Ex.No:03	Study of Network Topologies
Date:	

Objective(s):

To design and implement network topologies using Cisco Packet Tracer

Introduction:

Network topology is the geometric representation of relationship of all the links connecting the devices or nodes. Network topology represent in two ways one is physical topology that define the way in which a network is physically laid out and other one is logical topology that defines how data actually flow through the network. In this lab, we will discuss how to design bus, star and mesh topology network and provide interfacing and simulation between end points using packet tracer software.

Theoretical Background:

Bus Topology

In local area network, it is a single network cable runs in the building or campus and all nodes are connected along with this communication line with two endpoints called the bus or backbone. In other words, it is a multipoint data communication circuit that is easily control data flow between the computers because this configuration allows all stations to receive every transmission over the network. For bus topology we build network using three generic pc which are serially connected with three switches using copper straight through cable and switches are interconnected using copper cross over cable.

Star Topology

In star topology, all the cables run from the computers to a central location where they are all connected by a device called a hub. It is a concentrated network, where the end points are directly reachable from a central location when network is expanded. Ethernet 10 base T is a popular network based on the star topology. For star topology we build network using five generic pc which are centrally connected to single switch 2950-24 using copper straight through cable.

RING TOPOLOGY

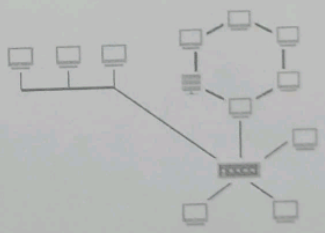
As we mentioned earlier, the ring topology is similar to a daisy chain topology but with the loop closed so that the nodes are arranged in a ring or circle. Each node has exactly two peers and the data travels in one direction passing through each intermediate node on the ring until it reaches the destination node. Data can be made to pass in both directions by adding a second connection between the network nodes, creating a dual ring topology.

In a ring topology, an electrical "token" circulates around the network. Any node that wants to transmit data has to wait until it has possession of the token.

MESH TOPOLOGY

In mesh topology every device has a dedicated point to point link to every other device. The term dedicated stand for link carries traffic only between four devices it connects. It is a well-connected topology; in this, every node has a connection to every other node in the network. The cable requirements are high and it can include multiple topologies. Failure in one of the computers does not cause the network to break down, as they have alternative paths to other computers star topology, all the cables run from the computers to a central location.

Hybrid Topology



Hybrid topology combines two or more topologies. You can see in the above architecture in such a manner that the resulting network does not exhibit one of the standard topologies.

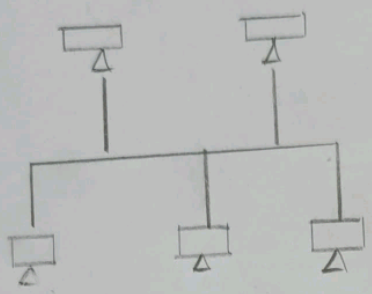
For example, as you can see in the above image that in an office in one department, Star and P2P topology is used. A hybrid topology is always produced when two different basic network topologies are connected.

Design the above mentioned topologies and verify the connectivity.

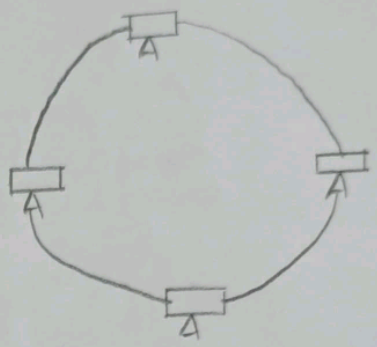
1. **Device Requirements:**
   1. Switch
   2. Laptop
   3. PC's
   4. copper cross-over

2. **Network Diagram for your experiment (draw the diagram either hand drawing/ms paint or any other drawing tools)**

