ST CLEMENT'S SECONDARY SCHOOL

INFORMATION AND COMMUNICATIONS TECHNOLOGY

ORDINARY LEVEL SECONDARY EDUCATION

FORM 1

Components of Computer Systems

Mario Kabula Makanga Chongo

Teaching and Learning Materials

- ***Charts & Diagrams: Illustrate the timeline of computer development. Old Hardware:***
- ***show examples of older computers or components.***
- ***Worksheets & Matching Exercises: Match early ICT tools to their functions***

Learning Environment

- computer components.
- computer labs with desktops/laptops,
- projectors,
- Internet
- videos

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Components of Computer Systems

Computer system

- **Computer system** is a combination of hardware, software, and other components that work together to process data and perform tasks.
- It consists of several key components, each with a specific role.

Activity

- Create a chart categorizing components of the computer system into hardware and software.


Java
Windows 7
McAfee
GMail


Office
Outlook Express
Adobe


monitor
bocinas
ratón o mouse
teclado
impresora

Assignment

- search for hardware components draw and match them to their functions.

Computer Hardware Components

Activity

Ask learners to

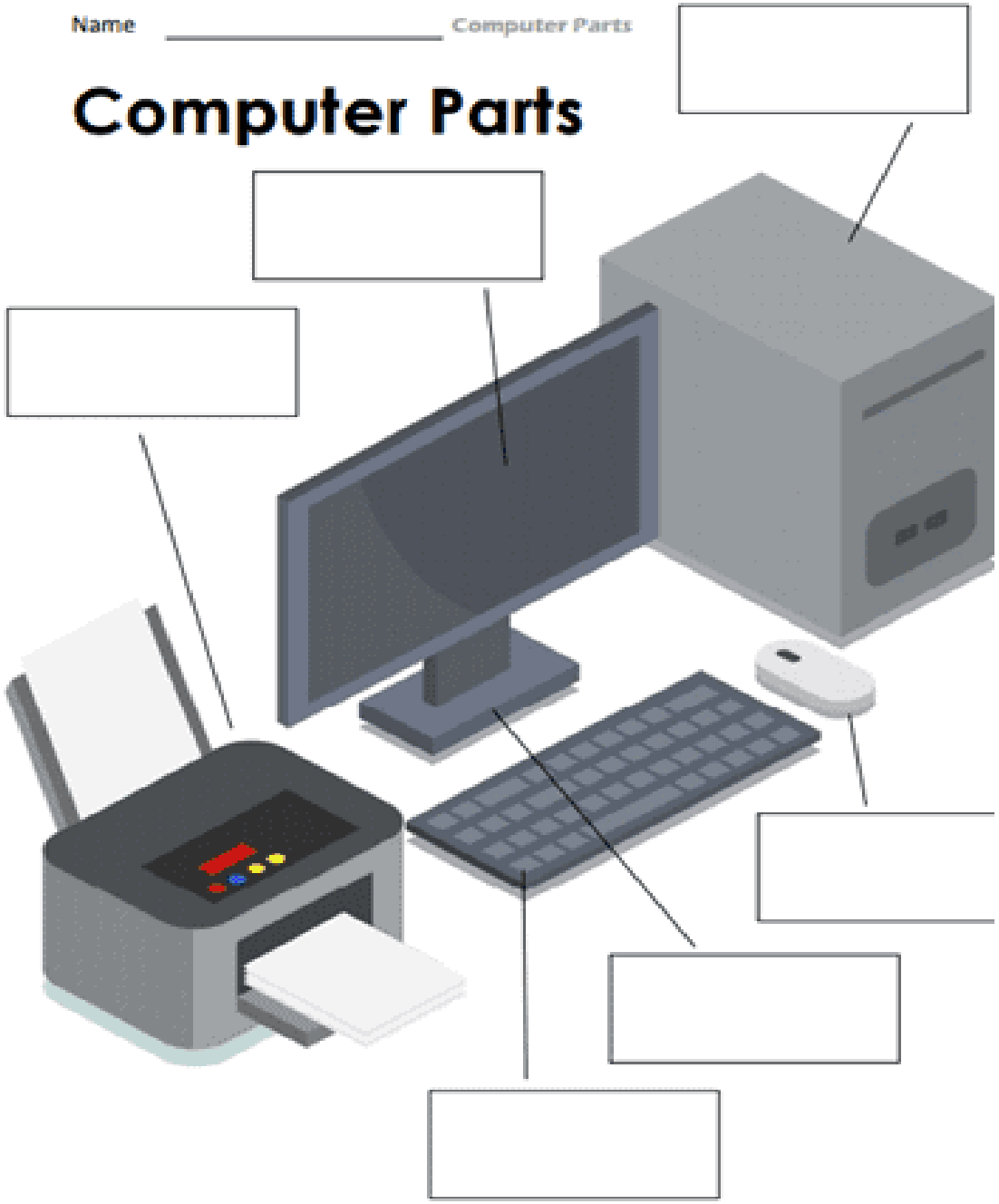
(i) identify the external components of the computer

