KATHMANDU UNIVERSITY

DHULIKHEL, NEPAL

Department of Computer Science & Engineering (DoCSE)

LAB ASSIGNMENT

COMP-204

Submitted By:

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2nd Year, 2nd Semester

Submitted to:

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19 October, 2020

LAB TASKS

Lab 2: Create a LAN network and then configure the DHCP.

a. Two client PCs.

You must get the ip address at client side dynamically.

Lab3: Create a simple LAN network. Your network should have the following devices

a. Router

b. Two client PCs.

Assign the Class C type IP address for each unit.

Lab 4: Create a VLAN network with following specification:

a. Create a teacher and Student network

b. Authenticate the switch access

Lab 5: Create a VLAN network with TRUNK following specification:

a. Demonstrate Nepal Banks network

b. Create a trunk in between switches

c. Authenticate the switch access

d. Demonstrate the telnet connection.

Lab 2

Objective

Creating a simple LAN and configuring a DHCP server based IP addressing.

Components Used

- **Client PC**
  In computing, a client is a piece of computer hardware or software that accesses a service made available by a server as part of the client–server model of computer networks. The server is often (but not always) on another computer system, in which case the client accesses the service by way of a network.

- **Server PC**
  In computing, a server is a piece of computer hardware or software (computer program) that provides functionality for other programs or devices, called "clients".

- **Switch**
  A network switch is networking hardware that connects devices on a computer network by using packet switching to receive and forward data to the destination device.

- **Cables**
  Cables are used as medium for connecting different components over the network for transceive data. Usually copper cables insulated with some materials are used as connection cables because of their conductivity and economic value.

Concepts and Protocols

- **Dynamic Host Configuration Protocol (DHCP)**
  The Dynamic Host Configuration Protocol (DHCP) is a network management protocol whereby a DHCP server dynamically assigns an IP address and other network configuration parameters to each device on the network, so they can communicate with other IP networks. A DHCP server enables computers to request IP addresses and networking parameters automatically from the Internet service provider (ISP), reducing the need for a network administrator or a user to manually assign IP addresses to all network devices. In the absence of a DHCP server, a computer or other device on the network needs to be manually assigned an IP address.

- **Local Area Network (LAN)**
  A local area network (LAN) is a computer network that interconnects computers within a limited area such as a residence, school, laboratory, university campus or office building. Ethernet and Wi-Fi are the two most common technologies in use for local area networks.

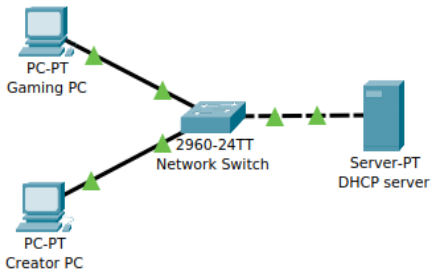
Procedure

1. Setup LAN

Following component devices are used for the LAN.

1. Two PCs (Here named Gaming PC and Creator PC)
2. Switch (Name: Network Switch)
3. General Server (Name: DHCP server)

Connect components using *Copper wire* from *Connections* using Ethernet ports as displayed in figure:

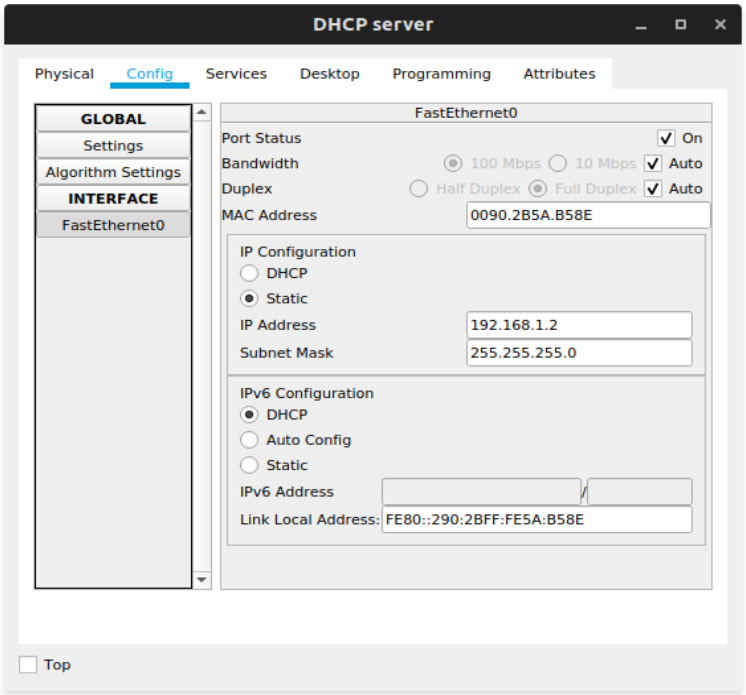


1 LAN connection

2. Configuration Steps

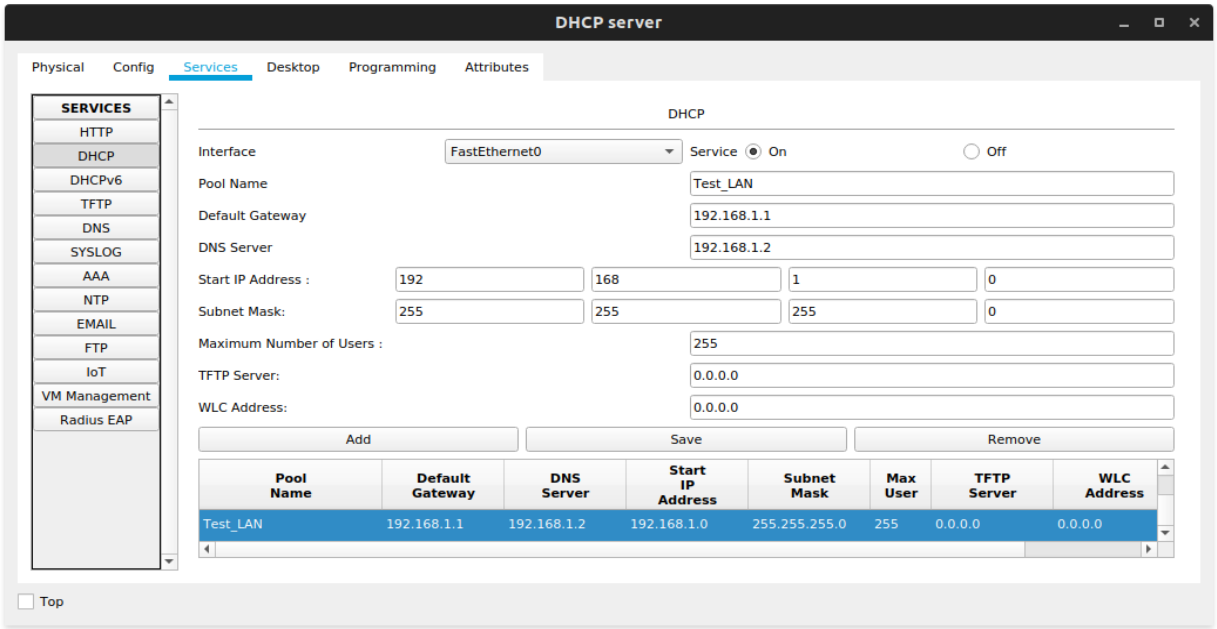
The setting configuration was done in the following steps:

I. Configure static IP on the *DHCP Server* as 192.168.1.2.



2 IP Address configuration for Interface

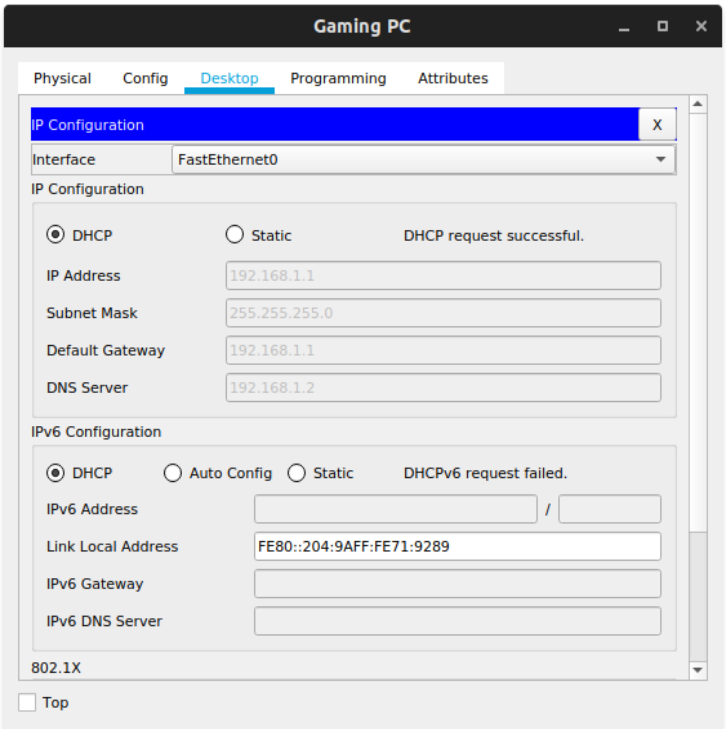
II. Configure DHCP Services with DHCP Pool name as *TEST_LAN*



