








COMPUTER SYSTEM ORGANIZATION/OVERVIEW CBSE BASED CLASS XI COMPUTER SCIENCE WITH PYTHON

BY
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Learning Objectives

- By the end of today's class you will be able to
- ☑ Define Computer
- ☑ Understand Data & Information
- ☑ Explain IPO Cycle
- ☑ Identify Hardware & Software
- ☑ Understand Functional Components of Computer

THINK BEFORE WE START

-  MOBILE
-  LAPTOP
-  ATM
-  GAMING CONSOLE

- **WHAT IS COMMON IN ALL THESE DEVICES?**

Think before we start

-  Mobile
-  Laptop
-  ATM
-  Gaming Console

- **What is common in all these devices?**

They are all Computer Systems.

WHAT IS A COMPUTER?

Definition:

A computer is an electronic device that accepts data and instructions, processes them, stores them, and produces meaningful information as output.

Diagram:

Input

↓

Processing

↓

Output

↓

Storage

Real Life Example:

Calculator

Input

5 + 10

↓

Processing

↓

15

output

WHAT IS A COMPUTER?

Definition:

A computer is an electronic device that accepts data and instructions, processes them, stores them, and produces meaningful information as output.

Can a computer think on its own?
No
It follows instructions.

Diagram:

Input

↓

Processing

↓

Output

↓

Storage

Real Life Example:

Calculator

Input
5 + 10
↓
Processing
↓
15

DATA VS INFORMATION



DATA

RAW FACTS

EXAMPLES

RAHUL

95

CLASS XI

INFORMATION

Processed Data

Rahul scored 95 marks in Class XI.

INFORMATION PROCESSING (IPO) CYCLE

INPUT

↓

PROCESS

↓

OUTPUT

↓

STORAGE

RAM
ROM
HDD
SDD

Real Example
ATM Machine:

Input
ATM Card
PIN
Amount

↓

Processing

↓

Cash

↓

Transaction Saved

COMPUTER SYSTEM

COMPUTER SYSTEM

↓

HARDWARE

+

SOFTWARE

Hardware –>Physical Parts

Software --> Programs



Real Examples:

