FAKULTI TEKNOLOGI KEJURUTERAAN ELEKTRIK DAN ELEKTRONIK

ASSIGNMENT

BVI 1222 NETWORK, SWITCHING AND ROUTING

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1.0 INTRODUCTION

This project aims to design a simple, yet functional network infrastructure for a small organization, such as a university department, office and home using Cisco Packet Tracer. The network is intended to support 20 devices, including workstations, printers, and network devices like routers and switches, while ensuring reliable connectivity, scalability, and security.

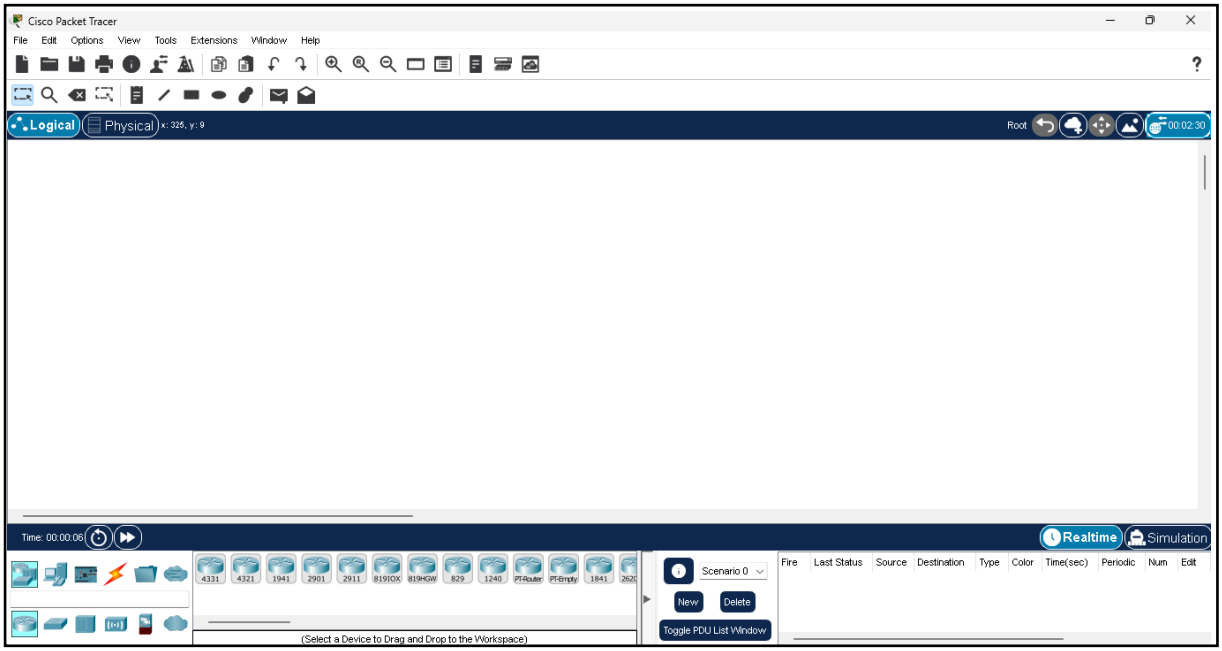
2.0 OBJECTIVE

- To develop skill in using Cisco Packet Tracer for network simulation and design
- To design a functional and efficient network system using Cisco Packet Tracer
- To simulate and manage up to 20 devices within a single network environment

3.0 PROCEDURE

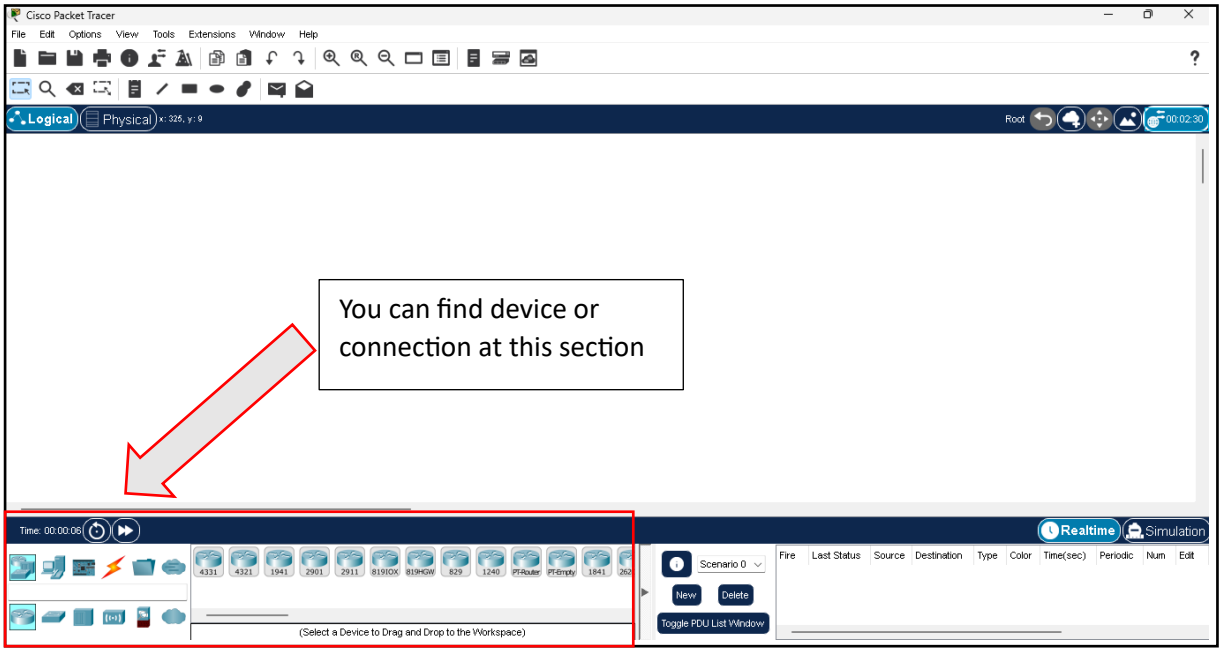
Step 1: Set Up the Simulation Environment

Launch Cisco Packet Tracer software and create a new workspace for the project.

