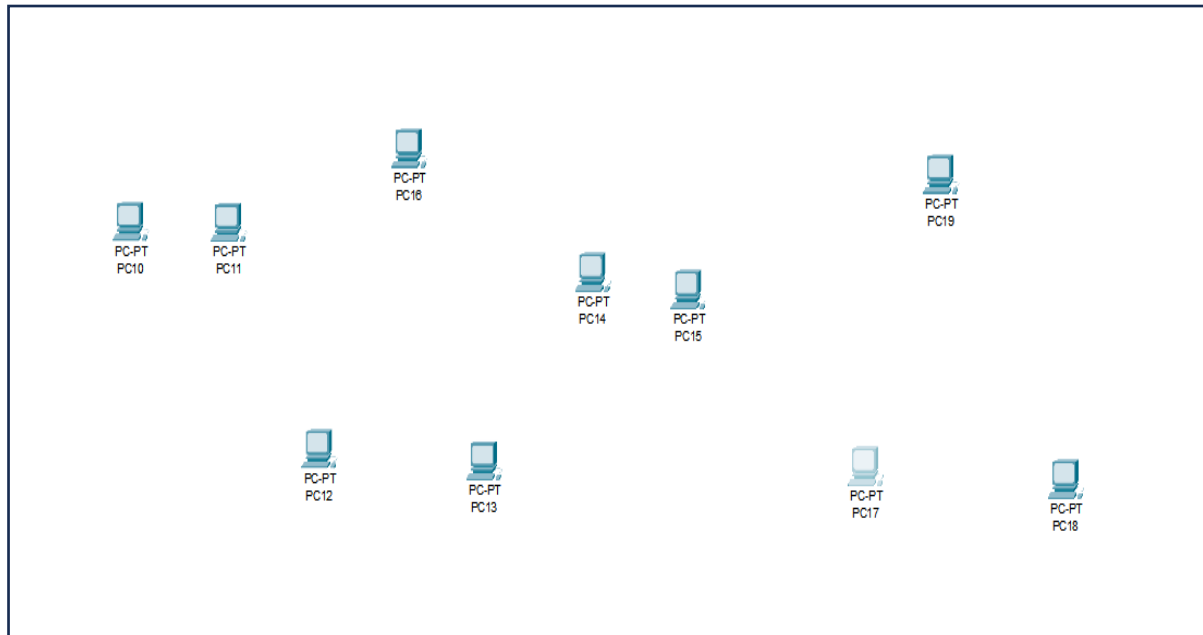


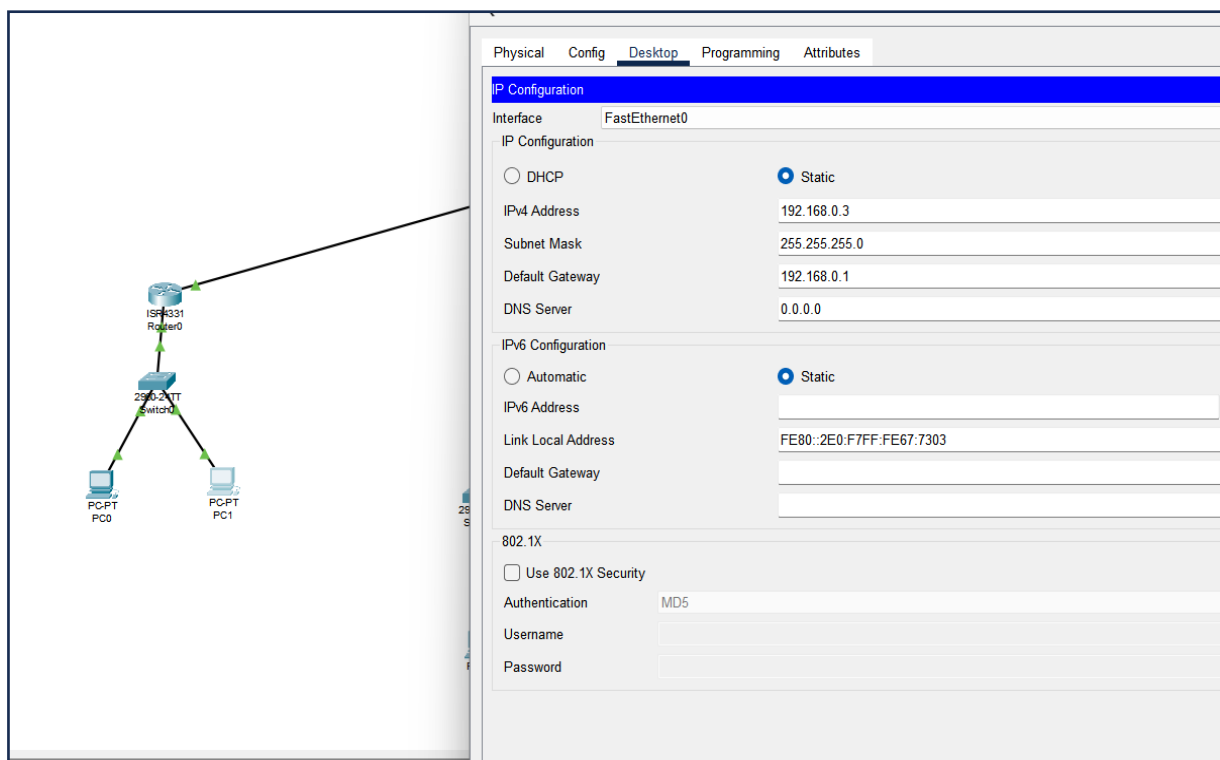
PRACTICAL-4

AIM:- Design and test a full-scale network for a company with multiple branches and departments. Ensure smooth communication between