Lab 1: Connection of Network Devices Using Ethernet Preparation of Ethernet Cable with RJ45 Connectors

Materials Required:

- Ethernet cable (Cat5e or Cat6)
- RJ45 connectors
- Crimping tool
- Wire stripper
- Cable tester

Theory:

- Ethernet is the most widely used technology for Local Area Networks (LANs). It provides a standard method for connecting computers and networking devices using twisted pair cables, such as Cat5 or Cat6. Ethernet communication uses electrical signals transmitted through specific wire pairs inside the cable.

- An Ethernet cable contains eight wires arranged as four twisted pairs and is terminated using an RJ-45 connector. Each wire has a special color code defined by standards such as TIA/EIA-568A. Proper color coding ensures correct data transmission and reception.

- ➢ **In Ethernet communication, devices are classified into two categories:**

- **Category A (End Devices):** Devices such as PCs, laptops, and printers. These devices transmit data through pins 1 and 2 (TX) and receive data through pins 3 and 6 (RX).
- **Category B (Networking Devices):** Devices such as switches and hubs. These devices transmit data through pins 3 and 6 (Tx) and receive data through pins 1 and 2 (RX)

Procedure:

Type 1: Straight-through Cable

1. Cut the Ethernet cable to the desired length.s

2. Strip about 1 inch of the outer jacket from both ends of the cable using the wire stripper.

3. Untwist the pairs of wires and arrange them according to the T568B wiring standard:

   - Pin 1: White/Orange
   - Pin 2: Orange
   - Pin 3: White/Green
   - Pin 4: Blue
   - Pin 5: White/Blue
   - Pin 6: Green
   - Pin 7: White/Brown
   - Pin 8: Brown

4. Trim the wires to ensure they are all the same length.

5. Insert the wires into the RJ45 connector, ensuring each wire goes into its respective slot.

6. Use the crimping tool to secure the RJ45 connector onto the cable.

7. Repeat steps 2-6 for the other end of the cable.

8. Test the cable using a cable tester to ensure proper connectivity.

Type 2: Crossover Cable

1. Follow steps 1-4 from the straight-through cable procedure.

2. For one end of the cable, arrange the wires according to the T568A wiring standard:

   - Pin 1: White/Green
   - Pin 2: Green
   - Pin 3: White/Orange
   - Pin 4: Blue
   - Pin 5: White/Blue
   - Pin 6: Orange
   - Pin 7: White/Brown
   - Pin 8: Brown

3. For the other end of the cable, arrange the wires according to the T568B wiring standard:

- Pin 1: White/Orange
- Pin 2: Orange
- Pin 3: White/Green
- Pin 4: Blue
- Pin 5: White/Blue
- Pin 6: Green
- Pin 7: White/Brown
- Pin 8: Brown

4. Trim the wires to ensure they are all the same length.

5. Insert the wires into the RJ45 connectors, ensuring each wire goes into its respective slot.

6. Use the crimping tool to secure the RJ45 connectors onto the cable.

7. Test the cable using a cable tester to ensure proper connectivity.

Connection Testing Using Cable Tester

1. Connect one end of the cable to the transmitter unit of the cable tester.

2. Connect the other end of the cable to the receiver unit of the cable tester.

3. Turn on the cable tester and observe the results.

- For a straight-through cable, all pairs should show continuity in the same order.
- For a crossover cable, the transmit and receive pairs should be crossed.
  - Orders : 1-8 for straight-through and 1-3, 2-6, 3-1, 6-2 for crossover.

Output : Straight

Output : Crossover

Results and Conclusion

In this lab, Ethernet cabling was examined, focusing on the differences between straight-through and crossover cables. The distinction between end devices and networking devices was understood in terms of their transmit and receive pin configurations. It was observed that straight-through cables are suitable for connecting different types of devices, whereas crossover cables are used to connect similar devices by swapping the transmit and receive pairs. Hence, ethernet casting was studied and demonstroted using straig ht through cabling and crossover cabling connections.