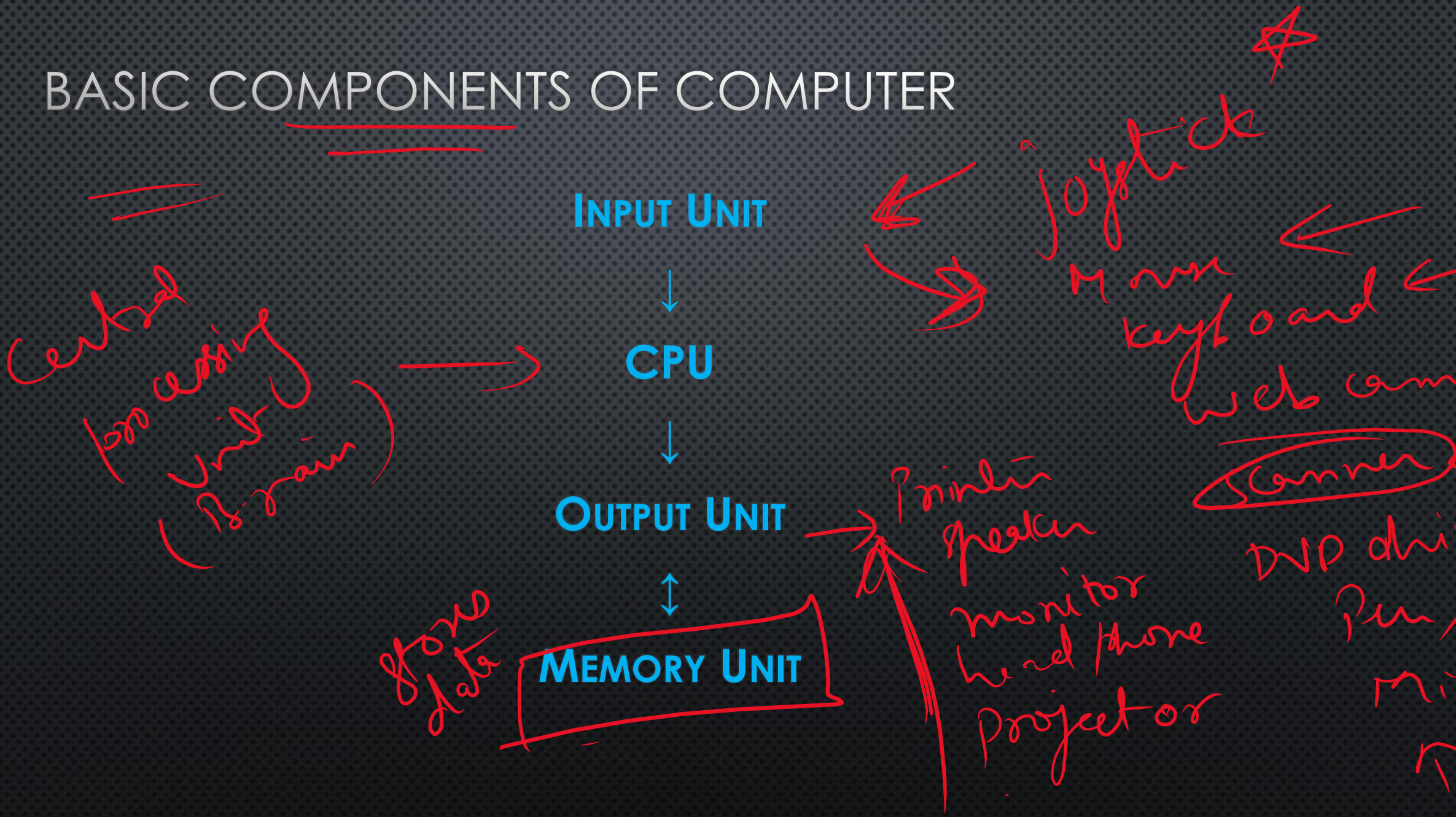
Hardware	Software
Keyboard	Windows
CPU	MS Word
Mouse	Python
Printer	Chrome

HARDWARE VS SOFTWARE

Hardware	Software
Physical	Programs
Can Touch	Cannot Touch
Manufactured	Developed
Wears Out	Can be Updated

Examples	Software
Hardware	Windows
Monitor	MS Paint
Printer	Python
RAM	Photoshop

BASIC COMPONENTS OF COMPUTER



BASIC COMPONENTS OF COMPUTER

INPUT UNIT

↓

CPU

↓

OUTPUT UNIT

↕

MEMORY UNIT

Example
Typing in MS Word

Keyboard

↓

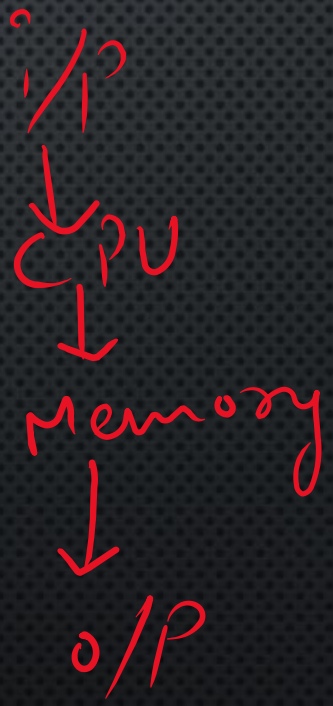
CPU

↓

RAM

↓

Monitor



Quick Quiz

Question 1

Define Computer.

Question 2

Difference between Data & Information.

Question 3

Name any 3 Hardware devices.

Question 4

Can we touch Software?

Question 5

What are the four stages of IPO Cycle?