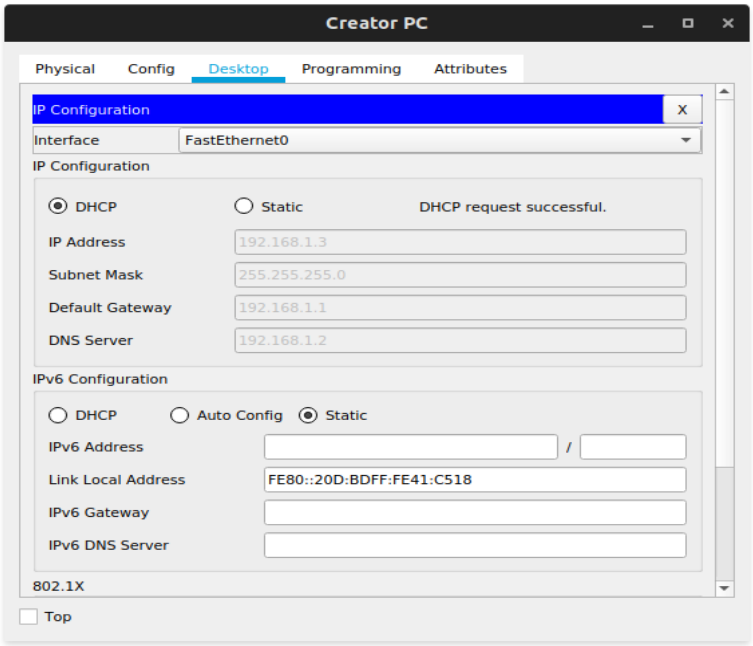
3DHCP Configuration

III. Setup DHCP IPv4 addresses in Client PCs.

4 PC Desktop Configurations



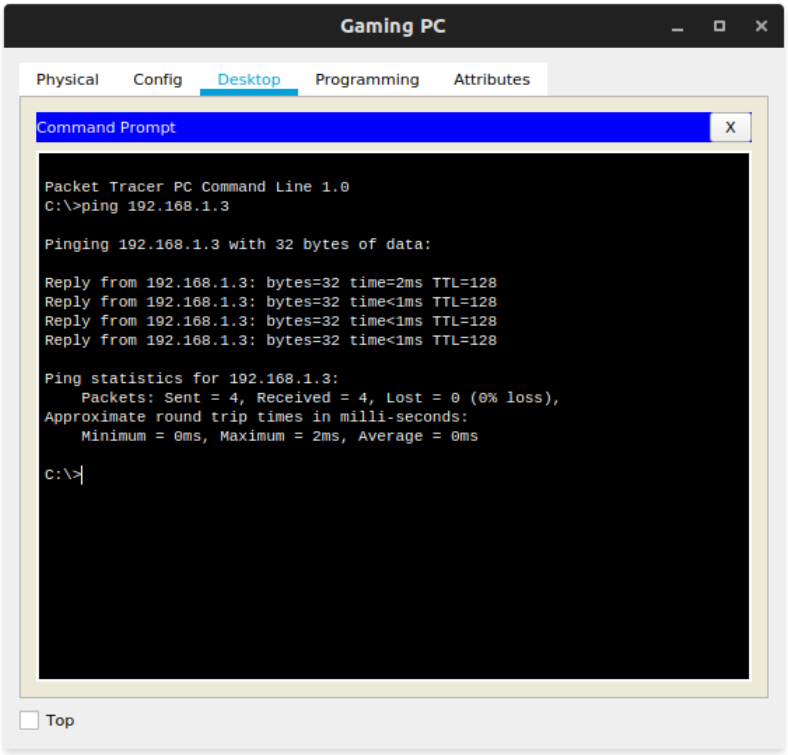
5 PC 1



6 PC 2

IV. Test Connections

Using *Gaming PC*'s Command Prompt Ping *Creator PC*



7 Command Prompt Console in PC

Conclusion

Hence, in this way we can easily setup a simple LAN along with a DHCP server for IP addressing. Using Packet tracer, we can simulate real word connections.

LAB 3

Objective

To learn how to connect different client PCs through a router

Components Used

- **Client PC**
  In computing, a client is a piece of computer hardware or software that accesses a service made available by a server as part of the client–server model of computer networks. The server is often (but not always) on another computer system, in which case the client accesses the service by way of a network.

- **Cables**
  Cables are used as medium for connecting different components over the network for transceive data. Usually copper cables insulated with some materials are used as connection cables because of their conductivity and economic value.

- **Router**
  A router is a networking device that forwards data packets between computer networks. Routers perform the traffic directing functions on the Internet

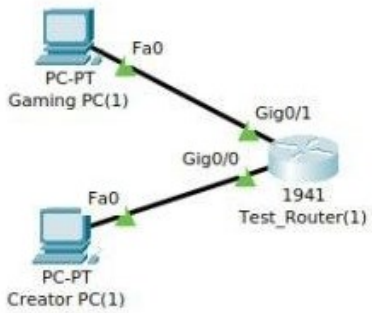
Procedure

1. Setup LAN

LAN was setup using following components

1. Router
2. Two client PCs

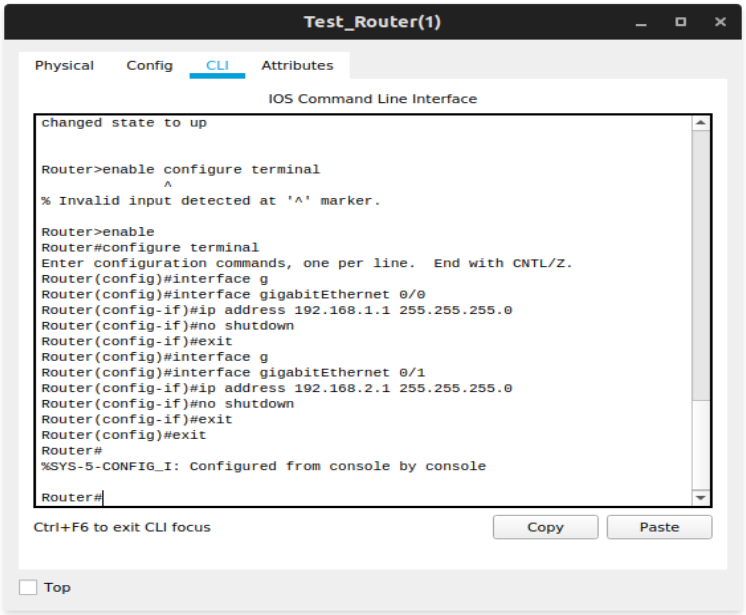
Both PCs were individually connected to the router using Copper wire through.