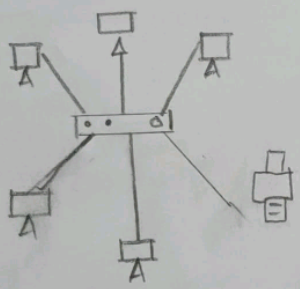
BUS TOPOLOGY



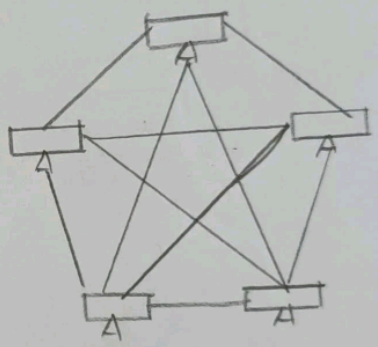
RING TOPOLOGY



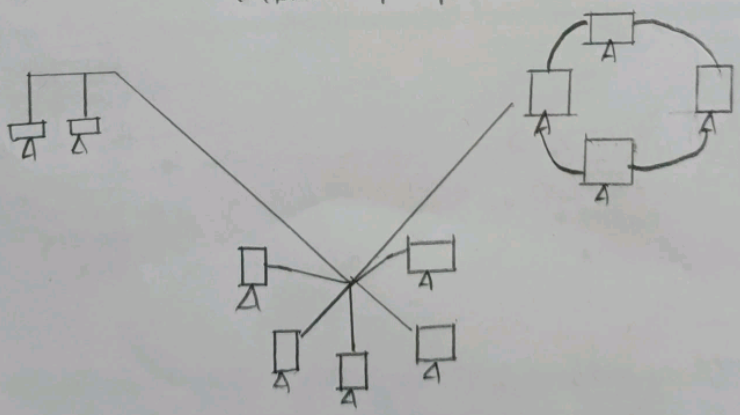
STAR TOPOLOGY



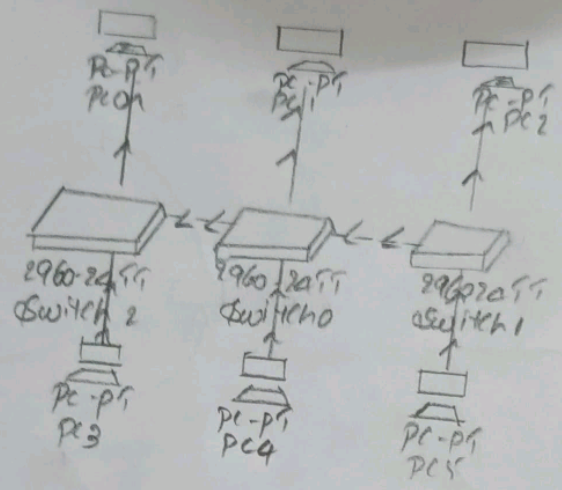
MESH TOPOLOGY

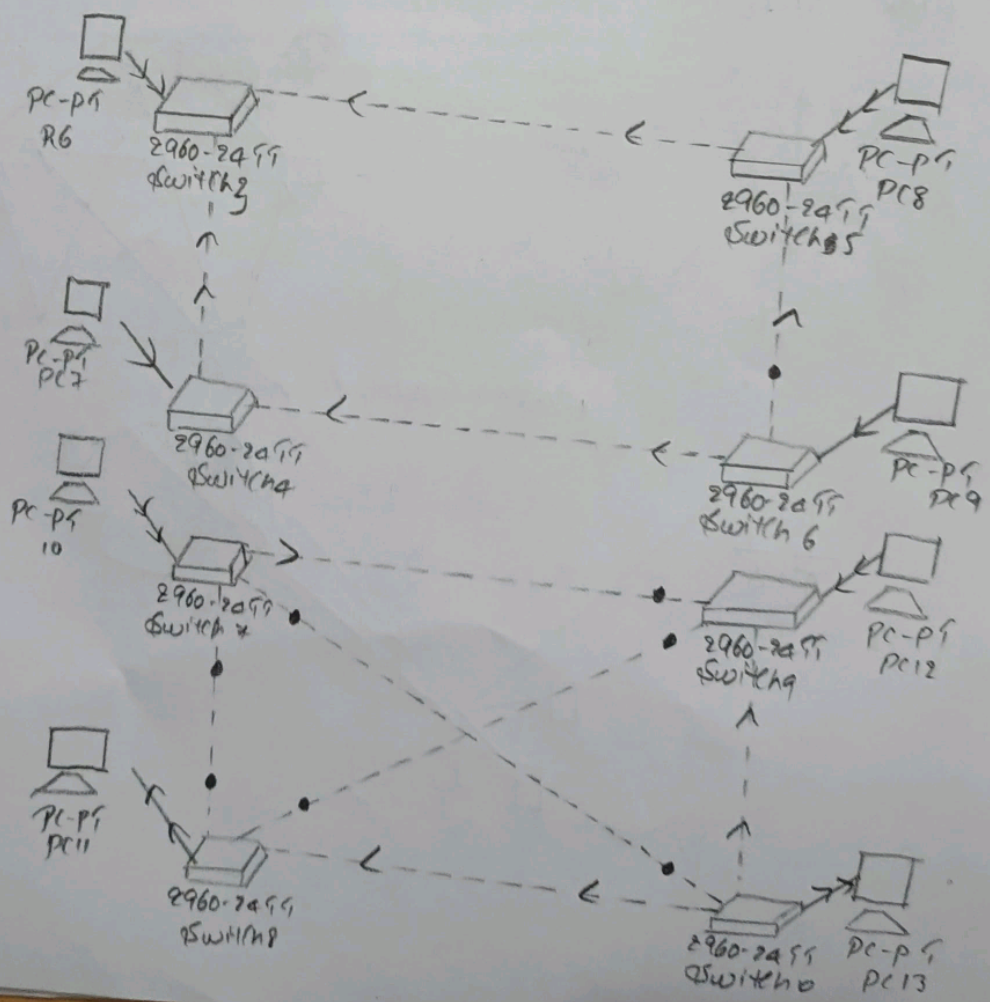


HYBRID TOPOLOGY



3. **Network Diagram (Packet tracer diagram before configuration):**





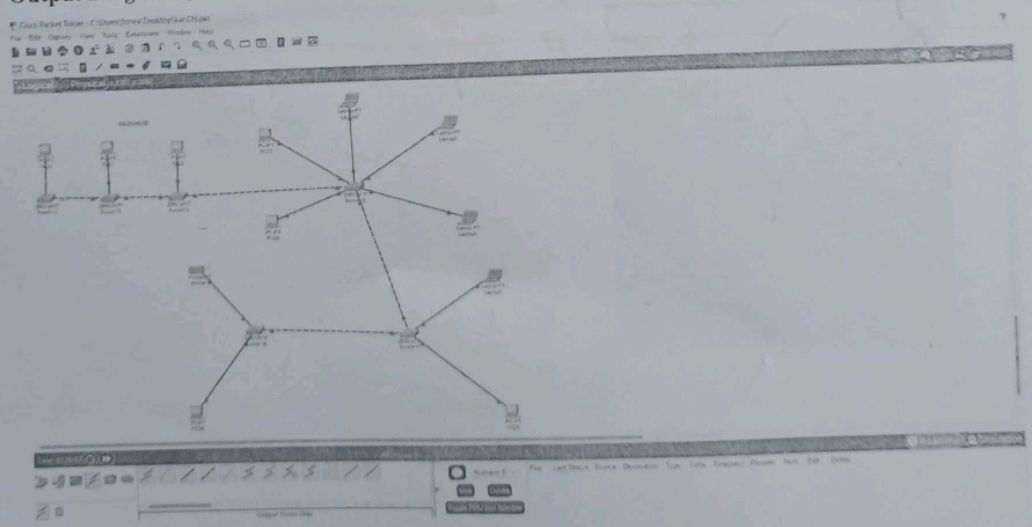
4. **Configuration details:**

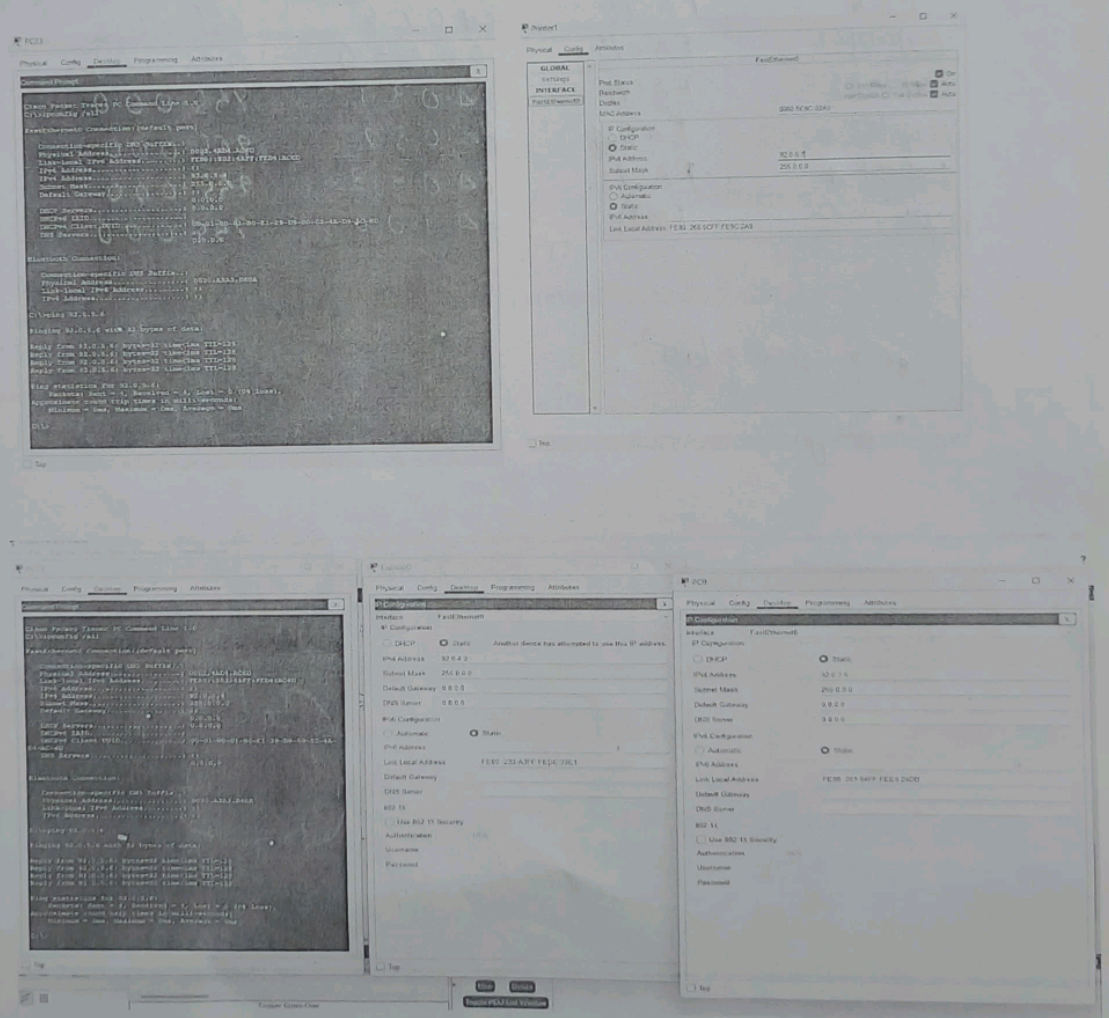
Device Name	Interface Name	IP Address	Subnet mask
PC 0	FA 0/0	84.0.2.0	255.0.0.0
PC1	FA 0/1	84.0.2.1	255.0.0.0
PC2	FA 0/2	84.0.2.2	255.0.0.0
PC3	FA 0/3	84.0.2.3	255.0.0.0
PC4	FA 0/4	84.0.2.4	255.0.0.0
PC5	FA0/5	84.0.2.5	255.0.0.0
PC6	FA 0/6	84.0.2.6	255.0.0.0
Laptop 1	FA 0/0	84.0.3.0	255.0.0.0
Laptop 2	FA 0/2	84.0.3.1	255.0.0.0
Laptop 3	FA 0/4	84.0.3.2	255.0.0.0
Laptop 4	FA 0/1	84.0.3.3	255.0.0.0
Printer	FA 0/3	84.1.0.0	255.0.0.0

5. **Commands used in each of the diagram (if any):**

- ip config /all
- ping

6. **Output Diagram (Minimum 3 screenshot):**




PC3
Physical
Config
Desktop
Programming
Attributes
Command Prompt
Printer1
GLOBAL
INTERFACE
FastEthernet0
PC0

Ex.No:04	

CONCLUSION (provide conclusion about this experiment):

Successfully Created and Executed Network Topologies (Star, Ring, BUS, Mesh, Hybrid) using Cisco Packet tracer.

Rubrics for Experiment Assessment:

Rubrics	Good	Normal	Poor	Marks
Creation of Topology (4)	Created the topology, Identify the proper devices and making the connections **(4)**	Created the topology, Identify the proper devices, making the connections But missing some features **(3)**	Created wrong topology, Failed to Identify the proper devices and making connections **(1)**	
Verify the connectivity (4)	Verified the connectivity in all the levels **(4)**	Verified the connectivity at some levels (only some nodes) **(2)**	Verified the connectivity is not done. **(1)**	
Timely Completion (2)	Completed the lab before the allotted time **(2)**	Completed the lab after the deadline **(1)**	Did not submitted before grading **(0)**	
			Total	

Ex.No:04	Routing Configuration
Date:	

Objective(s):

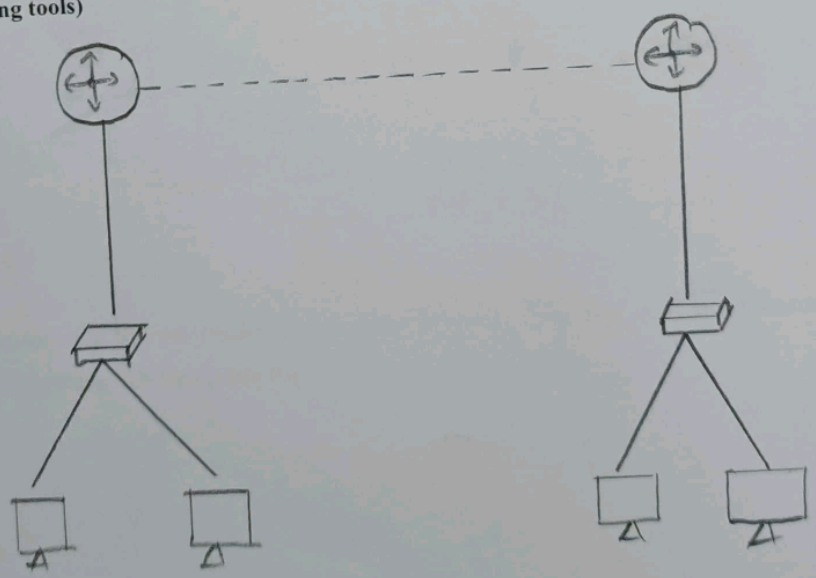
To design and implement router configuration using RIP dynamic routing

Introduction:

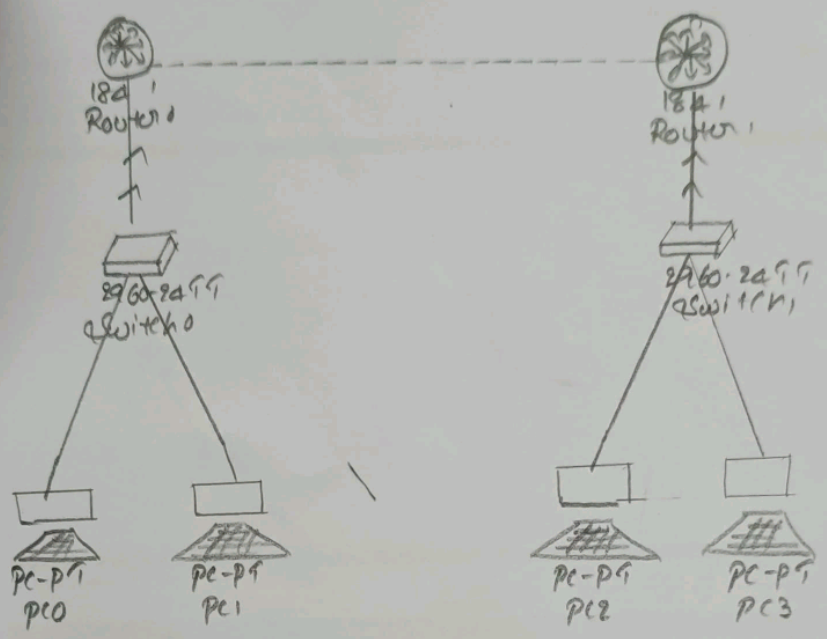
Configuring a router using RIP (Routing Information Protocol) dynamic routing enables it to exchange routing information with neighboring routers and dynamically update its routing table. RIP is a distance-vector routing protocol that allows routers to share information about the best paths to destination networks, using a hop count metric to select the optimal route.