(ii) Categorise the input, processing and output components

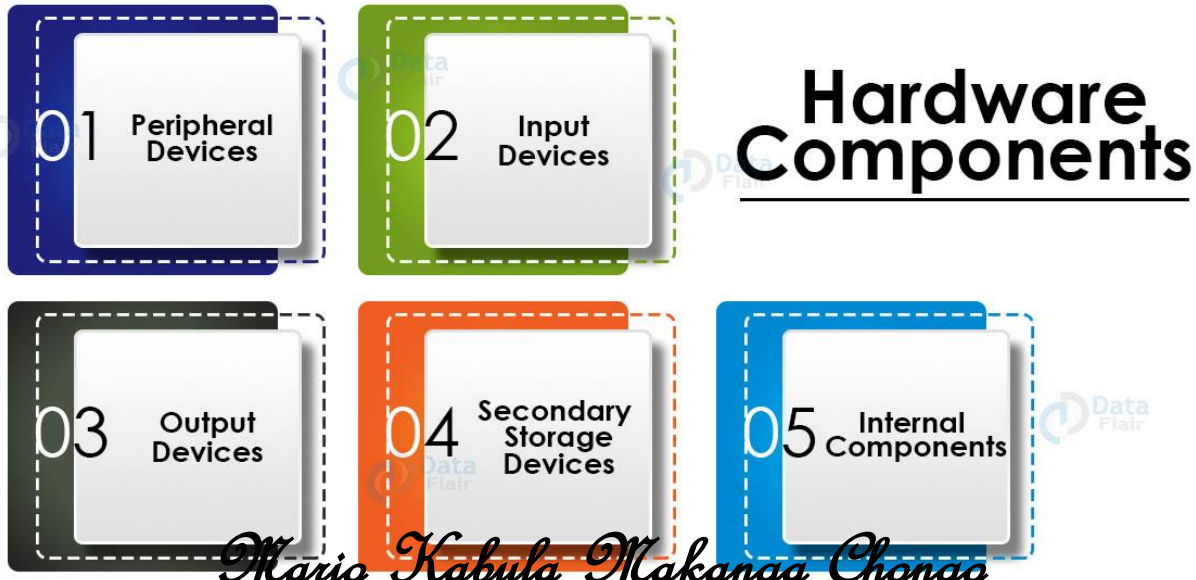
(iii) Labelling hardware component, (input/output device)

Name _____ Computer Parts

Computer Parts



- **Hardware** is the mechanical device in a computer system that is interconnected for operation.
- Computer Hardware these are the tangible parts you can see and touch, and they work together to process data and execute tasks.



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Peripheral Devices

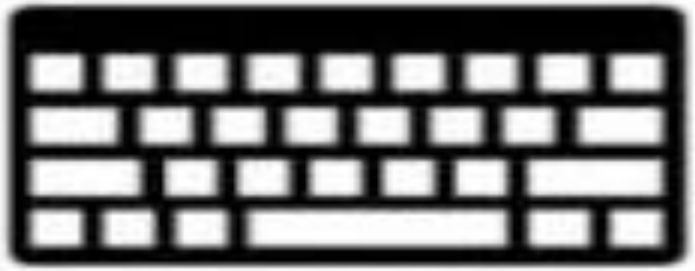
- These devices are the ones that provide input/output to the computer externally.
- They are auxiliary devices meant to form a connection with the device externally via a cable or Bluetooth to function.
- examples

mouse, headphones

Input devices

- The input device allows the user to send data or information to the computer to perform a task.
- Keyboards
- Joysticks
- mouse

Mouse



Keyboard

Scanner

Microphone

Light pen

Joy stick

TrackBall

Bar code scanner

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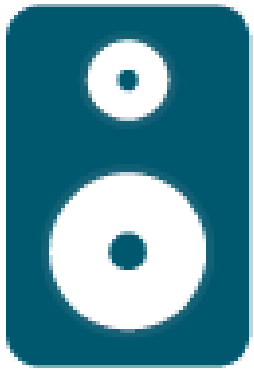
Output devices

- They receive Output devices are hardware components that allow a computer or electronic system to communicate information to the user or another system. They convert electronic data into a human-readable or machine-usable form.
- Printers
- Monitors
- Headphones
- Projector
- Speaker
- Plotter

MONITOR

PRINTER



SPEAKER

HEADPHONES

PROJECTOR

Secondary storage devices

- It is a hardware device to store digital data in multiple forms like text, images, audio, etc. Some **Examples**
- hard drives
- USB Drives
- memory cards


SD CARD
64 GB


D · C60 TDK


HDD


SanDisk

Exercise

1. Define Hardware components of the computer system.
2. Give two examples of Hardware components of the computer system.
3. Give the difference between output and input components of the computer system.
4. Explain the use of storage components of the computer system.

