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Subject	Computer Network Laboratory (BTECCE21506)
Assignment No	One

Assignment Number - 01

Title : Ad-Hoc and Infrastructure Network

Problem Statement : Set up a small network of 2 to 4 computers using Switch. It includes installation of LAN Cards, Preparation of Cables, Assigning IP addresses and sharing C drive.

Write information IN word document related to following computer network terms with diagram.

1. NIC Card

- A NIC (Network Interface Card) is a hardware component that allows a computer to connect to a network.
- It can be either integrated into the motherboard or installed as an expansion card.
- NICs typically support both wired (Ethernet) and wireless (Wi-Fi) connections.
- They handle data transmission and reception, enabling communication between the computer and other network devices.
- Modern NICs support high-speed data transfer and often come with additional features like Wake-on- LAN and hardware acceleration.

2. Hub

- A hub is a basic networking device that connects multiple computers in a network.
- It operates at the physical layer (Layer 1) of the OSI model and simply forwards data packets to all connected devices.
- Hubs do not filter traffic; every data packet is sent to all devices, leading to potential collisions.
- They are largely obsolete and have been replaced by more advanced devices like switches.
- Hubs are simple and inexpensive but lack the efficiency and security of more modern network devices.

3. Switch

- A switch is a networking device that connects multiple devices in a network and operates at the data link layer (Layer 2) of the OSI model.
- Unlike hubs, switches filter and forward data only to the specific device that needs it, reducing collisions and improving network efficiency.
- Switches use MAC addresses to determine the destination of data packets.
- They can support full-duplex communication, allowing simultaneous data transmission and reception.
- Managed switches offer advanced features like VLAN support, QoS, and network monitoring.

4. Network Topology

- Network topology refers to the physical or logical arrangement of devices in a network.
- Common topologies include star, bus, ring, and mesh, each with its own advantages and disadvantages.
- The choice of topology affects network performance, scalability, fault tolerance, and cost.
- In a star topology, all devices are connected to a central hub or switch, making it easy to manage and troubleshoot.
- Mesh topology, where every device is connected to every other device, provides high redundancy but is more complex and expensive.

5. Crimping tool

- A crimping tool is a hand tool used to attach connectors, such as RJ45, to the ends of cables like twisted pair cables.
- It works by pressing the metal contacts inside the connector into the wires, ensuring a secure and stable connection.
- Crimping tools are essential for creating custom-length cables in networking.
- They often come with multiple functions, including cutting and stripping cable insulation.
- Proper crimping ensures reliable data transmission and reduces the risk of connectivity issues.

- **LAN tester**

- A LAN tester is a device used to test the integrity and performance of network cables.
- It checks for continuity, correct wiring order, and the presence of shorts or open circuits in the cable.
- LAN testers are commonly used to verify the functionality of newly crimped or installed cables.
- Advanced LAN testers can also measure signal quality, detect cross-talk, and test for Ethernet standards compliance.
- They are essential tools for network troubleshooting and ensuring reliable network connections.

6. Connector -RJ11, RJ45

- RJ11 and RJ45 are types of connectors used in telecommunications and networking.
- RJ11 is commonly used for telephone connections, supporting up to 4 wires, and is smaller than RJ45.
- RJ45 is the standard connector for Ethernet networking, supporting 8 wires, and is used with twisted pair cables.
- RJ45 connectors are used to terminate network cables, allowing them to plug into NICs, switches, and routers.
- Proper crimping of RJ45 connectors is crucial for maintaining network performance and preventing connection issues.

7. Twisted pair cable – Straight through cable & Cross Over cable

- Twisted pair cables consist of pairs of wires twisted together to reduce electromagnetic interference.
- Straight-through cables are used to connect different types of devices, such as a computer to a switch or router, with identical wiring on both ends.
- Crossover cables are used to connect similar devices, such as computer to computer or switch to switch, with the transmit and receive wires crossed.
- The difference in wiring allows crossover cables to directly connect two devices without a switch or hub.
- Both types of cables are essential in setting up and managing Ethernet networks, depending on the devices being connected.

Theory :

Q) What do you mean by computer network?