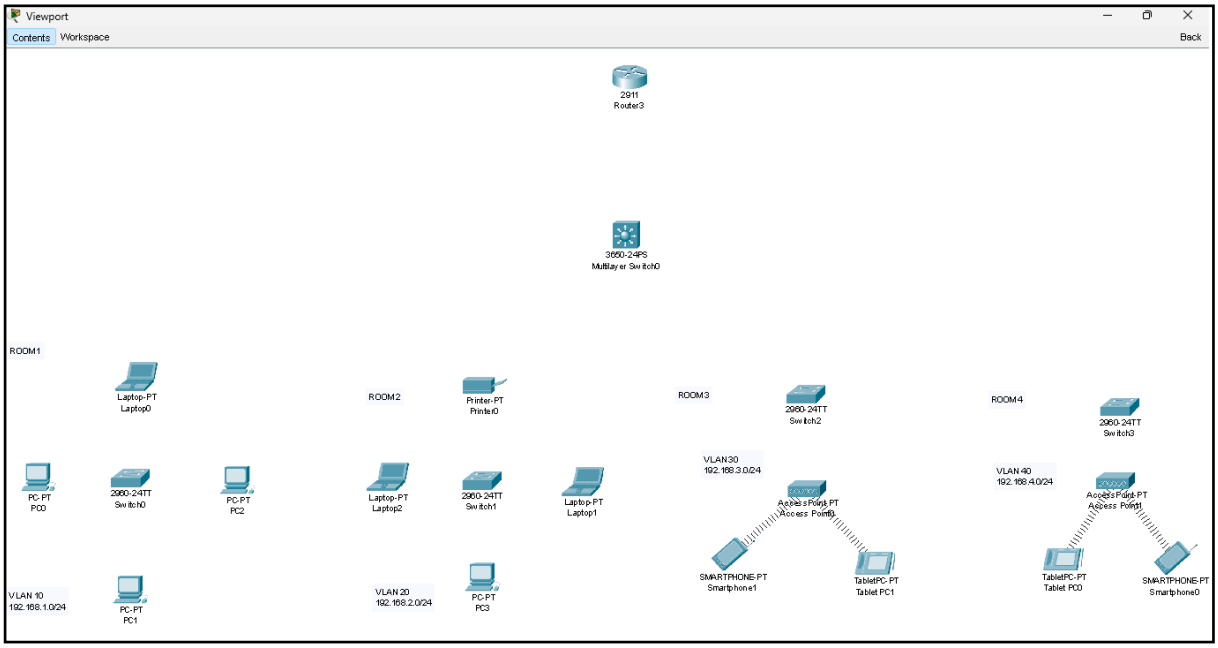


Step 2: Add Devices Want to Use

I. Drag and drop required devices (routers, switches, PCs, etc.) into the workspace.

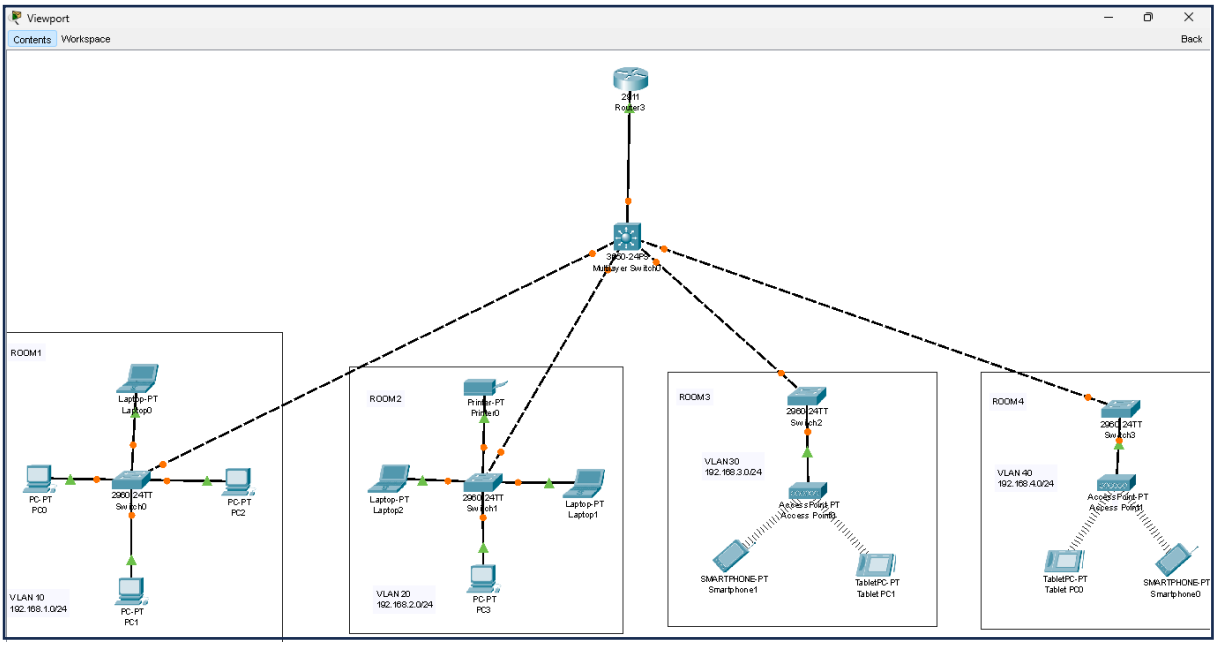


II. Organize your device you want to use neatly and orderly



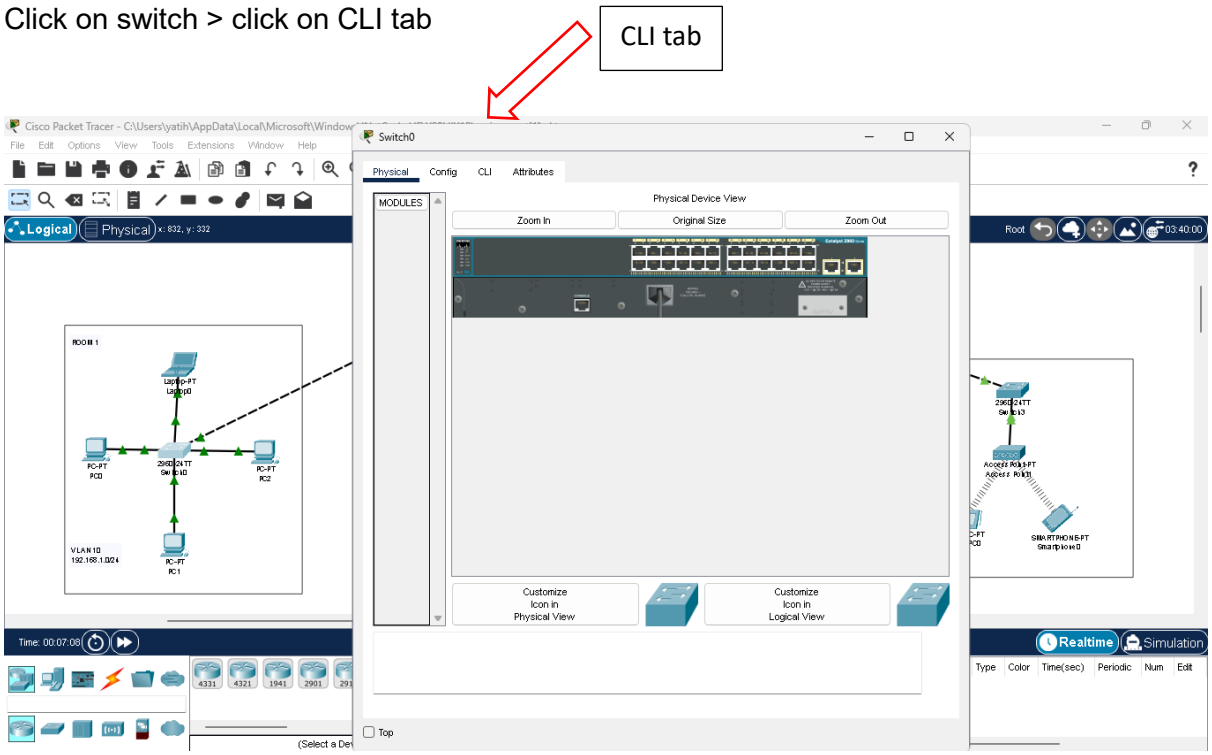
Step 3: Connect Devices

Use appropriate cables (e.g., copper straight-through or crossover) to connect devices and please make sure physical connectivity by checking link lights and testing connections.



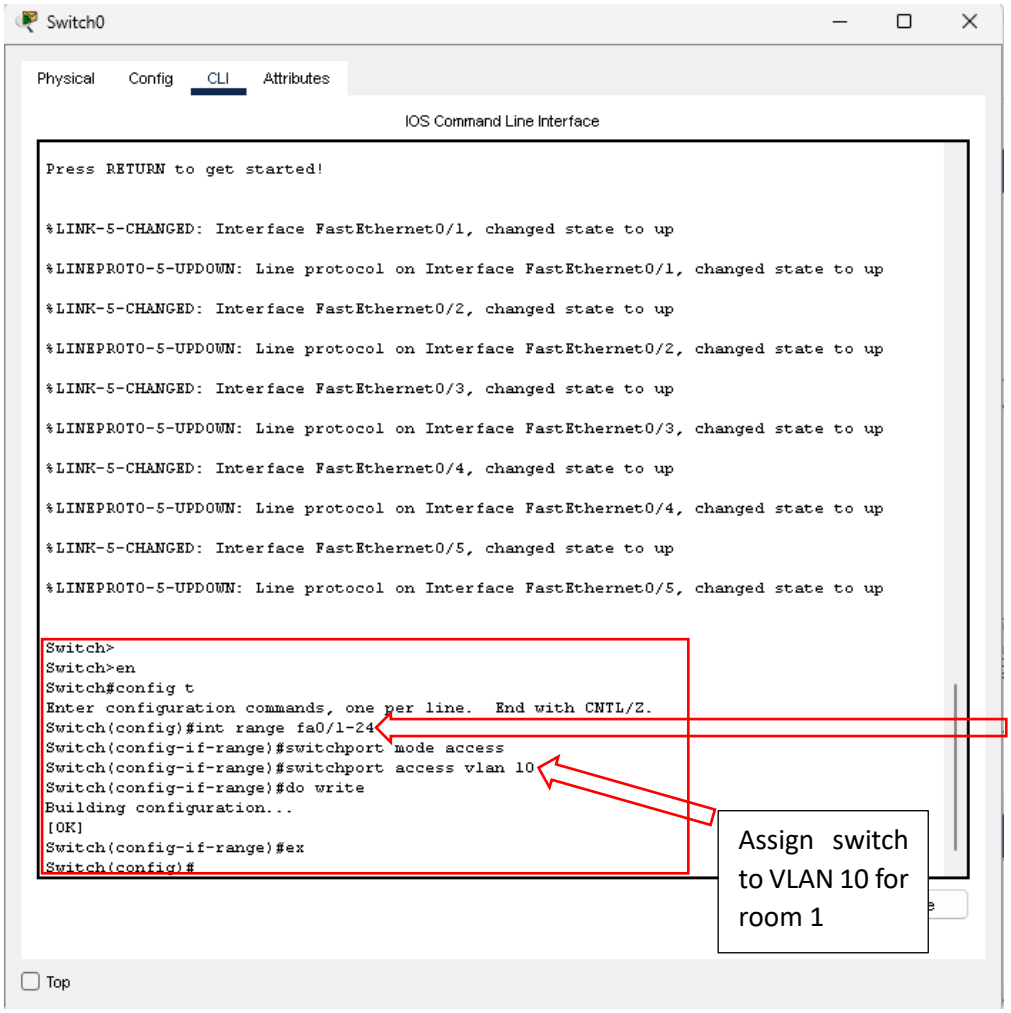
Step 4: Configure Devices Switch

Click on switch > click on CLI tab



Type instruction for vlan configuration :

