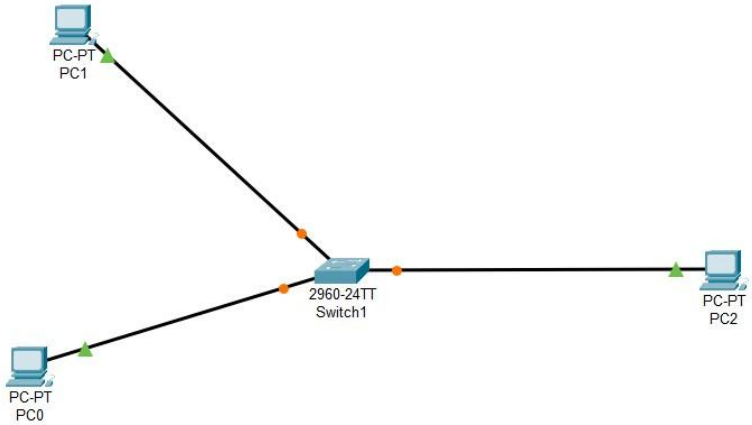
PRACITCAL -1

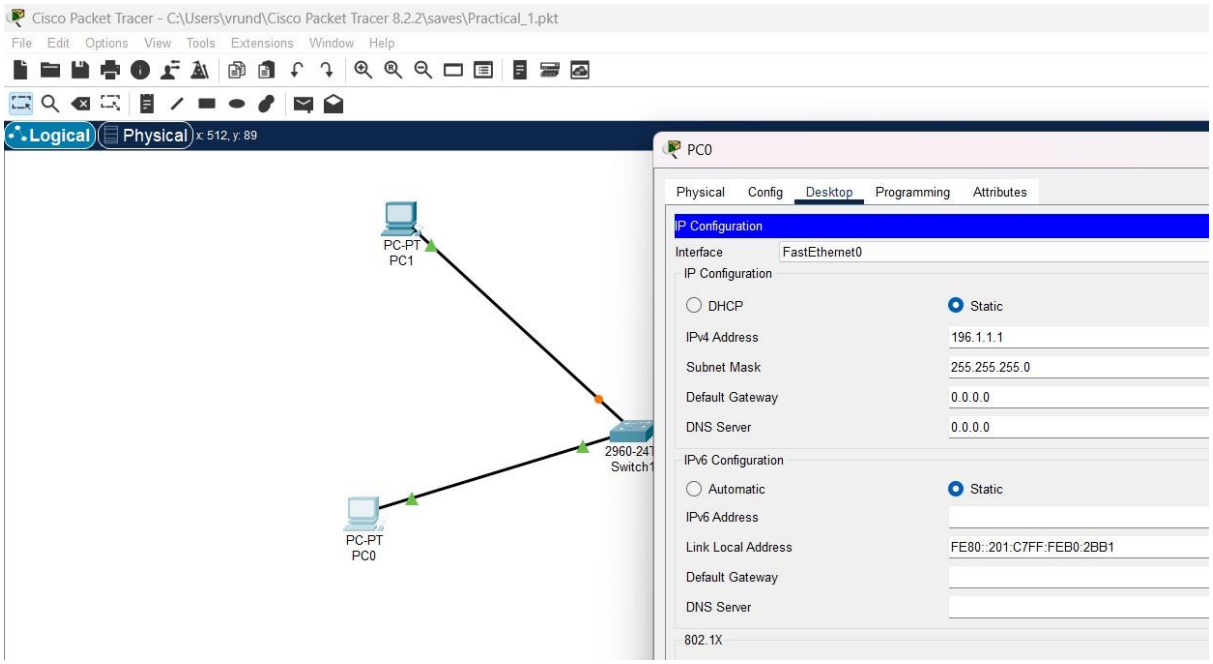
AIM : Simulate a real-time office environment where employees located in the same department need to exchange files and communicate seamlessly over a local network. Validate end-to-end connectivity and investigate how the internal network infrastructure supports this communication.

Step 1: Insert 3 PC .

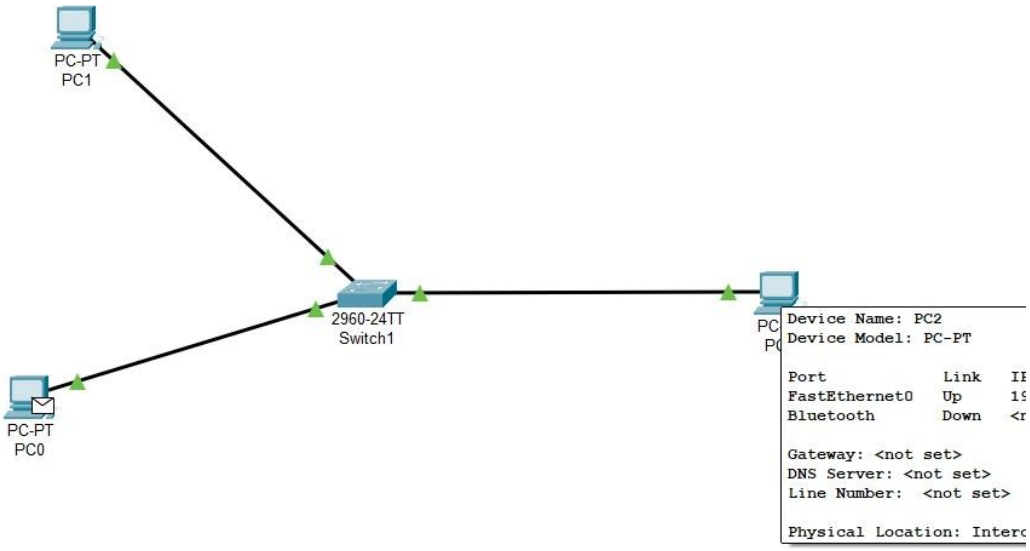
Step 2: Insert a switch and connect PCs with it with compatable cable.



Step 3: Give IP address to all 3 PCs.



Step 4:Press massage button and select from which PC to PC massage want to send.



Step 4: Simulate and run the programm.

Key Questions:

1. How does ARP help resolve IP to MAC addresses?
   - ARP (Address Resolution Protocol) is used to map an IP address to its corresponding MAC address in a local network. When a device wants to send data to another device, it knows the destination IP address but not the MAC address. The sender broadcasts an ARP request asking *"Who has this IP?"*. The device with that IP replies with its MAC address. The sender then stores this mapping in its ARP cache and uses the MAC address to deliver the data frame. Thus, ARP resolves IP addresses into MAC addresses to enable communication within a LAN.

2. How does a switch build and use its MAC address table?
   - A switch builds its MAC address table by learning the **source MAC address** of incoming frames and mapping it to the port it was received on. It then uses this table to:
   - **Forward** frames to the correct port if the destination MAC is known.
   - **Flood** frames to all ports if the destination MAC is unknown.
   - **Filter** frames if source and destination are on the same port.

3. Why Is Layer-2 communication limited to the local network?
   - Layer-2 communication uses **MAC addresses** and relies on **broadcasts (like ARP)**, which work only within a single LAN segment. Switches forward frames based on MAC addresses locally, but they do not route traffic between different networks. Hence, Layer-2 communication is limited to the local network, and routers are needed for Layer-3 communication across networks.

CONCLUTION:

In this simulation, three PCs were connected through a switch and assigned IP addresses in the same network. Using the message tool, communication between the PCs was tested and verified. The results showed that all devices could exchange data seamlessly. This confirms proper end-to-end connectivity within the local office network.
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