CCNA: Introduction to Network

**Module 2: Basic Switch and End Device Configuration**

I. The TCP/IP and OSI Model:

**- OSI Model:** A conceptual framework for network communication, divided into seven layers, each with specific functions.

- **TCP/IP Model:** A more practical model used in modern networks, with four layers that closely align with how data is transmitted.

*II. Data Encapsulation and Decapsulation*

**- Encapsulation (Quá trình đóng gói):** The process of adding header information to data as it moves down the OSI model layers.

**- Decapsulation (Quá trình mở gói):** The process of removing header information as data moves up the OSI model layers.

*III. Ethernet*

**- Ethernet:** A widely used technology for local area networks (LANs).

**- Ethernet Frames:** The basic unit of data transmission in Ethernet networks, containing source and destination MAC addresses, data, and error detection information.

*IV. Media and Media Access Control (MAC)*

**- Media:** The physical pathway used for network communication (e.g., copper cables, fiber optic cables, wireless).

**- MAC Addresses:** Unique hardware addresses assigned to network interfaces.

**- MAC Sublayer:** Controls access to the shared media in a network.

*V. IP Addressing*

**- IP Addresses:** Unique logical addresses assigned to devices on a network.

**- IPv4:** The original version of IP, using 32-bit addresses.

**- IPv6:** The newer version of IP, using 128-bit addresses to accommodate the growing number of devices on the internet.

*VI. Subnetting*

**- Dividing a Network:** Subnetting is the process of dividing a larger network into smaller, more manageable subnetworks.

**- Benefits:**

+ Improved network efficiency.

+ Enhanced security.

+ More efficient use of IP addresses.

**- Subnets:** Smaller, more efficient networks within a larger network.

*VII. Network Address Translation (NAT)*

**- Sharing a Public IP Address:** NAT allows multiple devices on a private network to share a single public IP address.

**- Benefits:**

+ Conserves public IP addresses.

+ Enhances security by hiding internal IP addresses from the internet.

*VIII. Introduction to Routing*

**- Routers:** Devices that forward data packets between different networks.

**- Routing Protocols:** Algorithms used by routers to determine the best path for data to travel between networks (e.g., RIP, OSPF, EIGRP).