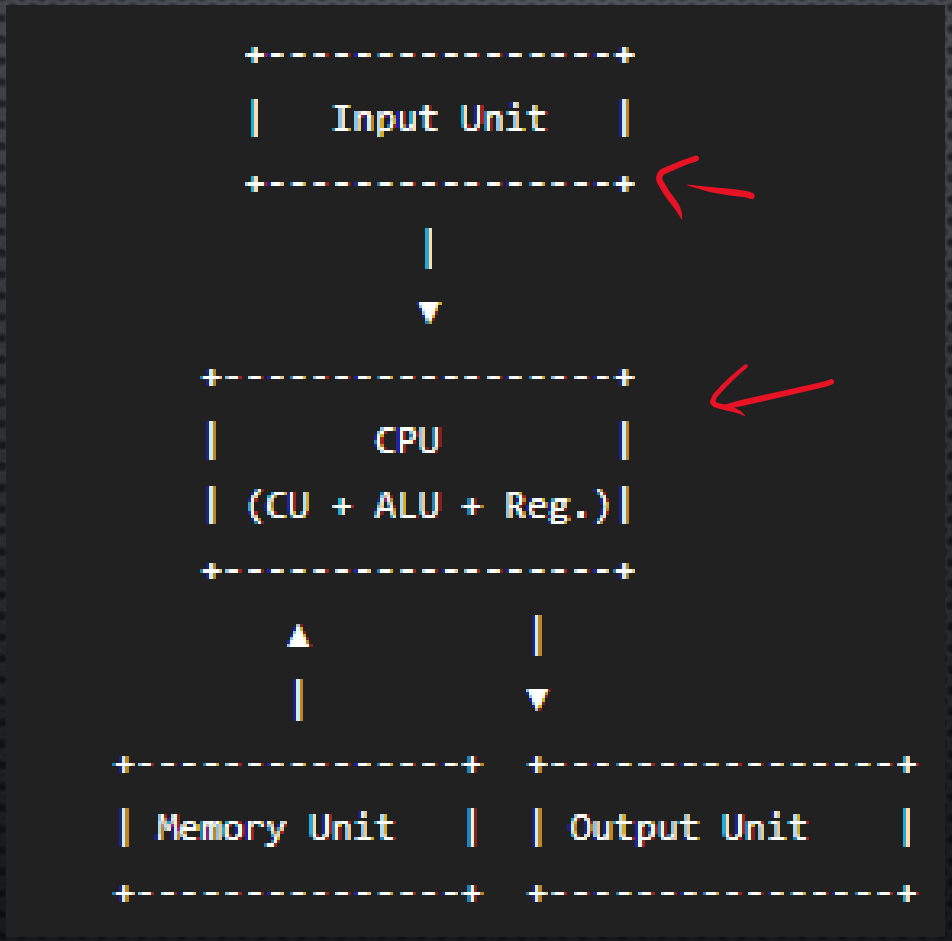
TOPIC: INPUT UNIT, OUTPUT UNIT & CPU

FUNCTIONAL COMPONENTS OF A COMPUTER

Every computer has four main components:

- Input Unit
- CPU
- Memory Unit
- Output Unit

These components work together to process information.



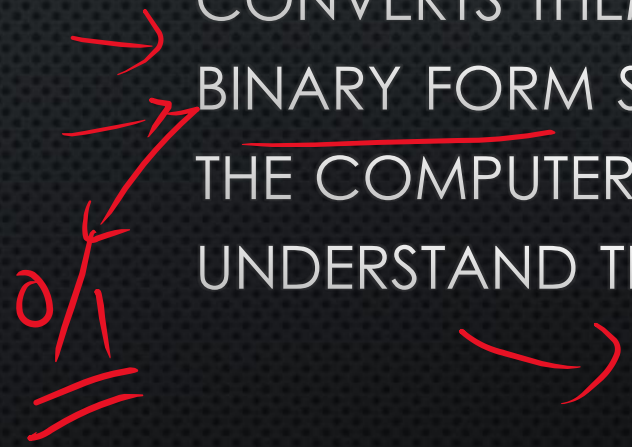
Can a computer work without an input device?
(Answer: No)

INPUT UNIT



Definition

The **Input Unit** accepts data and instructions from the user and converts them into binary form so that the computer can understand them.



Functions

- ✔ Accepts data
- ✔ Converts data into binary
- ✔ Sends data to CPU

Diagram:

User
↓
Keyboard
↓
Input Unit
↓
CPU

Real-Life Example

Typing your name using a keyboard.

