Objective:

To design and implement a network using star topology with a HUB and a switch, and understand the working of both in a local area network (LAN).

Equipment Required:

1. **HUB** (for the first part of the experiment)
2. **Switch** (for the second part of the experiment)
3. Ethernet cables (straight-through or cross-over cables as per requirement)
4. Minimum 4 PCs or Laptops
5. RJ45 connectors
6. Crimping Tool
7. Network interface cards (NICs) on each PC

Theory:

Star Topology: In a star topology, all devices are connected to a central device (HUB or switch). Each device communicates with the central device rather than directly with other devices. In this experiment, we will create two star topologies:

1. Using a HUB
2. Using a Switch

- **HUB:** A hub broadcasts the data it receives to all connected devices. It operates at Layer 1 (Physical layer) of the OSI model. It does not distinguish between the destination MAC address of the frames.
- **Switch:** A switch is a more intelligent device that operates at Layer 2 (Data Link Layer). It uses MAC addresses to determine the destination of data and sends the data only to the specific device.

Simulation Part 1: Star Topology Using a HUB

- **Network Diagram:**

Past figure 1 here

Part 2: Star Topology Using a Switch

Network Diagram:

Past figure 2 here

Conclusion:

- In the star topology with a HUB, data is broadcasted to all connected devices, which can lead to network inefficiencies and potential collisions in a busy network.

- In contrast, the switch sends data only to the intended device, improving network performance by reducing unnecessary data transmissions.