Lab 7 : Creating VLAN and VLAN Trunking using Packet Tracer

Theory

a. VLAN, VLAN Trunking & its Architecture

- **VLAN (Virtual Local Area Network):** VLANs segment a physical network into smaller, isolated networks, allowing better control over traffic and enhancing security and performance.

- **VLAN Trunking:** Trunking allows multiple VLANs to communicate over a single physical link between switches. This is achieved by tagging data frames with a VLAN ID, enabling devices on different VLANs to exchange information across trunked links.

- **Architecture:** VLANs operate within switches, separating traffic and isolating broadcast domains, while trunk links facilitate VLAN communication between switches.

b. Component Used

- **Hardware:**

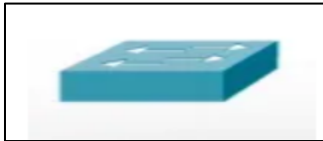   o **Switch:** Connects multiple devices within the LAN.

Fig: Switch

    o **End Devices:** Computers or servers that interact over the network.

Fig: End device

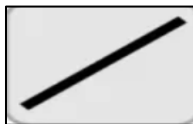   o **Ethernet Cables:** Used to connect devices to the switch.
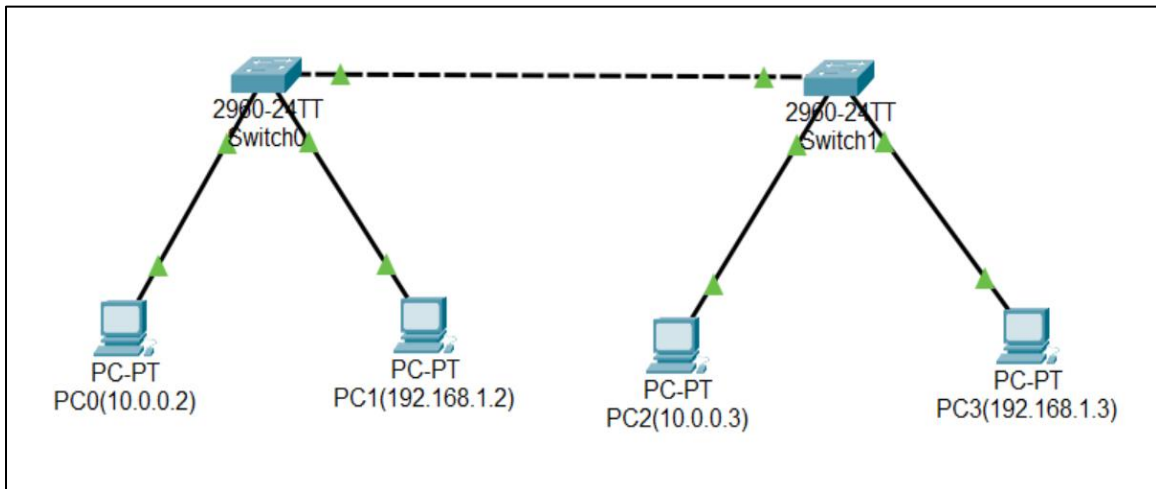

Fig: Cable

c. Network Diagram

Fig: VLAN

Implementation Sequence

Following are the steps to implement VLAN and trunk them:

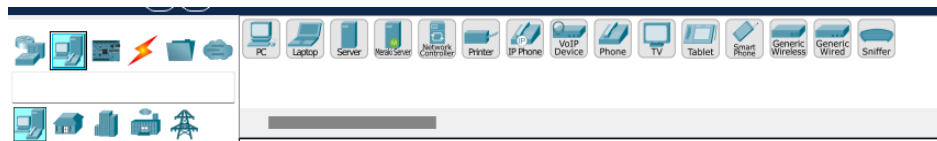1. **Select necessary nodes and network device from selection panel**