8 Router connection with two PCs

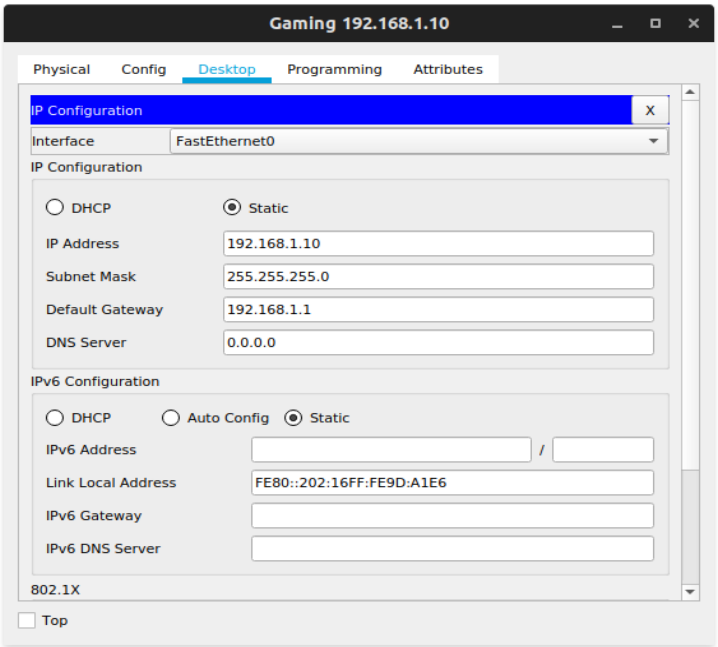
2. Steps

I. Configuration of router settings through CLI to setup IP configurations for its Ethernet interfaces

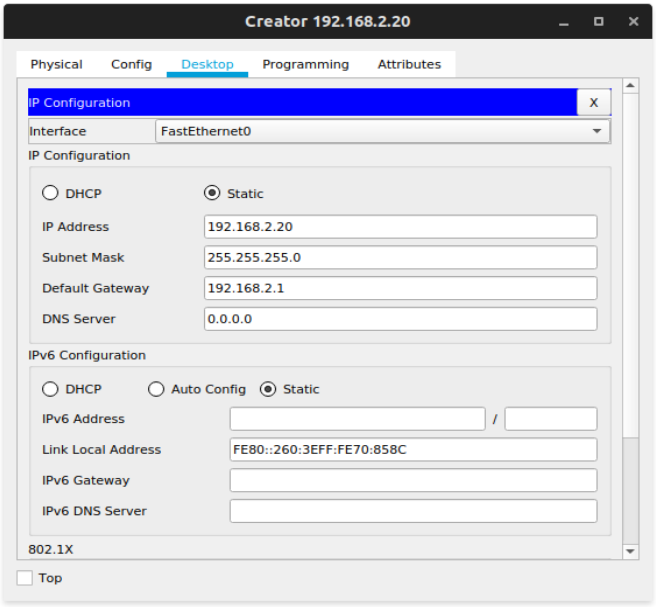


9 Router CLI configuration

II. Configuration of IP addresses of client computers Statically.



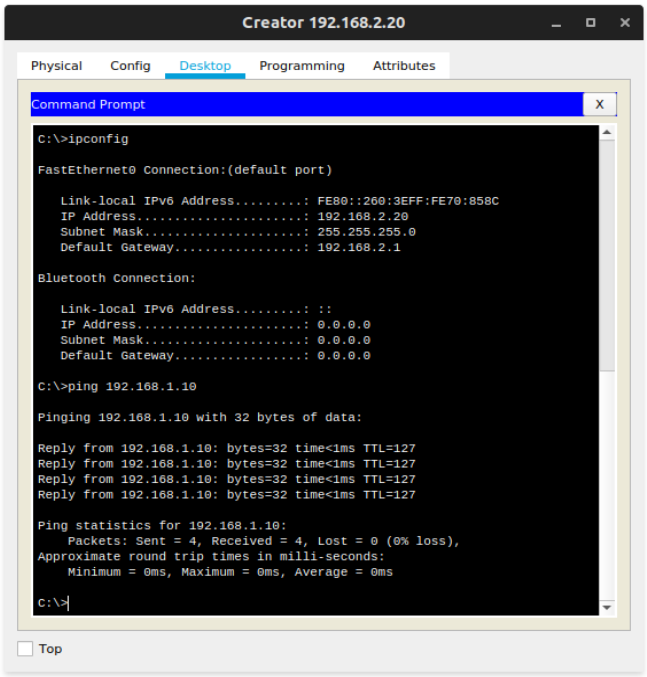
10 Client PC IP configuration



11 Client PC IP address configuration

III. Test Connection between PCs

By using the command prompt, we ping Pcs to check connection.



12 Testing connection between PCs

Conclusion

Hence, we learned how to configure Router settings and connect different Clients PCs with each other through the router in the LAN.

LAB 4

Objective

To Understanding how VLAN works and can be used and configured.

Components Used

- **Client PC**
  In computing, a client is a piece of computer hardware or software that accesses a service made available by a server as part of the client–server model of computer networks. The server is often (but not always) on another computer system, in which case the client accesses the service by way of a network.

- **Switch**
  A network switch is networking hardware that connects devices on a computer network by using packet switching to receive and forward data to the destination device.

- **Cables**
  Cables are used as medium for connecting different components over the network for transceive data. Usually copper cables insulated with some materials are used as connection cables because of their conductivity and economic value.

Concepts

- **VLAN**
  A VLAN (virtual LAN) is a subnetwork which can group together collections of devices on separate physical local area networks

(LANs). A LAN is a group of computers and devices that share a communications line or wireless link to a server within the same geographical area.