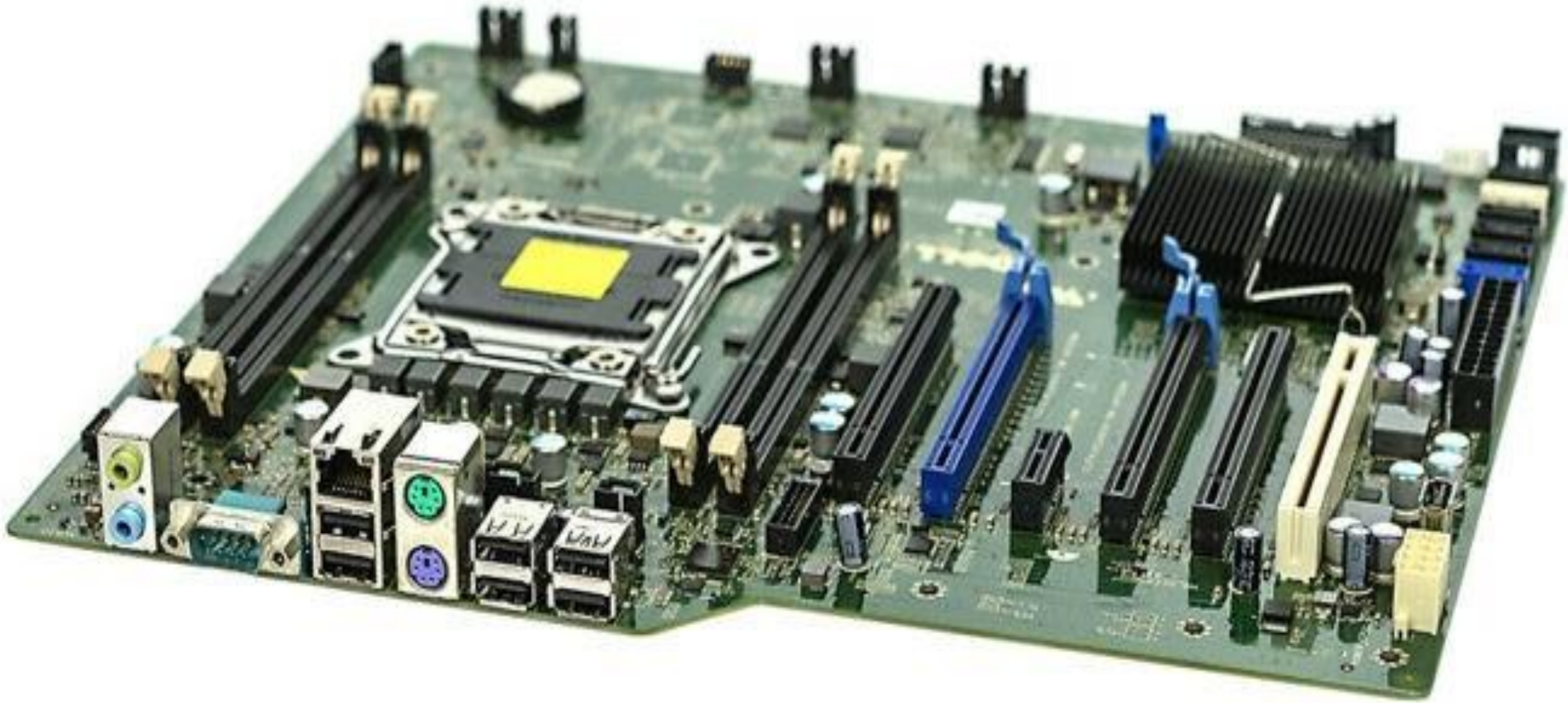
Internal components of the computer

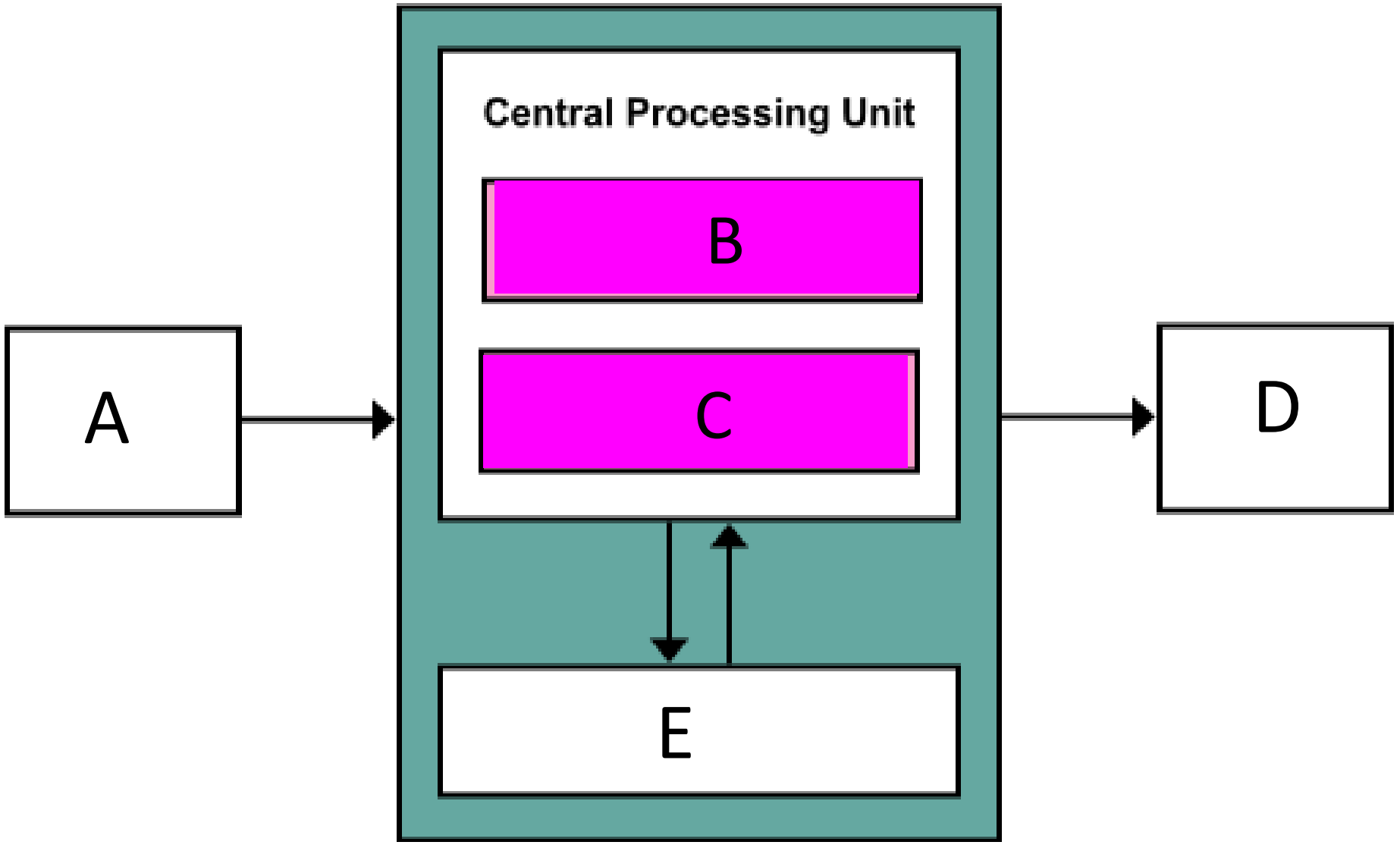
Internal components

The components that are already a part of the motherboard and the system.

ACTIVITY

- ***Performing a hands-on activity where learners open a computer and identify and explain the functions internal components.***