COMMON INPUT DEVICES

-  KEYBOARD
-  MOUSE
-  MICROPHONE
-  WEBCAM
-  SCANNER
-  TOUCH SCREEN

Keyboard
Used to enter text and numbers.

Mouse
Used to point, click and drag.

Microphone
Used to record sound.

Scanner
Converts paper documents into digital form.

Touch Screen
Acts as both input and display.

Webcam
Captures images and videos.

MORE INPUT DEVICES

- OMR
- Smart Card Reader
- Barcode Reader
- QR Code Reader
- Biometric Scanner
- Light Pen

OMR
Reads shaded circles.
Used in board examinations.

Barcode Reader
Used in supermarkets.

QR Code Reader
Used for digital payments.

Biometric Sensor
Used for attendance and fingerprint scanning.

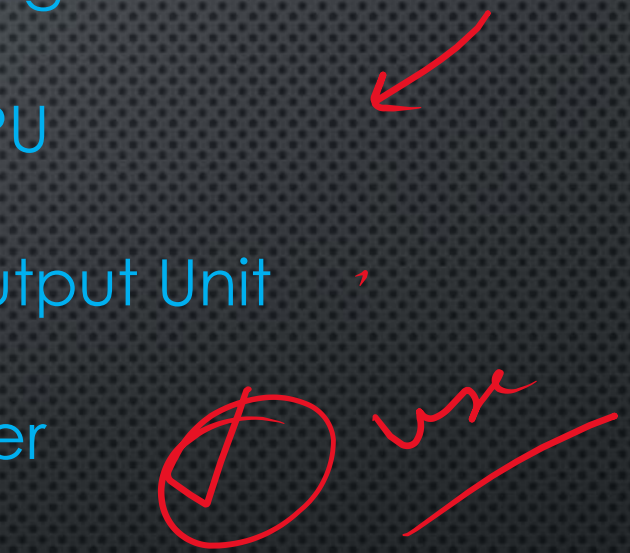
Smart Card Reader
Reads ATM and debit cards.

Light Pen
Used for drawing directly on the screen.

OUTPUT UNIT

- **DEFINITION**
- THE **OUTPUT UNIT** DISPLAYS THE PROCESSED INFORMATION IN A FORM THAT USERS CAN UNDERSTAND.
- **FUNCTIONS**
- ✔ RECEIVES PROCESSED DATA
- ✔ CONVERTS IT INTO HUMAN-READABLE FORM
- ✔ DISPLAYS THE RESULT

Diagram:



COMMON OUTPUT DEVICES

- MONITOR
- PRINTER
- SPEAKER
- PROJECTOR
- PLOTTER

Monitor
Displays output.

Printer
Produces hard copy.

Speaker
Produces sound.

Projector
Projects the screen.

Plotter
Used for maps and engineering drawings.

CPU – THE BRAIN OF THE COMPUTER

DEFINITION

CPU STANDS FOR

CENTRAL PROCESSING UNIT

IT CONTROLS AND PROCESSES ALL OPERATIONS INSIDE THE COMPUTER.

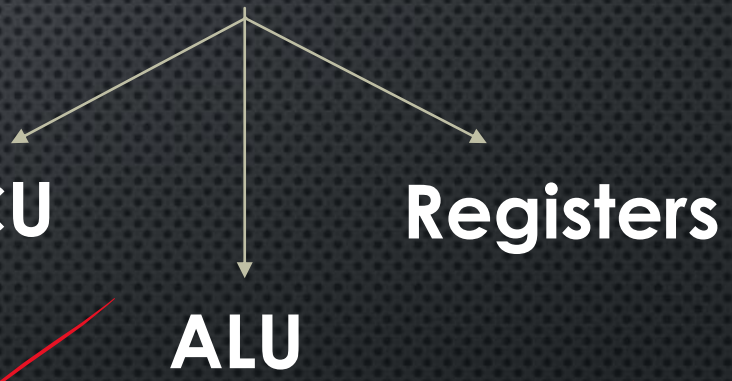
CPU has three parts:

Control Unit

Arithmetic Logic Unit

Registers

Parts of CPU



CPU – THE BRAIN OF THE COMPUTER

CU

CONTROLS EVERY OPERATION.