Fig: Device selection

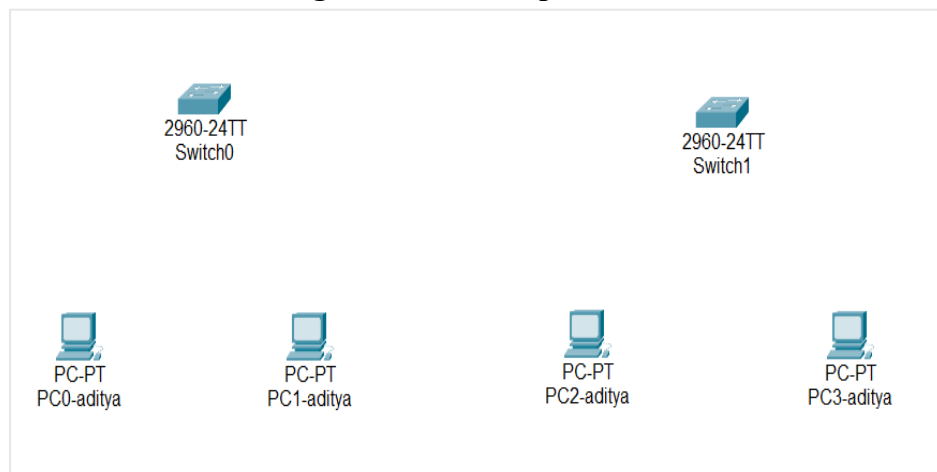2. **Select devices and drag them on workspace**

