

I.T SUMMARY

What is Information Technology?

I.T is the application or use of computers and electronic systems to process, store and share information.

Role of IT in the society.

① Transport: Through traffic lights, GPS navigation, online ride hailing apps like Bolt, Uber and Little, trans. has been made easier.

② Business: It has transformed business landscape by automating processes, enabling e-commerce and facilitating global trade - jumia, ads.

③ Healthcare: - It plays a crucial role in patient management, medical research and treatment delivery.

→ Electronic health systems, records, telemedicine and health information systems enhance quality of health care.

④ Government: - it has helped improve public services, enhance transparency and engage with citizens.
example ; E-citizen service.

⑤ Education: It has enabled institutions provide online learning platforms, digital resources and interactive tools
e.g Zeraki, Stadocu,

⑥ Finance: The finance industry relies heavily on I.T for secure transactions, risk management and data analysis
e.g online banking, investment services

Culture and entertainment: It influences cultural practices by providing new ways of preserving and sharing culture and by creating digital communities e.g. Tiktok.

Communication - Communication has been made easier, faster and accessible through email, social media platforms like WhatsApp and Instagram allowing information to be conveyed to long distances.

Security - IT helps protect data through passwords, encryption and monitoring systems. Also through CCTVs and alarms.

Agriculture: Farmers use IT for weather updates, market prices and modern farming tools.

Innovation and creativity - IT supports new ideas like Artificial intelligence, robots, editing and producing digital work.

Fundamentals of Computer operations - IPOS

Input - This is when the computer receives data through the keyboard, mouse or touchscreen.

- The information may be stored in the memory for later reference or immediately used to perform the desired operation.

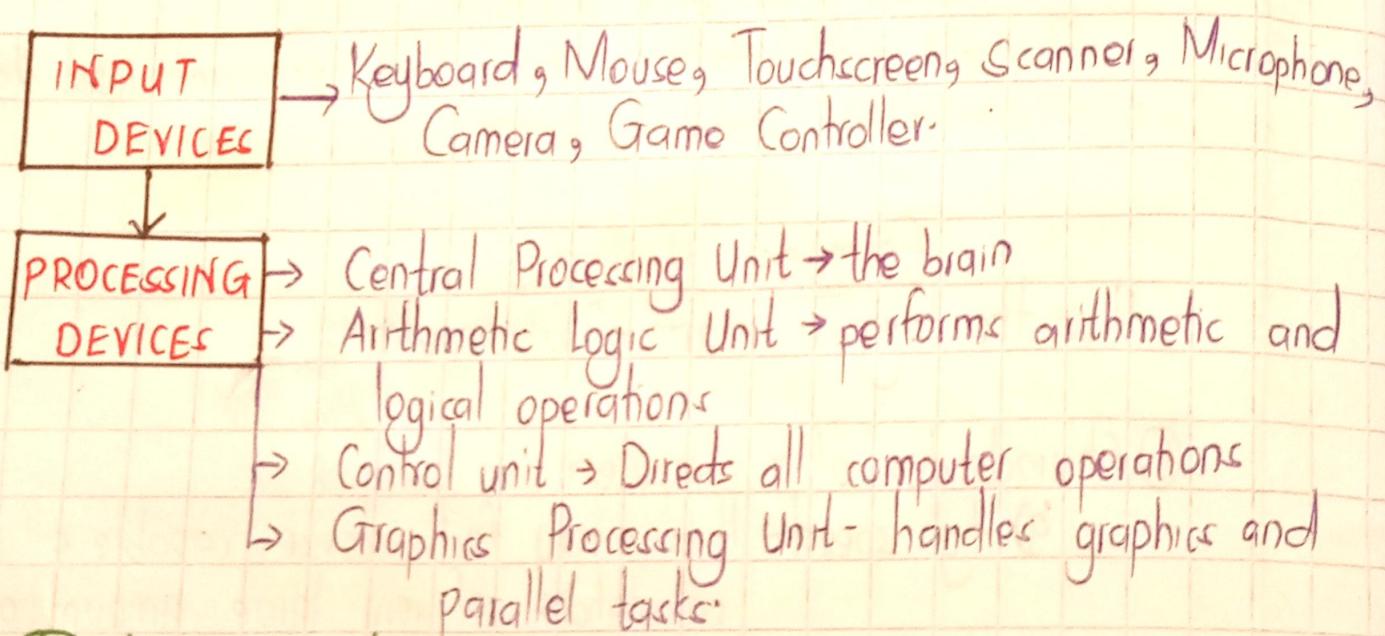
Output Processing - It is the 2nd basic operation. It is where the computer system starts executing the instructions given by the user.