ALU

PERFORMS CALCULATIONS AND COMPARISONS.

REGISTERS

TEMPORARY STORAGE INSIDE CPU.

ROM

Which part performs calculations?

ALU VS CU

ALU	CU
Performs calculations	Controls operations
Performs logical decisions	Gives instructions
Processes data	Coordinates all components

Examples
ALU
10 + 20
50 > 30

CU
Controls Keyboard
Controls Monitor
Controls Memory

ALU VS CU



Memory Trick
ALU
Think
Arithmetic + Logic

CU
THINK
CONTROL EVERYTHING

Quick Quiz

Question 1

What is Input Unit?

Question 2

Name five input devices.

Question 3

What is CPU?

Question 4

What are the three parts of CPU?

Question 5

Differentiate ALU and CU.

CLASSROOM ACTIVITY

Device
Keyboard
Mouse
Scanner
Monitor
Printer
Speaker
Webcam
Projector
Barcode Reader
Touch Screen

Screen

i/p
i/p
i/p
o/p
o/p
o/p
i/p
o/p
i/p
i/p and o/p
o/p

OUTPUT?

CLASSROOM ACTIVITY

Device	Answer
Keyboard	Input
Mouse	Input
Scanner	Input
Monitor	Output
Printer	Output
Speaker	Output
Webcam	Input
Projector	Output
Barcode Reader	Input
Touch Screen	Input & Output (why)

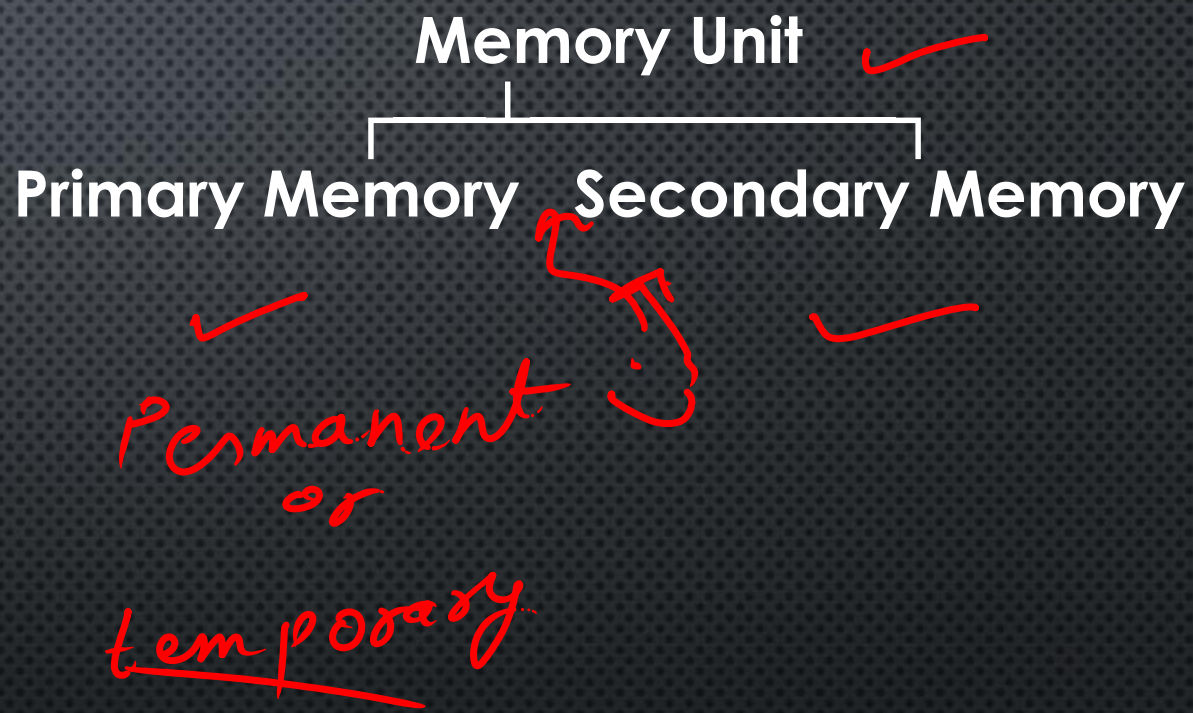
MEMORY UNIT

Definition
The Memory Unit stores data, instructions, and results during processing. It is directly accessed by the CPU for executing programs