all parts of the organization and closely observe how information flows across the network in different directions and through different paths.

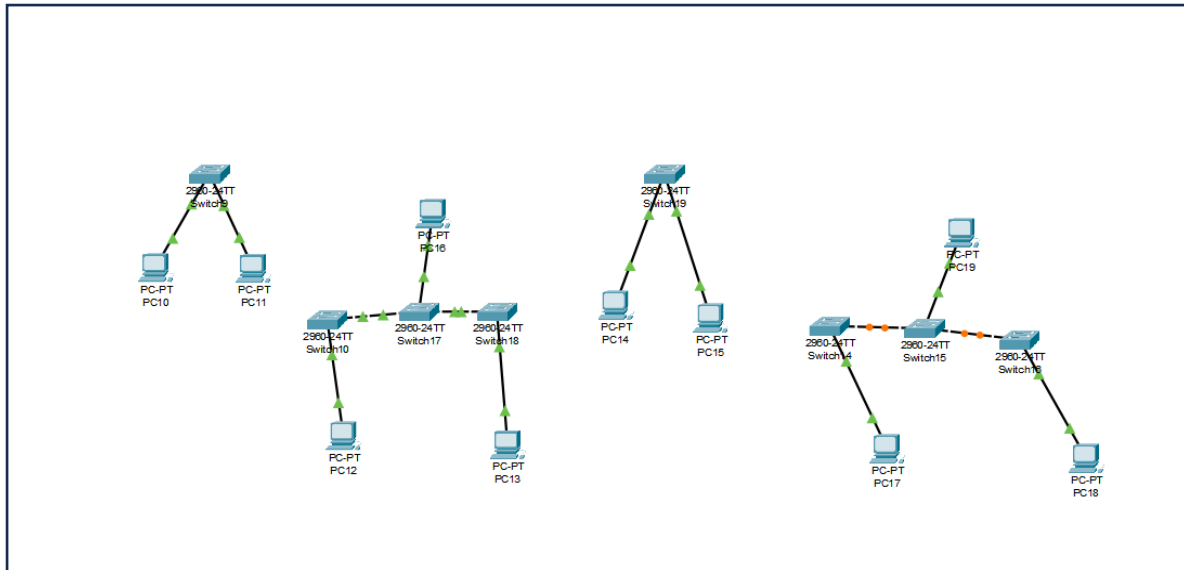
STEP 1:- Insert Some PC For Communication.