Output - It is the result of the instruction given by a user.

Storing - Memory and storage are used to hold data temporarily or permanently.

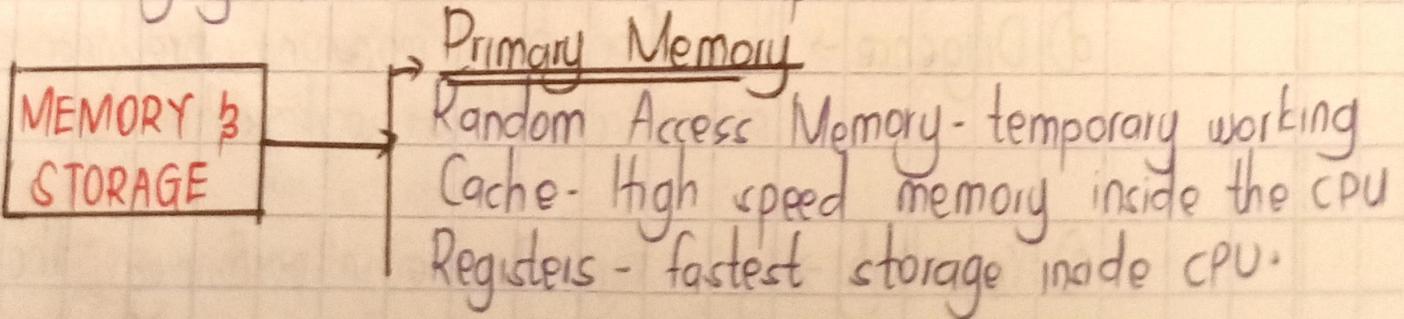
→ The CPU is responsible for storing data in your computer's memory.

Controlling - It is a type of process that monitors the instructions given by the user from the time it is executed to the output result.



Functions involved through processing.

- ① Running program instructions
- ② Performing arithmetic calculations
- ③ Decision making through logic operations
- ④ Managing flow of data b/w components



Secondary memory -

- Solid State Drive - fast permanent storage
- Hard Disk Drive - mechanical permanent storage
- USB flash drives - portable external storage
- Memory cards - used in phone and cameras

OUTPUT DEVICES

- Monitor, Printer, Speakers, Projector, VR headset

Computer → it is an electronic device that receives information, processes it and gives back results
→ it is an electronic device that processes input data to output data.

COMPUTER HARDWARE

H is the tangible parts of a computer.

① Characteristics of a computer

a) High speed → It is a very fast device capable of performing calculations of very large amount of data.

b) Accuracy → Calculations are 100% error free.

c) Storage → Computers have a large storage capacity.

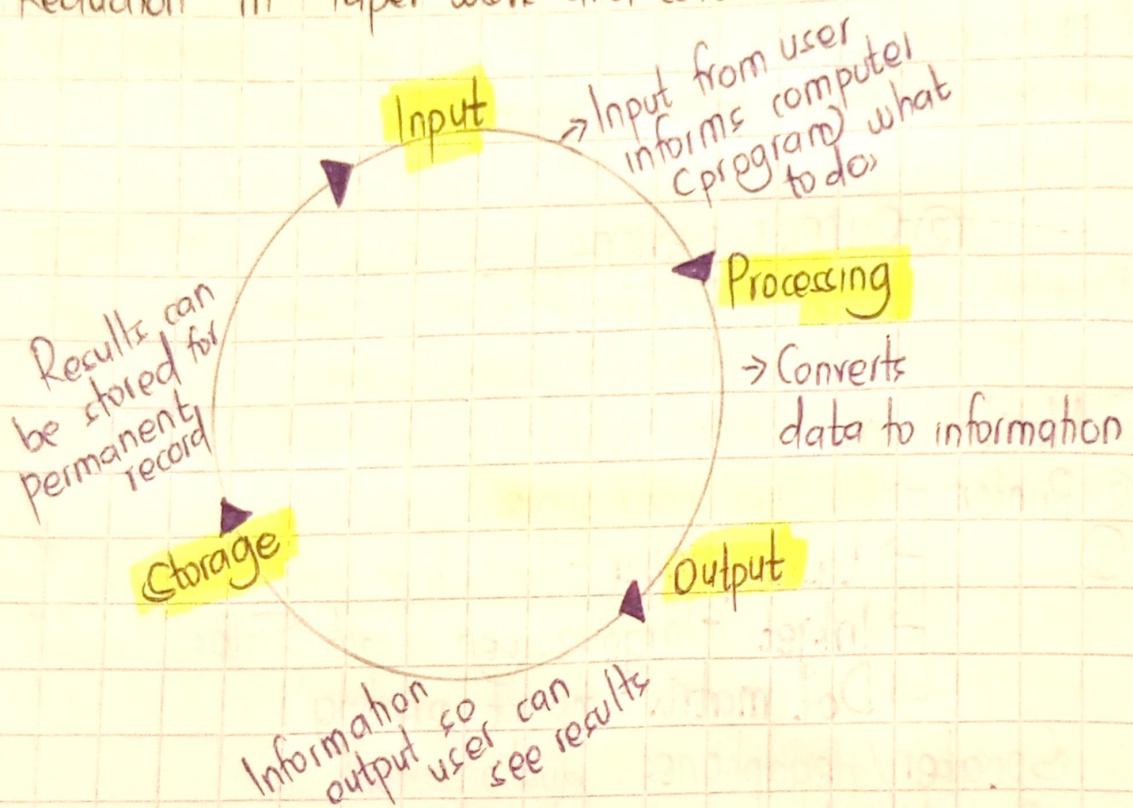
d) Diligence → It is free from monotony, tiredness and lack of concentration. It can work continuously w/o errors

