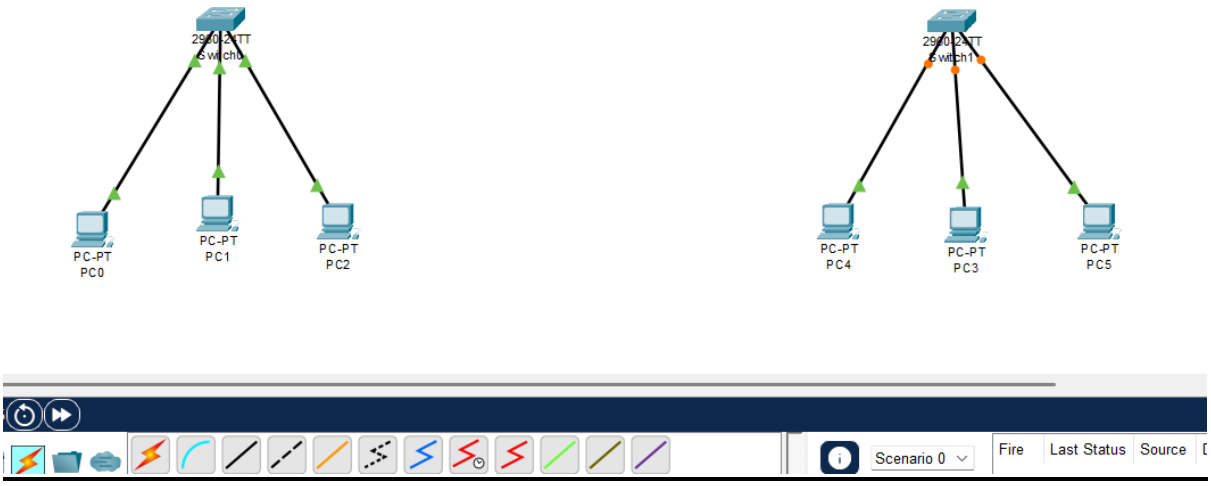
PRACTICAL-3

AIM: Simulate communication between two office branches located in different cities. Build a network that enables devices from both branches to exchange information reliably, and test whether data can travel seamlessly between the locations.

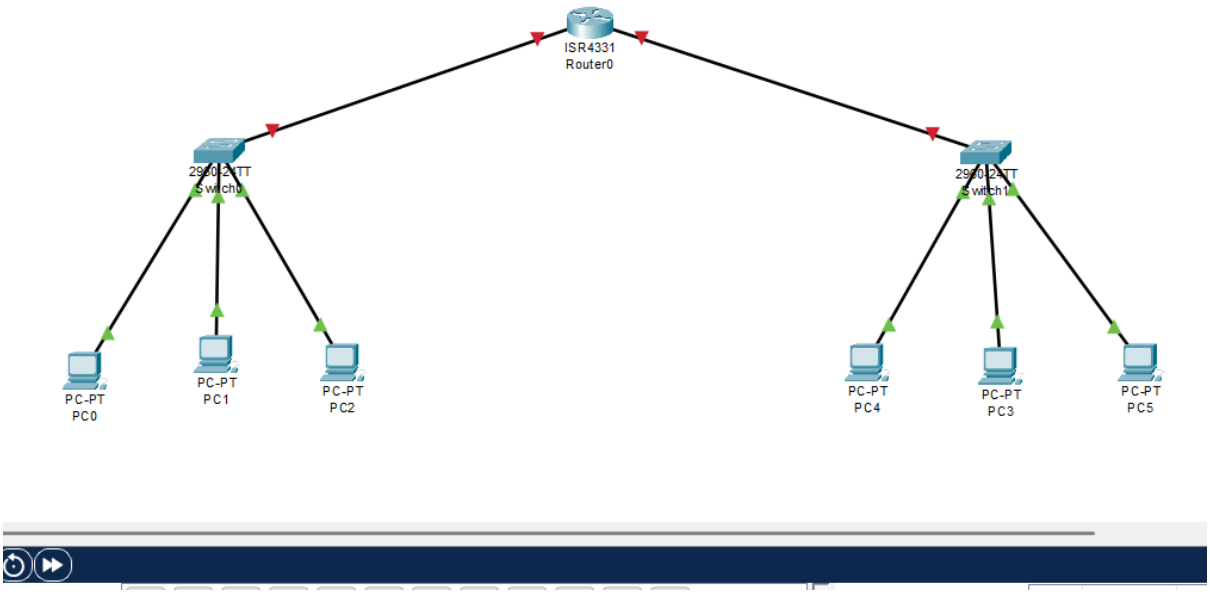
STEP-1: Add Devices for each cities

STEP-2: Put switch for each city.

