## Introduction to computing

Building blocks of the digital world

**Powered by 3 core components:**

1. **Applications**- computer program written in a programming language (Java, Python, or C++, etc…). A set of instructions that performs a specific task and is generally referred to as software. Eg: mobile apps, web apps, and games
2. **Computers**- electronic device that processes data using a combination of hardware and software components. It follows programmed instructions to perform tasks, run applications, and manage information. Eg: smartphones, tablets, eReaders, laptops, desktops, and servers
3. **Networks**- a system that connects multiple computers and devices so they can share data and resources. It enables communication through wired connections (Ethernet) or wireless signals (Wi-Fi). The internet is the largest and most widely used network.

These form the foundation of a technology ecosystem.

**Hardware Components**

1. **Motherboard**
   - The main circuit board that connects and holds all hardware components.
   - Links the CPU, memory, storage drive, network card, video card, and external ports.
2. **Central Processing Unit (CPU)**
   - Known as the brain of the computer.
   - Executes instructions from applications and the operating system.
   - Performs arithmetic, logic, control, and input/output (I/O) operations.
   - CPUs may have multiple cores, allowing more tasks to run at once and improving performance.
3. **Memory (RAM)**
   - Temporarily stores data and program instructions for the CPU.
   - Contents are lost when the computer powers off.
   - Measured in megabytes (MB) and gigabytes (GB).
   - More RAM allows more applications to run at the same time, improving system speed.

4. **Storage Drive**
    - Stores files, programs, and system data permanently (data remains even when powered off).
    - Two main types:
        - HDD (Hard Disk Drive): Uses spinning disks; cheaper but slower.
        - SSD (Solid State Drive): Uses flash memory; faster but more expensive.
    - Performance measured in MB/s or IOPS (I/O operations per second).
5. **Network Interface Card (NIC)**
    - Connects a computer to a network or the internet.
    - Can be wired (Ethernet cable) or wireless (Wi-Fi).
    - Speed measured in Gbps (gigabits per second).
    - Also known as a network adapter.

**Software Components**

1. **Operating system (OS)**
    - Manages hardware and software resources.
    - Coordinates CPU usage, memory allocation, storage access, and network activity.
    - Provides user interfaces such as:
        - Command Line Interface (CLI)
        - Graphical User Interface (GUI)
    - Examples: Windows, macOS, Amazon Linux 2, iOS, Android.
2. **Applications**
    - Programs that perform specific tasks (e.g., browsers, mobile apps, productivity tools).
    - Rely on the OS to access hardware and run properly.

**Computer Networks**

- Allow multiple devices (computers, phones, printers, etc.) to share data and resources.
- Wired networks: use Ethernet cables.
- Wireless networks: use Wi-Fi signals.
- The Internet is the largest global network.

**Key Takeaways**

- Applications, computers, and networks form the backbone of the digital world.
- Hardware includes physical components like the CPU, RAM, storage drive, and network card.
- Software includes the OS and applications installed on the computer.
- The OS is essential for managing hardware and allowing users to interact with the system.
- Networks enable computers and devices to share information and communicate.