Functions

- ✔ Stores data
- ✔ Stores instructions
- ✔ Stores intermediate results
- ✔ Supplies data to CPU

Diagram



TYPES OF MEMORY

Memory

↓

Primary Memory

↓

RAM → Permanent

ROM → Temporary

↓

Secondary Memory

↓

Hard Disk
SSD
CD/DVD
Pen Drive

Primary Memory
Temporary
Fast

Secondary Memory
Permanent
Large Storage

Which memory stores your movies and photos?
Secondary Memory

RAM (RANDOM ACCESS MEMORY)

Definition
RAM is a read and write memory used to store currently running programs and data. It is volatile, meaning its contents are lost when power is switched off.

Features

- ✔ Read & Write
- ✔ Fast
- ✔ Temporary
- ✔ Volatile

Examples
Opening Chrome
MS Word
Python Games
All use RAM.

Diagram:
Power ON
↓
RAM Stores Data
↓
Power OFF
↓
Data Lost

ROM (READ ONLY MEMORY)

Definition:

ROM stores permanent instructions that are written during manufacturing and normally cannot be modified. It is non-volatile, so data remains even after power is switched off.

Features

- ✔ Permanent
- ✔ Non-Volatile
- ✔ Read Only
- ✔ Stores Boot Program

ROM helps the computer start.
Without ROM, computer cannot boot.

RAM VS ROM

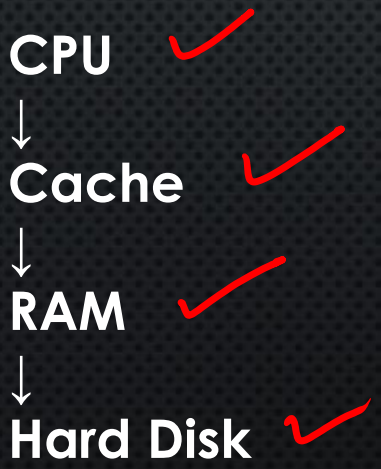
RAM	ROM
Temporary	Permanent
Read & Write	Read Only
Volatile	Non-Volatile
Fast	Slower
Used During Processing	Used During Booting

CACHE MEMORY

Definition
Cache Memory is a small, high-speed memory located inside or very close to the CPU. It stores frequently used data so the CPU can access it quickly.

Cache is much faster than RAM.
It improves computer performance.

Diagram:



Real Life Example
Think of Cache as Your study table.
Books on the table are easier to access than books kept in a cupboard.

MEMORY UNITS



Unit	Value
Bit	0 or 1
Nibble	4 Bits
Byte	8 Bits
KB → Kilo Bytes	1024 Bytes
MB → Mega Bytes	1024 KB
GB → Giga Bytes	1024 MB
TB → Tera Bytes	1024 GB → Giga Bytes
PB	1024 TB → Tera Bytes

MEMORY UNIT

Memory Trick:

Bit
↓
Byte
↓
KB
↓
MB
↓
GB
↓
TB
↓
PB

How many Bytes are there in 1 KB?

1 KB = 1024 Bytes
↓
Kilo Bytes

MEMORY UNIT

Memory Trick:

Bit
↓
Byte
↓
KB
↓
MB
↓
GB
↓
TB
↓
PB

How many Bytes are there in 1 KB?
1024

SECONDARY MEMORY

Definition
Secondary Memory stores data permanently and has a much larger storage capacity than primary memory.