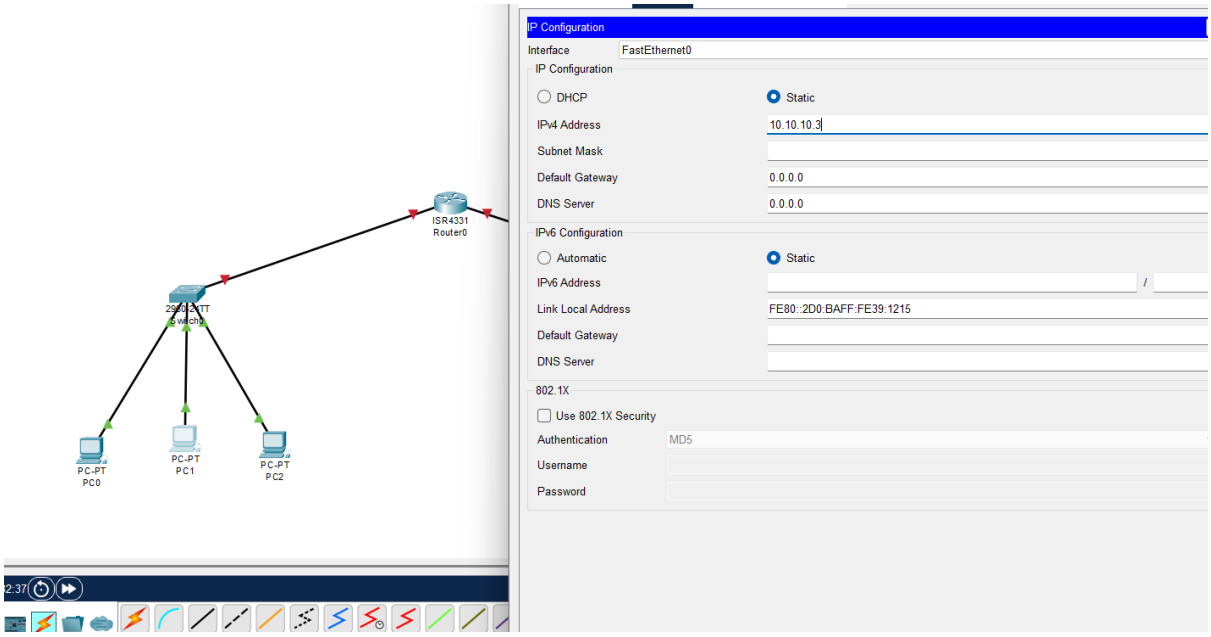
STEP-3: Connect device with switch.