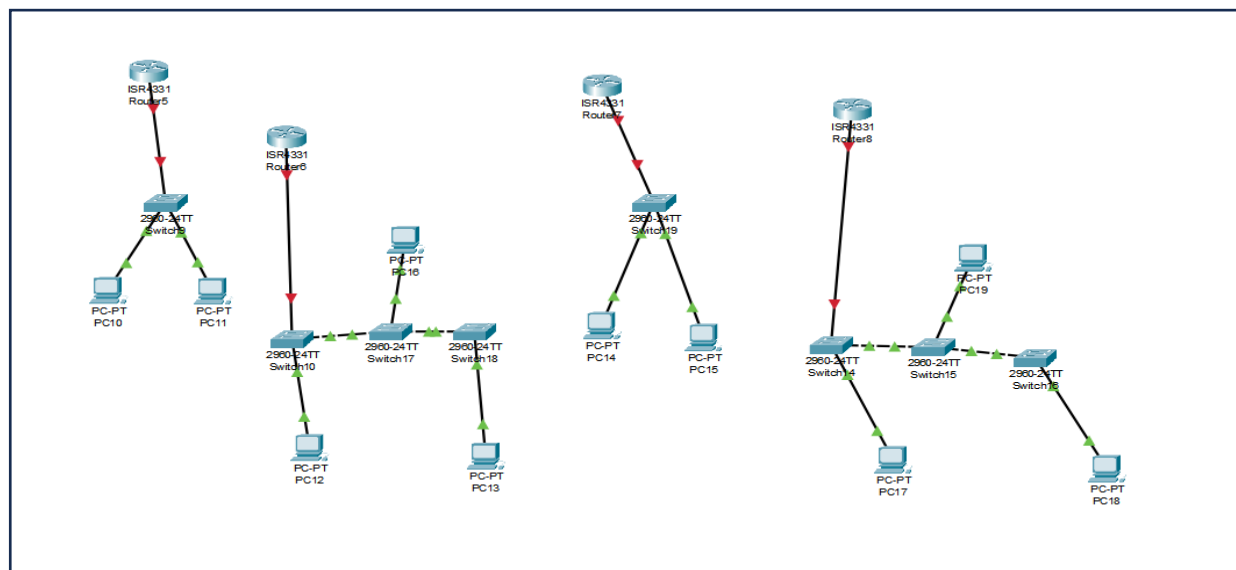
STEP 2:- Now Give All Computer IP Address For Connection.



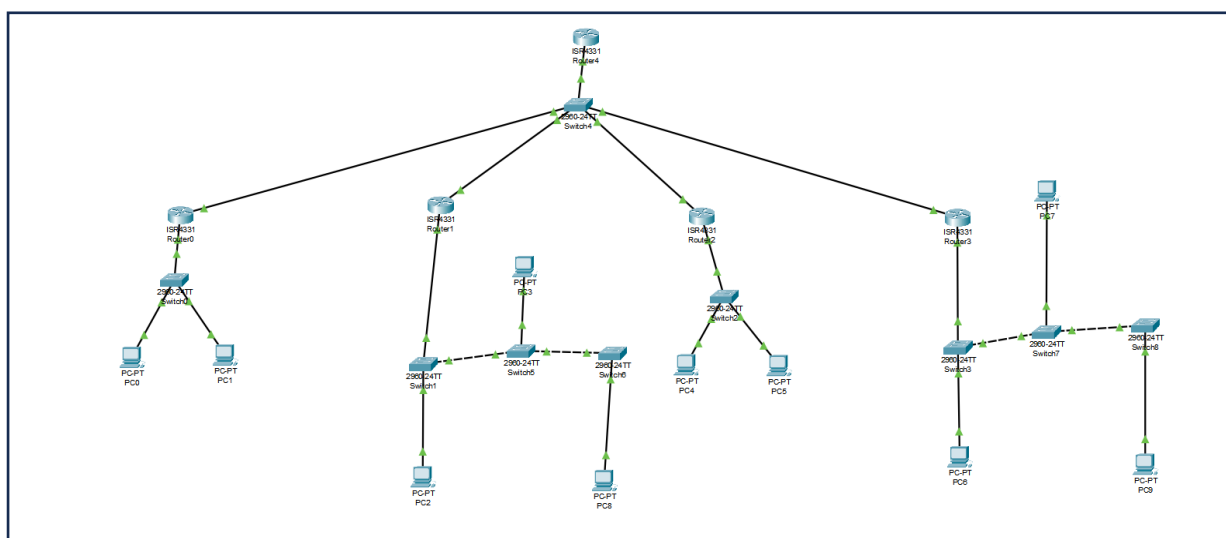
STEP 3:- Now Connect this All PC's With Switch's And Cable.