By configuring RIP on a router, network administrators can create a dynamic routing environment that adapts to changes in the network topology, ensuring efficient and reliable data transmission. This involves enabling RIP, configuring the RIP version, specifying the networks to be advertised, and defining neighboring routers to exchange routing information with.

1. **Device Requirements:**
   1. Router
   2. Switch
   3. PC
   4. Connection cable
2. **Network Diagram for your experiment (draw the diagram either hand drawing/ms paint or any other drawing tools)**



. Network Diagram (Packet tracer diagram before configuration):



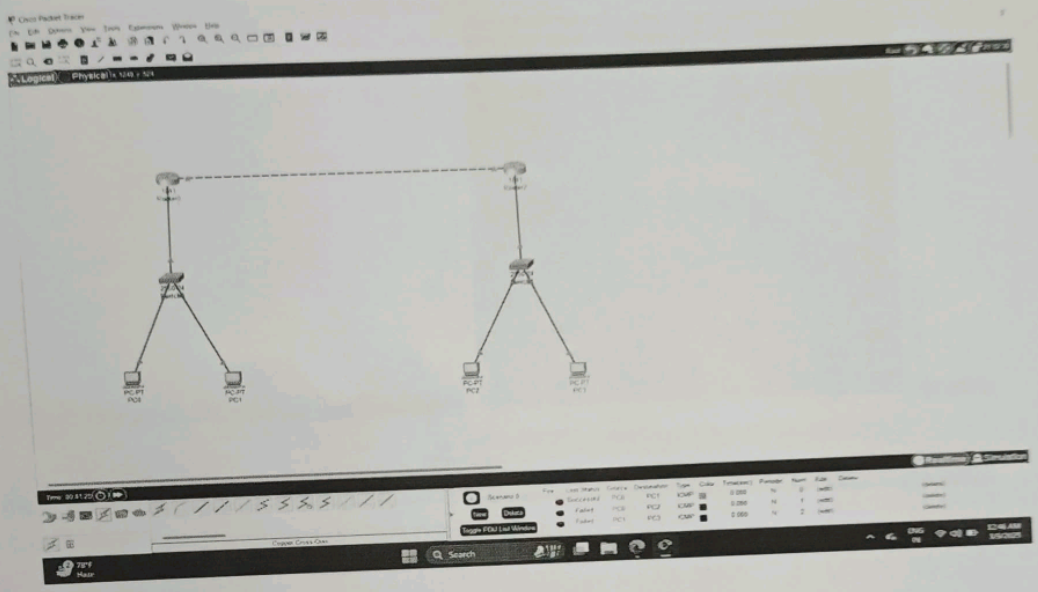
4. Configuration details:

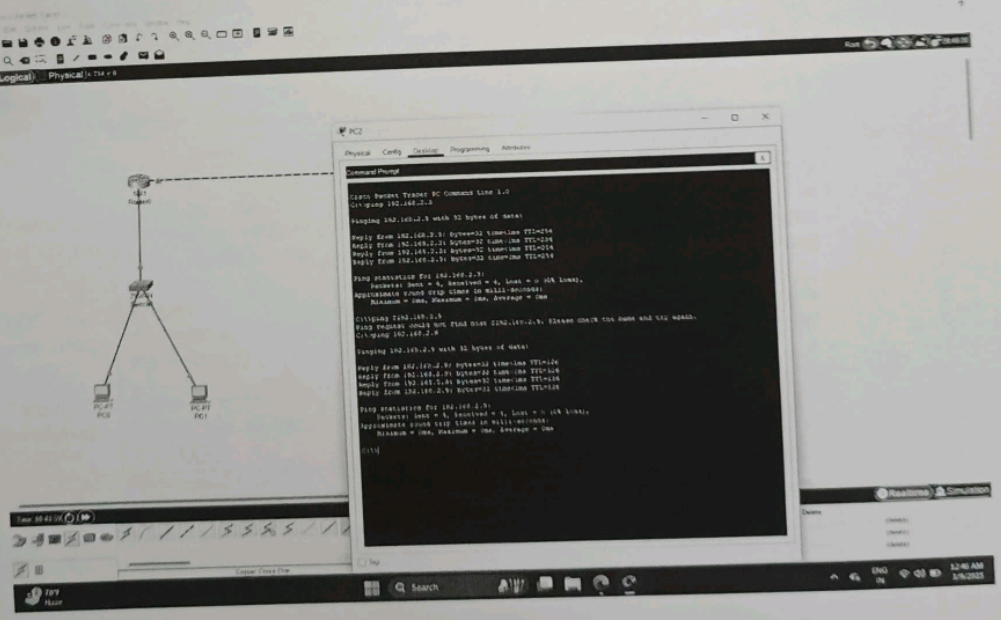
Device Name	Interface Name	IP Address	Subnet mask
Router 0	FA0/0	84.0.0.0	255.0.0.0
Router 1	FA0/1	84.0.0.1	255.0.0.0
PC0	FA0/0	84.0.1.2	255.0.0.0
PC1	FA0/1	84.0.1.3	255.0.0.0
PC2	FA0/2	84.0.1.4	255.0.0.0
Switch 0			

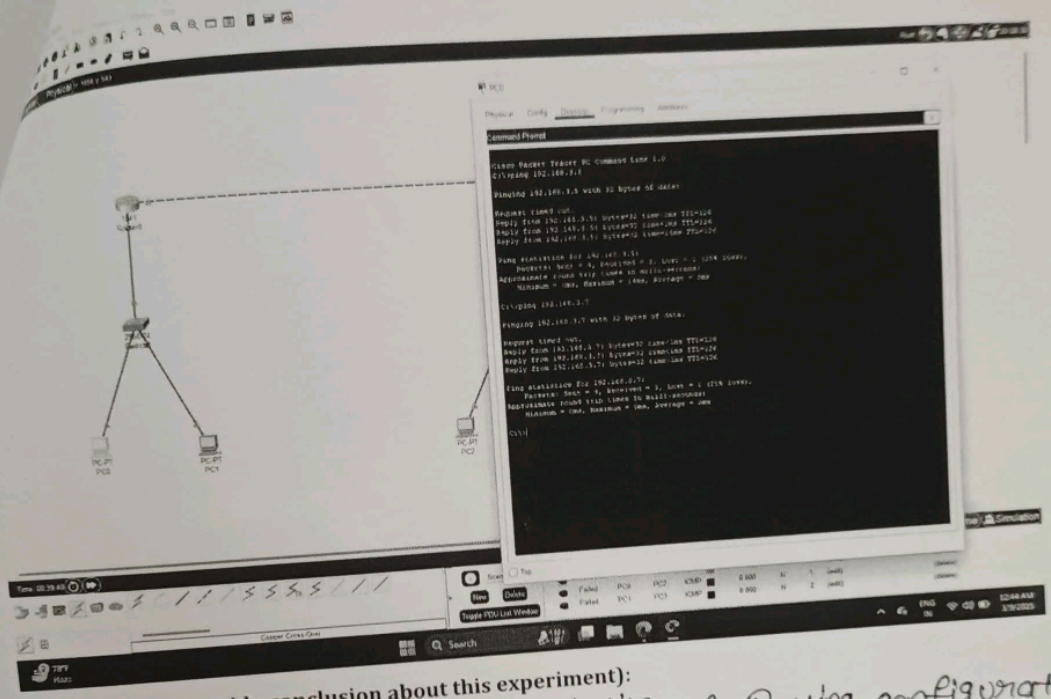
5. Describe step by step configuration steps properly (you may copy the commands used in the configuration tab and paste it.)

- Ping
- ip config/all

6. **Output Diagram (Minimum 3 screenshot):**







CONCLUSION (provide conclusion about this experiment):

Thus, design and implementation of Routing configuration using dynamic routing protocol in ciscopacket traces is successfully implemented, executed and verified.