Fig: Adding Network Devices in VLAN

3. Add the networking device to the workspace and connect the devices.
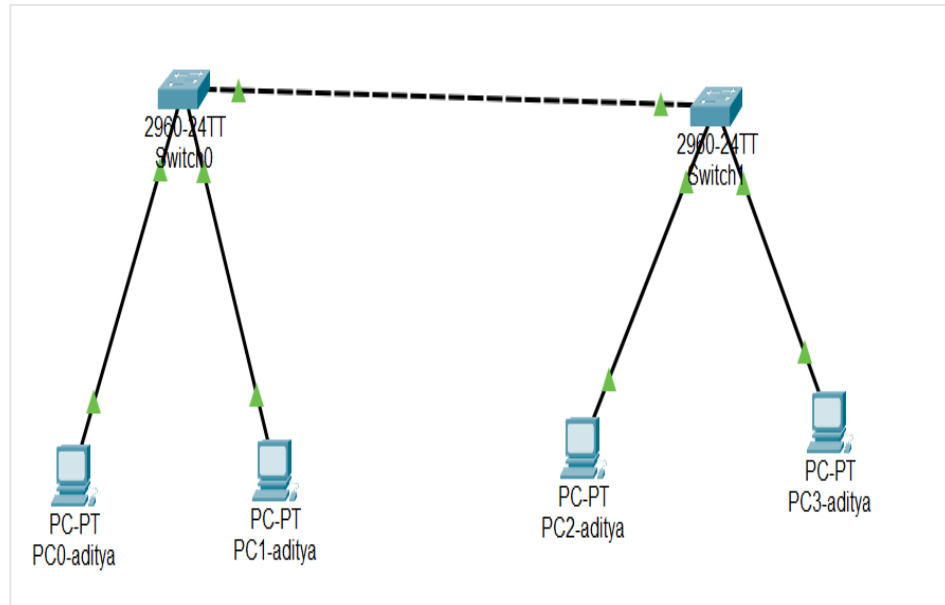

Fig: Connection between devices in vlan

4. Configure Ip address.

PC0:10.0.0.2
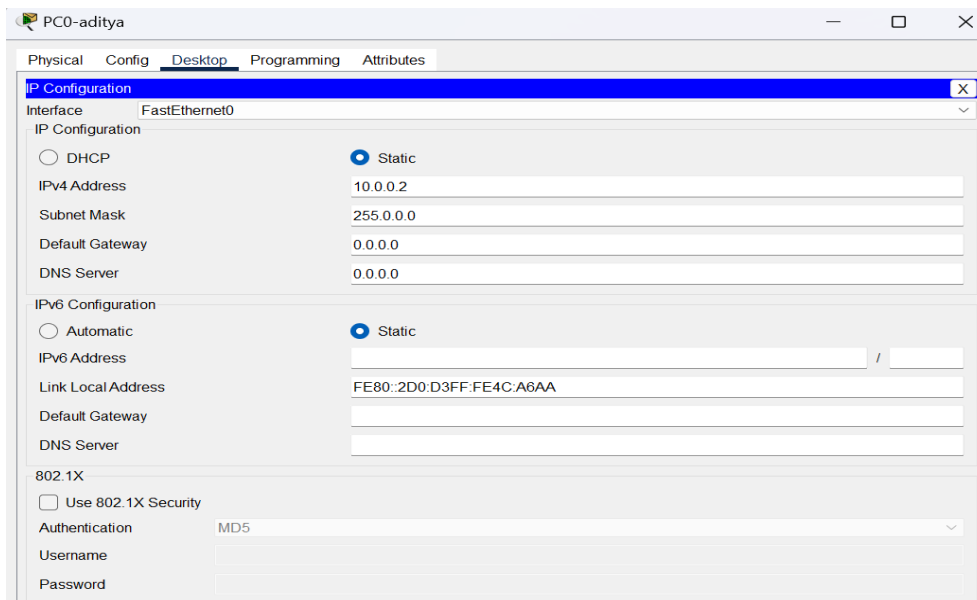
PC1:192.168.1.2

PC2:10.0.0.3

PC3:192.168.1.3

Fig: Configuring Ip address
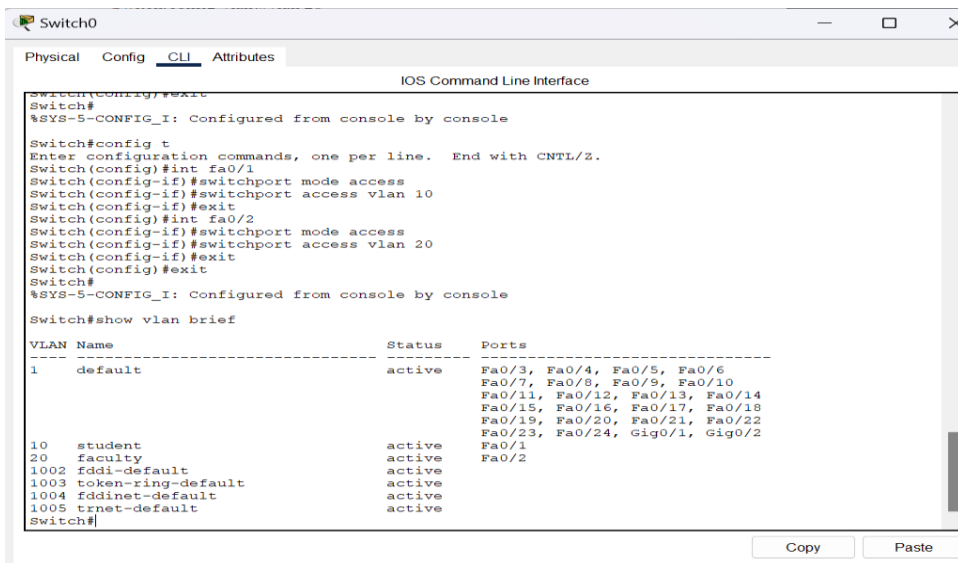
5. **Configuring VLAN in both switch 0 and 1**

Create VLAN on both switches and assign port to create VLANs on them, enter the configuration mode on both switches and use the vlan command to create separate VLANs. After creating the VLANs, assign ports to the VLAN by selecting the specific interfaces and using the switchport access vlan command to associate the ports with the correct VLAN.

Code for VLAN configuration:

Switch(config)#vlan 10
Switch(config-vlan) #name student
Switch(config-vlan) #vlan 20
Switch(config-vlan) #name faculty
Switch(config-vlan) #exit
Switch(config)#exit