Examples
Hard Disk
SSD
Pen Drive
Memory Card
DVD

Features
- ✔ Permanent
- ✔ Large Capacity
- ✔ Non-Volatile
- ✔ Slower than RAM

PRIMARY MEMORY VS SECONDARY MEMORY

Primary Memory	Secondary Memory
Temporary	Permanent
Fast	Slower
Small Capacity	Large Capacity
Directly accessed by CPU	Accessed through I/O devices
RAM, ROM	HDD, SSD, Pen Drive

QUICK QUIZ

1 KB = 1024 Bytes
(1 kilo)

Question 1
What is Memory Unit?
Question 2
Difference between RAM and ROM.
Question 3
What is Cache Memory?
Question 4
Arrange in ascending order
KB
MB = 1024 KB
GB
TB
PB

Question 5
Which memory is faster?
RAM (2)
ROM (3)
Cache (1)

CLASSROOM ACTIVITY

Give each student these questions:

1. Convert:
    1. 2 KB into Bytes
    2. 5 MB into KB
    3. 3 GB into MB
2. Identify whether the following are Primary Memory or Secondary Memory:
    1. RAM
    2. ROM
    3. SSD
    4. Hard Disk
    5. Pen Drive
    6. DVD

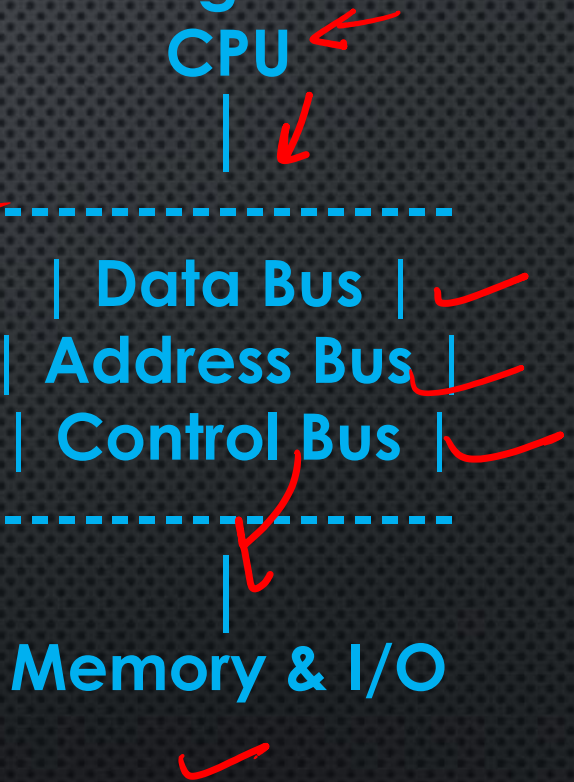
1. Fill in the blanks:
    1. _____ memory is volatile.
    2. _____ memory stores the boot program.
    3. Cache memory is located _____ the CPU.

COMMUNICATION BUS

Definition
A Communication Bus is a collection of wires or pathways that transfers data, instructions, and control signals between different parts of the computer.



Diagram



Types of Bus

- ✔ Data Bus
- ✔ Address Bus
- ✔ Control Bus

Explain
Think of a bus as a road connecting different components of the computer.
Can CPU communicate directly without a bus?
Answer: No

MOBILE SYSTEM ORGANIZATION

Modern Mobile Phone Components

- Processor (CPU)
- Camera ISP
- Display
- Memory
- Battery

Diagram
Smartphone

↓

Processor

↓

Memory

↓

Camera

↓

Display

↓

Battery

Today's smartphones are actually small computers.
They contain CPU, memory, storage and operating system.

Which operating system does your phone use?

Android

iOS

TYPES OF SOFTWARE

System Software
Controls the computer.
Examples
Windows
Linux
Android

Application Software
Used by users.
Examples
MS Word
Chrome
Photoshop
Python

Utility Software
Maintains the computer.
Examples
Antivirus
Disk Cleanup
Backup Software

SYSTEM SOFTWARE VS APPLICATION SOFTWARE

System Software	Application Software
Controls hardware	Performs user tasks
Runs computer	Runs after OS starts
Essential	Optional
Windows	MS Word
Linux	Firefox

Is Google Chrome a system software?

SYSTEM SOFTWARE VS APPLICATION SOFTWARE

System Software	Application Software
Controls hardware	Performs user tasks
Runs computer	Runs after OS starts
Essential	Optional
Windows	MS Word
Linux	Firefox

Is Google Chrome a system software?
NO

OPERATING SYSTEM (OS)

Definition

An Operating System is system software that acts as an interface between the user and computer hardware and manages all computer resources.