- ***Using visual aids to identify and label hardware components (CPU, RAM,ROM)***




Central Processing Unit
B
C
A
D
E

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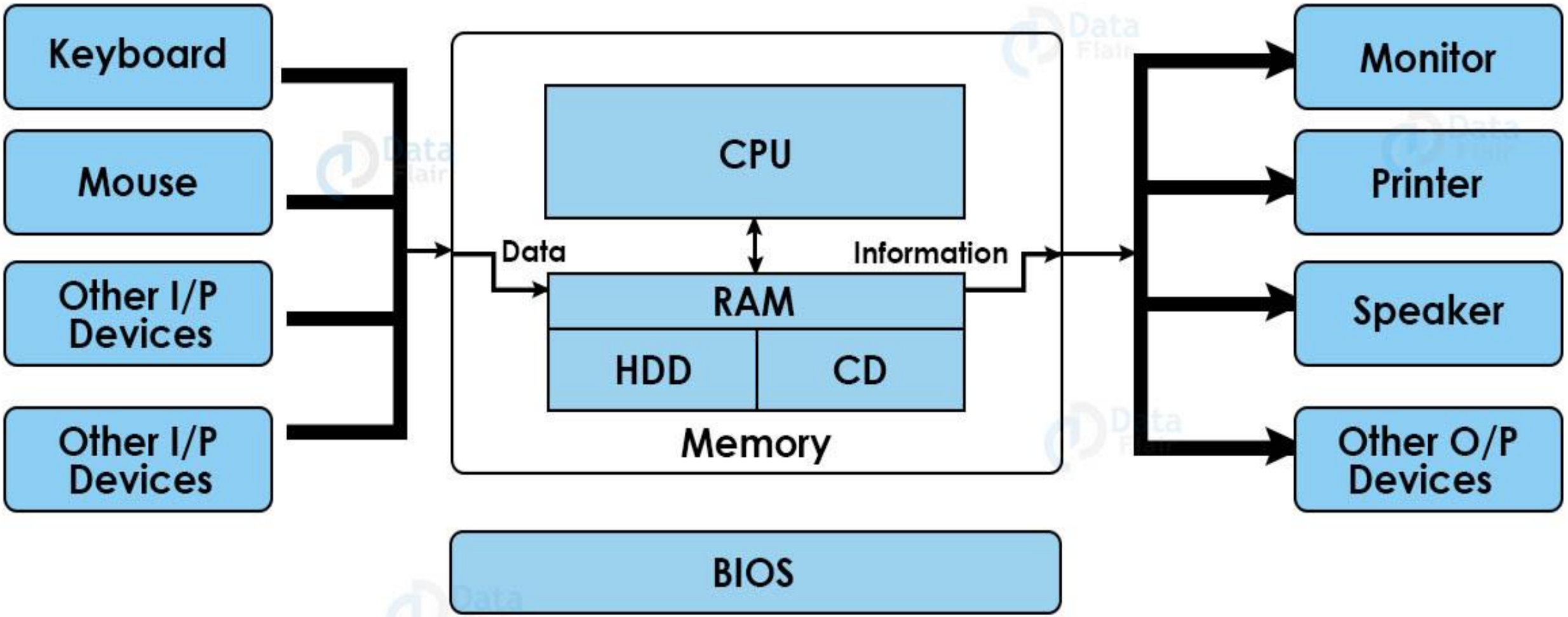

Keyboard
Mouse
Other I/P Devices
Other I/P Devices
CPU
Data
Information
RAM
HDD
CD
Memory
BIOS
Monitor
Printer
Speaker
Other O/P Devices