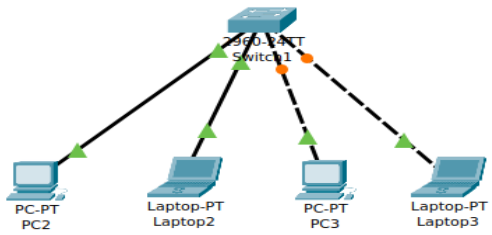
Procedure

1. Setup Lan

The LAN was set up using the following components

1. Four Client PCs
2. One Networking Switch

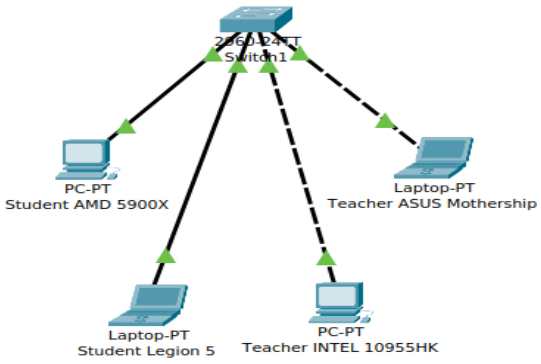
All 4 PCs are connected to the switch



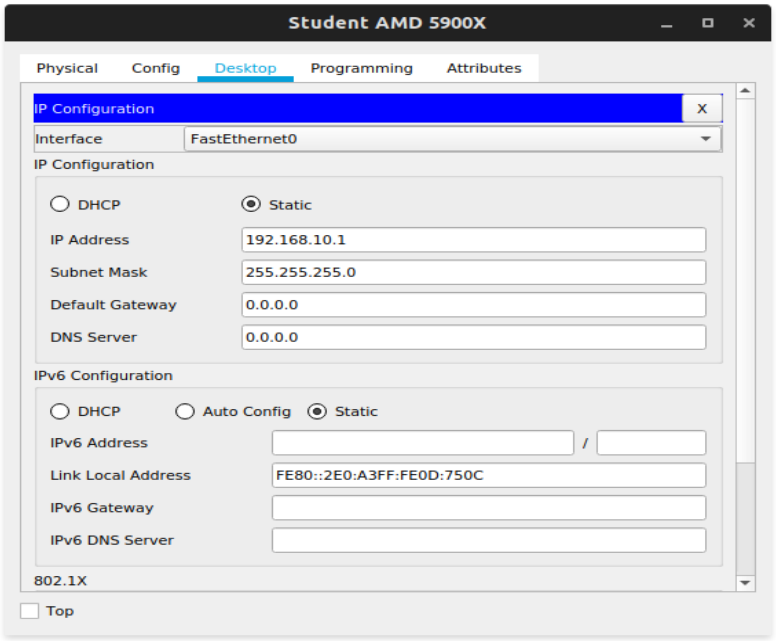
13 LAN connection

2. Steps

I. Assign names and IP to the PCs

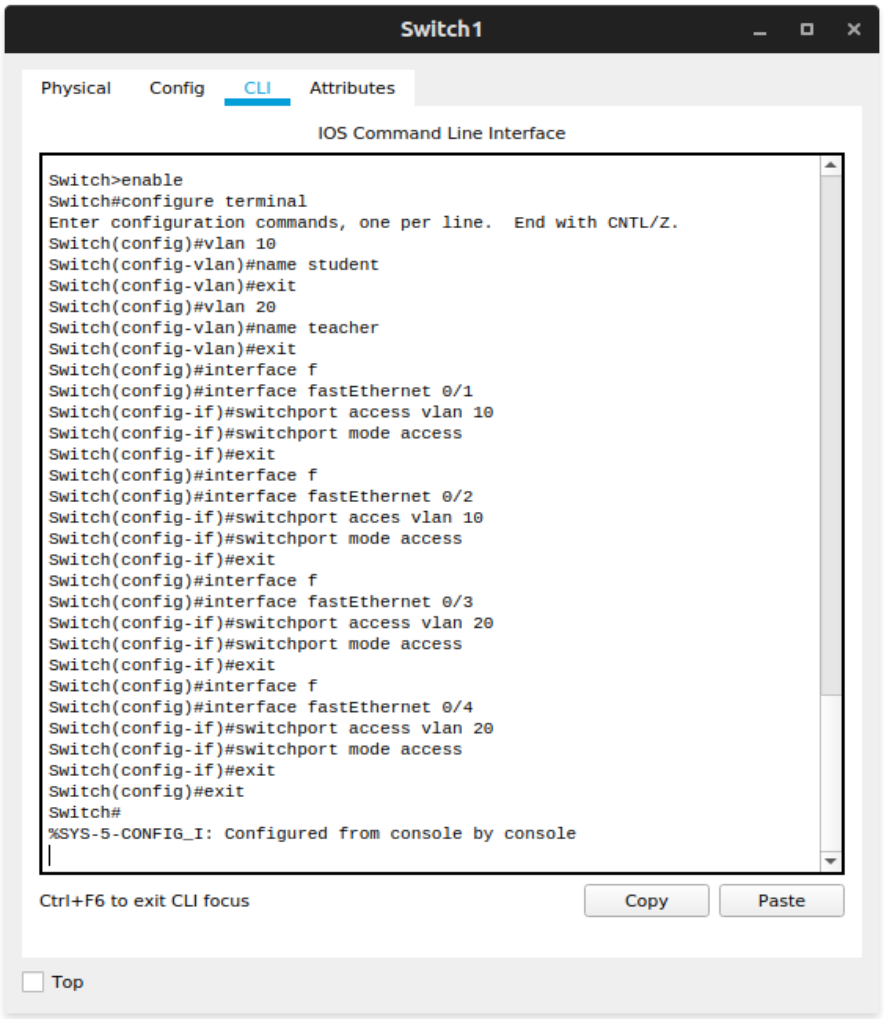


14 Naming the components



15 Assigning IPs

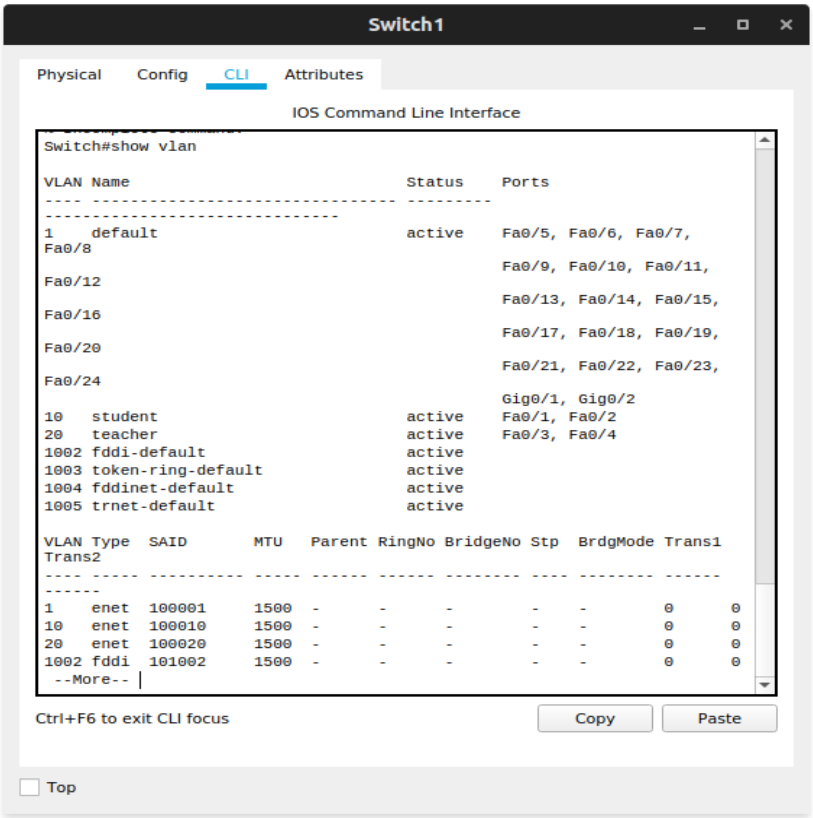
II. Configure VLAN in switch using the CLI



16 Configuring VLANs and Interfaces Using CLI

Here, for each interfaces connected to client PCs, vlan was configured.

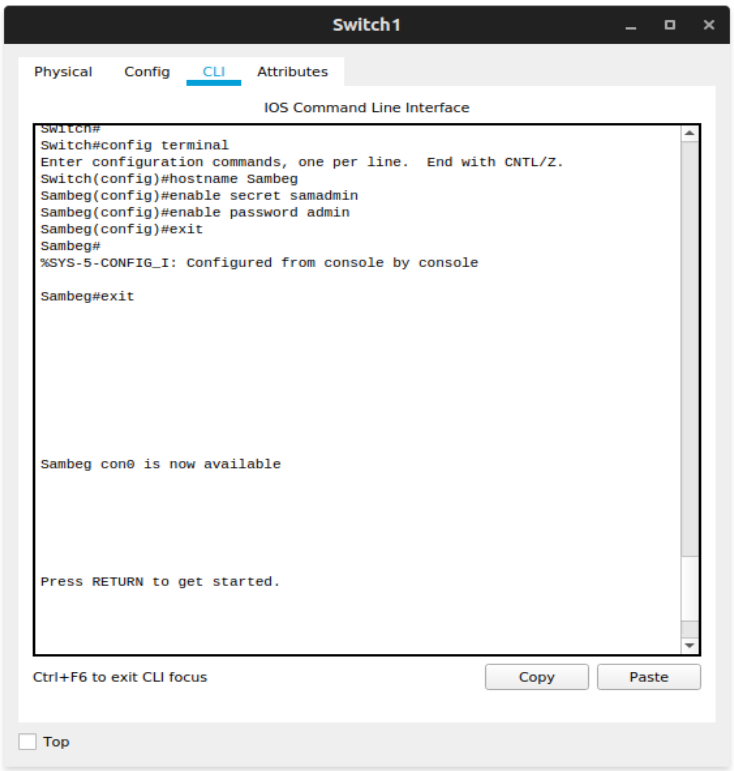
III. Check the configured VLAN



17 Showing VLANs

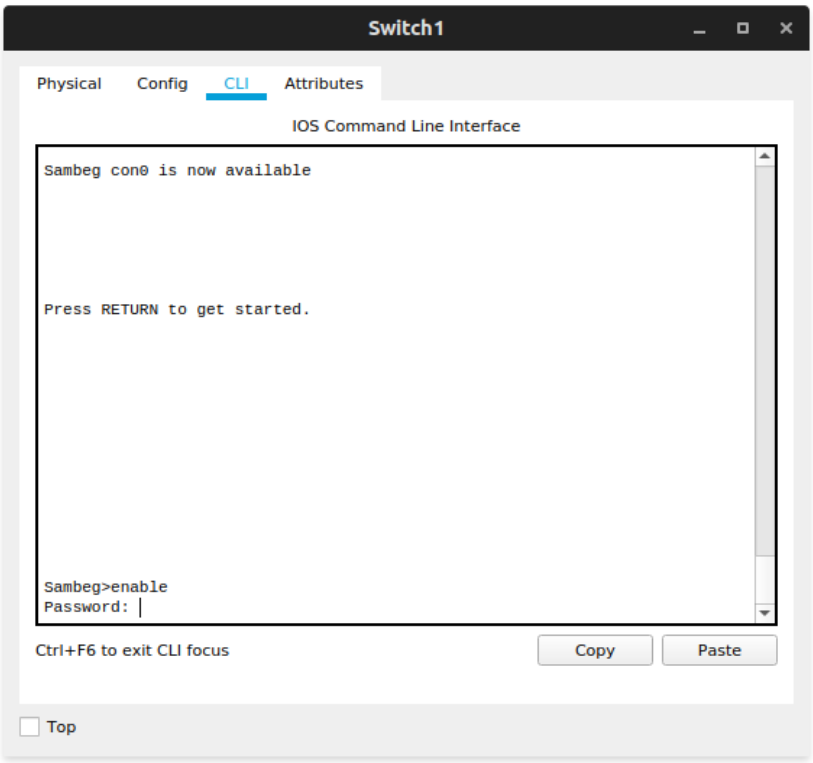
As we can see, two PCs were connected to Student and remaining two were connected to Teacher VLAN.