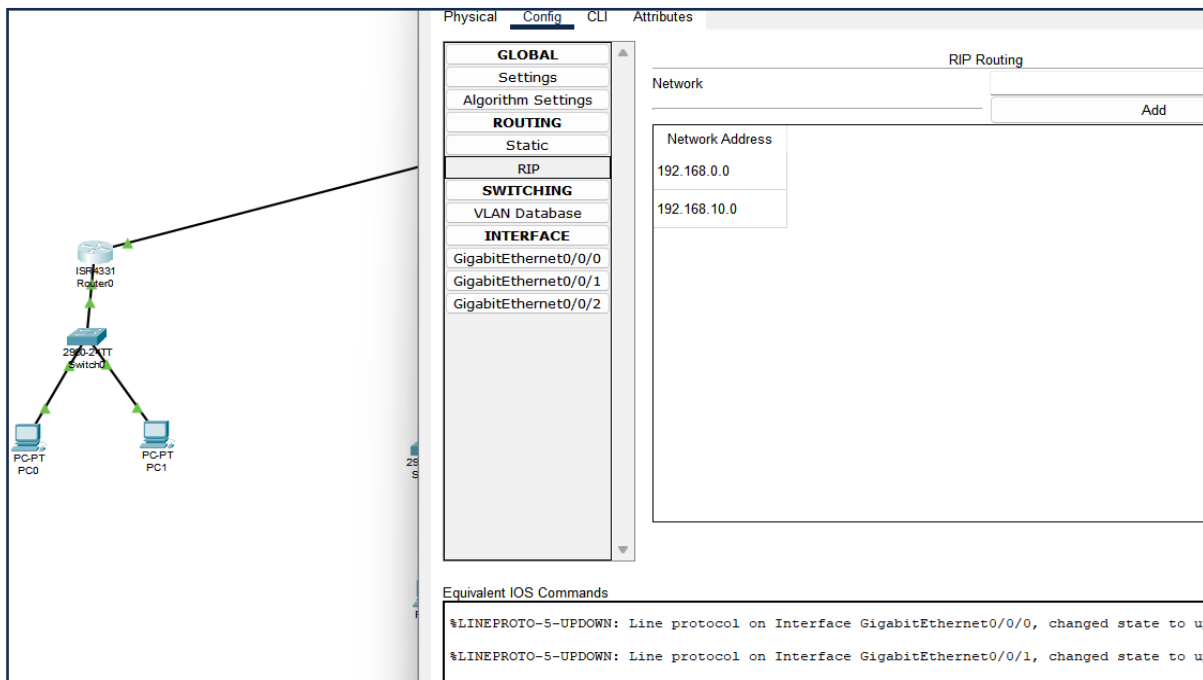
STEP 4:- Now Connect This Switch's With Router.



STEP 5:- Now Connect This Router's With Switch And connect this switch with Head Router.



STEP 6:- Now Config Both Router BY RIP And Connect Together.