Central Processing Unit **CPU**

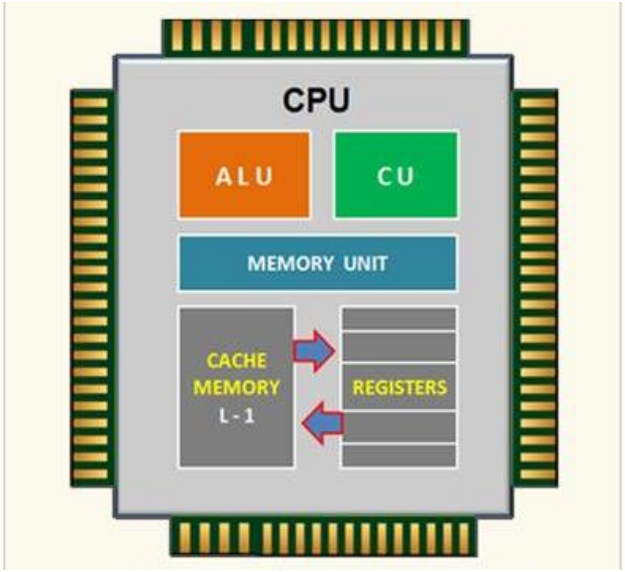
- The **Central Processing Unit (CPU)**, often referred to as the "brain" of the computer, is a critical hardware component responsible for executing instructions and performing calculations.
- It processes data and controls the operations of other parts of the computer system

Functions of the CPU

- **Instruction Execution**: The CPU carries out instructions from programs and applications.
- **Data Processing**: It performs arithmetic (e.g., addition, subtraction) and logical operations (e.g., comparisons).
- **Control**: It manages and coordinates the activities of all other hardware components.

Components of the CPU

- **Arithmetic Logic Unit (ALU)**:
  - Performs mathematical calculations and logical operations.
- **Control Unit (CU)**:
  - Directs the flow of data and instructions within the CPU and between other components.
- **Registers**:
  - Small, fast storage locations used to hold data and instructions temporarily during processing.
- **Cache Memory**:
  - High-speed memory that stores frequently used data to speed up processing.



Input Device

Central Processing Unit

Control Unit

Arithmetic/Logic Unit

Memory Unit

Output Device

EXERCISE

1. CPU stands for.
2. List two functions of the CPU
3. Explain four components of the CPU

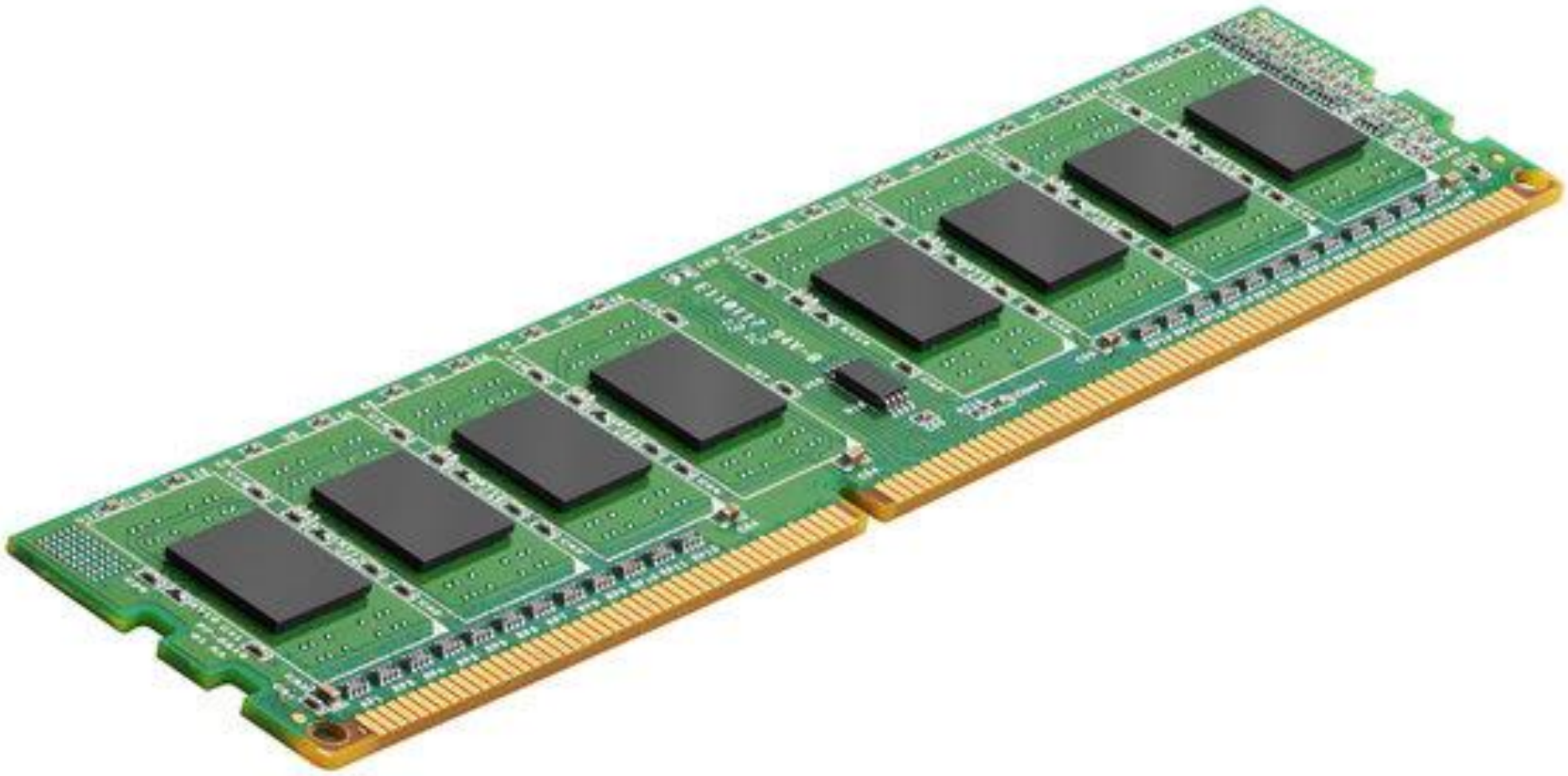
Random Access Memory (RAM)