Functions

- ✔ Memory Management
- ✔ File Management
- ✔ Device Management
- ✔ Process Management
- ✔ Security

Examples

Windows
Linux
macOS
Android

Diagram

User
↓
Operating System
↓
Hardware

PROGRAM EXECUTION

How does a program run?

Program

↓

Operating System

↓

RAM

↓

CPU

↓

Output

1.User starts the program.
2.Operating System loads it into RAM.
3.CPU executes instructions.
4.Output is displayed.

Real Example

Opening Microsoft Word.

CLOUD COMPUTING

Definition
Cloud Computing is the delivery of computing services such as storage, software, and processing over the Internet instead of using only a local computer.

Examples
Google Drive
OneDrive
Dropbox
Google Docs

Advantages
- ✔ Access Anywhere
- ✔ Backup
- ✔ Easy Sharing
- ✔ Less Local Storage Required

Activity

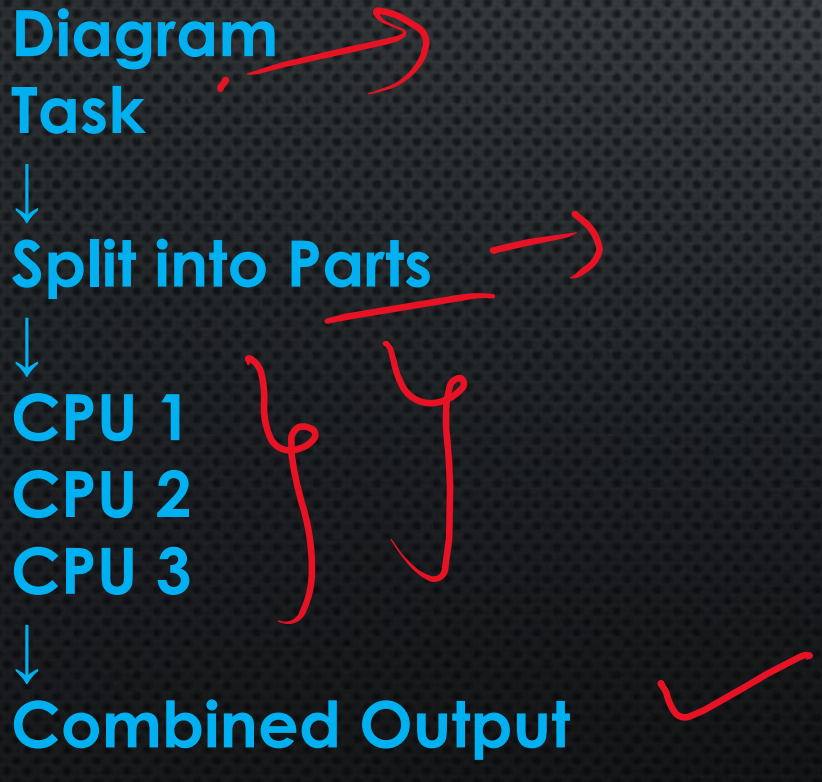
Who has used Google Drive?

PARALLEL COMPUTING

Definition
Parallel Computing is the process of performing multiple tasks simultaneousiy using more than one processor or core.

Real Life Example
Watching YouTube while downloading a file.

Diagram



Advantages

- ✔ Faster Processing
- ✔ Better Performance
- ✔ Saves Time

CHAPTER SUMMARY

we learned

- ✓ Computer
- ✓ Data & Information
- ✓ IPO Cycle
- ✓ Hardware & Software
- ✓ Functional Components
- ✓ Input Devices
- ✓ Output Devices
- ✓ CPU
- ✓ Memory
- ✓ RAM
- ✓ ROM
- ✓ Cache Memory
- ✓ Secondary Storage
- ✓ Communication Bus
- ✓ Mobile System
- ✓ Software
- ✓ Operating System
- ✓ Cloud Computing
- ✓ Parallel Computing

THANK YOU