Rubrics for Experiment Assessment:

Rubrics	Good	Normal	Poor	Marks
Creation of Topology (4)	Created the topology, Identify the proper devices and making the connections **(4)**	Created the topology, Identify the proper devices, making the connections But missing some features **(3)**	Created wrong topology, Failed to Identify the proper devices and making connections **(1)**	
Verify the connectivity (4)	Verified the connectivity in all the levels **(4)**	Verified the connectivity at some levels (only some nodes) **(2)**	Verified the connectivity is not done. **(1)**	
Timely Completion (2)	Completed the lab before the allotted time **(2)**	Completed the lab after the deadline **(1)**	Did not submitted before grading **(0)**	
			Total	

Ex.No:05	Configuration of Intra VLAN network
Date:-	

Objective(s):

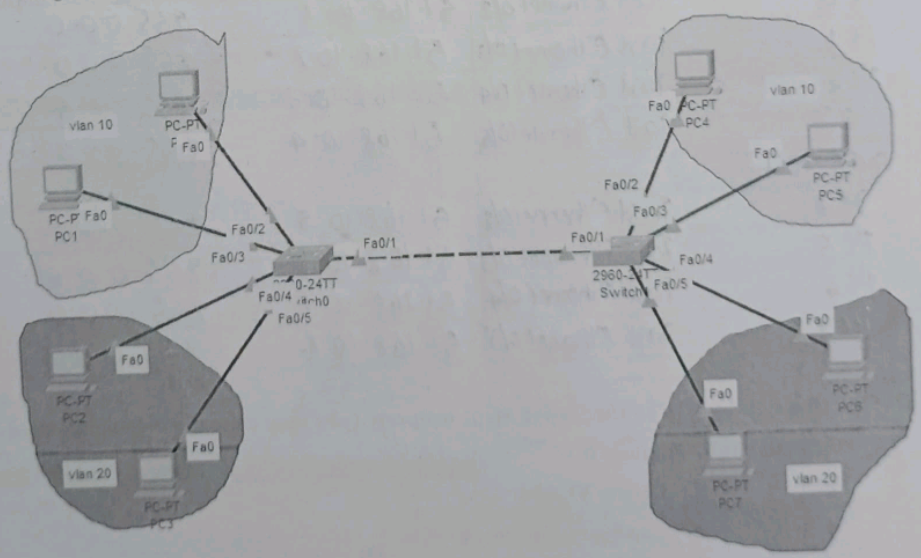
To design and implement Intra VLAN using switch configuration

Introduction:

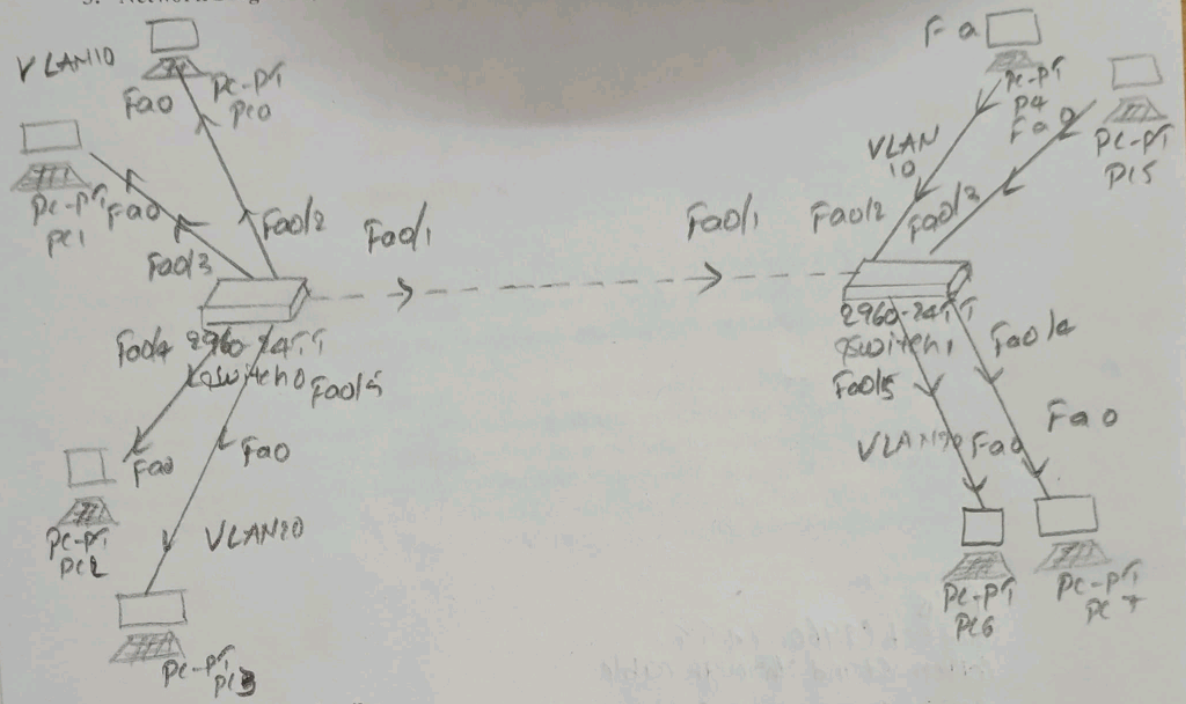
A VLAN is a group of devices on one or more LANs that are configured to communicate as if they were attached to the same wire, when in fact they are located on a number of different LAN segments. Because VLANs are based on logical instead of physical connections, they are extremely flexible.

VLANs define broadcast domains in a Layer 2 network. A broadcast domain is the set of all devices that will receive broadcast frames originating from any device within the set. Broadcast domains are typically bounded by routers because routers do not forward broadcast frames. Layer 2 switches create broadcast domains based on the configuration of the switch. Switches are multiport bridges that allow you to create multiple broadcast domains. Each broadcast domain is like a distinct virtual bridge within a switch. Design the above mentioned topologies and verify the connectivity.

1. **Device Requirements:**
   1. PC'S
   2. Switch (2960-24TT)
   3. copper stand through cable
   4. copper cross wire cable
2. **Network Diagram for your experiment (draw the diagram either hand drawing/ms paint or any other drawing tools)**



3. Network Diagram (Packet tracer diagram before configuration):



4. Configuration details:

Device Name	Interface Name	IP Address	Subnet mask
SWITCH 0			
PC0	Fast Ethernet 0/2	51.168.10.1	255.0.0.0
PC1	Fast Ethernet 0/3	51.168.10.2	255.0.0.0
PC2	Fast Ethernet 0/4	51.168.10.3	255.0.0.0
PC3	Fast Ethernet 0/5	51.168.10.4	255.0.0.0
SWITCH1			
PC4	Fast Ethernet 0/2	51.168.10.5	255.0.0.0
PC5	Fast Ethernet 0/3	51.168.10.6	255.0.0.0
PC6	Fast Ethernet 0/4	51.168.10.7	255.0.0.0
PC7	Fast Ethernet 0/5	51.168.10.8	255.0.0.0

5. Describe step by step configuration steps properly (you may copy the commands used in the configuration tab and paste it.)
   1. Create VLANs
   2. Configure interfaces
   3. Configure trunking

1) Create VLANs:
Switch 0 & switch 1:

→ VLAN 10
- enable
- configure terminal
- Vlan 10

→ VLAN 20
- enable
- configure terminal
- Vlan 20

2) Configure interfaces:
Switch 0 & Switch 1

→ VLAN 10:
- interface 0/2
- Switch port mode access
- Switch port access VLAN 10

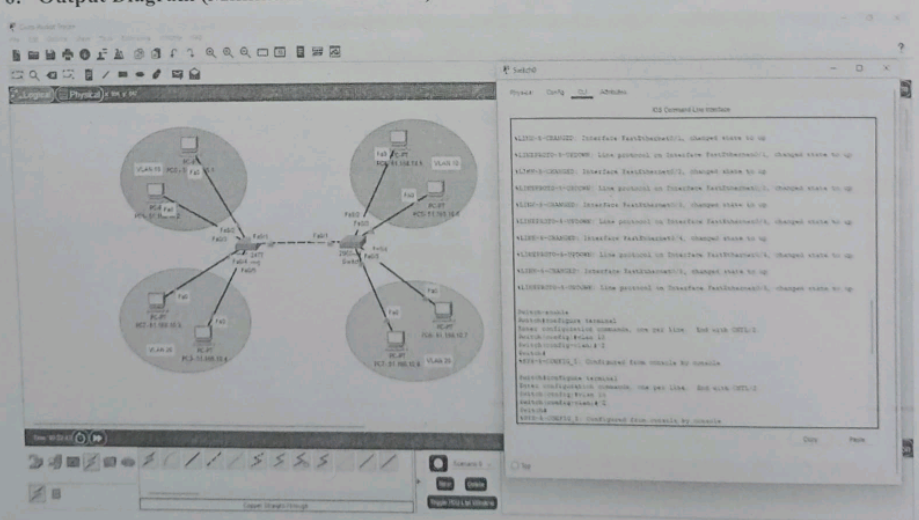
- interface fast ethernet 0/3
- Switch port mode access
- Switch port access VLAN 10

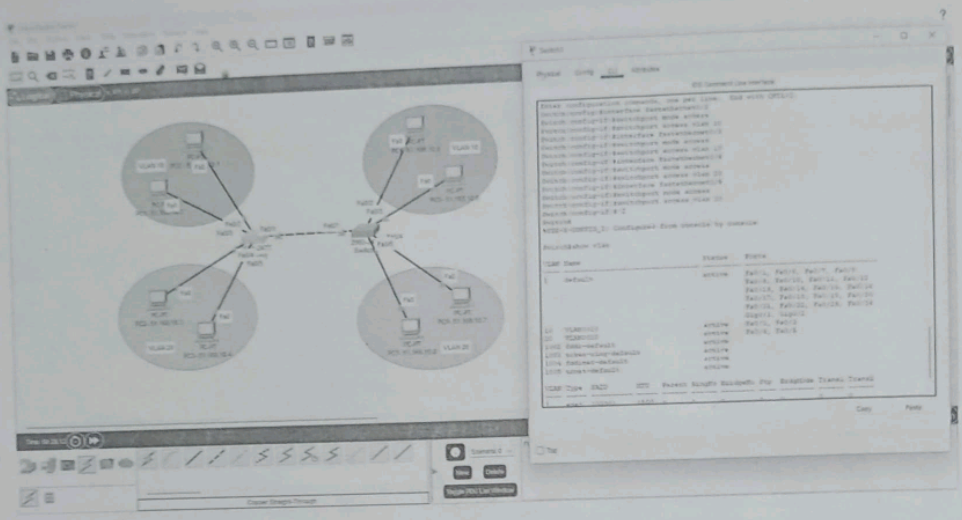
→ VLAN 20:
- interface fast ethernet 0/4
- Switchport mode access
- Switchport access VLAN 20
- Show VLAN