e) Versatility → It is very flexible in performing the jobs to be done.

① Reliability → they are designed to make maintenance easy

② Automation → they perform a given task automatically.

③ Reduction in Paper work and cost.



HARDWARE

It is grouped into 4,

① Input devices

Keyboard → enters texts and commands

Mouse → pointer device

Scanner → converts physical documents to digital

Microphone → voice input

Camera/Webcam → image and video capture

Touchscreen → input + display

Joystick/Game pad → reads product codes → gaming input

Barcode Reader → reads product codes

Biometric devices → reads up fingerprint / face scanners

Functions of Input devices

- ① Accept user commands
- ② Capture raw data
- ③ Enable interaction with programs

② OUTPUT DEVICES

Display processed information.

- ① Monitor - main visual output
- ② Printer → Produces hard copies
 - ③ → Laser printer - fast, high quality
 - Inkjet - cheaper, good for photos
 - Dot matrix - impact printing

Speaker / Headphones - audio output

Projector - large screen display

Plotter - prints large diagrams and architectural drawings

Functions

- ① Provide visual / audio display
- ② Present results after processing

Motherboard - main circuit board that connects and allows communication between all components

Key sections:

- ① CPU socket - where the processor is installed
- ② RAM slots - memory installation

Chipset - manages communication

Expansion slots → PCIe for GPU

→ PCI for older cards

Storage connectors - (SATA ports for HDD/SDD)

→ NVMe/M.2 slots

Power connectors

BIOS/UEFI Chip

Function:

- ✓ Connects all components
- ✓ Distributes power
- ✓ Co-ordinates communication
- ✓ Holds BIOS/UEFI firmware.

Central Processing unit

Main components → ALU

→ CU

→ Registers

Characteristics of CPUs

① Clock speed (GHz) → speed of operations

② Cores → number of independent processors

③ Threads → virtual cores

④ Cache Memory - L₁, L₂, L₃

Storage devices

① **Primary storage** - stores data permanently or temporarily, however it is the main memory

Random Access Memory - Temporary

Read Only Memory - Permanent

→ Stores system instructions

Secondary storage → HDD, SSD, flash drives, Memory cards, Optical disks (CD/DVD)

Power Supply Unit

Converts electricity from the socket into usable power for computer components.

Expansion cards

Improve or add new functions to the computer

- ✓ Graphics card ✓ Sound card
- ✓ Network interface ✓ WiFi adapter
- card

Peripheral Devices

External devices connected to the system

- | | |
|------------|--------------------|
| → Printers | → USB devices |
| → Modems | → External devices |

Ports & connectors

Interfaces used to connect hardware

Examples;

- ① USB ports
- ② HDMI
- ③ VGA
- ④ Ethernet port
- ⑤ Audio ports

Cooling system

Prevents overheating of components

- ✓ Fans
- ✓ Heat sinks
- ✓ Liquid cooling systems.

SYSTEM SOFTWARE

A computer software refers to the programs, instructions, and data that tell the hardware what to do.

1. A system software runs the computer itself. It manages hardware and provides a platform for other programs.
Examples; Operating systems eg Windows, Androids

2. Application software - programs created to help users do specific tasks
example; Word processors, browsers, media players, games and learning apps

3. Programming software - used by developers to create and test other software
examples; Compilers, interpreters and code editors

4. Software licences - a software can be free or paid depending on its license.

Types; Freeware, shareware, open source and commercial software

Different softwares come with different usage rules

Importance of hardware software.

- ① Makes software useful

- Helps users perform tasks
- Supports communication and entertainment.
- Improves productivity.