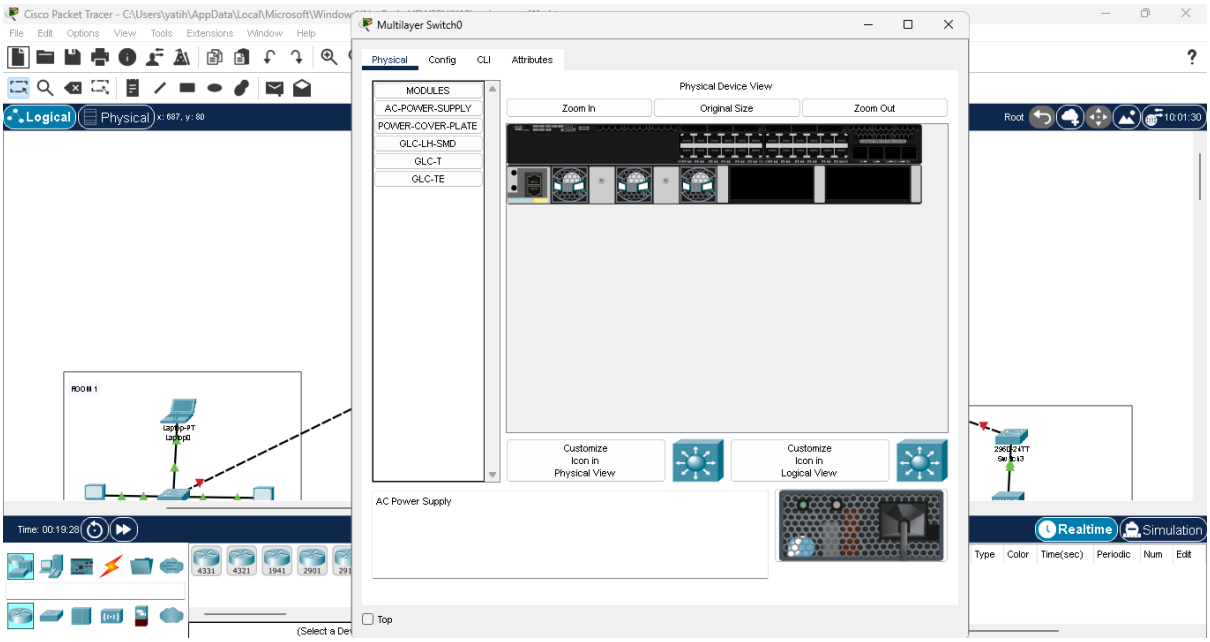
Enter > en > config t > int range fa0/1-24 > switchport mode access > switch access vlan 10 > do write



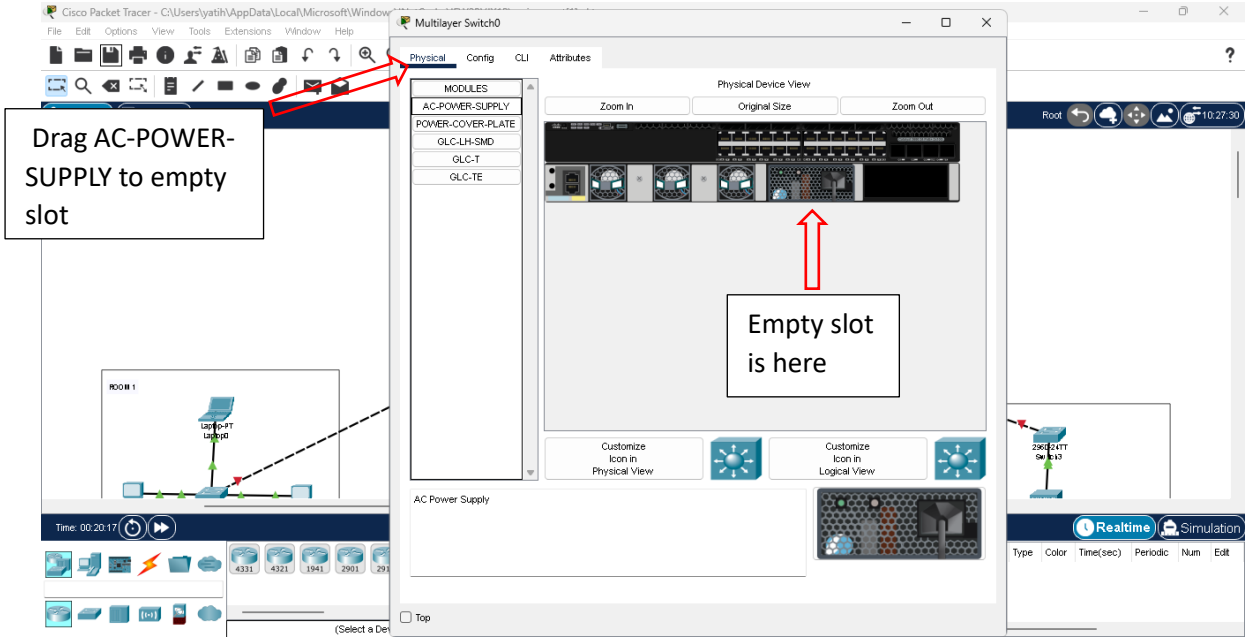
Do the same command configuring vlan to all switch on every room. Assigned vlan on room 2 is **VLAN 20**, room 3 is **VLAN 30** and room 4 is **VLAN 40**.

Step 5: Configure Devices Main Switch

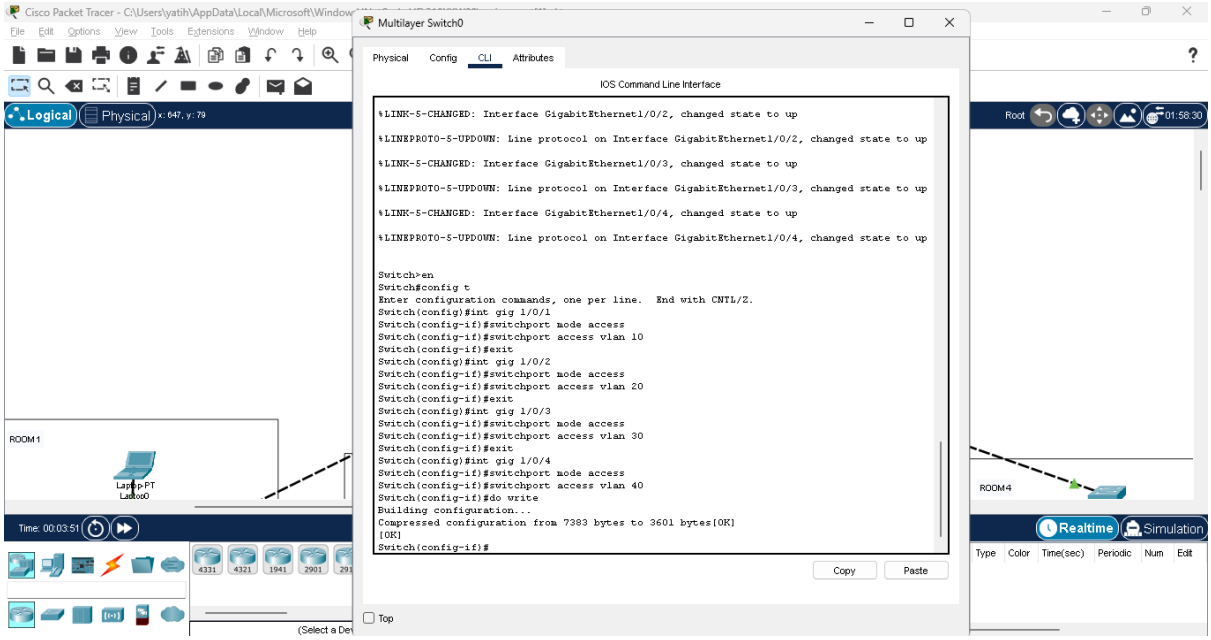
I. Click main switch and turn on the main switch for enabling to open the CLI tab