Code for Assigning ports

Switch# config t
Switch(config)#int fa 0/1
Switch(config-if) #switchport mode access
Switch(config-if) #switchport access vlan 10
Switch(config-if) #int fa 0/2
Switch(config-if) #switchport mode access
Switch(config-if) #switchport access vlan 20
Switch(config-if) #exit
Switch(config)#exit
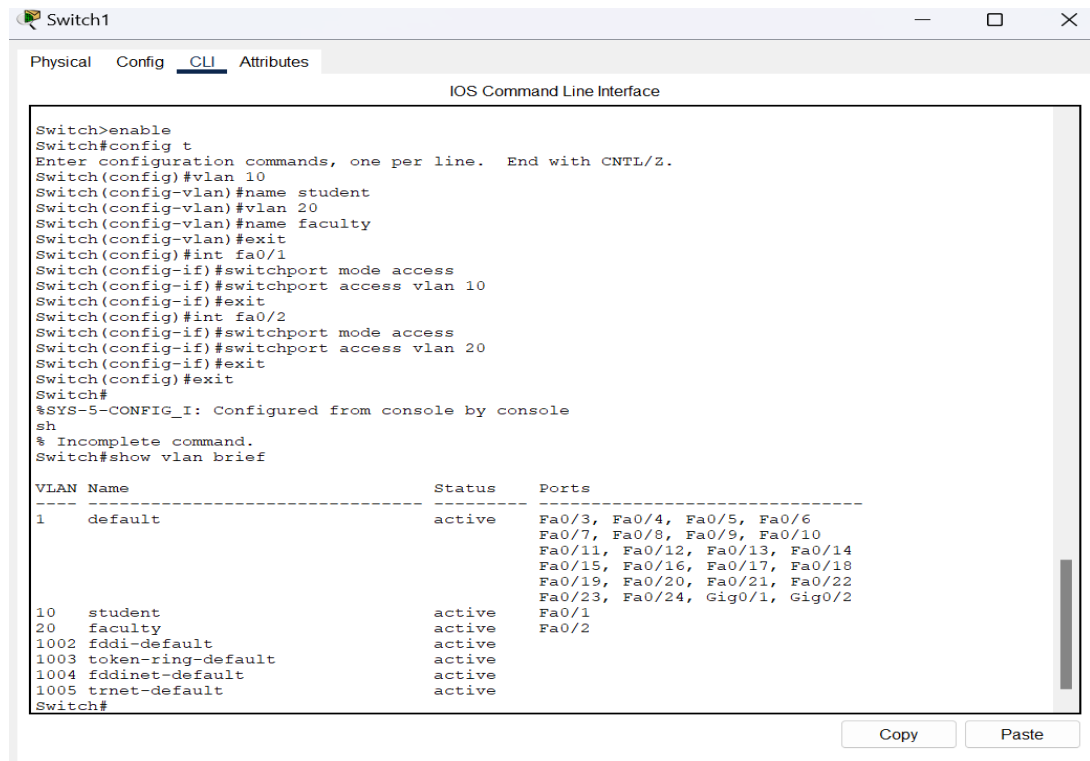

Fig: Switch 0 configuration

Fig: Switch 1 configuration

6. **Configuring trunking between two switches.**

To enable trunking, configure the interfaces between the two switches using the switchport mode trunk command. This allows multiple VLANs to pass through the same link, making communication between devices in the same VLAN but connected to different switches. Trunking ensures that tagged traffic is carried across the switches while maintaining the VLAN distinctions.
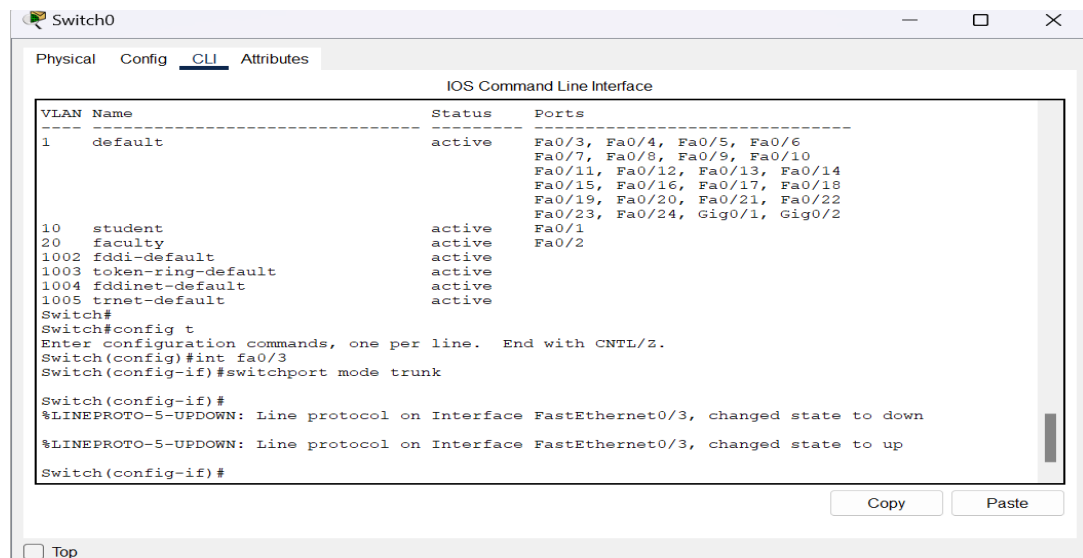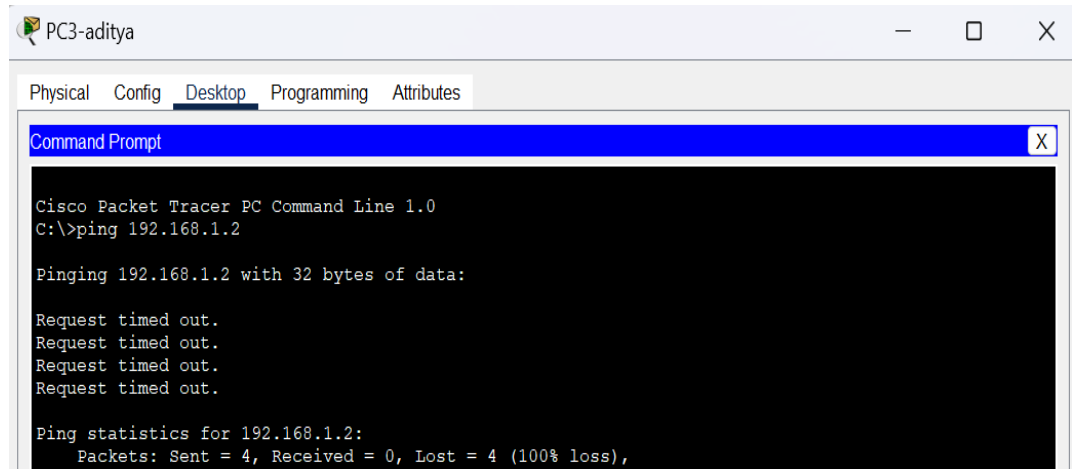