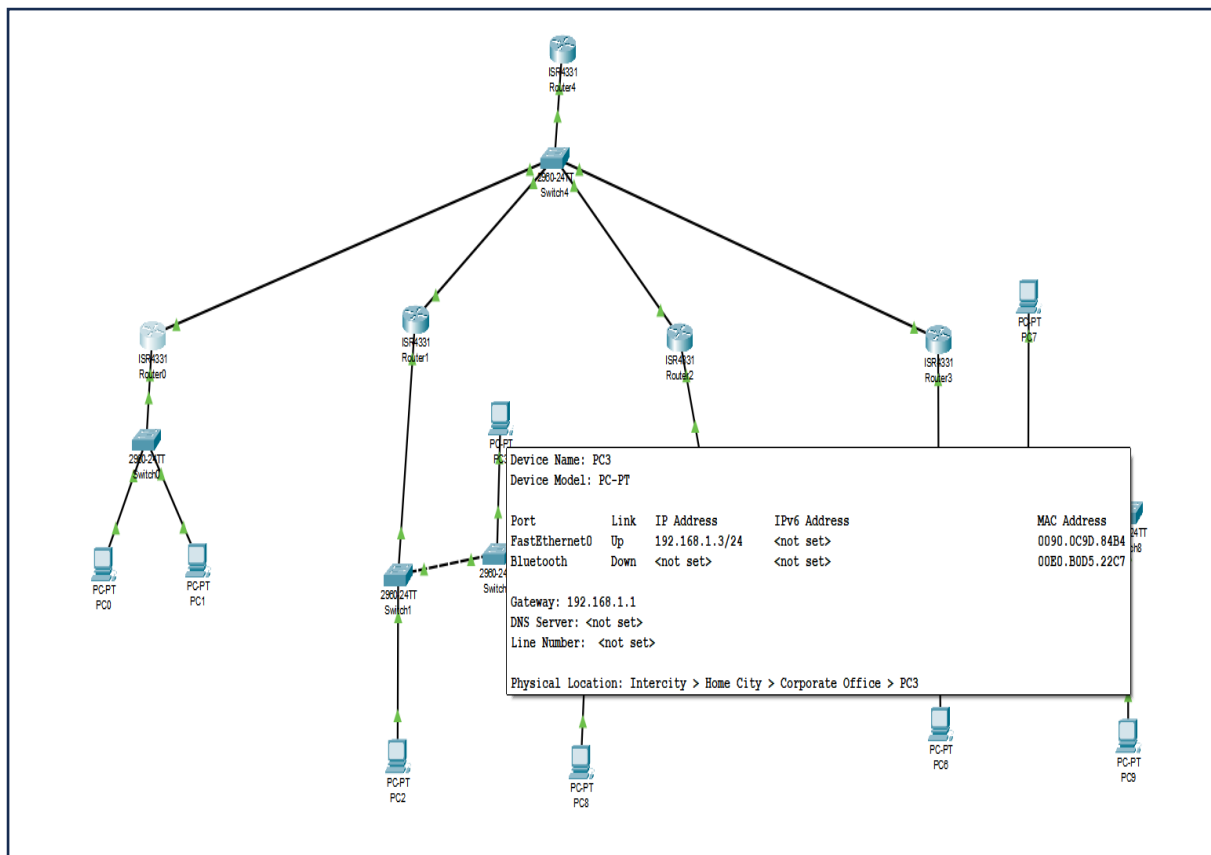
The image shows a network diagram on the left and a configuration interface on the right. The diagram depicts a central 2950-24TT Switch connected to four ISR-4331 Routers (Router0, Router1, Router2, Router3). Router0 is further connected to two PC-PT devices (PC0 and PC1). The configuration interface on the right is titled 'RIP Routing' and shows the 'Config' tab. It lists the following settings:

- GLOBAL**
 - Settings
 - Algorithm Settings
- ROUTING**
 - Static
 - RIP
- SWITCHING**
 - VLAN Database
- INTERFACE**
 - GigabitEthernet0/0/0
 - GigabitEthernet0/0/1
 - GigabitEthernet0/0/2