IV. Password Security Configuration for the switches



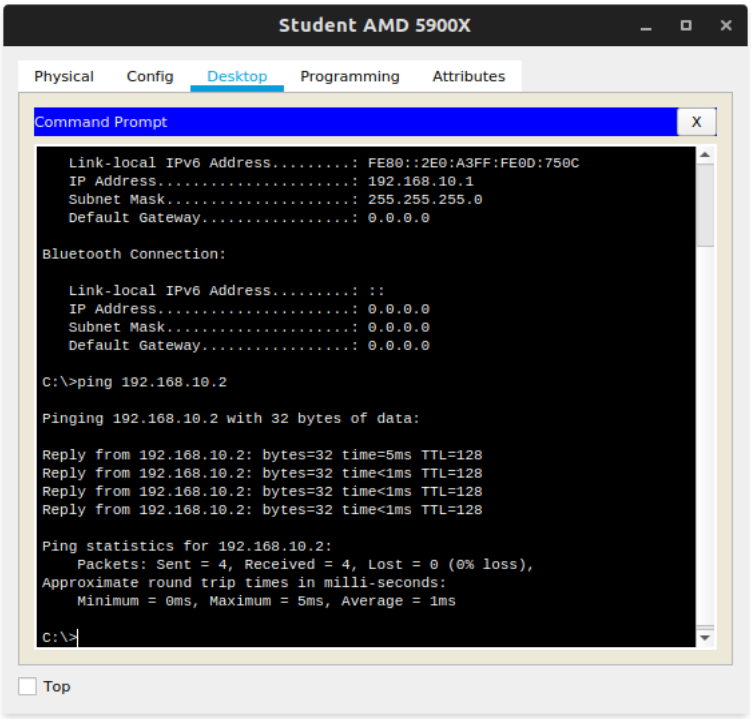
18 Configuring Switch Password

Now after configuring *secret*, next time password is prompted for accesses

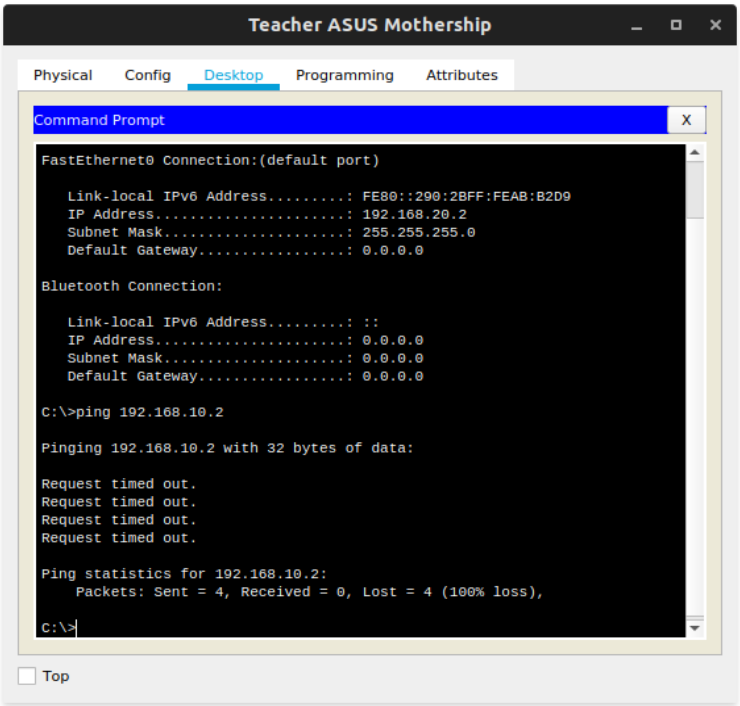


19 Password Prompt for access

V. Checking VLAN connection



20 Connecting with PC in same VLAN gives ping reply



21 Trying to connect with PC in other VLAN gives no ping

Conclusion

Hence, we learned how a VLAN works and its configuration using a switch.

LAB 5

Objective

To learn a real life application of VLAN through banks and learn switch-switch connection through trunking. Demonstrating a switch authentication along with real life Telnet connection.

Components Used

- **Client PC**
  In computing, a client is a piece of computer hardware or software that accesses a service made available by a server as part of the client–server model of computer networks. The server is often (but not always) on another computer system, in which case the client accesses the service by way of a network.

- **Switch**
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- **Cables**
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Concepts

- **VLAN**

A VLAN (virtual LAN) is a subnetwork which can group together collections of devices on separate physical local area networks (LANs). A LAN is a group of computers and devices that share a communications line or wireless link to a server within the same geographical area.

Trunk

A trunk is a single channel of communication that allows multiple entities at one end to correspond with the correct entity at the other end. It is a "link" that carries many signals at the same time, creating more efficient network access between two nodes. Trunking is perhaps best known in reference to telecommunications, where the method is used to connect switching centers and create multiple-signal links

- **Telnet**

  Telnet is an application protocol used on the Internet or local area network to provide a bidirectional interactive text-oriented communication facility using a virtual terminal connection.

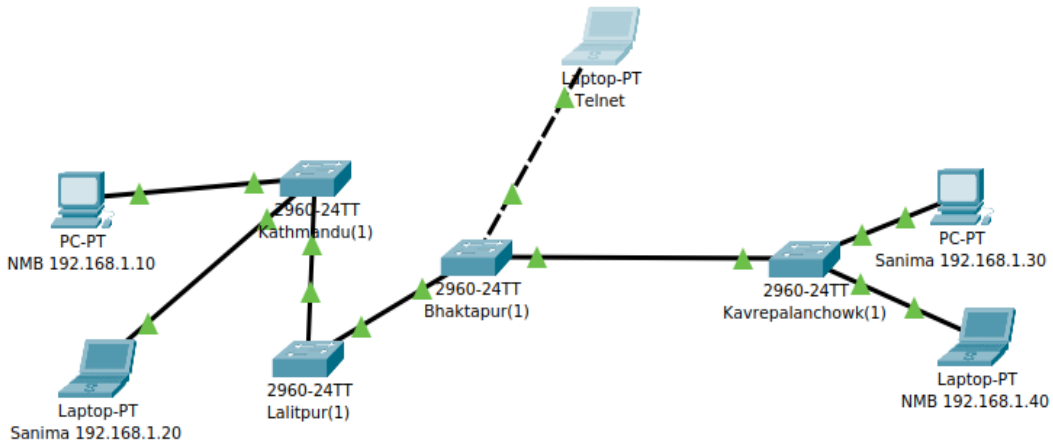
1. Procedure

Setting up WAN connection

The following components were used in creating the network

1. Five Client PCs
2. Four Switches

The Connections made are according to the following diagram.

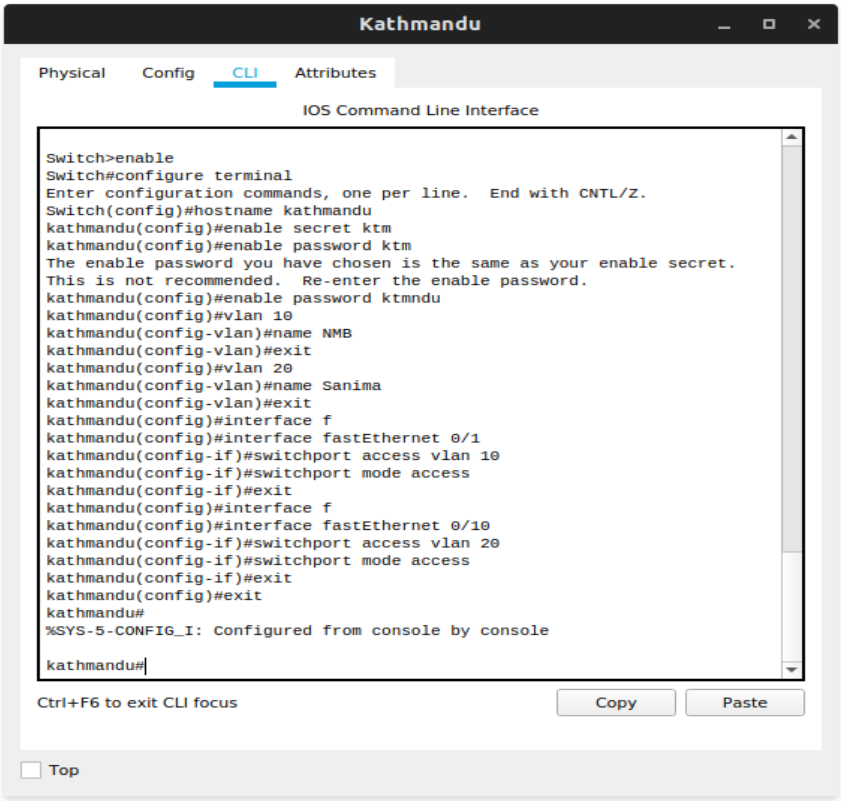


22 Bank Network VLAN

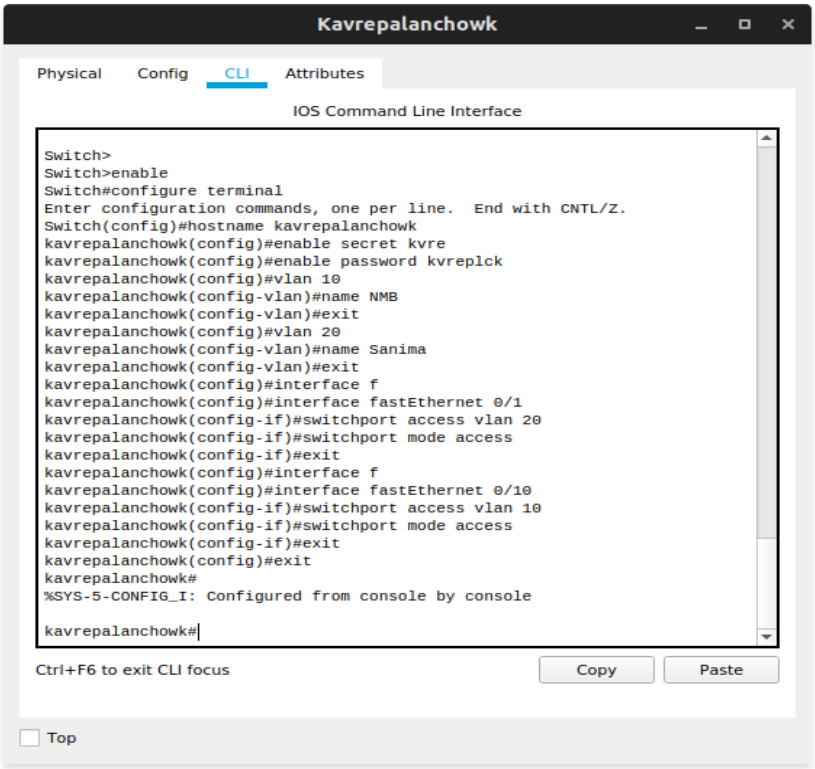
2. Steps

I. Setting Up VLAN

Configuring Switches at four different locations Kathmandu, Lalitpur, Bhaktapur and Kavrepalanchowk using the CLI and setting up two VLANS for banks *NMB* and *Sanima* in VLAN 10 and 20. Configuring interfaces for Kathmandu and Kavrepalanchowk branches with two client PCs each