Fig: Configuring trunking between switches

7. **Verify connection between the nodes**

   To verify the connection between the nodes and to check if trunking has been successfully implemented between the switches, we use the ping command in the end device's CLI to ping other devices from different switch to see if we get reply from those devices.
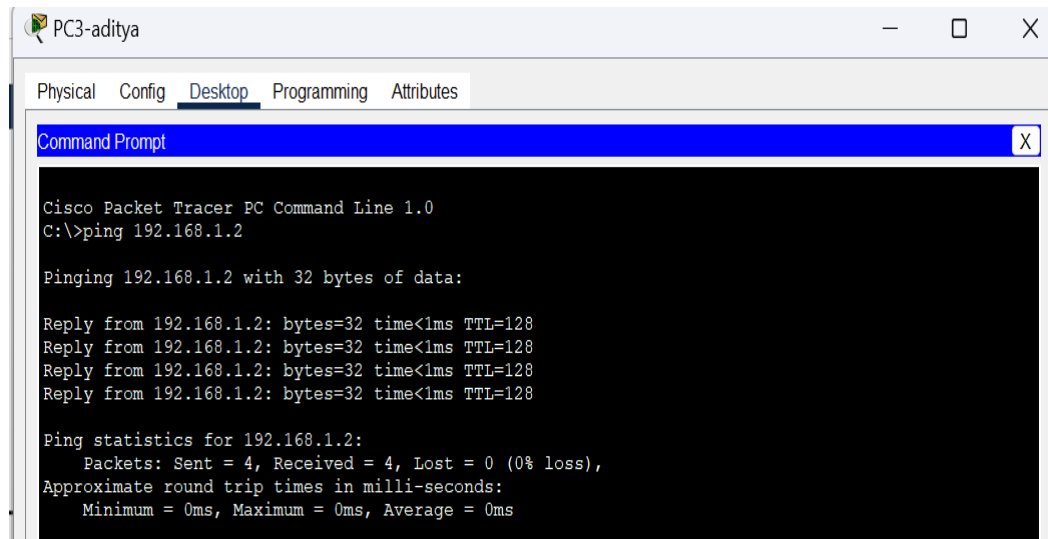
Fig: pinging Ip 192.168.1.2

As we can see there is no reply from Ip 192.168.1.2 when pinging from 192.168.1.3 even if they are from same class of Ip before trunking as they are connected to different switches.

Fig: Pinging Ip 192.168.1.2 after trunking

After trunking the ping command works and we are getting reply from 192.168.1.2 and it works even if the devices are connected on different switches as long as they are of same Ip class.

Conclusion

In this lab, we successfully configured VLANs and trunking between two switches in Cisco Packet Tracer. By assigning ports to VLANs and establishing a trunk link, we isolated network traffic and enabled communication between VLANs. The configuration and testing highlighted the importance of VLANs in network segmentation and trunking for efficient data flow between multiple VLANs across switches.