II. Drag the AC-POWER-SUPPLY to main switch

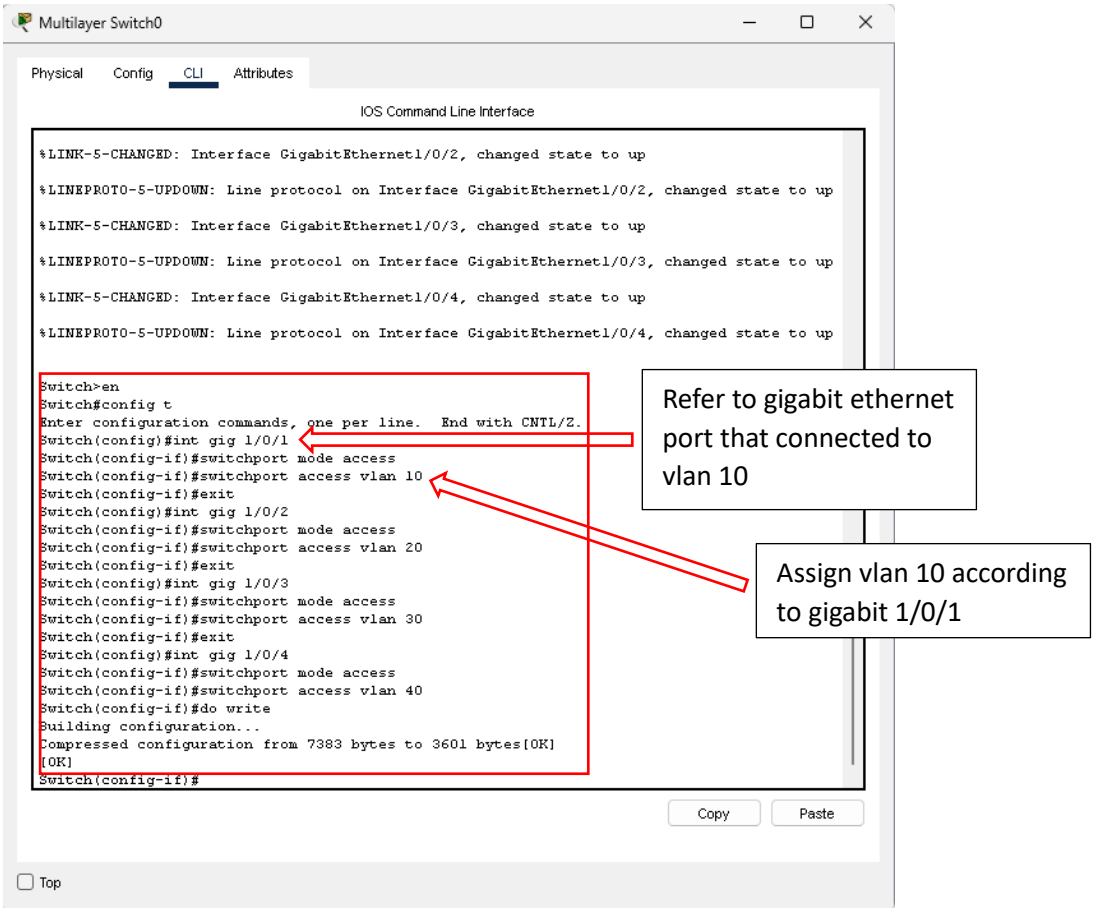


III. Click CLI tab to command the main switch



Type instruction for configuring vlan main switch:

Enter > en > config t > int gig 1/0/1 > switchport mode access > switchport access vlan 10 > exit

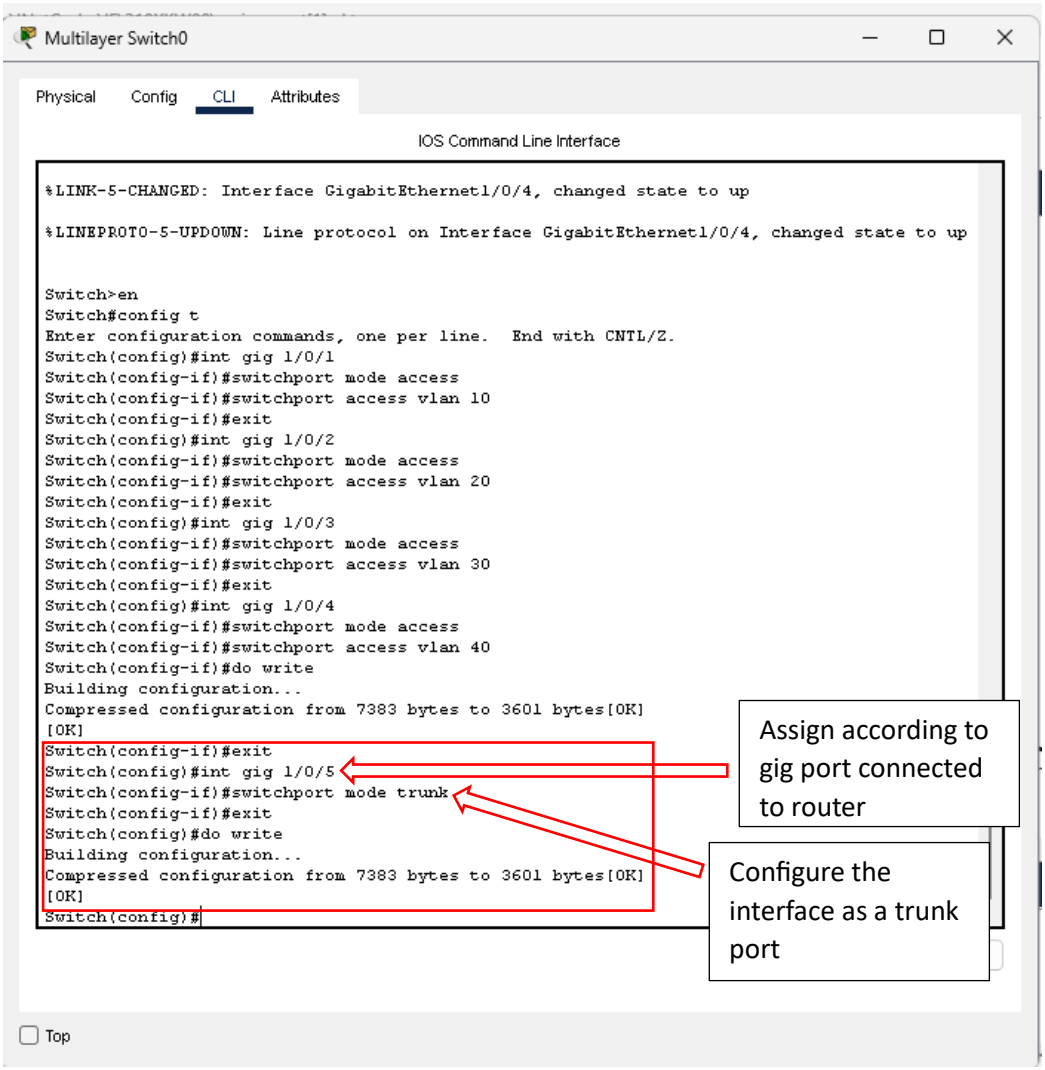


Do the same instruction for **VLAN 20**, **VLAN 30** and **VLAN 4** following their gigabit ethernet port on main switch

IV. Configure a swicth port (gigabitEthernet 1/0/5) as a trunk port to allow multiple VLANs to communicate across the network

Type instruction for configuration trunk port:

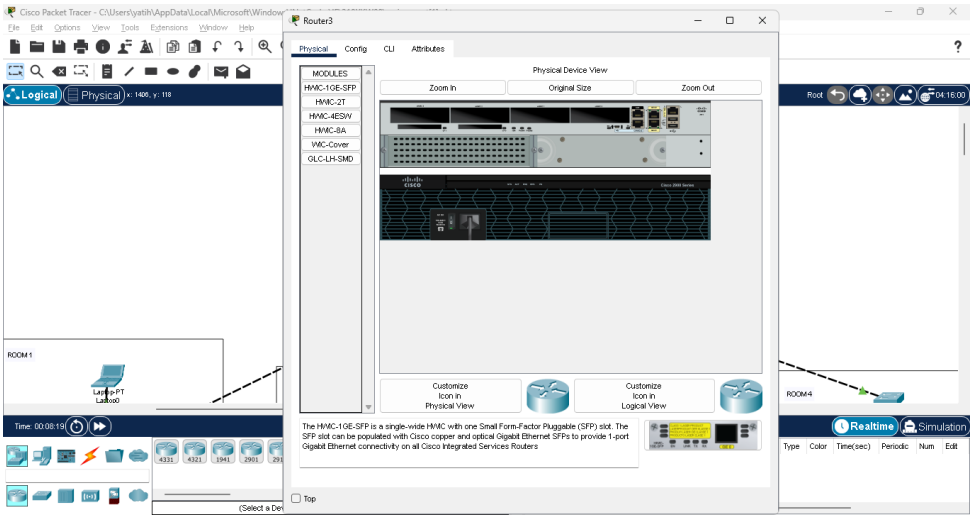
En > config t > int gig 1/0/5 > switchport mode trunk > exit > do write



Step 6: Configure a Subinterface on a Router

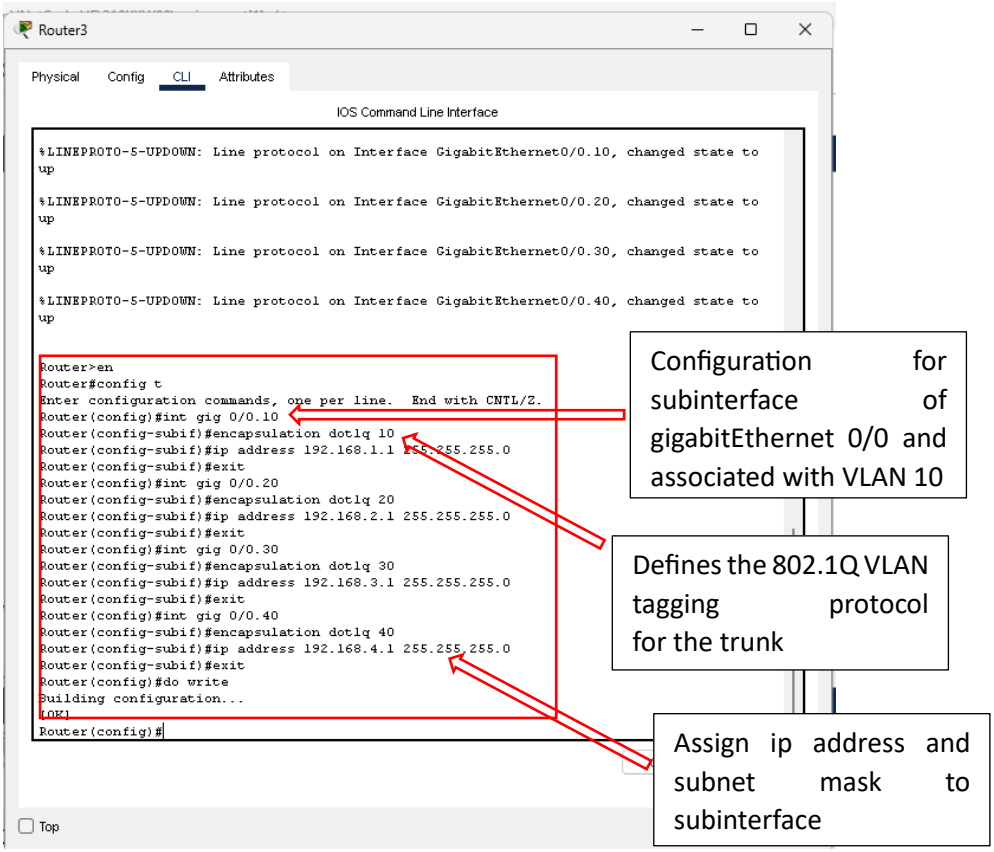
Subinterface is use to enable inter-VLAN routing, allowing the communication between device in the diffrent VLANs.

I. Click router > click CLI tab



Type instruction for subinterface router:

Enter > en > config t > int gig 0/0.10 > encapsulation dot1q 10 > ip address 192.168.1.0 255.255.255.0 > exit

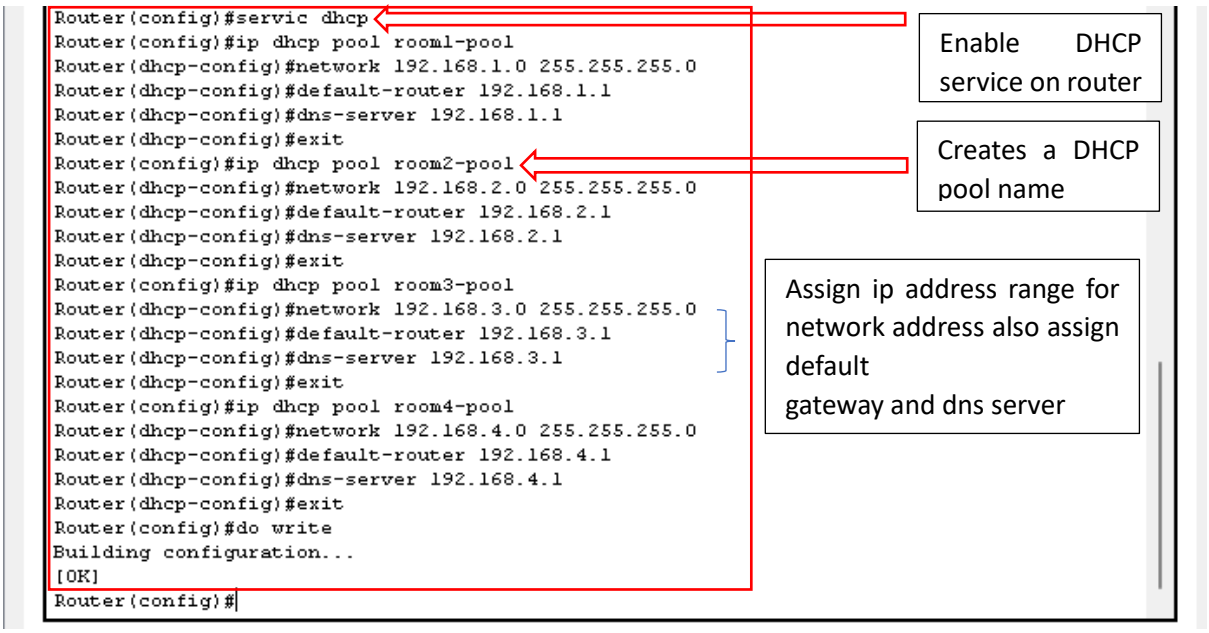


Step 7: Configure IP Address Intermittent Routing on Router (DHCP)

Use the same CLI according the step 6

Type instrcution for configuration IP Address:

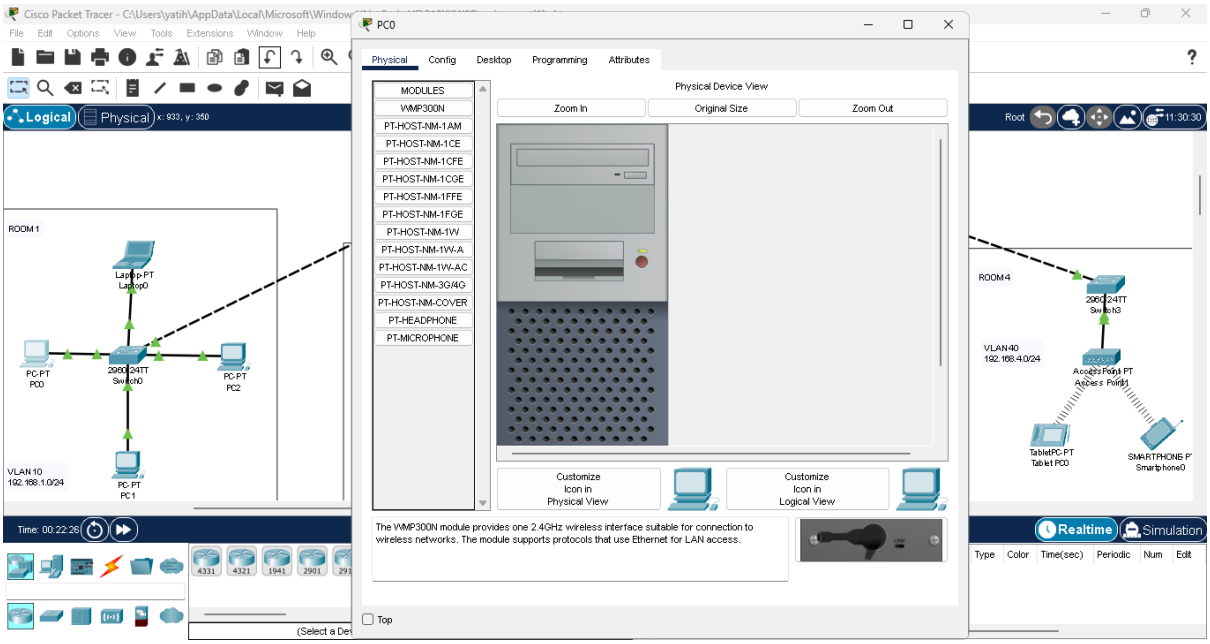
Enter > en > config t > service dhcp > ip dhcp pool room1-pool > network 192.168.1.0 255.255.255.0 > default-router 192.168.1.1 > dns server 192.168.1.1 > exit > do write