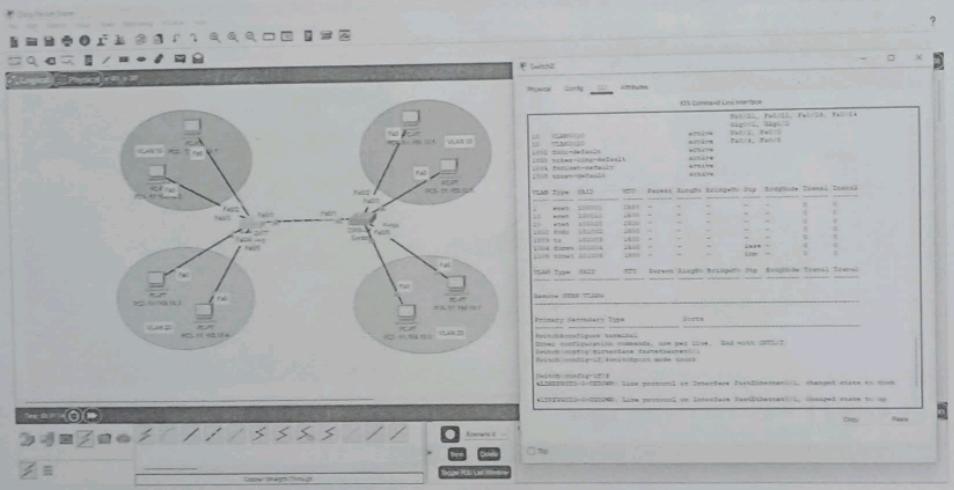
- interface fast ethernet 0/5
- Switchport mode access
- Switch port access Vlan 20

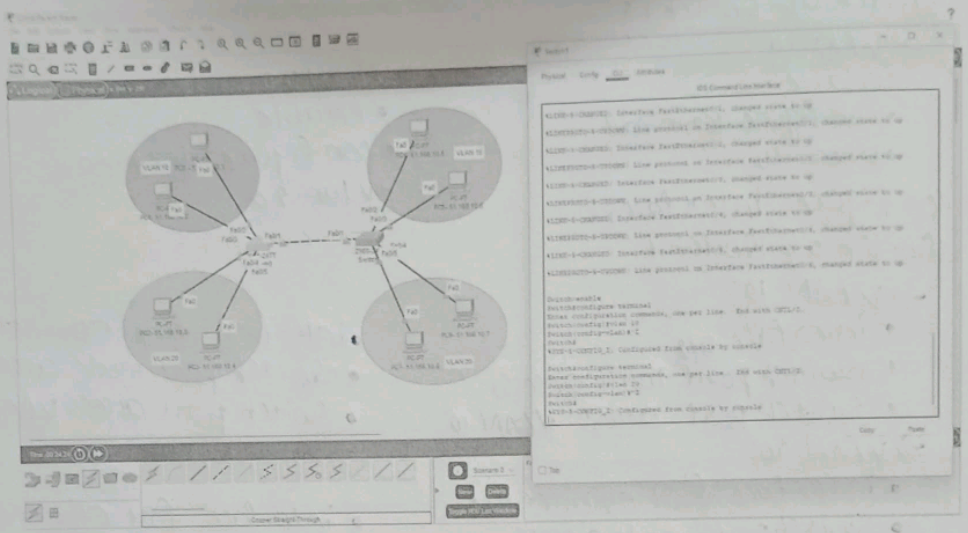
3) Configure trunking:
Switch 0 & Switch 1
- configure terminal
- Interface fast ethernet 0/1
- Switch port mode trunk

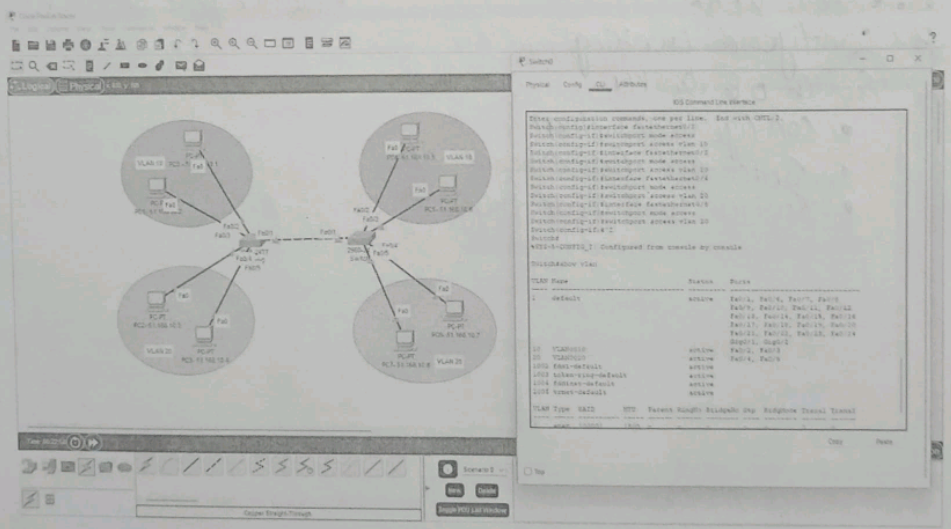
6. **Output Diagram (Minimum 3 screenshot):**

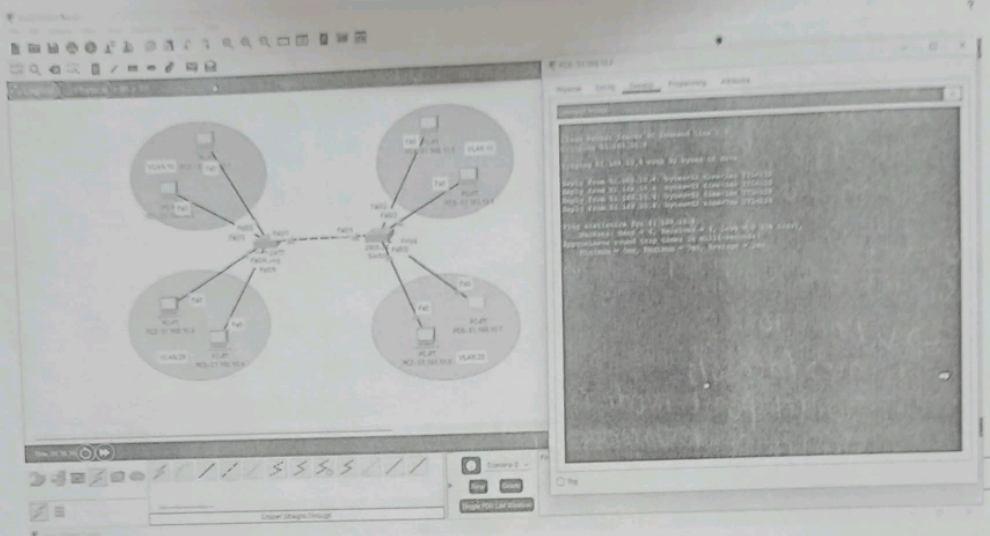


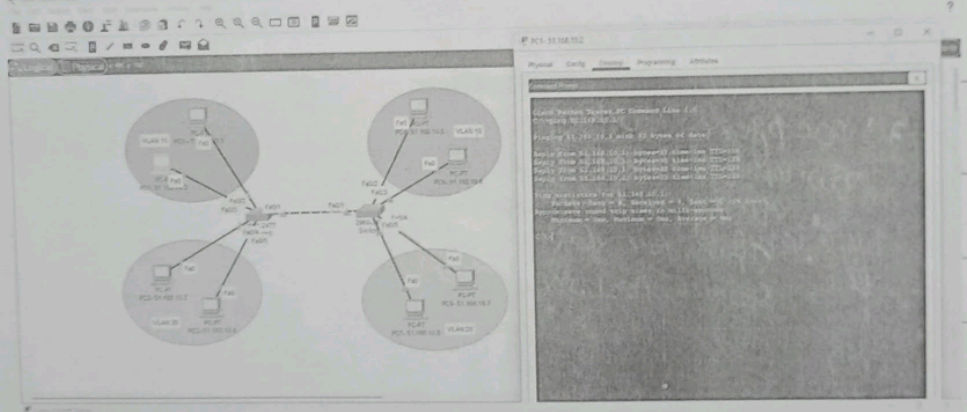


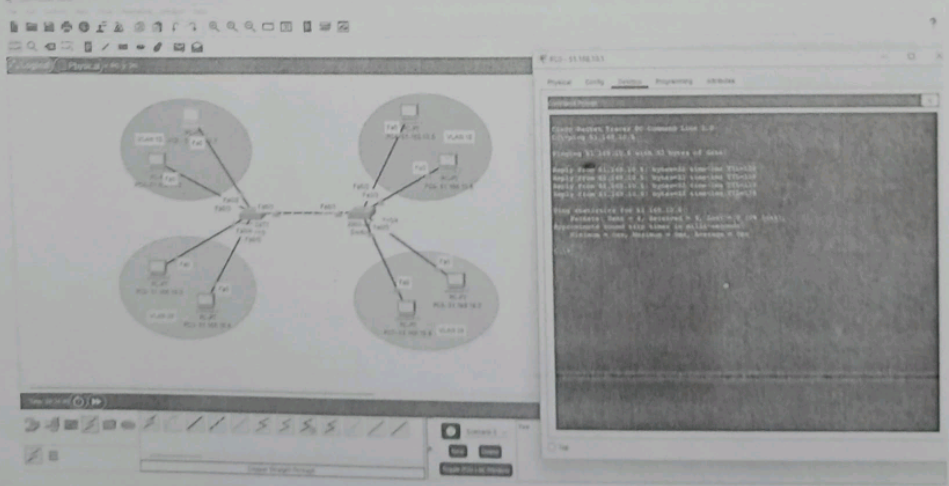












CONCLUSION (provide a conclusion about this experiment):
Successfully designed and implemented Intra VLAN using switch configuration.

