

# Internetworking devices - Repeater

- Repeaters are also called **regenerator**.
- **Repeater regenerates a signal.**
- Even digital signals become weak when they travel long distances.
- In telecommunications, a repeater is an electronic device that receives a signal and retransmits it.
- Repeaters are used to extend transmissions so that the signal can cover longer distances or be received on the other side of an obstruction.
- Repeaters amplify the received/input signal to a higher frequency domain so that it is reusable, scalable and available.
- Signals travelling across a physical wire travel some distance before they become weak or corrupted as they get interfered with other signals/voice.
- **It operates at the physical layer.**

# Internetworking devices - Repeater

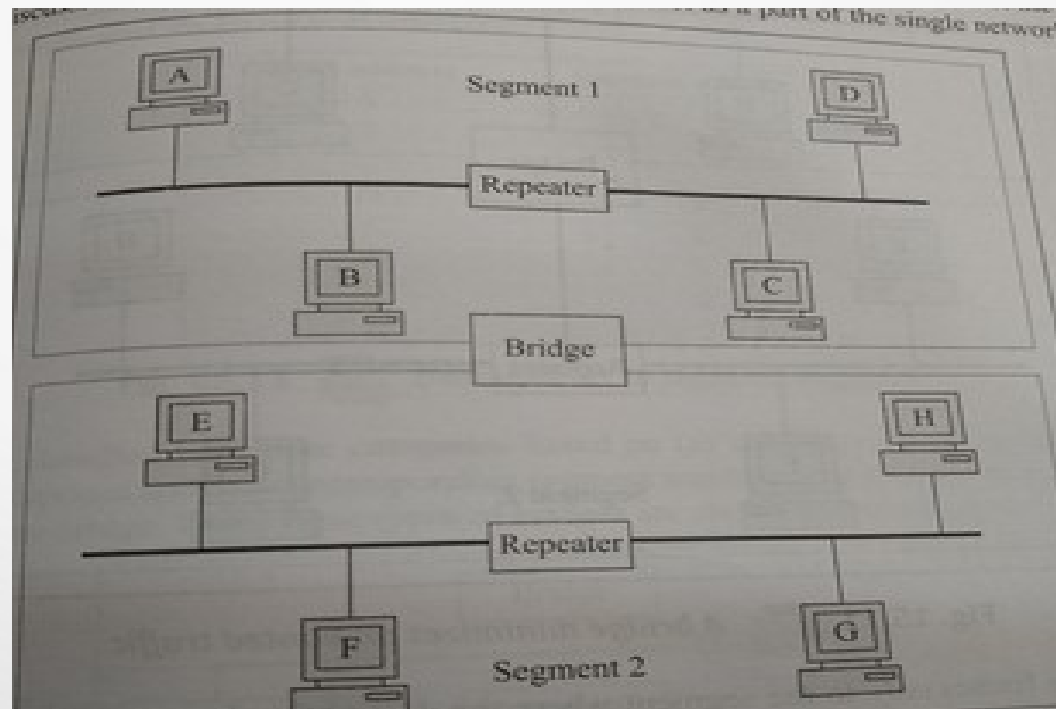


**WIFI-Repeater**



# Internetworking devices - Bridges

- A bridge is a computer that has its own processor, memory and two NIC cards to connect to two portions of a network.
- A bridge does not run application programs but it facilitates hosts-to-host communication within a network.
- It operates at the physical layer and data link layer of OSI layer.
- The main idea of bridge is to divide a big network into smaller subnetworks called **segments**.