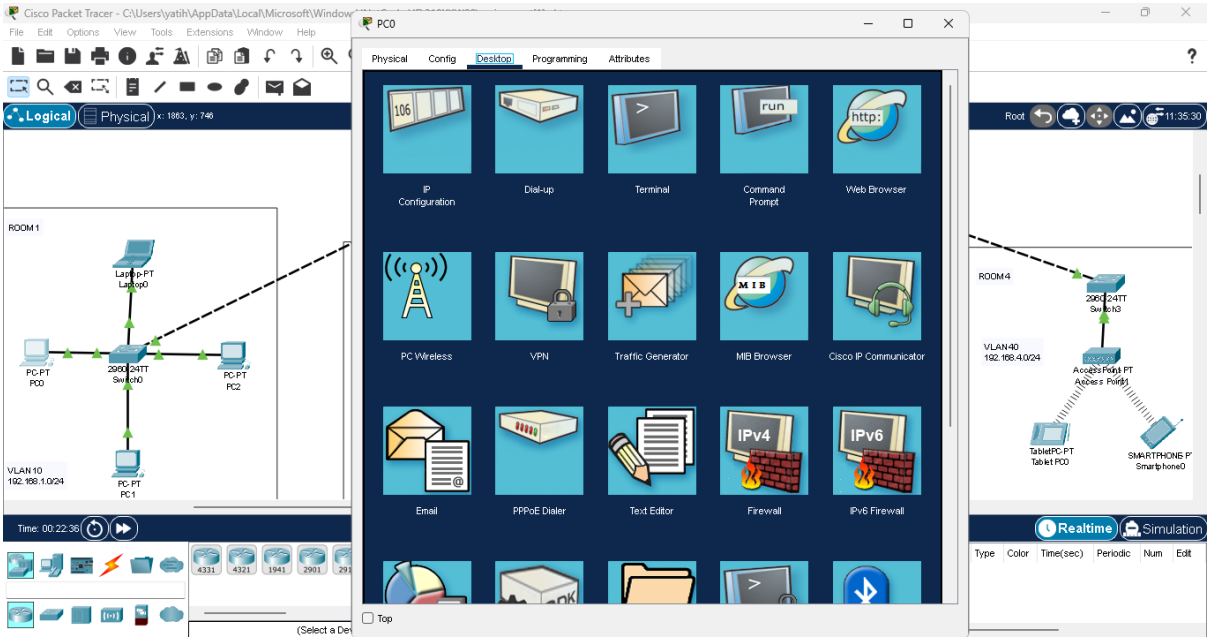
Step 8: Change Settings IP configuration On Device