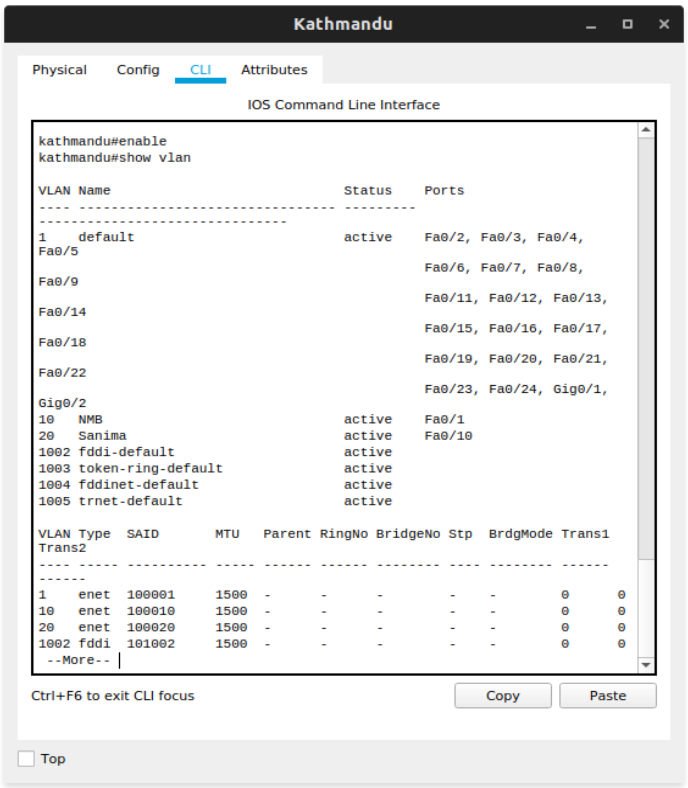


23 Katmandu VLAN setup

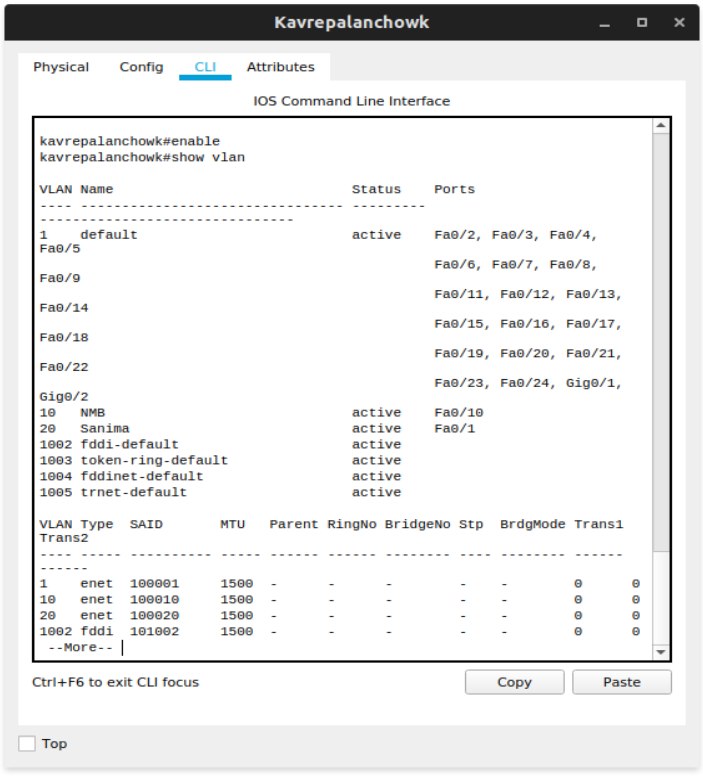


p

24 Kavrepalanchowk VLAN setup



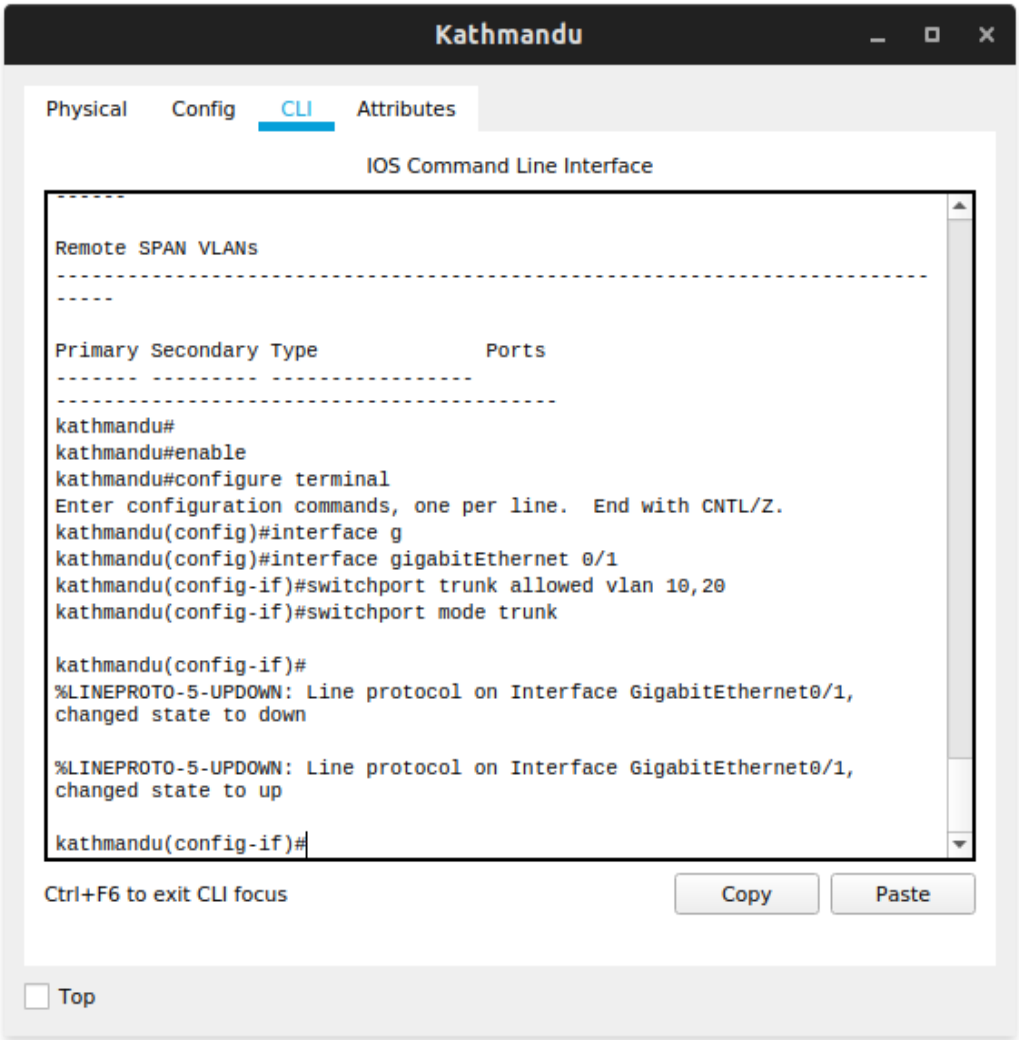
25 Kathmandu VLAN interfacing



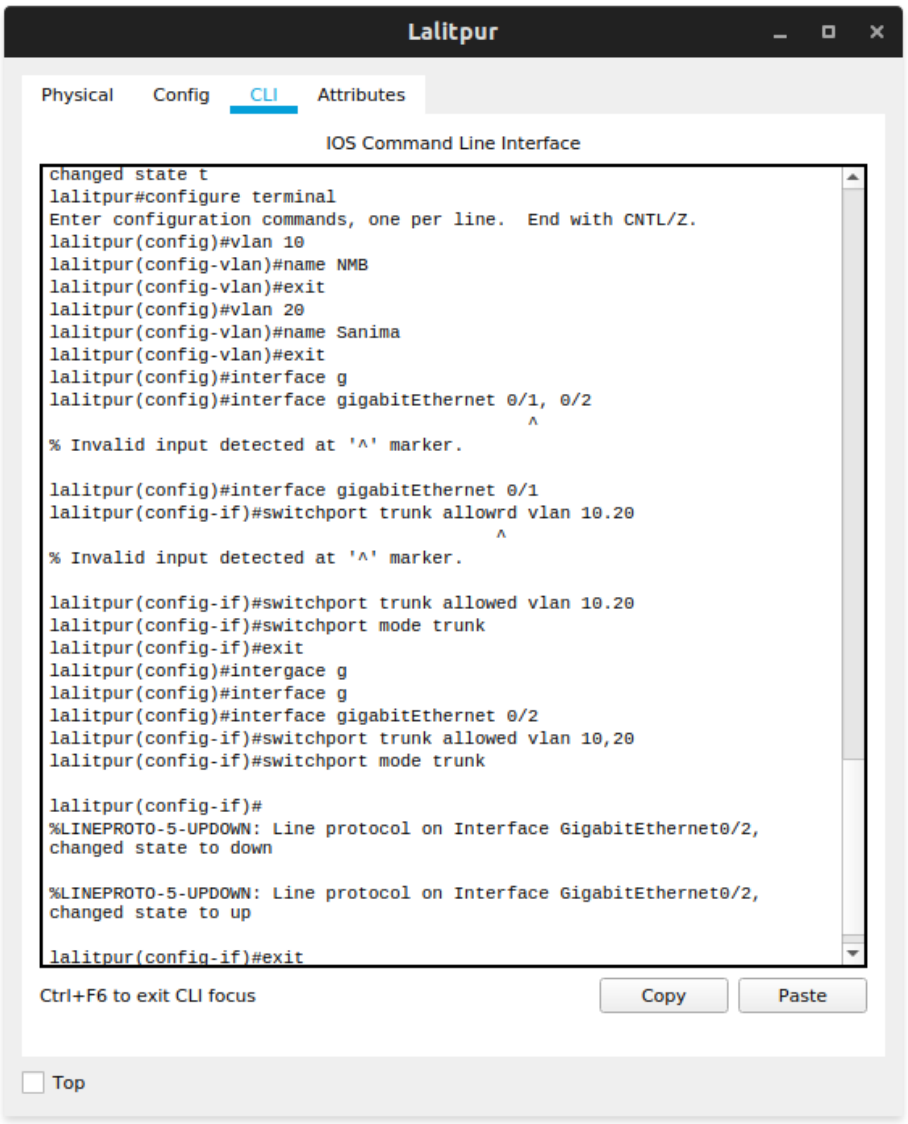
26 Kavrepalanchowk VLAN interfacing

II. Configuring VLAN trunk

In order for switches to communicate with VLAN trunking was done for each switch as follows



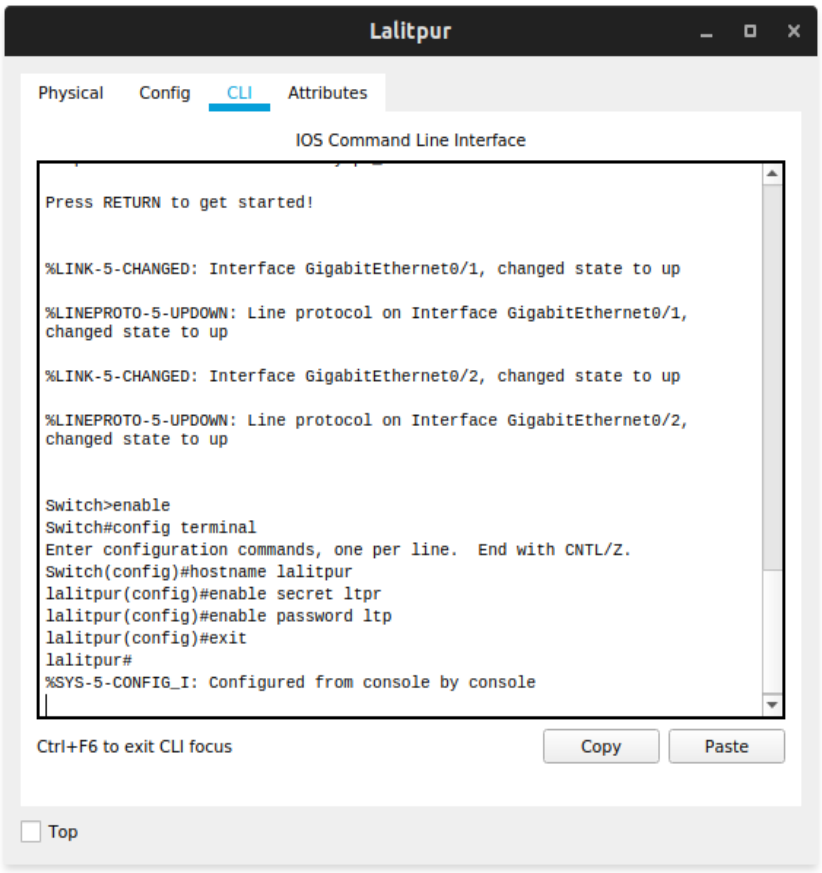
27 Kathmandu VLAN trunking



28 Lalitpur VLAN trunking

