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1. Introduction to IT & Computers

Information Technology (IT) involves the use of computers, storage, networking, and other physical devices, infrastructure, and processes to create, process, store, secure, and exchange all forms of electronic data.
A computer is an electronic device that manipulates data or information. It has the ability to store, retrieve, and process data. Computers perform five basic operations:
Input: Accepting data and instructions from the user.
Storage: Saving data and instructions in its memory.
Processing: Performing arithmetic and logic operations on data to convert it into useful information.
Output: Presenting the processed data (information) in a human-readable format.
Control: Managing and coordinating all the operations within the computer system.

2. Fundamentals of Computer Operations

A computer operates by executing a sequence of instructions known as a program. The core operational cycle involves the basic functions mentioned above: input, process, output, and storage (IPOS cycle).
Input Unit: Devices like the keyboard and mouse are used to enter raw data and instructions into the computer's memory.
Central Processing Unit (CPU): Often called the "brain" of the computer, the CPU executes the program instructions. It consists of the Arithmetic Logic Unit (ALU) for calculations and logic, and the Control Unit (CU) which directs all system operations.
Memory Unit: This unit holds data and instructions during processing. Primary memory (RAM) is temporary and volatile, while secondary storage provides permanent, non-volatile storage.
Output Unit: Devices such as the monitor and printer translate machine-processed results into a form humans can understand.
3. Computer Hardware Basics
Hardware refers to the physical, tangible components of a computer system that you can see and touch. Key hardware components include:
Internal Components:
Motherboard: The main circuit board that connects all other components, including the CPU, RAM, and storage drives.
CPU: The central processor responsible for executing instructions.
RAM (Random Access Memory): Temporary, volatile storage for data the CPU is actively using.
ROM (Read-Only Memory): Non-volatile memory that stores essential startup instructions (BIOS or UEFI).
Peripheral Devices:
Input Devices: Keyboard, mouse, scanner, microphone.
Output Devices: Monitor, printer, speakers, projector.
Storage Devices: Hard disk drives (HDD), Solid State Drives (SSD), USB flash drives.

4. Computer Software Basics

Software is a set of instructions or programs that tells the hardware what to do and how to do it. Without software, hardware is essentially useless. Software is broadly classified into two main categories:
System Software: Manages and controls computer hardware and provides a platform for application software.
Operating System (OS): The most critical system software (e.g., Windows, macOS, Linux) that manages resources, provides a user interface, and runs applications.
Device Drivers: Programs that allow specific hardware devices (like a printer or mouse) to communicate with the operating system.
Application Software: Designed for end-users to perform specific tasks.
Examples: Word processors (Microsoft Word), web browsers (Chrome), media players, database software, and games.

5. Data and Data Files

Data consists of raw, unprocessed facts, figures, and symbols that have no inherent meaning on their own (e.g., "G15, KPL, 100"). When data is processed, organized, and structured into a meaningful and useful context, it becomes information (e.g., "Student KPL achieved G15 in a score out of 100").
Data is logically organized into a hierarchy:
Character: A single letter, number, or symbol.
Field: A group of related characters (e.g., a "Name" field).
Record: A collection of related fields describing a single entity (e.g., all fields for one employee).
File: A group of related records (e.g., an employee file).
Database: An integrated collection of logically related data files.
6. Disk Storage Fundamentals

Disk storage is a data storage mechanism that uses a rotating disk medium. Data is stored permanently (non-volatile) and can be accessed randomly.
Primary vs. Secondary Storage: Primary storage (RAM) is fast but temporary; secondary storage (disks) is slower but permanent and has higher capacity at a lower cost per gigabyte.
Hard Disk Drives (HDDs): Traditional drives that use spinning magnetic platters (disks) and a read/write head on an actuator arm to store data. They are cost-effective for large capacity.
Solid State Drives (SSDs): Newer storage devices that use flash memory (semiconductors) instead of moving magnetic parts. They are significantly faster, more durable, and more power-efficient than HDDs.
Organization: Disks are organized into tracks (concentric circles) and further divided into sectors (fixed-length blocks) to allow the computer to locate data efficiently.