PC and laptop IP Configuration

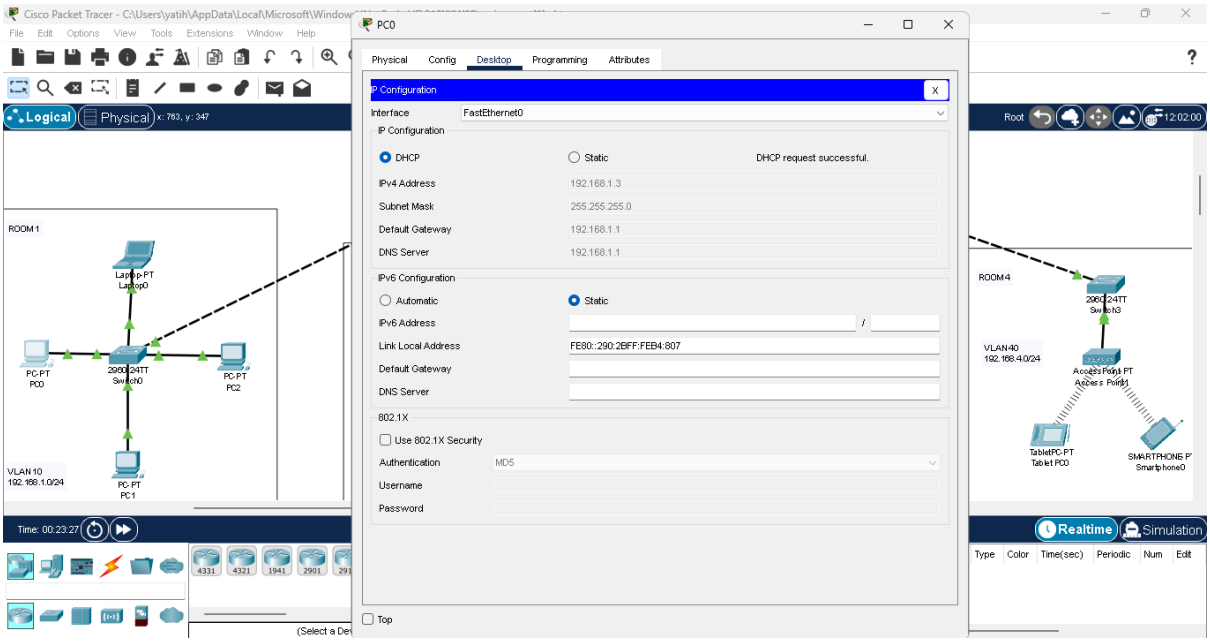
I. Click PC > click destop tab



II. Open IP configuration

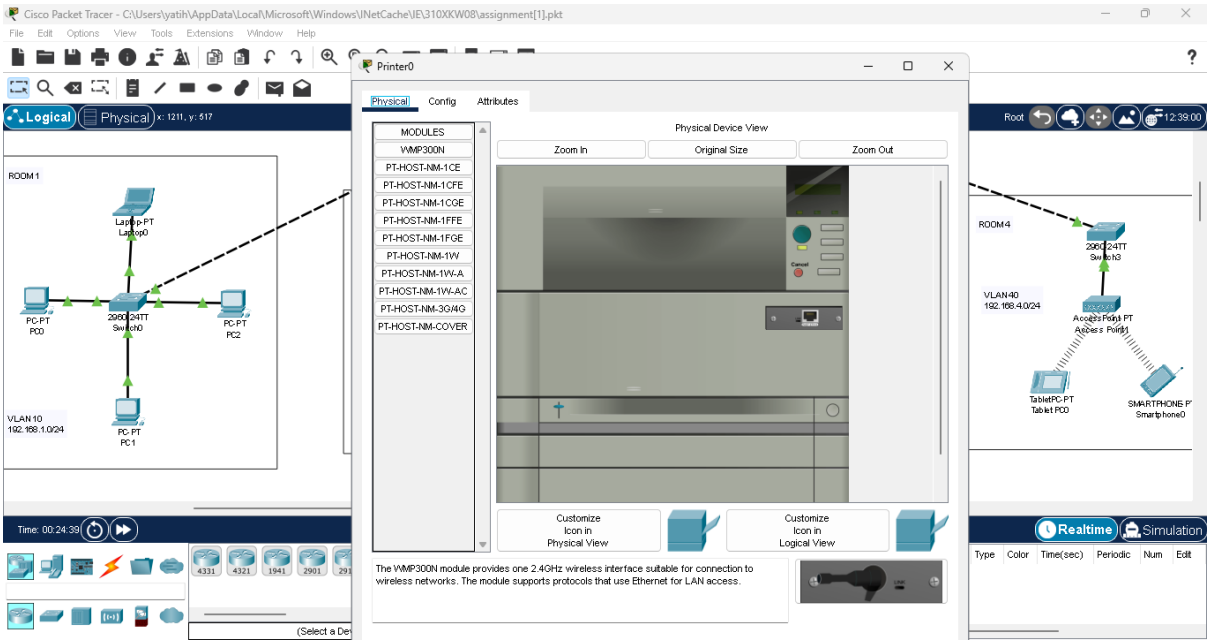


III. Select the DHCP on IP configuration to requesting IP Address

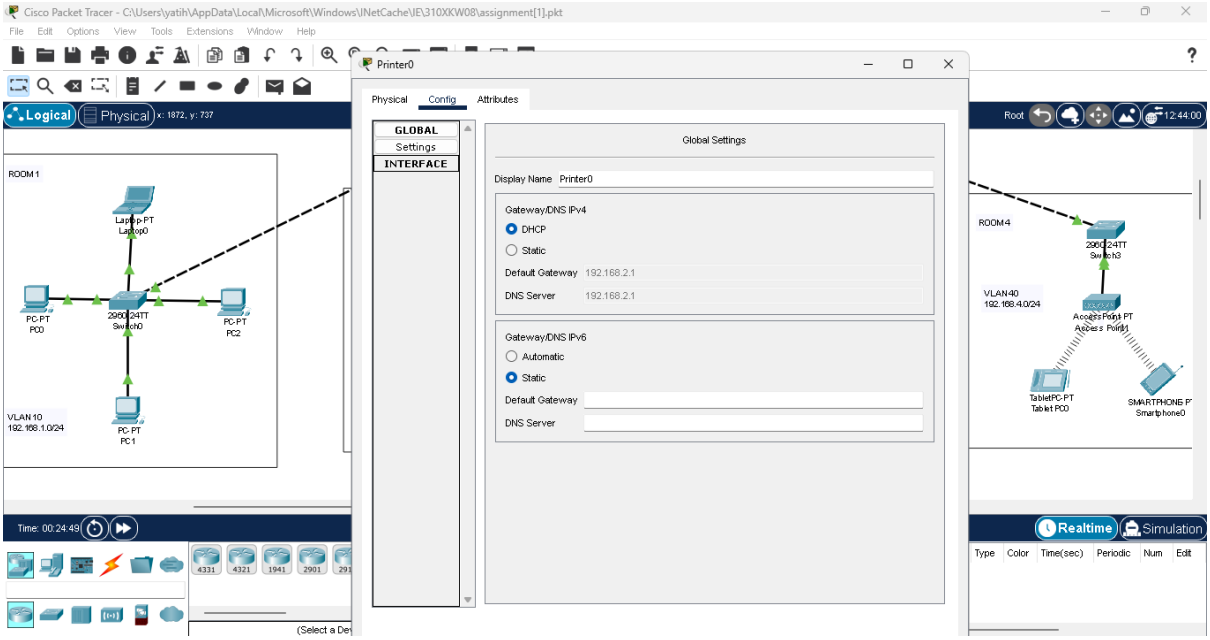


Printer IP Configuration

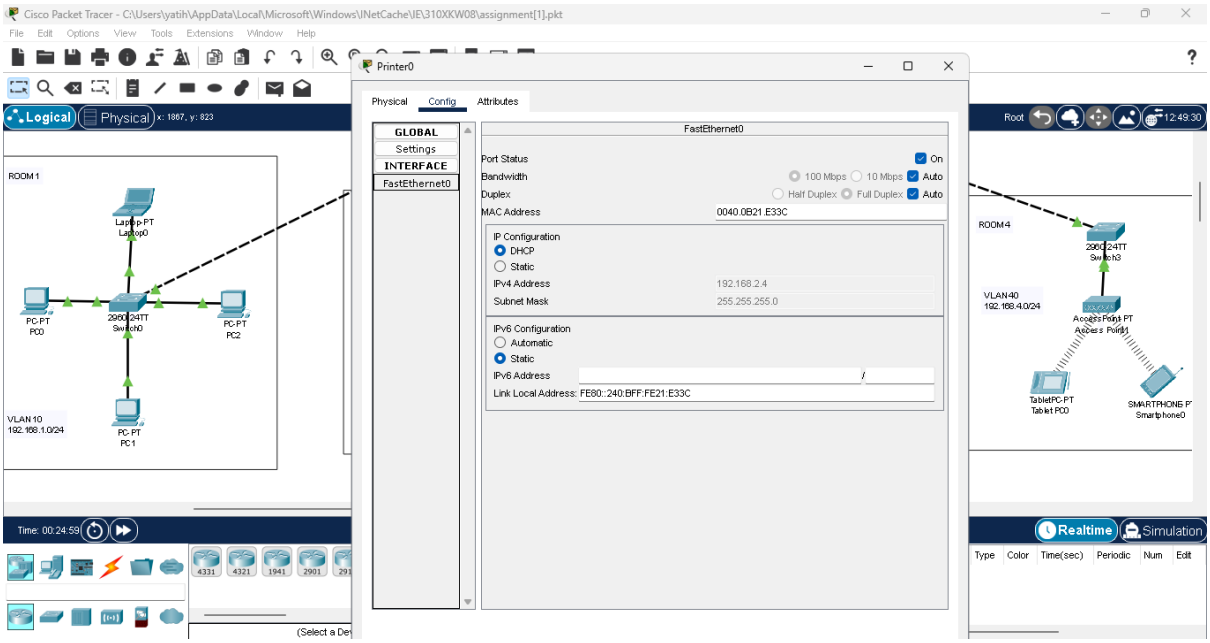
I. Click on the printer > click config



II. Drop down interface

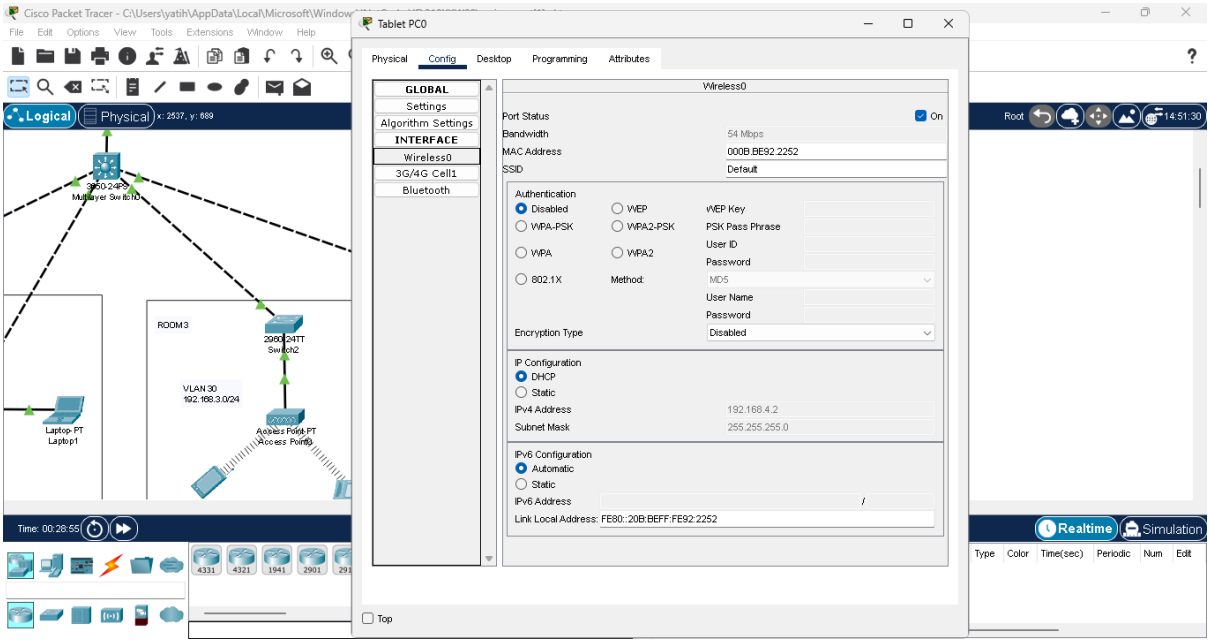


III. Click FastEthernet0 > select DHCP for IP Configuration



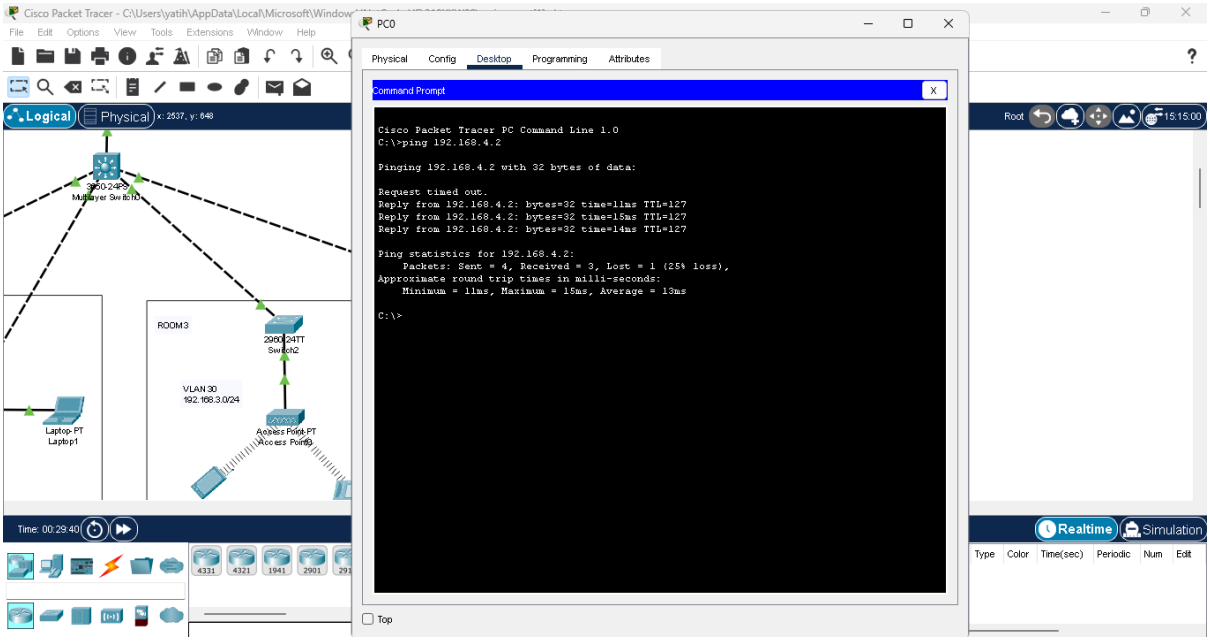
Tablet and Smartphone IP Configuration

I. Click on the tablet or smartphone > click config > drop down interface > click wireless0 > select DHCP for IP Configuration



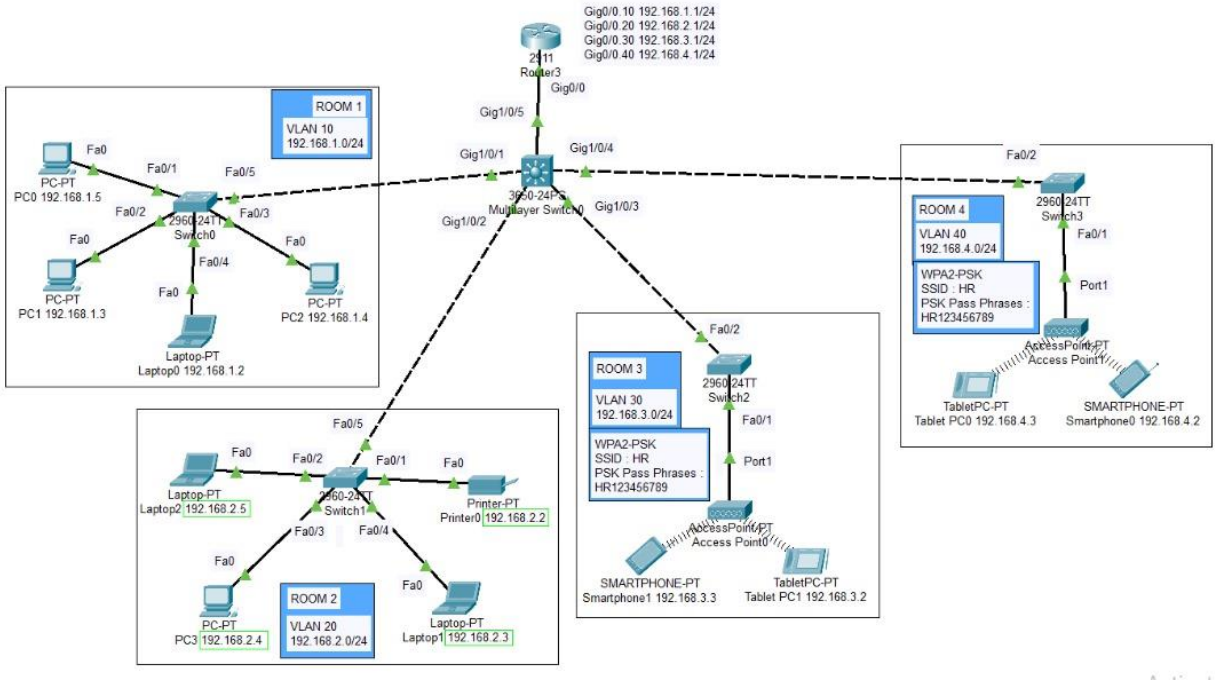
Step 9: Ping Communication of Device

Click any device > click destop > open command prompt > ping -IP address- > enter > wait for reply from targeted device

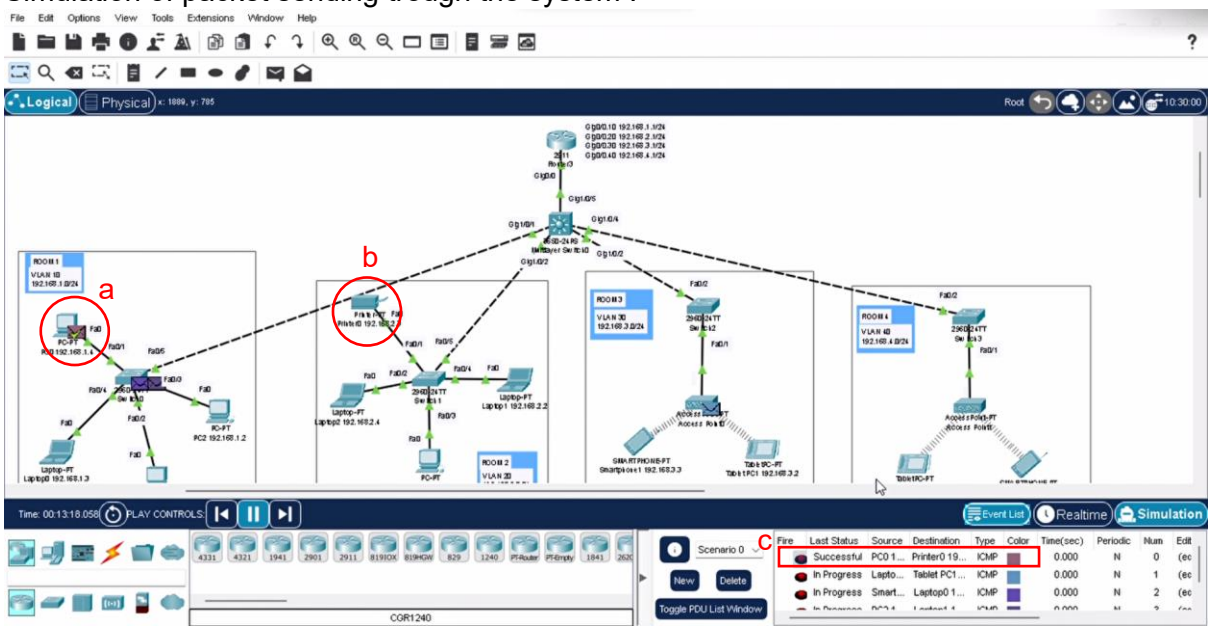


4.0 Result And Discussion

Below is the finalization of the system that have 4 room connect to the main switch and goes to the router



Simulation of packet sending trough the system :



PC0 (192.168.1.1) in ROOM 1 sends a packet to Printer (192.168.1.73) in ROOM 2 which is from a to b. The packet first goes to the router in ROOM 1, which acts as the gateway. From there, the router forwards the packet to the core switch, which performs inter-VLAN routing to identify the correct VLAN and destination. The core switch then routes the packet to the router in ROOM 2. Finally, the router delivers the packet to the printer via the local switch in ROOM 2. The simulation confirms that the communication was successful. The result can be reffered on the c mark above.

5.0 Conclusion

The network design and simulation using Cisco Packet Tracer successfully achieved the objectives of creating a functional, efficient, and scalable network infrastructure for a small organization. By implementing VLAN configurations, inter-VLAN routing, and DHCP services, we ensured reliable connectivity and efficient resource management. The successful packet communication between devices in different VLANs demonstrated the network's functionality. This project enhanced our practical skills in network design, device configuration, and troubleshooting within a simulated environment.

6.0 Link Video

https://youtu.be/UwPxqqppkNM?si=73q3BoOJsMXX3A9E