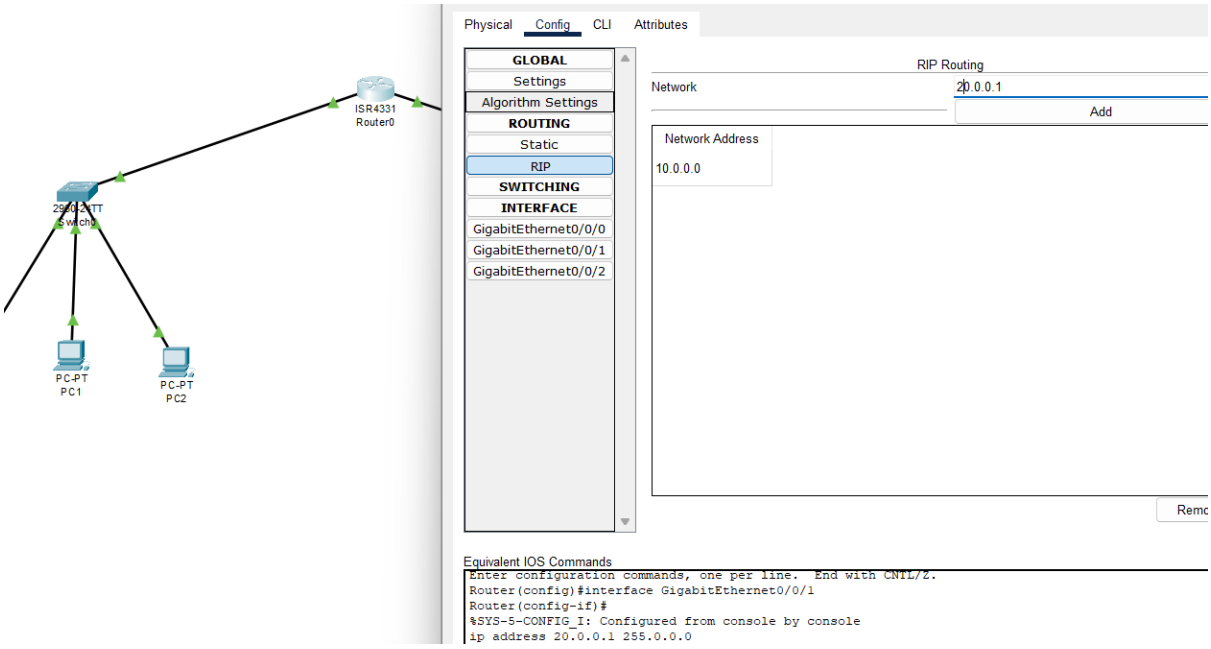
Step-4: Add a router and connect it with cable