Rubrics for Experiment Assessment:

Rubrics	Good	Normal	Poor	Marks
Creation of Topology (4)	Created the topology, identified the proper devices, and made the connections **(4).**	Created the topology, identified the proper devices, and made the connections. But missing some features **(3)**	Created the wrong topology, failed to identify the proper devices, and made connections **(1)**	
Verify the connectivity (4)	Verified the connectivity in all the levels **(4)**	Verified the connectivity at some levels (only some nodes) **(2)**	Verified the connectivity is not done. **(1)**	
Timely Completion (2)	Completed the lab before the allotted time **(2)**	Completed the lab after the deadline **(1)**	Did not submit before grading **(0)**	
			Total	

Ex.No:06	DHCP Configuration
Date:-	

Objective(s):

To design and implement DHCP configuration using packet tracer

Introduction:

Dynamic Host Configuration Protocol or DHCP is a networking protocol that allows for the automatic assignment of IP addresses to devices in a network. You have probably seen DHCP in action at the most basic level when you connect your laptop to an ISP router (like MTN-HynetFlex) or your phone's hotspot. Every new device that joins the Wifi network will get a local IP address, usually in the range 192.168.0.* or 172.16.*.* where * is a number between 0 and 255.

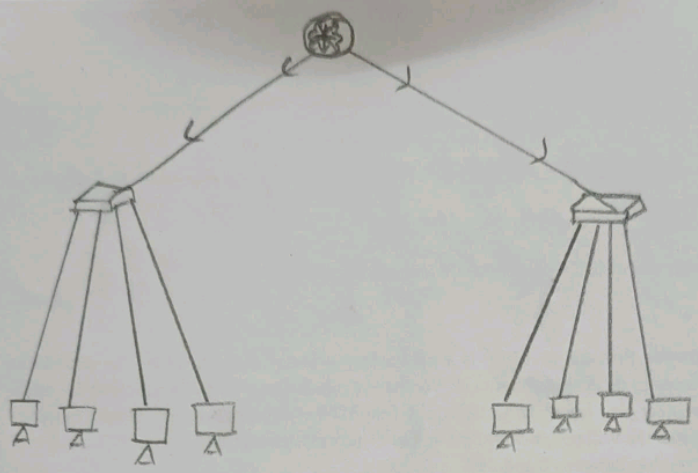
Without DHCP, these massive networks will require physical agents in call centers to manage who gets what IP address. While this is not only a hassle, it will be a huge cost to the service provider.

One easy way to practice a DHCP setup is in a local network simulation environment like Cisco Packet Tracer. This lab will discuss how to configure DHCP on a router for a simple 4-computer, two-switch network. The router will assign the IP addresses to the computers in each network so that inter-network communication can happen.

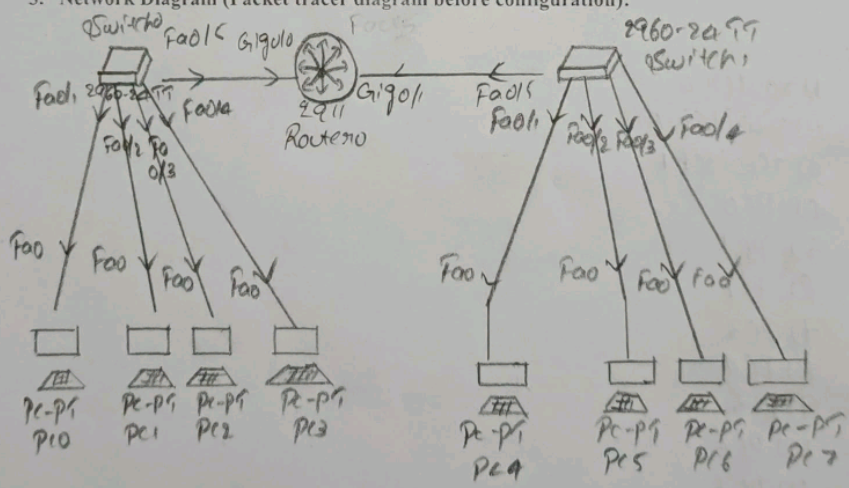
1. **Device Requirements:**

1) Router 0
2) Switch 0
3) Switch 1
4) PC0
5) PC1
6) PC2
7) PC3
8) PC4
9) PC5
10) PC6
11) PC7

2. **Network Diagram for your experiment (draw the diagram either hand drawing/ms paint or any other drawing tools)**



3. **Network Diagram (Packet tracer diagram before configuration):**



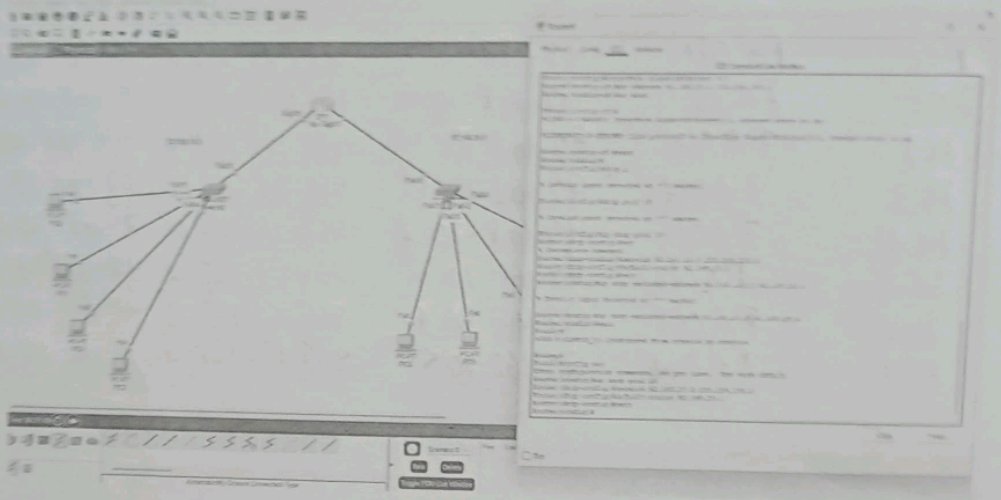
4. **Configuration details:**

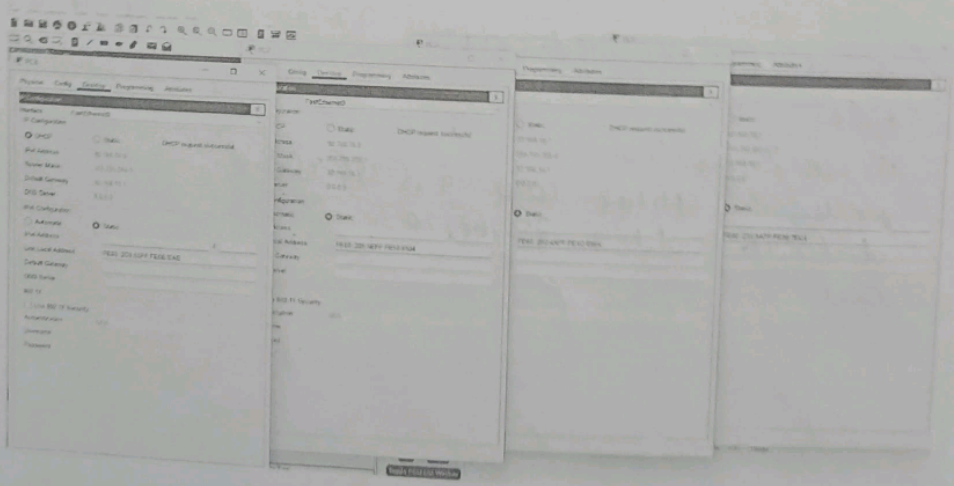
Device Name	Interface Name	IP Address	Subnet mask	Default Gateway
PC0	FA 0/1	92.168.10.2	255.255.255.0	92.168.10.0
PC1	FA0/2	92.168.10.9	255.255.255.0	92.168.10.0
PC2	FA 0/3	92.168.10.10	255.255.255.0	92.168.10.0
PC3	FA0/4	92.168.10.11	255.255.255.0	92.168.10.0
PC4	FA0/1	92.168.20.2	255.255.255.0	91.168.20.0
PC5	FA0/2	92.168.20.3	255.255.255.0	91.168.20.0
PC6	FA0/3	92.168.20.4	255.255.255.0	91.168.20.0
PC7	FA 0/4	92.168.20.5	255.255.255.0	91.168.20.0

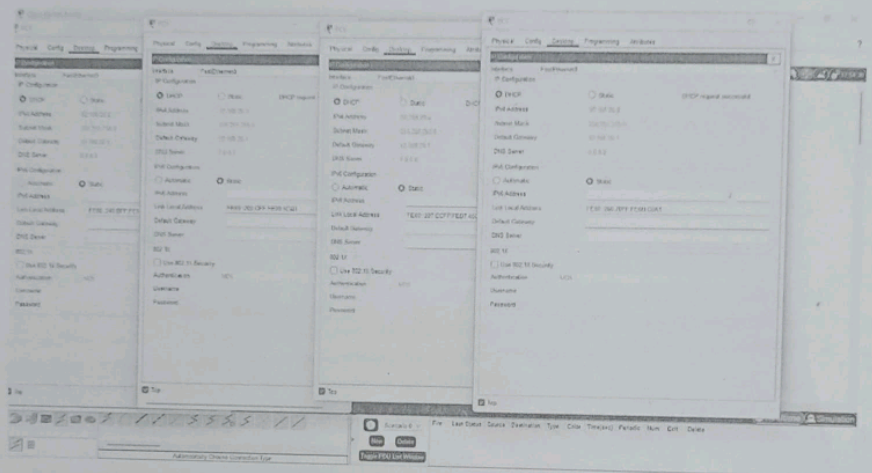
5. **Describe step by step configuration steps properly (you may copy the commands used in the configuration tab and paste it.)**

```
ipdhcp Pool 10
network 92.168.10.0 255.255.255.0
default-router 92.168.10.1
exit
ip dhcp excluded-address 92.168.10.3 92.168.10.8
exit
ip dhcp Pool 20
network 91.168.20.0 255.255.255.0
default-router 92.168.20.1
exit
```

b. **Output Diagram (Minimum 3 screenshot):**







CONCLUSION (provide conclusion about this experiment):

Successfully Executed and created the Dhcp configuration.