A) A computer network is a system that allows computers and other devices to communicate and share resources. Here are eight key points that describe a computer network:

1. **Interconnected Devices**: A computer network consists of multiple interconnected devices such as computers, servers, printers, and other hardware, allowing them to communicate with each other.
2. **Data Sharing**: Networks enable the sharing of data and information between devices, facilitating collaboration and efficient data management across different locations.
3. **Resource Sharing**: Networks allow the sharing of resources like printers, storage devices, and internet connections, reducing the need for redundant hardware and lowering costs.
4. **Communication**: Networks support various forms of communication, including email, instant messaging, video conferencing, and voice calls, enhancing interaction and collaboration.
5. **Networking Protocols**: Networks rely on protocols, such as TCP/IP, to define the rules and standards for data transmission, ensuring reliable and consistent communication between devices.
6. **Scalability**: Computer networks can be scaled up or down based on the needs of an organization, allowing for the addition or removal of devices without disrupting the entire system.
7. **Security**: Networks incorporate security measures, such as firewalls, encryption, and access controls, to protect data and prevent unauthorized access to network resources.
8. **Types of Networks**: There are different types of networks based on size and scope, including Local Area Networks (LANs), Wide Area Networks (WANs), and the Internet, each serving specific purposes and use cases.

Q) What do you mean by topologies? What are the different types?

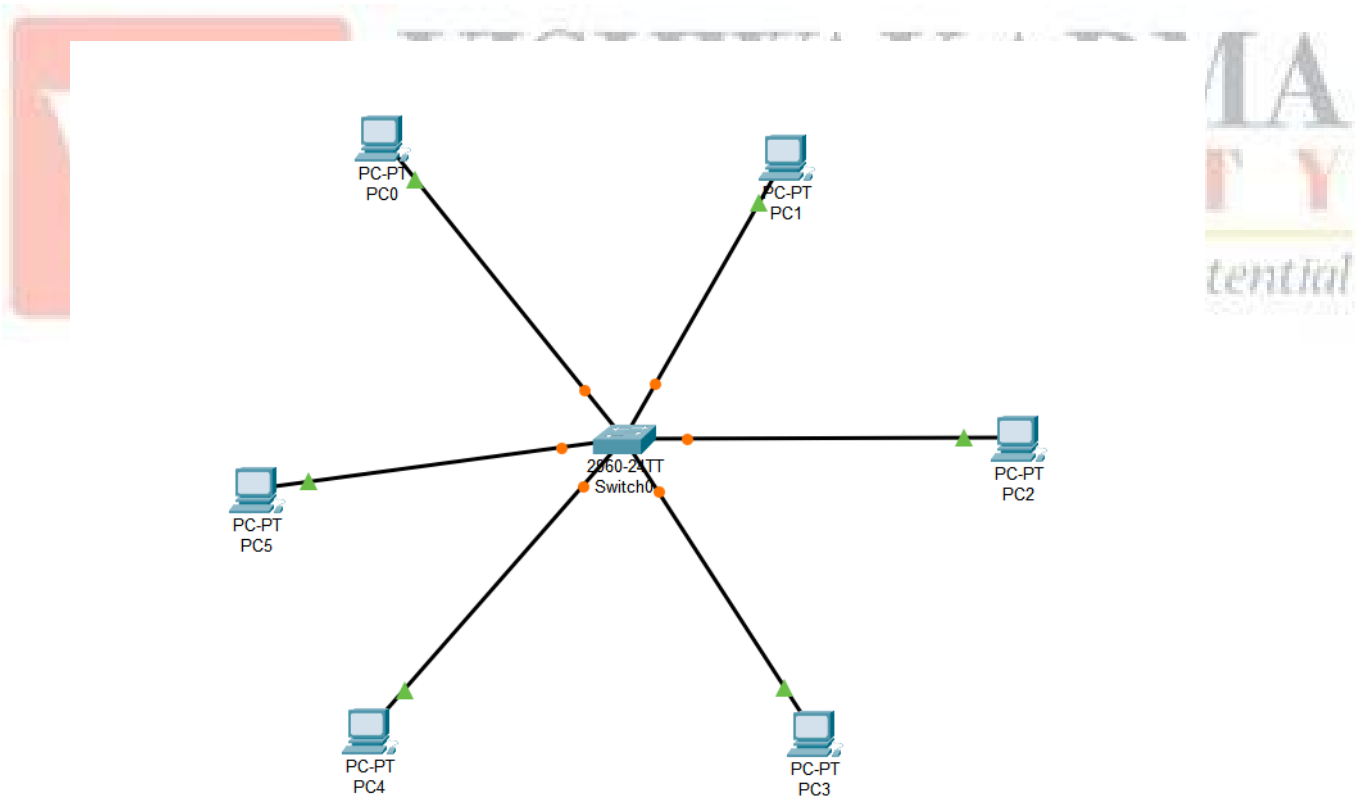
A) In computer networking, topology refers to the arrangement or layout of different elements (links, nodes, etc.) in a network. Topologies define how devices are connected and how data flows between them. There are several types of network topologies, each with its own characteristics, advantages, and disadvantages. Here are the main types of network topologies:

Bus Topology
Star Topology
Ring Topology
Mesh Topology
- Full Mesh Topology
- Partial Mesh Topology

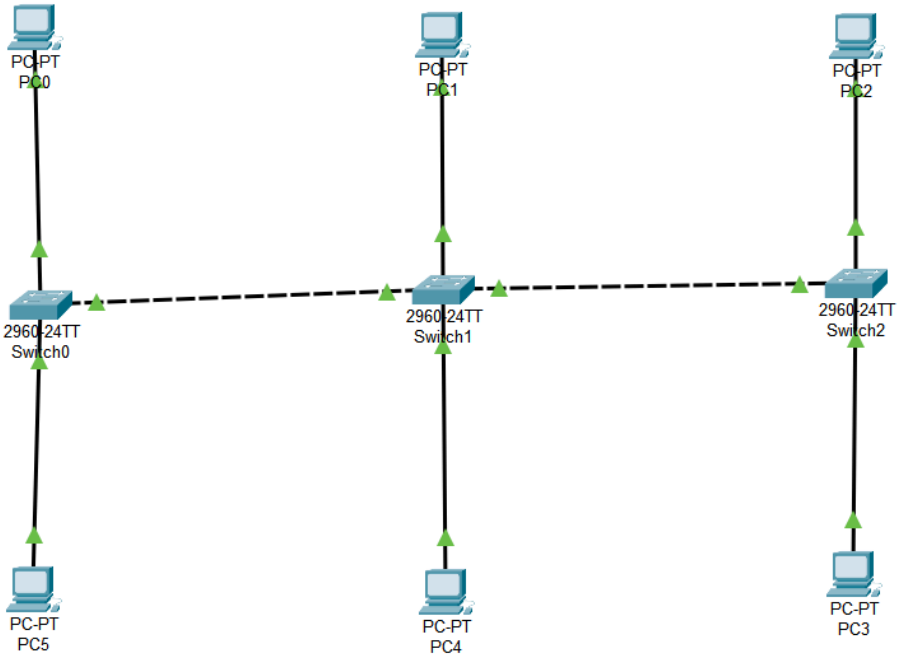
Tree Topology
Hybrid Topology

Screenshots of practical performed:

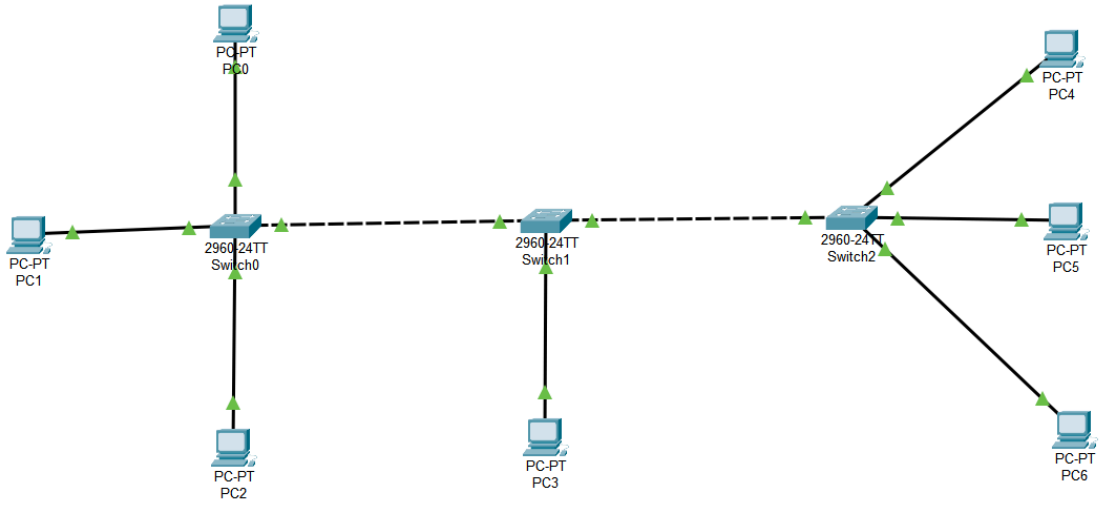
1) Star Topology



2) Bus Topology



3) Hybrid Topology



Conclusion :

In this assignment we learnt how to create a small network and configure its IP address.

We also sent a message from one pc to the other.

We saw 3 topologies in this assignment star, bus and hybrid.

I learned how to configure the ip address for a pc which class it should be in and how to simulate the transmission of any message from a sender to a receiver.