III. Switch authentication

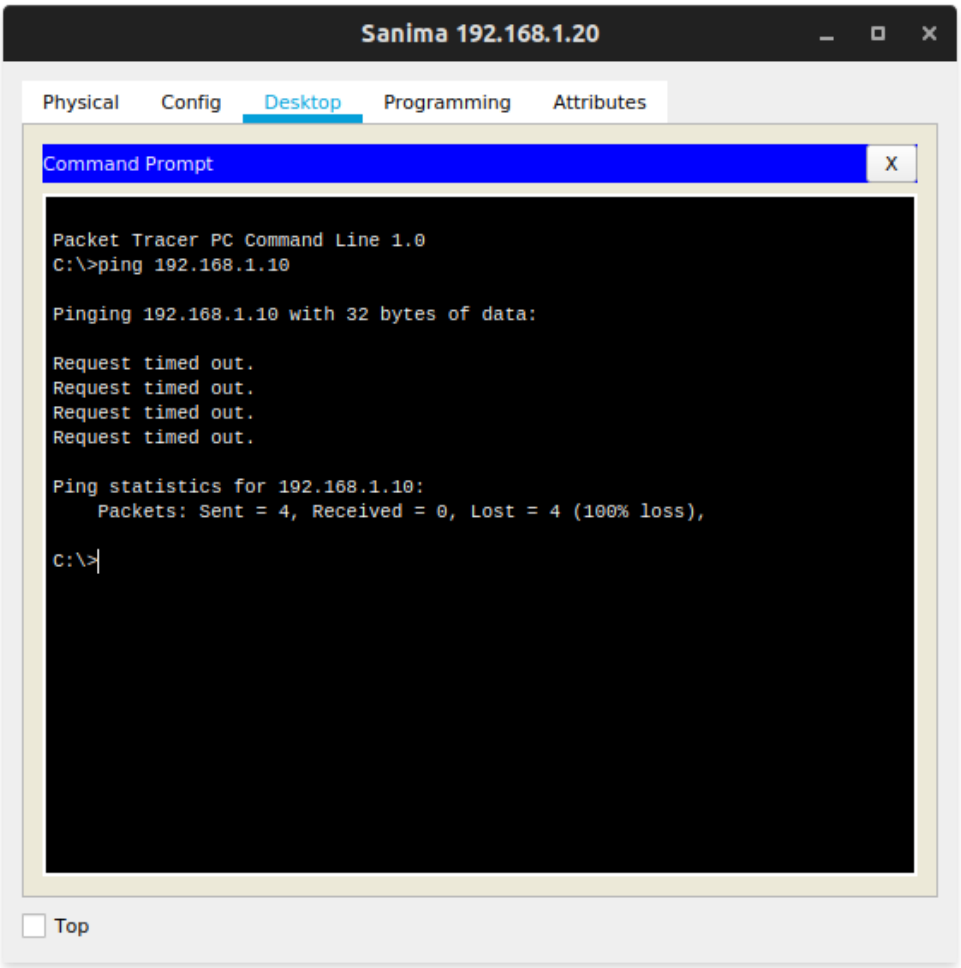
Switches were also made secure by adding a secret for every switches using the steps as follows:



29 Authentication setup Lalitpur

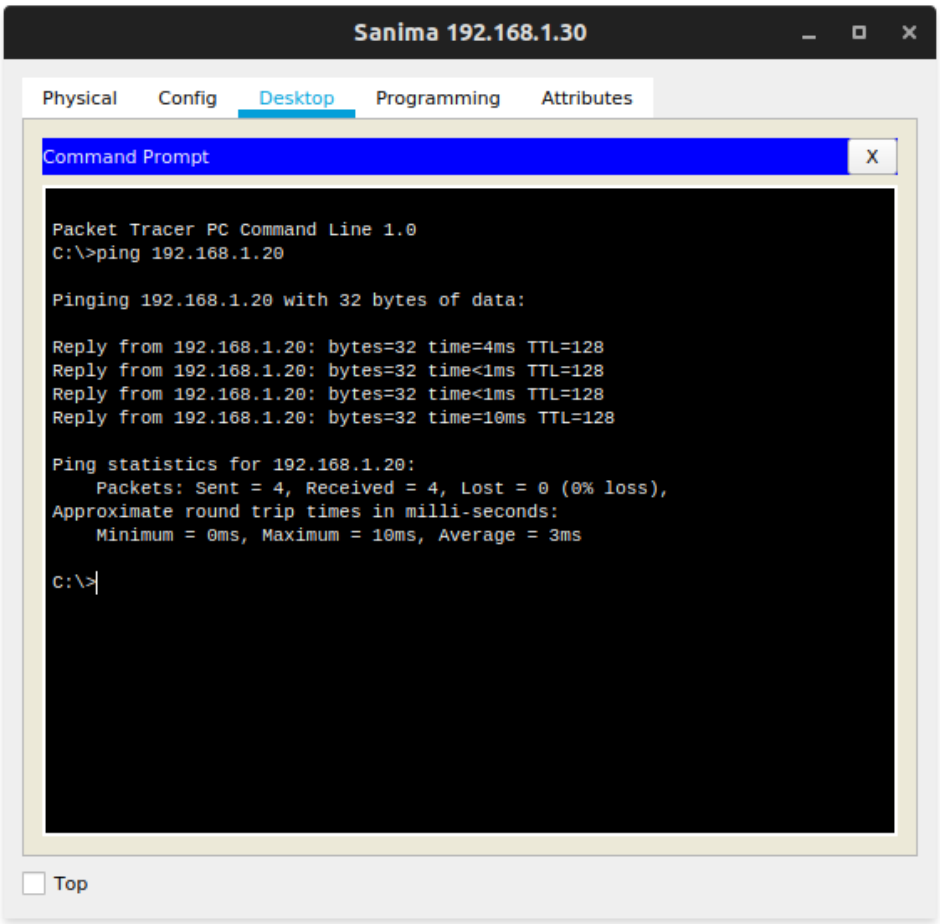
IV. Testing connections between distant client PCs in different VLANs

Ping connection was made inorder to test different connections



30 Connection made between different bank VLANs ie Sanima to NMB

Here, as you can see there is no response so Connection FAILS.

