# Extra Reading – Week 5

A network switch is a device that connects multiple devices within a local area network (LAN), such as computers, printers, and servers, enabling them to communicate with each other. It operates at the data link layer (Layer 2) of the OSI model, forwarding data frames based on the destination MAC (Media Access Control) addresses. This direct communication between devices enhances network efficiency and reduces collisions.

In contrast, a router connects different networks, such as a LAN to the internet, and operates at the network layer (Layer 3) of the OSI model. It forwards data packets based on destination IP (Internet Protocol) addresses, determining the optimal path for data transmission across networks. Routers are essential for directing traffic between networks and managing data flow to and from the internet.

## Key Differences Between Switches and Routers:

### Functionality:

* Switch: Facilitates communication within a single network by connecting devices and forwarding data based on MAC addresses.
* Router: Connects multiple networks, directing data between them based on IP addresses.

### Layer of Operation:

* Switch: Operates at Layer 2 (Data Link Layer).
* Router: Operates at Layer 3 (Network Layer).

### Addressing:

* Switch: Uses MAC addresses to forward data frames.
* Router: Uses IP addresses to route data packets.

### Use Cases:

* Switch: Ideal for creating a network within a building or campus, connecting devices like computers and printers.
* Router: Necessary for connecting a local network to the internet or linking multiple networks together.