Rubrics for Experiment Assessment:

Rubrics	Good	Normal	Poor	Marks
Creation of Topology (4)	Created the topology, identified the proper devices and made the connections **(4)**	Created the topology, Identify the proper devices, making the connections But missing some features **(3)**	Created wrong topology, Failed to Identify the proper devices and making connections **(1)**	
Verify the connectivity (4)	Verified the connectivity in all the levels **(4)**	Verified the connectivity at some levels (only some nodes) **(2)**	Verified the connectivity is not done. **(1)**	
Timely Completion (2)	Completed the lab before the allotted time **(2)**	Completed the lab after the deadline **(1)**	Did not submitted before grading **(0)**	
			Total	

Ex.No:07	Spanning Tree Protocol Configuration
Date:-	

Objective(s):

To design and implement spanning tree configuration using packet tracer

Introduction:

In a typical network topology, we have redundant connections between switches. Redundant connections play a very crucial role as it eliminates the single point of failure in the network. However, redundant connections create loop in the network. And to prevent those loops in networks the Spanning Tree Protocol chooses the best link while blocking the redundant links.

Root Bridge is the most important switch in a Spanning Tree Network. And all the other switches choose the best way to reach a Root Bridge and block the redundant links. Therefore, it is very important to choose the best switch in the network as a Root Bridge.

Root is selected on the basis of a Bridge ID. So, whichever switch will have the lowest Bridge ID, that very switch will be selected as a Root Bridge. Basically, Bridge ID is made up of a priority number and the MAC Address. And by default, all switches have the same priority number – 32768 to be precise – so the Spanning Tree relies on a MAC address for the selection of Root Bridge. But the problem is that by default any switch which has the lowest Bridge ID can be automatically selected as a Root Bridge. And if that switch is slow then it will slow down the entire network because its network traffic will pass through that switch. Hence, it is very important that every Spanning Tree Network has the best Switch as a root.

By default, the Spanning Tree is enabled on the switches so if we create a redundant connection on switches then the Spanning Tree Protocol will automatically come into action to prevent a loop in the network. Therefore, for maximum optimization it is very important to select the right switch as a Root Bridge.

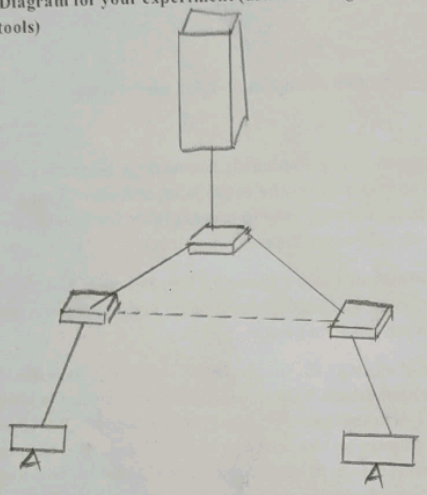
We cannot however, change the MAC address of a switch so we will have to change the priority number of switches to influence the selection of a Root Bridge.

In this lab, we will try changing the priority of a switch to be able to select the switch of our choice as a Root Bridge. Root Bridge is selected as per the VLAN number so we have to mention that for which VLAN, the switch is a root. We will also enable a newer version of the Spanning Tree which is a Rapid Spanning Tree.

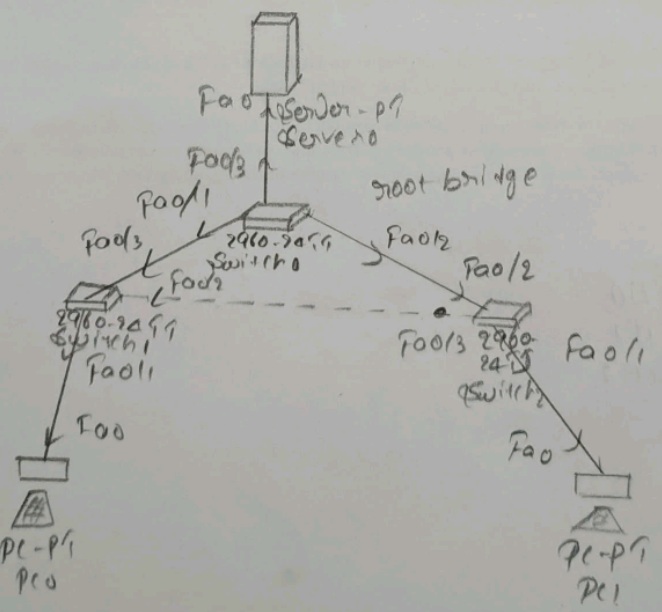
1. **Device Requirements:**

1) SWITCH0
2) SWITCH1
3) SWITCH2
4) PC0
5) PC1
6) PC2

2. Network Diagram for your experiment (draw the diagram either hand drawing/ms paint or any other drawing tools)



3. Network Diagram (Packet tracer diagram before configuration):



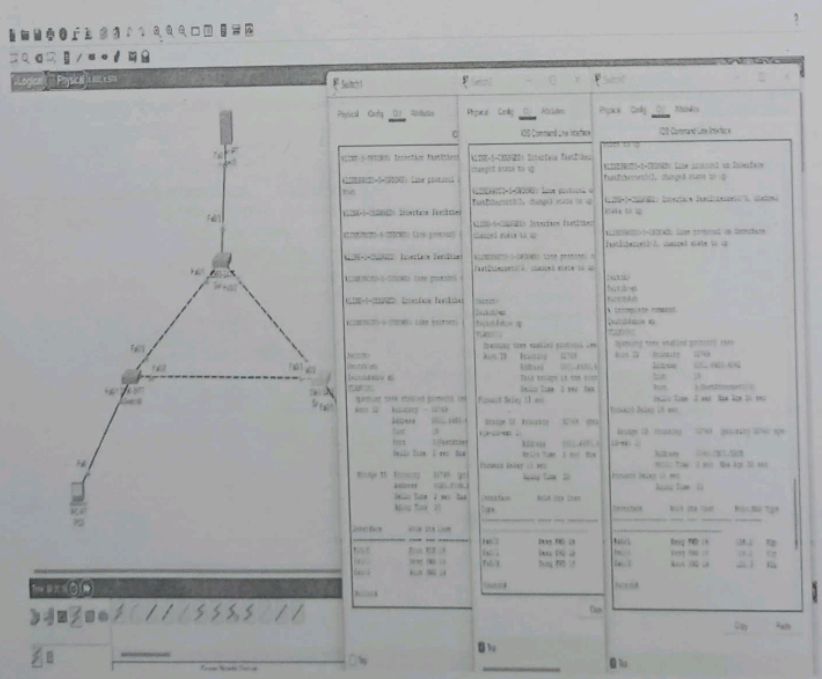
4. **Configuration details:**

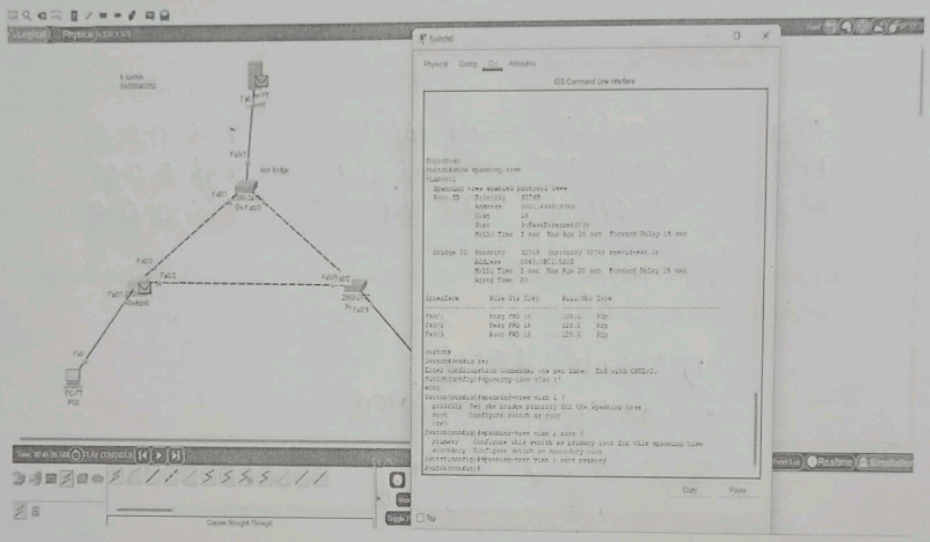
Device Name	Interface Name	IP Address	Subnet mask
PC0	Fa0/1-3	99.168.10.1	255.0.0.0
PC1	Fa0/1-3	99.168.10.2	255.0.0.0
PC2	Fa0/1-3	99.168.10.3	255.0.0.0

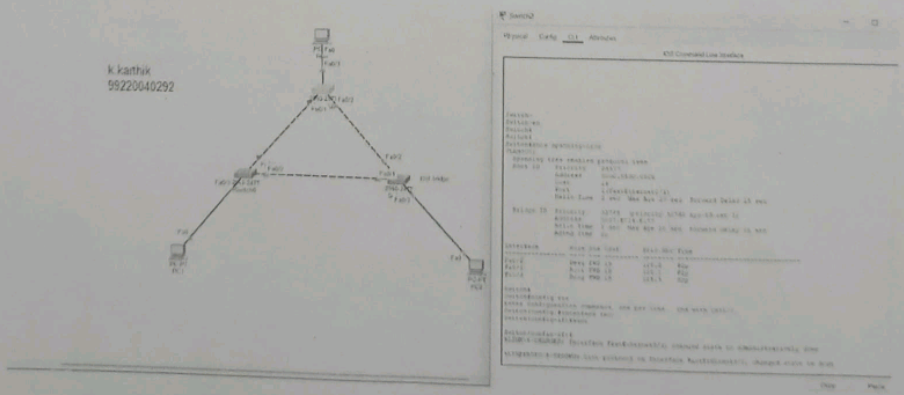
5. **Describe step by step configuration steps properly (you may copy the commands used in the configuration tab and paste it.)**