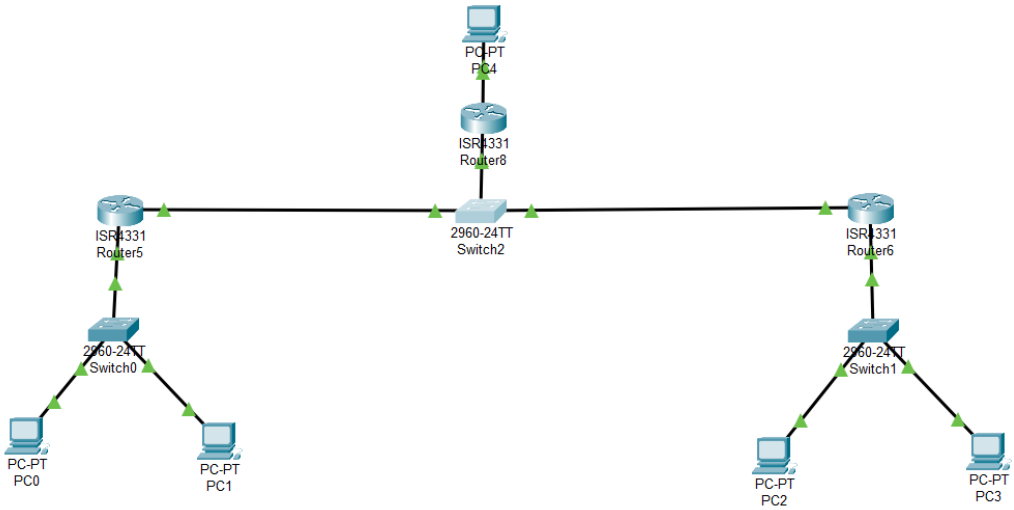
STEP-5: Assign Ip to all Devices



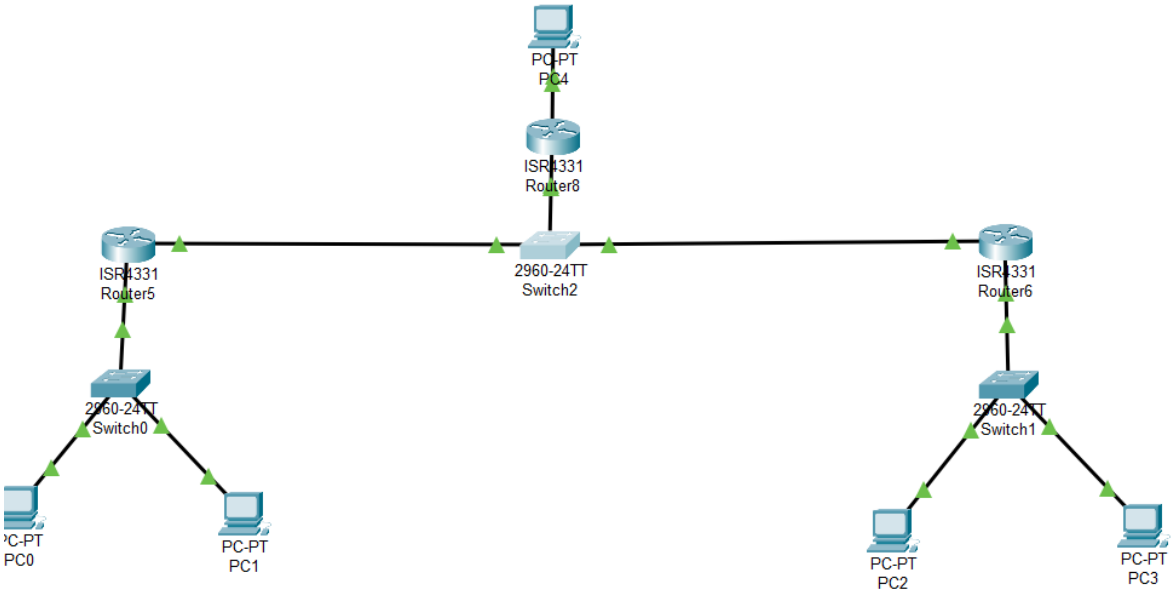
STEP-6: Give RIP value in Router.



