Faculty of Computing

[Computer Communications & Network]

Lab No 2 (Network Devices)

Tasks:

Task 1: Write down the advantages and disadvantages of RJ45 connectors.

Advantages	**Disadvantages**
Supports high data transfer rates (Fast Ethernet, Gigabit, 10 Gigabit)	Limited bandwidth compared to fiber optic connectors
Provides reliable and stable wired connection	Cable length limited to 100 meters without repeaters
Universally standardized and widely used in LANs	Cables are bulky and less flexible
Durable with proper handling	Plastic locking tab breaks easily, causing loose connections

Advantages	Disadvantages
Easy to crimp and install with simple tools	Incorrect crimping or wiring can cause connection issues
Supports long-distance transmission up to 100m	Less mobility – ties devices to fixed locations
Low latency, ideal for gaming/streaming	May become less relevant as wireless and fiber advance
Cost-effective compared to fiber optics	Susceptible to physical damage if mishandled

Task 2: Briefly explain how the data is transmitted in wireless medium

Data Transmission in Wireless Medium

In a wireless medium, data is transmitted without using physical cables. Instead, it uses **electromagnetic waves** (like radio waves, microwaves, or infrared) to send information between devices.

1. **Conversion to Signals** – Digital data from a device (like a computer or mobile) is first converted into radio signals using a transmitter.
2. **Transmission through Air** – These signals are broadcast through antennas into the air as electromagnetic waves.
3. **Propagation** – The signals travel through space, possibly bouncing off obstacles or being absorbed/attenuated.
4. **Reception** – A receiver (such as a Wi-Fi card, router, or mobile antenna) captures the signals.
5. **Decoding** – The receiver converts the signals back into digital data that the device can understand.

Task 3: Briefly explain all type of network topologies.

1. Bus Topology

- All devices are connected to a single central cable (called a bus).
- Data travels in both directions, but only one device can send at a time.
- **Advantage:** Easy to install, cost-effective.
- **Disadvantage:** If the main cable fails, the whole network goes down.

2. Star Topology

- All devices are connected to a central hub/switch.
- Data passes through the hub before reaching other devices.
- **Advantage:** Easy to add/remove devices; failure of one device doesn't affect others.
- **Disadvantage:** If the central hub fails, the entire network stops working.

3. Ring Topology

- Devices are connected in a circular path (ring).
- Data travels in one direction (unidirectional) or both directions (dual-ring).
- **Advantage:** Equal access to network, no collisions.
- **Disadvantage:** If one device/cable fails, the entire network may be affected.

4. Mesh Topology

- Every device is connected to every other device.
- Can be **full mesh** (all devices interconnected) or **partial mesh** (only some devices fully connected).
- **Advantage:** Very reliable, provides redundancy.
- **Disadvantage:** Expensive and complex to set up.

5. Tree Topology

- Combination of star and bus topologies.
- Groups of star networks connected to a central bus backbone.
- **Advantage:** Easy to expand and manage.
- **Disadvantage:** Failure of the backbone cable affects the entire network.

6. Hybrid Topology

- Combination of two or more topologies (e.g., star + mesh).
- Designed to meet specific network needs.
- **Advantage:** Flexible and scalable.
- **Disadvantage:** Expensive and complex design.