Experiment I

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Aim:

To understand the basics of Cisco Packet Tracer and implement a Local Area Network (LAN) and Wide Area Network (WAN) using Cisco Packet Tracer.

Theory:

Cisco Packet Tracer is a powerful network simulation tool designed by Cisco that allows students, network engineers, and IT professionals to simulate network topologies and experiment with network configurations without the need for physical hardware. The tool provides a virtual environment for learning and practicing networking concepts such as routing, switching, network security, and IoT.

Local Area Network (LAN):

A LAN is a network that connects computers and devices in a limited geographical area, such as a home, school, or office building. LANs are characterized by high data transfer rates and the use of Ethernet technology. Devices in a LAN are typically connected by switches and routers.

Wide Area Network (WAN):

A WAN is a network that extends over a large geographical area, often connecting multiple LANs. WANs are used by organizations to connect remote branches or offices. WANs typically utilize technologies such as MPLS, Frame Relay, or VPN to connect disparate networks over long distances.

Procedure:

1. Setting up a LAN in Cisco Packet Tracer:
   - Open Cisco Packet Tracer - Launch the Cisco Packet Tracer application
2. Create a Network Topology:
   - Drag and drop PCs and Switches onto the workspace.
   - Connect the PCs to their respective switches using straight-through Ethernet cables.

- Connect each switch to the single router using another straight-through Ethernet cable.
3. Configure the router and devices:
   - Click on each PC, go to the "Desktop" tab, and select "IP Configuration."
   - Assign an IP address and subnet mask to each PC within the same subnet (e.g., 192.168.1 .x with a subnet mask of 255.255.255.0).
   - Configure the router with appropriate IP addresses for its interfaces connected to the switches. Use subinterfaces if necessary for different VLANs.
4. Test Connectivity:
   - Use the "Ping" command to test connectivity between PCs connected to different switches through the router.
   - Example: ping 192.168.2.2 from a PC in the 192.168.1.x network to a PC in the 192.168.2.x network.

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Output:

- The LAN setup will enable communication between PCs connected to different switches through the single router.
- If WAN is configured, communication between devices in different LANs through the WAN link will be successful.
- Successful pings indicate correct configuration and connectivity.
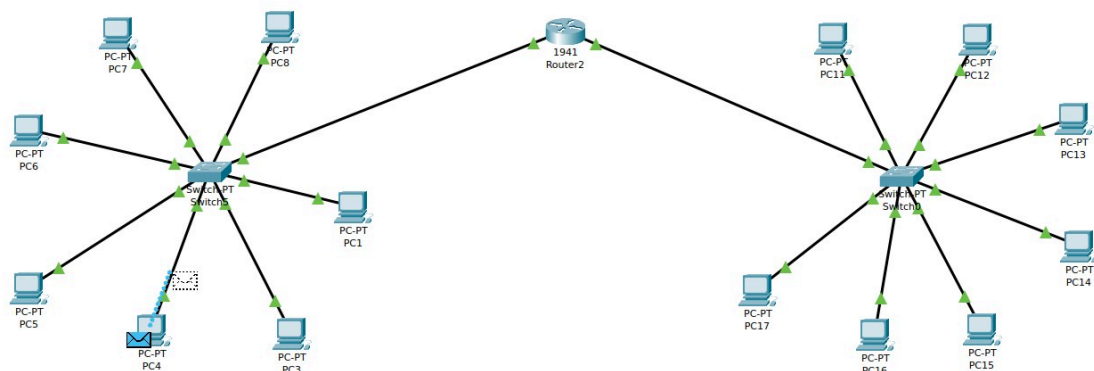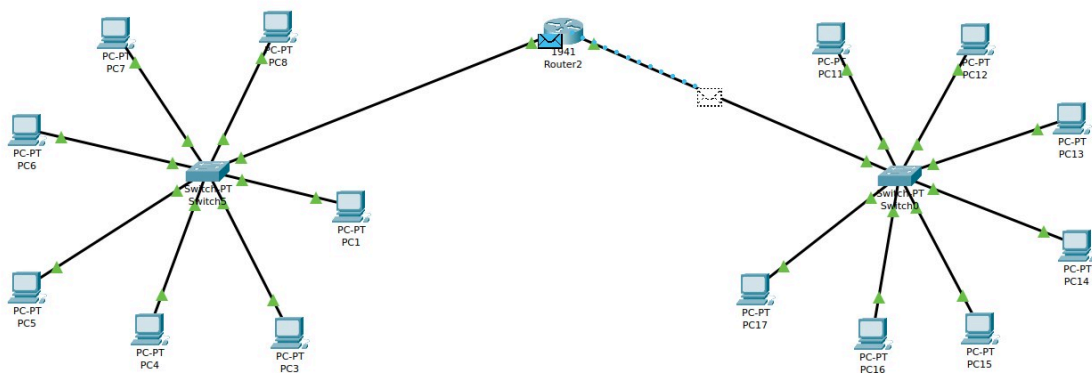
Conclusion:

By connecting PCs to switches and switches to a single router, the experiment demonstrates the ability to manage and route traffic within a LAN. This setup provides a practical understanding of how routers can manage traffic across different subnets and VLANs, as well as how WAN can extend the network over larger distances if implemented.

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