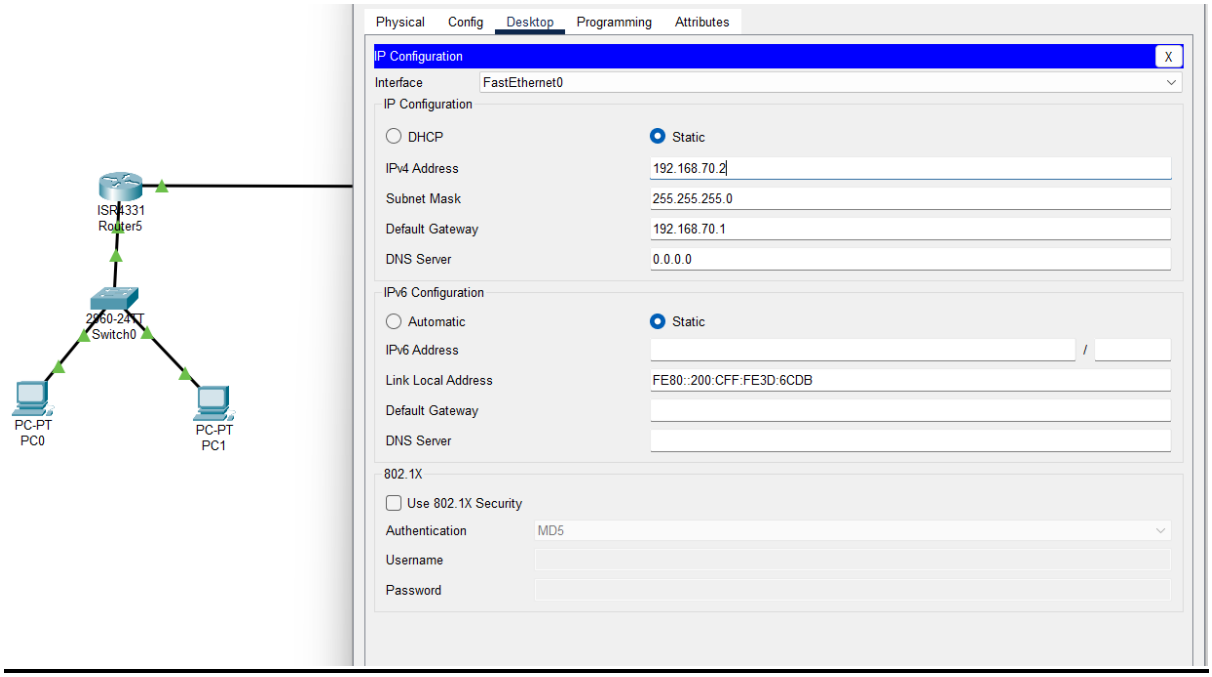
STEP-7: Add a router and A device

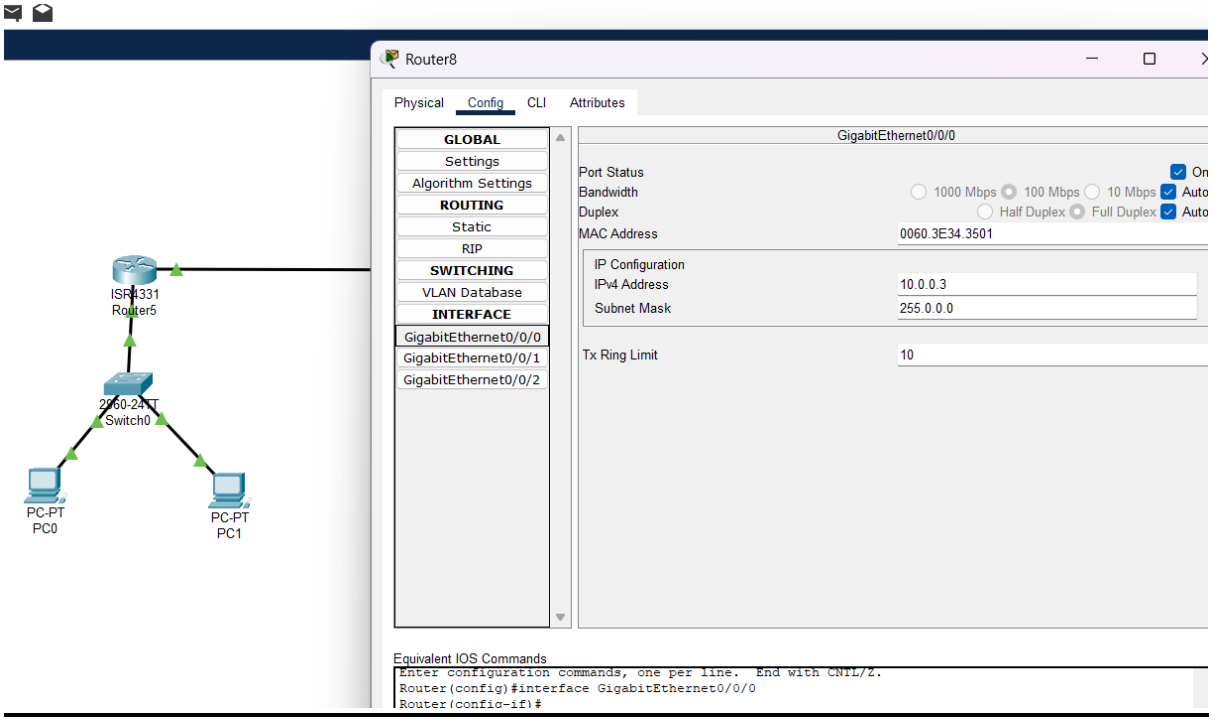


STEP8:



STEP9: Add IP address to device and Router





Key questions:

1. What changes occur in MAC and IP addresses as a packet crosses routers and switches?
    - As a packet moves across a network, the **IP address stays the same** end-to-end. The **MAC address changes at each router hop**, updated to the next hop's interface. **Switches do not alter MAC or IP addresses**, they just forward using their MAC table. Thus, only routers update MAC addresses, while the IP address remains constant.
2. How does the switch decide where to forward a frame?
    - A switch decides where to forward a frame by checking the **destination MAC address**, looking it up in its **MAC address table**, and then sending the frame out through the **specific port** mapped to that MAC. If the MAC is unknown, the switch **floods the frame to all ports** except the incoming one.
3. How does a router handle a packet's inbound and outbound headers?
    - A router checks the **inbound packet's IP header** to determine the destination network, then looks up the best route in its **routing table**. It removes the old **data link (MAC) header**, keeps the **IP header unchanged**, and adds a new **outbound MAC header** with its own interface as source and the next-hop device as destination.

CONCLUSION:

The simulation successfully demonstrated communication between two office branches in different cities. Data traveled seamlessly with IP addresses remaining constant and MAC addresses updated at each router. Switches efficiently forwarded frames, while routers ensured correct delivery across networks.