- **Random Access Memory (RAM)** is a type of computer memory that is essential for the operation of a computer.
- It serves as the short-term memory where the system stores data that it is actively using or processing

Functions of RAM

- **Temporary Storage**: Stores data and instructions that the CPU needs to access quickly.
- **Active Program Execution**: Holds the operating system, applications, and data currently in use.
- **Multitasking**: Allows multiple programs to run simultaneously by providing quick access to their data.

❑ **It is a Volatile Memory**: RAM loses its data when the computer is powered off.



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Read-Only Memory (ROM)

- **Read-Only Memory (ROM)** is a type of non-volatile memory used in computers and other electronic devices.

Characteristics of ROM

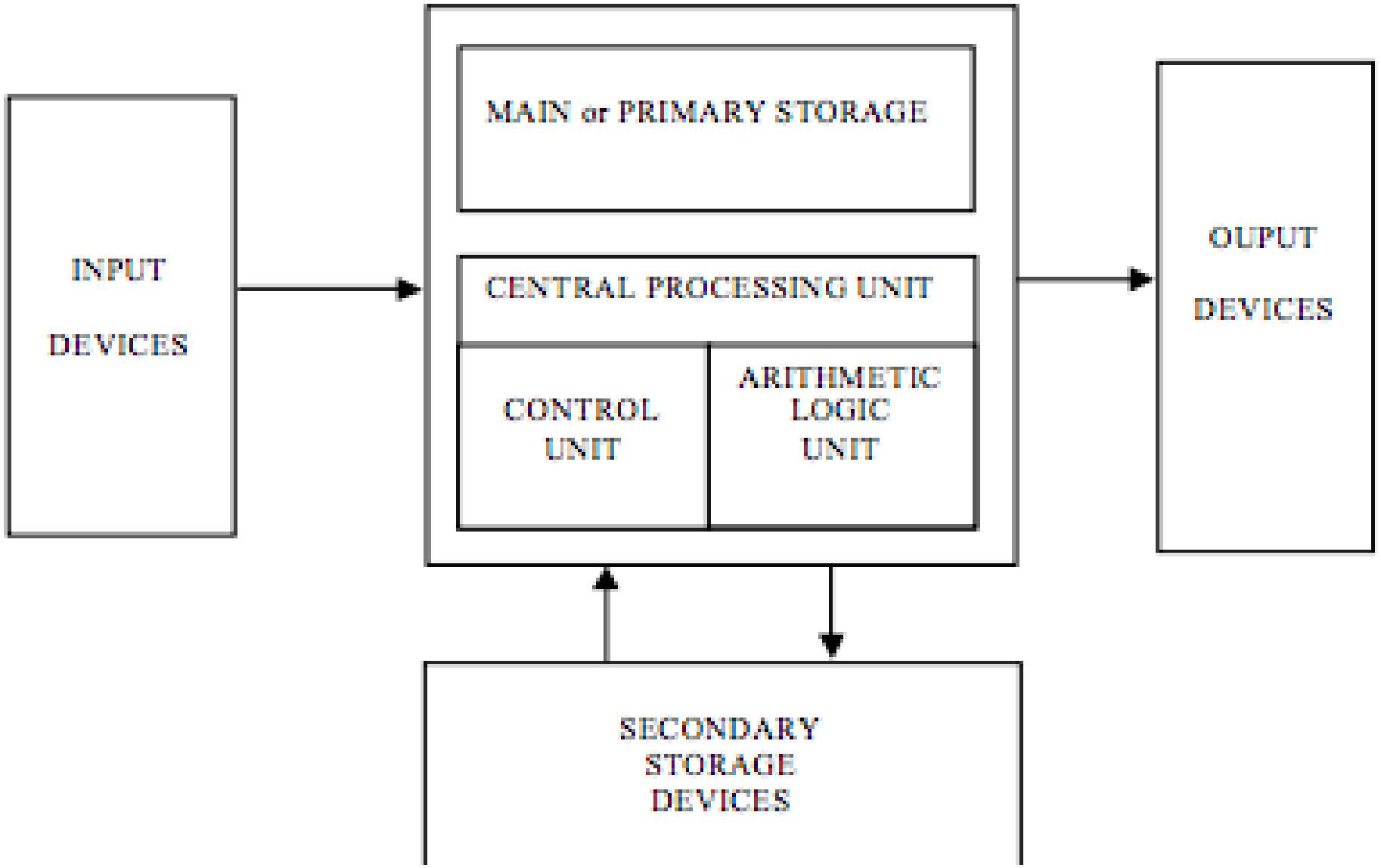
- **Non-Volatile**: Retains data even without power.
- **Read-Only**: Data is pre-written during manufacturing and cannot be easily modified.
- **Permanent Storage**: Used for storing firmware or essential system instructions.

