆਫ ਕੰਪਿਊਟਰਸ

IN THIS CHAPTER

- What Is A Computer?
- Basic Working Of A Computer
- Important Terms
- Main Components Of A Computer
- Classification Of Computers
- Micro Computer

WHAT IS A COMPUTER?

A Computer is a man-made electronic machine that receives data (input) from users, processes it according to given instructions, and produces meaningful information (output).

A computer is an electronic device that accepts data, processes it, stores it, and provides useful information as output.

Example

- Input: Typing "2 + 3" on a keyboard
- Processing: Computer calculates the sum
- Output: "5" displayed on the screen

BASIC WORKING OF A COMPUTER

Input → Processing → Output Cycle

```
INPUT → PROCESSING → OUTPUT
  ↓           ↓          ↓
Keyboard    CPU      Monitor
Mouse                Printer
Scanner
```

Example

Stage	Example
Input	Typing marks of students
Processing	Computer calculates percentage
Output	Percentage displayed on screen

IMPORTANT TERMS

1. **Data**

Data is raw, unorganized information entered into a computer through input devices such as a keyboard, mouse, scanner, etc.

Example

- 45, 78, 92
- Names of students
- Dates

2. **Information**

Information is processed and organized data that becomes meaningful and useful.

Example

Data	Information
45, 78, 92	Average Marks = 71.67

Remember

Information = Processed Data

Data + Processing = Information

3. Input

The data entered into a computer is called **Input**.

Examples

- Typing through keyboard
- Clicking with mouse
- Scanning a document

4. Output

The information produced by a computer after processing is called **Output**.

Examples

- Display on monitor
- Printed report
- Audio through speakers

5. Instructions

Instructions are commands given to the computer to perform a specific task.

Example

- Save a file
- Open a folder
- Print a document

6. Speed of Computer

Computer speed refers to the number of instructions processed by the computer in one second.

Units of Speed

Unit	Value
Millisecond (ms)	10^{-3} second
Microsecond (µs)	10^{-6} second
Nanosecond (ns)	10^{-9} second
Picosecond (ps)	10^{-12} second

MAIN COMPONENTS OF A COMPUTER

1. Processor (CPU)

The **Processor** executes instructions from software and hardware.

Function

- Performs calculations
- Controls computer operations
- Processes data

Example

Intel Core i5, Intel Core i7, AMD Ryzen

2. Memory

Memory is used for temporary storage of data and instructions while processing.

Function

- Stores data currently being processed
- Enables fast communication with CPU

Examples

- RAM
- Cache Memory

3. Motherboard

The **Motherboard** is the main circuit board that connects all components of a computer.

Connected Components

- CPU
- RAM
- Storage devices
- Input devices
- Output devices

Remember

Motherboard = Backbone of Computer

4. Storage Device

A storage device permanently stores data.

Examples

- Hard Disk Drive (HDD)
- Solid State Drive (SSD)
- Pen Drive
- CD/DVD

Remember

Memory = Temporary

Storage = Permanent

5. Input Devices

Input devices allow users to enter data into a computer.

Examples

Input Device	Function
Keyboard	Enter text
Mouse	Point and click
Scanner	Scan documents
Microphone	Input sound
Webcam	Input video

6. Output Devices

Output devices display processed information.

Examples

Output Device	Function
Monitor	Display information
Printer	Print documents
Speaker	Produce sound
Projector	Display on large screen

CLASSIFICATION OF COMPUTERS

Based on size and processing power, computers are divided into:

1. Micro Computer

2. Mini Computer

3. Mainframe Computer

4. Super Computer

5. Workstation

1. MICRO COMPUTER

A Micro Computer is a single-user computer that uses a microprocessor as its CPU.

Characteristics

- Small size
- Low cost
- Single user
- General-purpose use

Examples

- Desktop Computer
- Laptop
- Tablet
- Smartphone
- PDA (Personal Digital Assistant)

Exam Point:Most common type of computer = Micro Computer

2. MINI COMPUTER

A Mini Computer is a multi-user computer designed to support multiple users simultaneously.

Characteristics

- More powerful than microcomputers
- Supports many users
- Used by small organizations

Uses

- University admission systems
- Departmental databases
- Small business operations

Also Called Midrange Computer

3. MAINFRAME COMPUTER

A Mainframe Computer is a large, powerful multi-user computer capable of processing huge amounts of data and supporting hundreds to thousands of users simultaneously.

Characteristics

- Very high storage capacity

- Supports many users
- High reliability
- Used by large organizations

Uses

- Banking systems
- Insurance companies
- Government departments
- Universities

Examples

- Customer databases
- Billing systems
- Inventory management

Exam Point

Banks commonly use Mainframe Computers.

4. SUPER COMPUTER

A Super Computer is the fastest and most powerful type of computer.

Characteristics

- Extremely high processing speed
- Huge storage capacity
- Performs millions/billions/trillions of calculations

Uses

- Weather forecasting
- Space research
- Scientific simulations
- Nuclear research
- Petroleum exploration
- Medical research

IMPORTANT HISTORICAL FACTS

Fact Detail
First Supercomputer of World CDC 6600 (1964)
CRAY-1 Developed By Cray Research (1976)
First Indian Supercomputer PARAM 8000 Developed By C-DAC in Year 1991

5. WORKSTATION

A Workstation is a powerful single-user computer designed for professional and technical work.

Characteristics

- More powerful than a personal computer
- Better processor
- High-quality graphics
- Large memory

Uses

- Software development
- Engineering design
- CAD/CAM
- Scientific applications
- Desktop publishing

COMPARISON TABLE OF COMPUTER TYPES

Feature	Micro	Mini	Mainframe	Super	Workstation
Users	Single	Multiple	Hundreds/ Thousands	Specialized	Single
Speed	Low	Medium	High	Highest	High
Cost	Low	Medium	Very High	Extremely High	High
Example	Laptop	Department Server	Bank System	PARAM	CAD System

MOST IMPORTANT FACTS FOR EXAMS

- ✔ Computer = Electronic data processing machine
- ✔ Data = Raw facts
- ✔ Information = Processed data
- ✔ CPU = Brain of Computer
- ✔ ALU performs arithmetic and logical operations
- ✔ CU controls all activities
- ✔ Motherboard connects all components
- ✔ First Supercomputer = CDC 6600
- ✔ First Indian Supercomputer = PARAM 8000
- ✔ Developed by = C-DAC
- ✔ Banks mainly use Mainframe Computers
- ✔ Most common computer = Microcomputer

ONE-LINE REVISION POINTS

- Computer converts data into information.
- CPU is called the brain of the computer.
- ALU performs calculations.
- CU controls computer operations.
- RAM is temporary memory.
- Storage devices store data permanently.
- Keyboard is an input device.
- Monitor is an output device.
- Microcomputer is used by a single user.
- Mainframe computers are used by banks.
- Supercomputer is the fastest computer.
- PARAM 8000 was India's first supercomputer.
- Workstations are used for engineering and software development.

QUICK REVISION

- Data → Processing → Information
- CPU = Brain
- CPU = CU + ALU + Memory Unit
- Input Devices:Keyboard, Mouse, Scanner
- Output Devices:Monitor, Printer, Speaker
- Types:Micro → Mini → Mainframe → Super → Workstation
- First Supercomputer:CDC 6600 (1964)
- First Indian Supercomputer:PARAM 8000 (1991) Developed by C-DAC