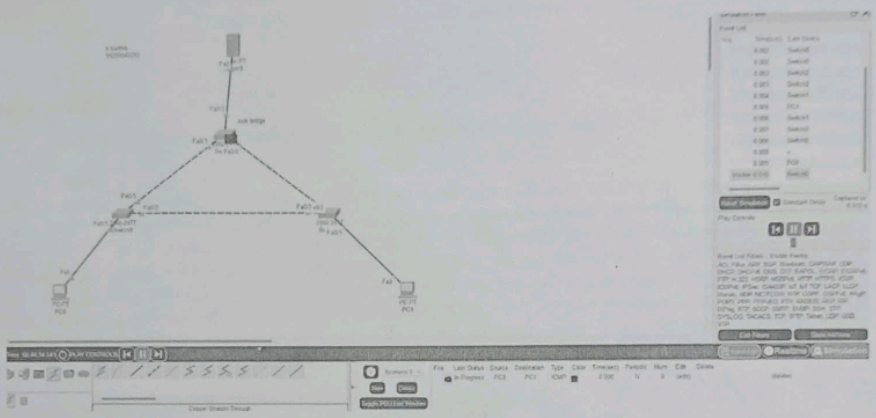
1) Create VLANs
2) Configure interfaces
3) Configure trunking

6. **Output Diagram (Minimum 3 screenshot):**






k.karthik
99220040292



CONCLUSION (provide conclusion about this experiment):

Successfully created and executed for spanning tree Protocol configuration in the cisco Packet tracer.

Rubrics for Experiment Assessment:

Rubrics	Good	Normal	Poor	Marks
Creation of Topology (4)	Created the topology, Identify the proper devices and making the connections **(4)**	Created the topology, Identify the proper devices, making the connections But missing some features **(3)**	Created wrong topology, Failed to Identify the proper devices and making connections **(1)**	
Verify the connectivity (4)	Verified the connectivity in all the levels **(4)**	Verified the connectivity at some levels (only some nodes) **(2)**	Verified the connectivity is not done. **(1)**	
Timely Completion (2)	Completed the lab before the allotted time **(2)**	Completed the lab after the deadline **(1)**	Did not submitted before grading **(0)**	
			Total	

Ex.No:08	Configuration of Address Resolution protocol
Date:-	

Objective(s):

To design and implement Address Resolution Protocol using packet tracer

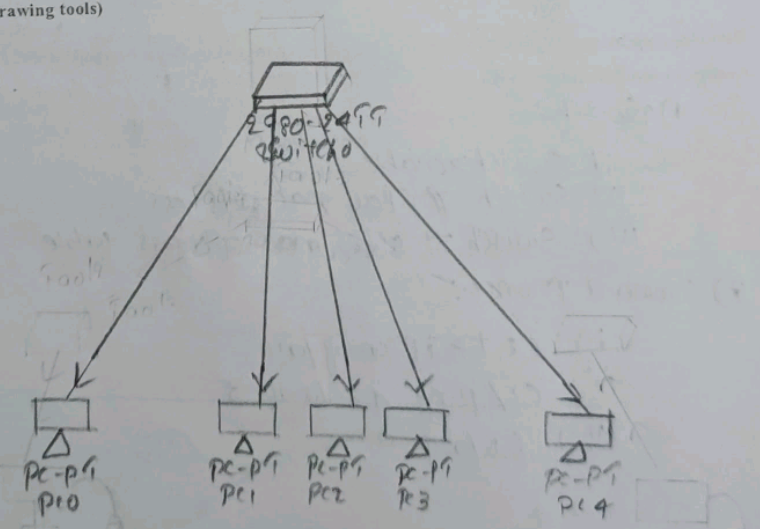
Introduction:

ARP (Address Resolution Protocol) is a network protocol used to find out the hardware (MAC) address of a device from an IP address. It is used when a device wants to communicate with some other device on a local network (for example on an Ethernet network that requires physical addresses to be known before sending packets). The sending device uses ARP to translate IP addresses to MAC addresses. The device sends an ARP request message containing the IP address of the receiving device. All devices on a local network segment see the message, but only the device that has that IP address responds with the ARP reply message containing its MAC address. The sending device now has enough information to send the packet to the receiving device.

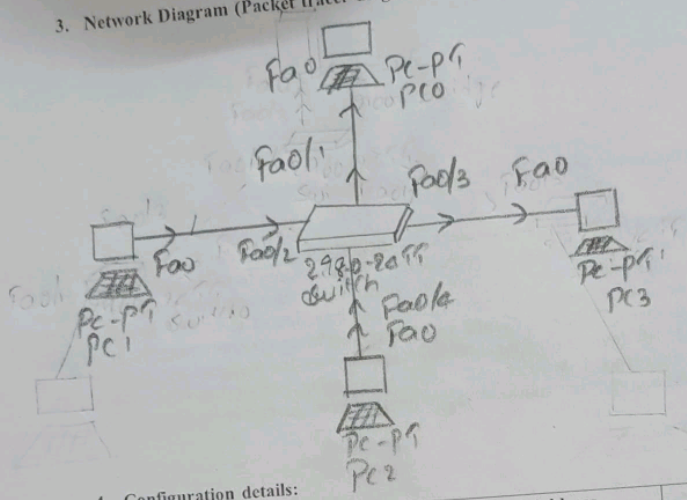
1. **Device Requirements:**

1) PC's
2) Switch
3) connection wires

2. **Network Diagram for your experiment (draw the diagram either hand drawing/ms paint or any other drawing tools)**



3. **Network Diagram (Packet tracer diagram before configuration):**



4. **Configuration details:**

Device Name	Interface Name	IP Address	Subnet mask
PC0	Fa0: Fa0/1	84.168.10.1	255.255.255.0
PC1	Fa0: Fa0/2	84.168.10.2	255.0.0.0
PC2	Fa0: Fa0/3	84.168.10.3	255.0.0.0
PC3	Fa0: Fa0/4	84.168.10.4	255.0.0.0
Switch0			

5. **Describe step by step configuration steps properly (you may copy the commands used in the configuration tab and paste it.)**

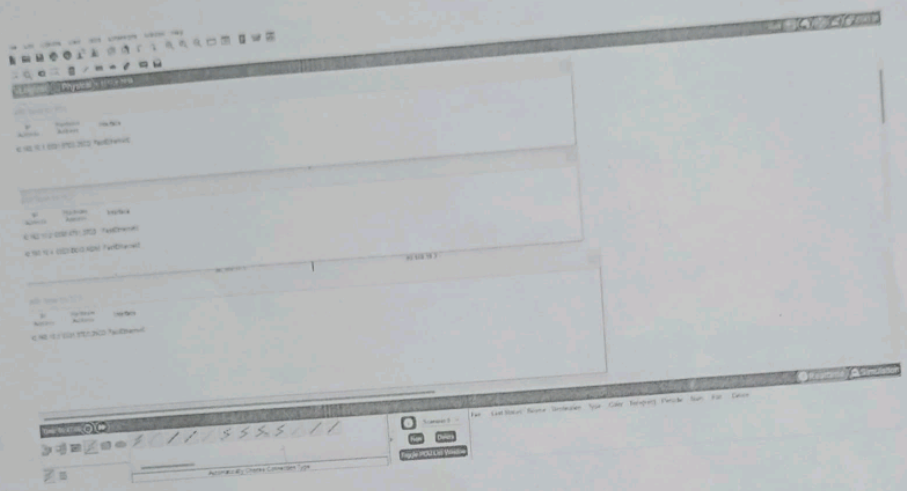
1) Switch:

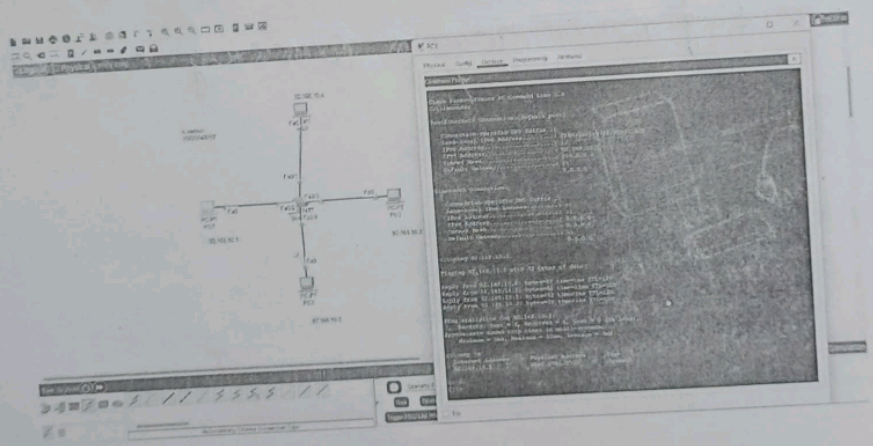
i) Switch>enable
ii) Switch #Show mac address
iii) Switch # show mac-address table

2) Command prompt:

i) C:\> ipconfig /all
ii) C:/ ping 47.168.10.3
iii) C:/arp -a

6. **Output Diagram (Minimum 3 screenshot):**





CONCLUSION (provide conclusion about this experiment):

Theory, design and implementation of Address Resolution Protocol using Packet tracer is successfully executed

Rubrics for Experiment Assessment:

Rubrics	Good	Normal	Poor	Marks
Creation of Topology (4)	Created the topology, Identify the proper devices and making the connections **(4)**	Created the topology, Identify the proper devices, making the connections But missing some features **(3)**	Created wrong topology, Failed to Identify the proper devices and making connections **(1)**	
Verify the connectivity (4)	Verified the connectivity in all the levels **(4)**	Verified the connectivity at some levels (only some nodes) **(2)**	Verified the connectivity is not done. **(1)**	
Timely Completion (2)	Completed the lab before the allotted time **(2)**	Completed the lab after the deadline **(1)**	Did not submitted before grading **(0)**	
			Total	