Functions of ROM

- **Storing Firmware**: Contains essential instructions for booting up the system and initializing hardware (e.g., BIOS/UEFI in computers).
- **System Configuration**: Stores settings and configurations for hardware devices.
- **Embedded Systems**: Used in devices like microwaves, washing machines, and calculators to store fixed programs.

Types of ROM

- Mask ROM
- PROM (Programmable Read-Only Memory)
- EPROM (Erasable Programmable Read-Only Memory)
- EEPROM (Electrically Erasable Programmable Read-Only Memory)
- Flash Memory
  - A type of EEPROM that allows for faster writing and erasing.
  - Commonly used in USB drives, SSDs, and memory cards.


INPUT
DEVICES
MAIN or PRIMARY STORAGE
CENTRAL PROCESSING UNIT
CONTROL
UNIT
ARITHMETIC
LOGIC
UNIT
SECONDARY
STORAGE
DEVICES
OUPUT
DEVICES

Exercise

1. What do the following letters stand for.

(a)RAM

(b)ROM

2. State the difference between RAM and ROM in terms of functionality and give one example on each.

Assignment

- physically assemble a computer
- use a virtual simulation to connect components (motherboard, CPU, RAM, and storage devices)

Computer Software

Activity

- ***The teacher will explain the concept of computer software, followed by a class discussion. Learners will then write their own definitions in their notebooks***
- ***Categorise computer system into application and system***

- ***Discussing different types of computer system software***

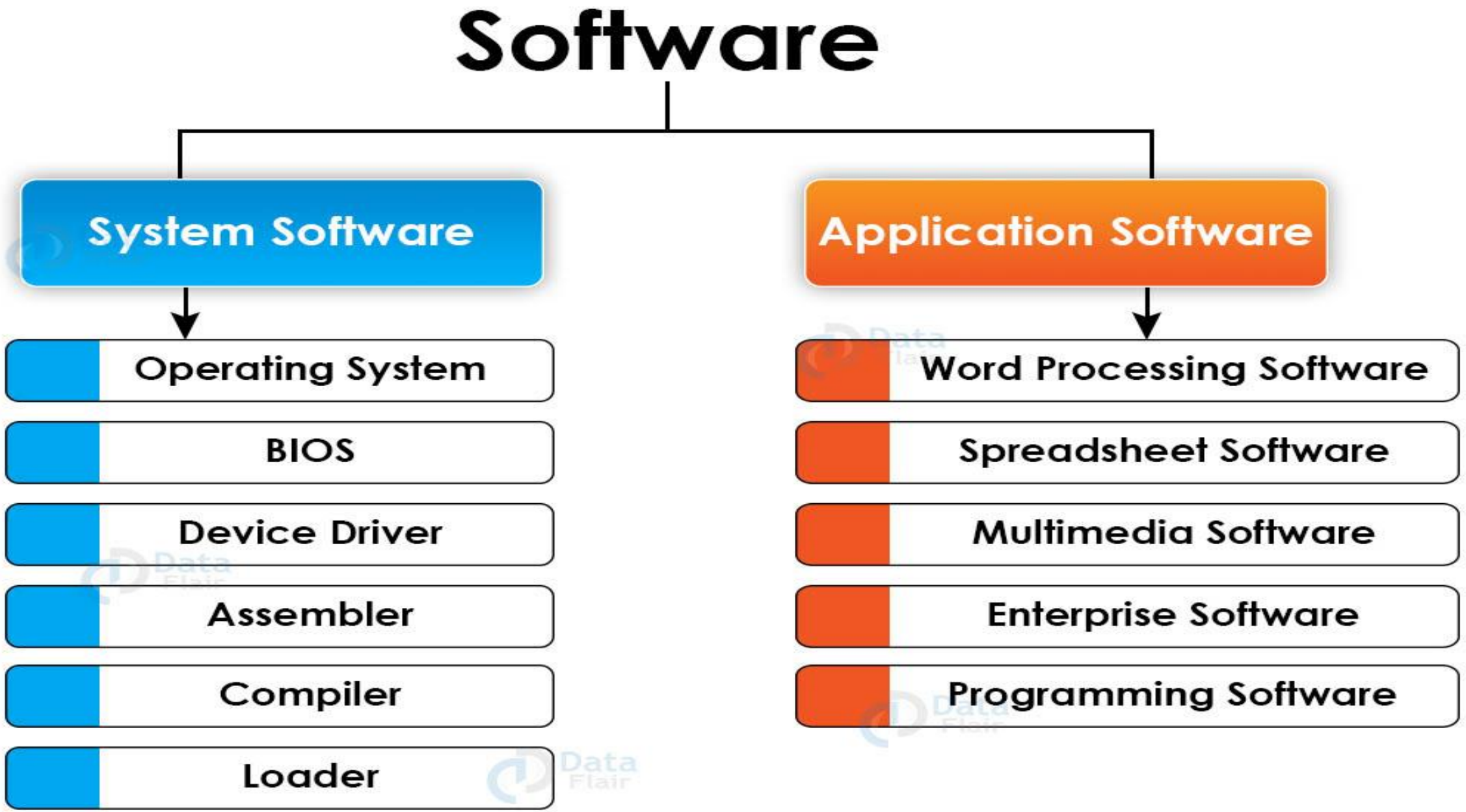
Teaching/Learning Materials:

- **Whiteboard,**
- **projector,**
- **handouts with definitions.**

Learning Environment
• **Physical**: Classroom with computers, projectors, and whiteboards.
• **Virtual**: Online platforms for sharing documents and collaborative work (e.g., Google Drive, Microsoft Teams).
• **Technological**: Access to computers with installed software (e.g., Microsoft Office, presentation software, spreadsheet software)

Computer Software

- Computer software consists of instructions, data, or programs that tell a computer what to do, enabling it to perform specific tasks.
- Software is a set of instructions that tell a computer how to perform tasks.


Software
System Software
Application Software
Operating System
BIOS
Device Driver
Assembler
Compiler
Loader
Word Processing Software
Spreadsheet Software
Multimedia Software
Enterprise Software
Programming Software

System Software

- The software that runs the computer by activating, controlling, and coordinating the hardware is system software.
- They also control the application programs on the computer.

Operating System

- The most relevant example of system software is an operating system.
- It is an interface connecting the users to the computer hardware.
- Linux
- Windows
- Edge

BIOS

- A basic input-output system is part of Read-Only Memory or flash memory.
- The first software that users activate at their computer is BIOS because it loads the drivers to assist storage of operating systems.
- It has a set of commands to make the devices perform effectively.

Device driver

- It is responsible for controlling computer hardware by providing an interface.
- The use this software to communicate with the processor.
- The operating systems usually have these drivers to work with hardware systems.

Assembler

- It is a language program with input being an assembly and output being an object.
- The programmer has a basic interpretation machine that uses hardware for fundamental instructions.
- It uses machine language to get machine memory in place.

Compiler

- An interpreter is a program responsible for executing a source program.

Features of a system software

- They are very close to the system.
- They have a very fast speed.
- These are difficult to design and understand.
- They are less interactive.
- They have small size.
- These are hard to manipulate.
- They usually use low-level language.

Exercise

1. Define system software
2. Give three examples of system software
3. Explain the use of the system software you have given on question 2.

Application Software

Application Software

- This type of software is for specific tasks related to end-users and their ease.
- The users can install and uninstall this software according to their needs.

ACTIVITY

- ***Prepare a blank word document and ask learners to:***

(i) type

(ii) apply basic formatting.

Word Processing Software

- This software is for creating editable documents that users can keep going back to.
- Some examples
- Ms Word,
- Google Docs
- Wordpad

Assignment

- Create a new document using shapes in MS word draw a computer system
- Apply basic formatting (font styles, alignment, shape colors).

Spreadsheet Software

- It has grids and columns to tabulate all the data properly making it easy for the user to maintain records.
- It enables data processing of even larger files.
- There is an option to calculate using different formulas as well.

Examples

- Ms Excel
- Google Sheets

ACTIVITY

- *Prepare a spreadsheet and ask learners to:*

(i) enter data into a spreadsheet

(ii) apply basic formatting.

Teaching/Learning Materials:

Computers with Microsoft Excel installed

Multimedia Software

- These are for editing videos, audios, and texts and allows users to combine all of them as well.
- They can improve their documents with interesting visuals and sounds using multimedia software.

Examples

- VLC player
- Premier Pro
- Window Media Player

ACTIVITY

- ***Prepare a MS paint and ask learners to:***

(i) Create graphics

(ii) apply basic formatting.

Programming Software

- These are software for writing other programs by translating programming languages into machine language.
- The developers use them to create, debug, and maintain applications.

Features of application software

- Closer to the user.
- Easy to design and understand.
- Interactive.
- Have a slow speed.
- Usually use high-level language.
- Easy to manipulate and use.
- Need large storage space in a device.

Utility software

- **Utility software** is a type of system software designed to help analyze, configure, optimize, and maintain a computer.
- It performs specific tasks to ensure the smooth operation of the system and enhance its performance.

Main types of utility software

- Disk Management Utilities
- File Management Utilities
- System Monitoring and Optimization Tools
- Security Utilities
- Backup and Recovery Utilities
- Network Utilities
- Driver Management Utilities
- System Cleanup Utilities
- Accessibility Utilities

Importance of Utility Software

- **Improves Performance**: Optimizes system resources and speeds up operations.
- **Enhances Security**: Protects against malware and unauthorized access.
- **Simplifies Maintenance**: Automates tasks like disk cleanup, backup, and driver updates.
- **Prevents Data Loss**: Ensures data is backed up and recoverable in case of failures.
- **Extends Hardware Lifespan**: Keeps hardware components running efficiently.

Exercise

1. Define the following
(a)Application software
(b)System software
(c)Utility software
2. State two functions of utility software

Assignment

Using spreadsheet software

(i) Create a document name it my budget

(a) List the items

(b) Put prices

(c) Calculate the total of each item

(d) Give the overall total of the cost of all items.