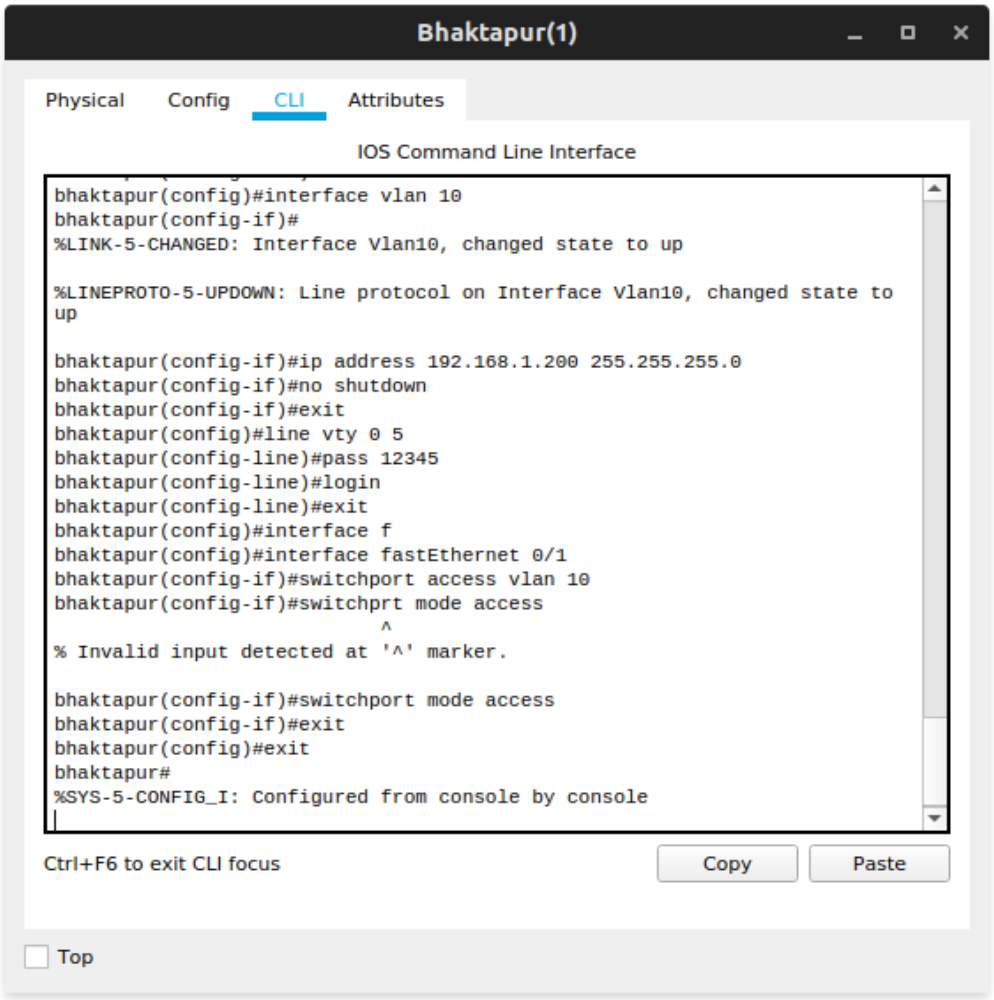


31 Connection made between same bank VLANs ie Sanima to Sanima

However, when connection made in same VLANs of same bank we get response from the ping command as they are in the same VLAN.

V. Telnet configuration

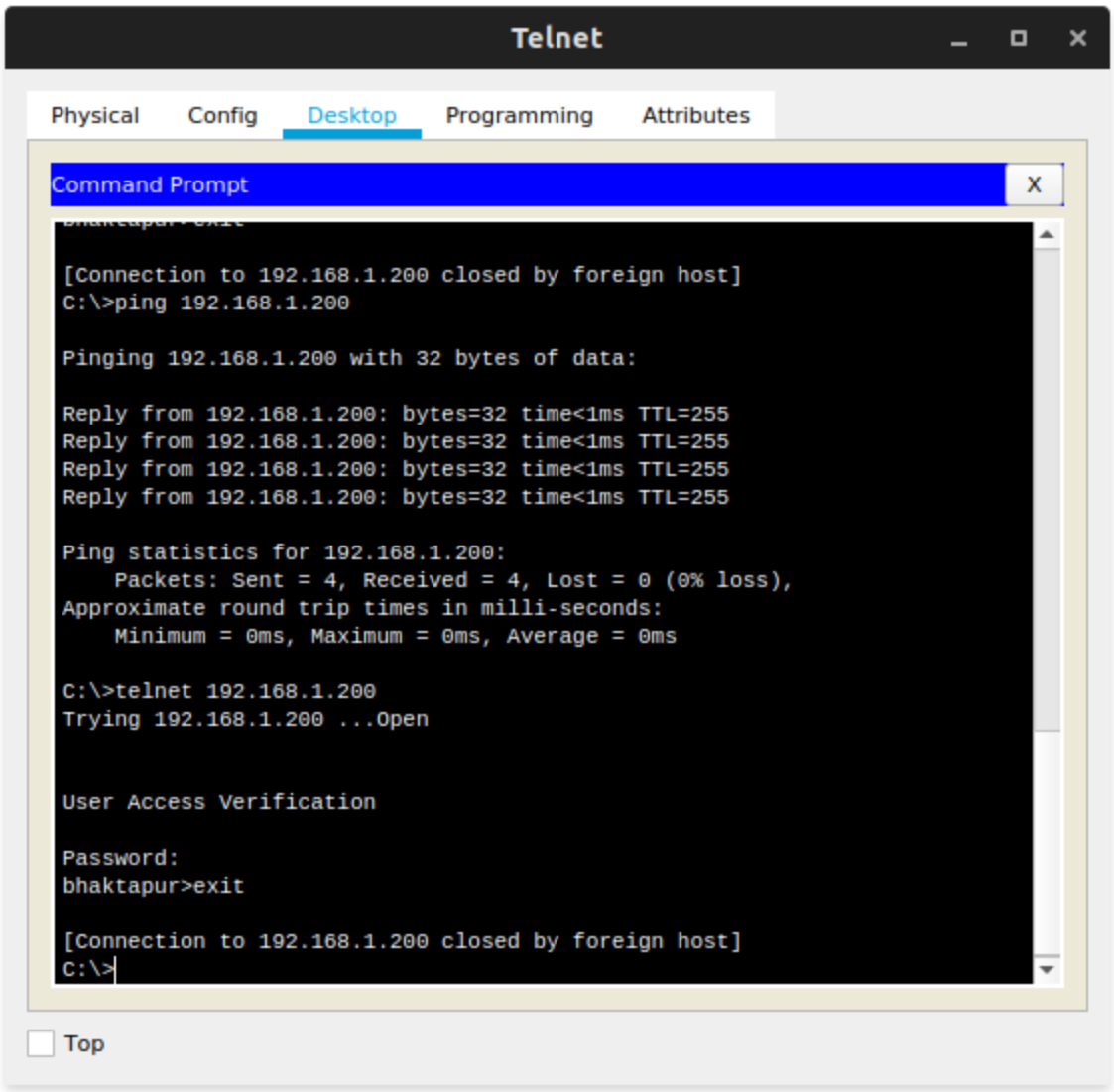
For telnet configuration we added client PC named Telnet to the Bhaktapur switch and configured telnet settings as follows



32 Telnet CLI configuration in Bhaktapur switch

VI. Testing Telnet connection

We use the command line interface and telnet command to check the access of switch via a remote connected PC client as follows:



33 Telnet access via Telnet PC connected to Bhaktapur switch

Conclusion

Hence, we learned how real life Banks use same connections however using concept of VLANs connect distant devices. We learned how switch trunking works for VLAN and how to configure remote desktop connection using Telnet services.