System software
 Controls and manages the computer
 Works in background
 Needed for the computer to operate
 Examples: OS, drivers

Application software.
 Helps the user do tasks
 Users interact directly
 Installed based on user needs.
 Examples: Word, Chrome.

Compiling systems

A set of programmes used to translate source codes to machine code that computers can understand.

Main Components

Compiler → does the actual translation of source code into machine code.

Lexical Analyzer → Breaks the code into tokens (words / symbols)

Syntax Analyzer → Checks if the code follows language rules

Code Generator → Produces the final machine code.

Error handler → Shows mistakes in the code.

How it works.

- You write a code in a programming language.
- The compiler reads the code and checks for errors.
- If everything is correct, the compiler converts the code.

into machine language
④ The computer can now execute the program.

Importance:

- ✓ They turn human-readable programs into executable files
- ✓ They help detect errors before the program runs
- ✓ They make programs run faster because machine code is optimized.

Data and Data files.

① Concept of data

Data refers to raw facts, symbols, figures, or observations that have not yet been processed.

It has no meaning until it is interpreted or organized.

Examples; Numbers, Words/letters, Images, Sensor readings.

② Characteristics of Good data

- ① Accurate - free from errors
- ② Complete - contains all necessary details
- ③ Relevant - relates to the subject matter.
- ④ Reliable - can be trusted.
- ⑤ Timely - available when needed.
- ⑥ Consistent - doesn't contradict.

③ Types of data

According to Nature

Numeric data - numbers

Textual - letters

- 3. Boolean - TRUE, FALSE, YES OR NO.
- 4. Audio - music, recordings
- 5. Image data - photo, scans
- 6. Video data - moving pictures
- 7. Graphical data - charts, diagrams.

b) According to structure:

- ① Structured data → neatly organized (spreadsheets)
- ② Unstructured data → no fixed format (videos, PDFs)
- ③ Semi-structured → mixture of both (emails, JSON files)

Data

- ① Raw facts
- ② No meaning

Information

- Processed data
- Has meaning

Information = Data + processing.

5. Data processing

Steps involved in converting data to information include;

- 1. Collection - gathering raw data
- 2. Input - entering data into a system
- 3. Processing - sorting, calculating, summarizing
- 4. Output - presenting results
- 5. Storage - saving for future use
- 6. Distribution - sharing information with users.

6. Data Representation in Computers

Bit - smallest unit of data

Byte - 8 bits

Kilobyte - 1024 bytes

Megabyte - 1024 KB

Gigabyte - 1024 MB

Tera Terabyte - 1024 GB

Data file is a collection of related data stored together under one name.

It has a filename and an extension (e.g report, docx, image)

Files help organize and retrieve information quickly

Types of Data Files.

a) Text files

- Contains readable characters e.g txt, docx

f) Program files

- Executable or system files
- .exe, .bat

b) Binary files

Data stored in binary form
.exe, .bin, .dat

g) Database files

- .db, .mdb, .sql

c) Image files

.jpg, .png, .gif

h) Compressed files

- .zip, .rar, .7z

d) Audio files

.mp3, .wav, .aac

e) Video files

.mp4, .mkv, .avi

File Organization methods Used especially in databases

1. Sequential file Organization

Records stored one after another in order
Best for batch processing.

2. Direct / Random file Organization

Records accessed using a key field
Fast for large files

3. Indexed - sequential Organization

Combines sequential and direct access
Uses an index for quick searching

File management

Activities involved in handling files include:

- Creating files
- Naming files
- Opening and closing files
- Saving and retrieving files
- Renaming files
- Moving files btwn folders
- Deleting files
- Backing up important data

File extension

Common file extensions and meanings

txt - text

docx - document

pdf - portable document

JPG/PNG - image

mp3 - sound

mp4 - video

exe - executable

xlsx - spreadsheet

File Security.

Methods of protecting files:

① Passwords - restrict access

② Encryption - scrambles data so only authorized can read it.

③ Access rights permission - control who can read, edit or delete files

④ Firewalls - block unauthorized network access.

⑤ Anti-Antivirus software - protects files from malware.

File Storage Devices.

HDD (Hard Disk Drive) - large capacity, cheaper.

SDD (Solid State Drive) - faster, more durable.

USB Flash drives - portable and convenient.

Memory cards - used in phones/cameras

Optical discs - CDs, DVDs.

Cloud storage - Google Drive, One Drive, iCloud.

14. Data Backup

Purpose; prevent loss of data

Backup methods;

Full backup - copies everything.

Incremental backup - copies only changes since last backup.

Differential backup - copies changes since last full backup.