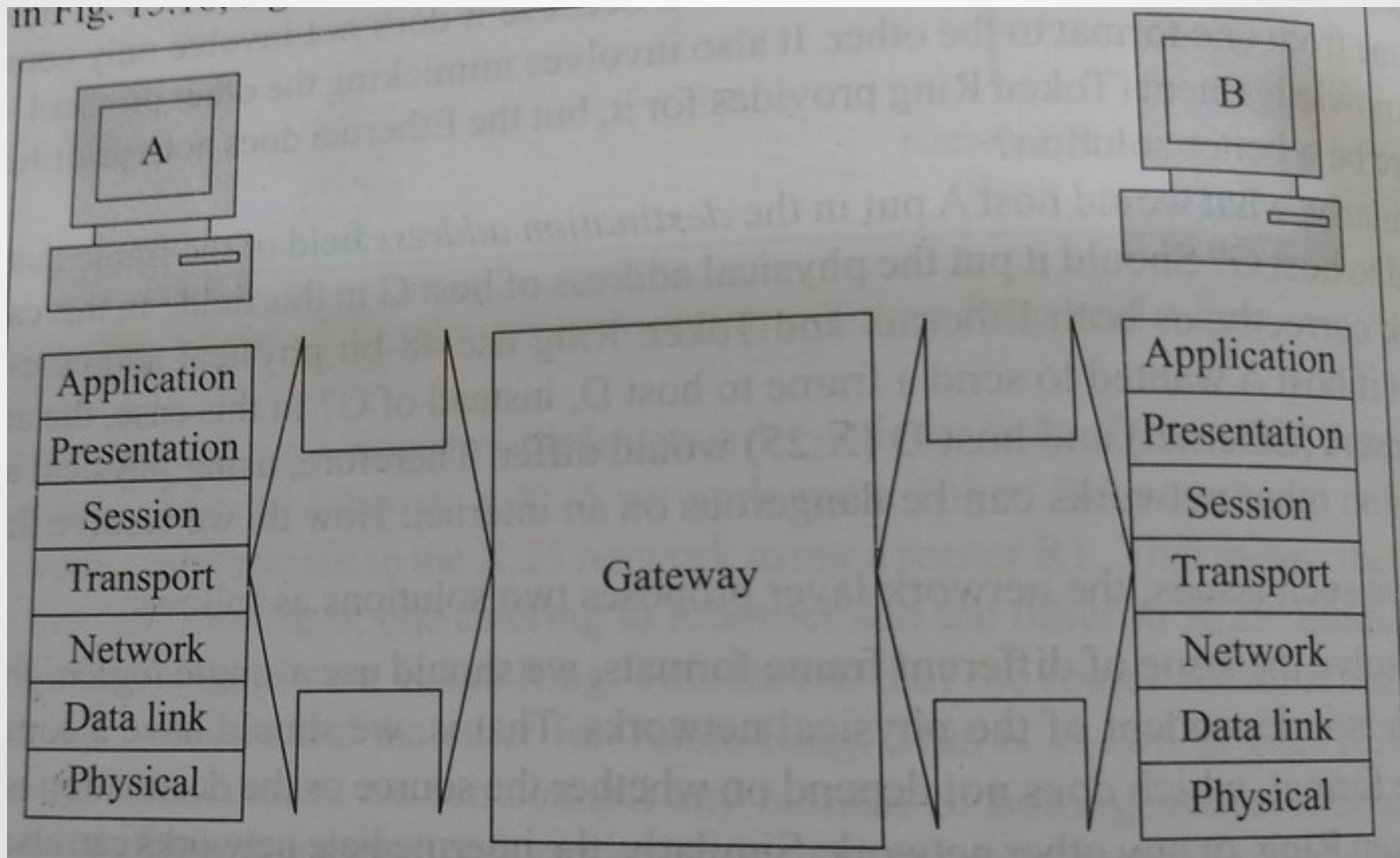
# Internetworking devices - Routers

- **A Router operates at the physical, data link and network layer of the OSI model.**
- **A router is termed as intelligent device.**
- **It interconnects two or more network.**
- Network can differ in physical characteristics such as frame size, transmission rates, topologies, addressing, etc.
- A router is a device that forwards data packets along networks.
- A router is connected to at least two networks, commonly two LANs or WANs or a LAN and its ISP's network.
- Routers are located at gateways, the places where two or more networks connect.
- These nodes maintain routing tables and execute routing algorithms to take routing decisions.
- When an intermediate node is equipped with the capability to take decisions, it called router instead of switch.

# Internetworking devices - Gateway

- A gateway operates at **all the seven layers** of the OSI model.
- A router can forward packets across different network types. However they are not using the same protocol a router would not be able to forward packets from one network to another.
- **Example: if network is a Token Ring using TCP/IP and network B is Novell Netware network, a gateway can relay frames between the two.**
- Gateway is not only responsible for translating between different frame formats but also different protocols.
- A gateway is a very powerful computer as compared to a bridge or a router.
- It is used to connect **huge incompatible networks**.

# Internetworking devices - Gateway



# Internetworking devices - Switch

- A switch is a multiport device that improves network efficiency.
- The switch maintains limited routing information about nodes in the internal network, and it allows connections to systems like hubs or routers.
- Switches can read the hardware addresses of incoming packets to transmit them to the appropriate destination.
- A switch can work at either the Data Link layer or the Network layer of the OSI model.
- A multilayer switch is one that can operate at both layers, which means that it can operate as both a switch and a router.
- A multilayer switch is a high-performance device that supports the same routing protocols as routers.



# Internetworking devices - Switch

- The switch can perform error checking before forwarding data, that makes it very efficient as it does not forward packets that have errors and forward good packets selectively to correct port only.
- Switches can be subject to distributed denial of service (DDoS) attacks; flood guards are used to prevent malicious traffic from bringing the switch to a halt.
- Switch port security is important so be sure to secure switches: Disable all unused ports and use DHCP snooping, ARP inspection and MAC address filtering.



# Internetworking devices - Switch