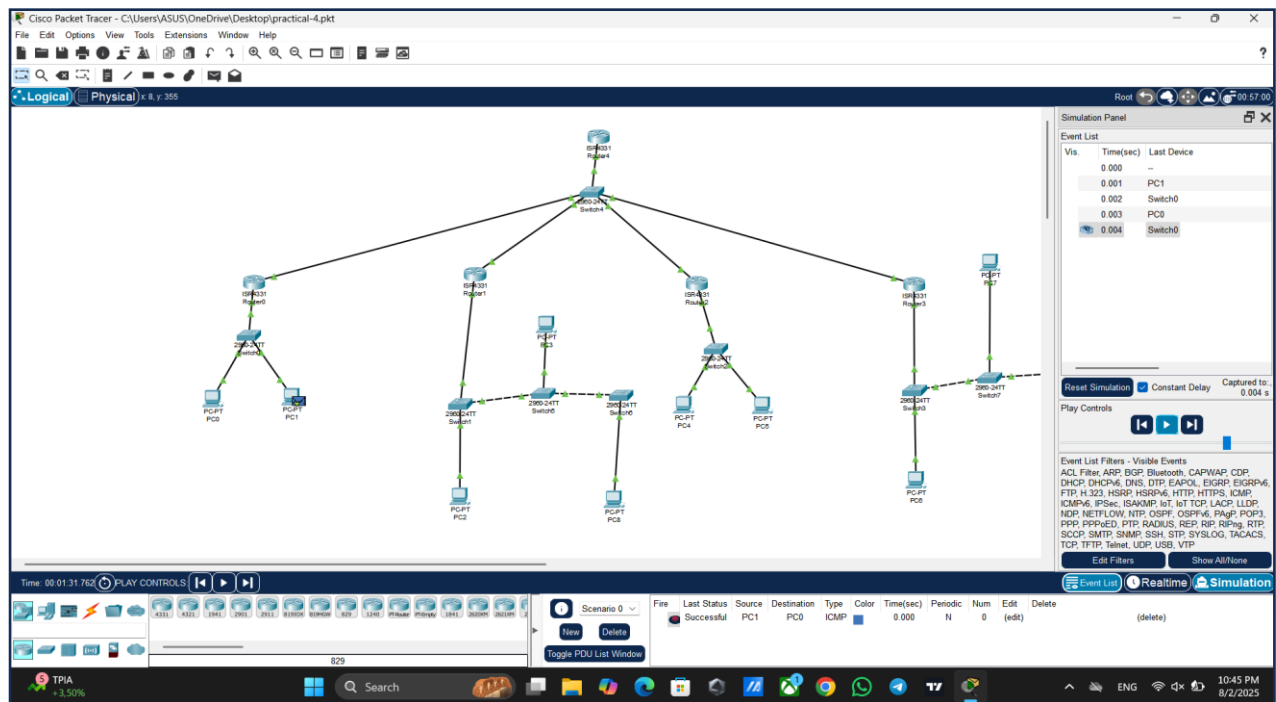
Below the configuration tabs, the 'Equivalent IOS Commands' section shows the following commands:

```
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0/1, changed state to up
```

STEP 7:- Now choose From Which PC to PC Send The msg.



STEP 8:- Now Simulate The Program And Run It.



Key Questions:

1. How do ARP, routing, and switching tables interact in a multi-layer, multi-network setup?

Ans:- In a multi-network setup, ARP maps IP addresses to MAC addresses for local delivery, while switches use MAC tables to forward frames. If the destination is on another network, the router uses its routing table to determine the best path. Once on the target network, ARP and switching handle final delivery. Together, these components enable efficient end-to-end communication.

2. How do IP and MAC addresses change at each stage of packet travel?

Ans:- As a packet moves across networks, the IP address stays the same end-to-end, guiding delivery. At each hop, the MAC address changes—set to the current router's MAC as source and the next hop's MAC as destination. Routers strip and rebuild frames for each segment. IP handles global routing, while MAC addresses manage local delivery.

3. What differences are observed in real-time vs simulation mode behavior?

Ans:-In real-time mode, devices use actual hardware and traffic, revealing real-world issues like delays, jitter, and packet loss. In simulation mode, software mimics network behavior in a controlled, ideal environment without real delays or hardware limits. Real-time shows practical performance, while simulation is useful for testing and learning

Conclusion:-

In this practical, a full-scale network was successfully designed and tested in Cisco Packet Tracer to connect multiple company branches and departments. Communication between departments and branches was enabled using VLANs, routing protocols, and WAN links. The network ensured smooth data flow, reliable connectivity, and access to shared resources. All connections were verified using simulation tools like ping and traceroute.