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# PRACTICAL FILE

## SESSION: 2023-24

### Computer Networks Lab (CIC 355)

### III Year, V Sem

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## **EXPERIMENT NO. 1**

**AIM:** Introduction to Networking Simulation Tools: Cisco Packet Tracer

Packet Tracer is a protocol simulator developed by Dennis Frezzo and his team at Cisco Systems. Packet Tracer (PT) is a powerful and dynamic tool that displays the various protocols used in networking, in either Real Time or Simulation mode. This includes layer 2 protocols such as Ethernet and PPP, layer 3 protocols such as IP, ICMP, and ARP, and layer 4 protocols such as TCP and UDP. Routing protocols can also be

traced.

**Purpose:**

The purpose of this lab is to become familiar with the Packet Tracer interface. Learn how to use existing topologies and build your own.

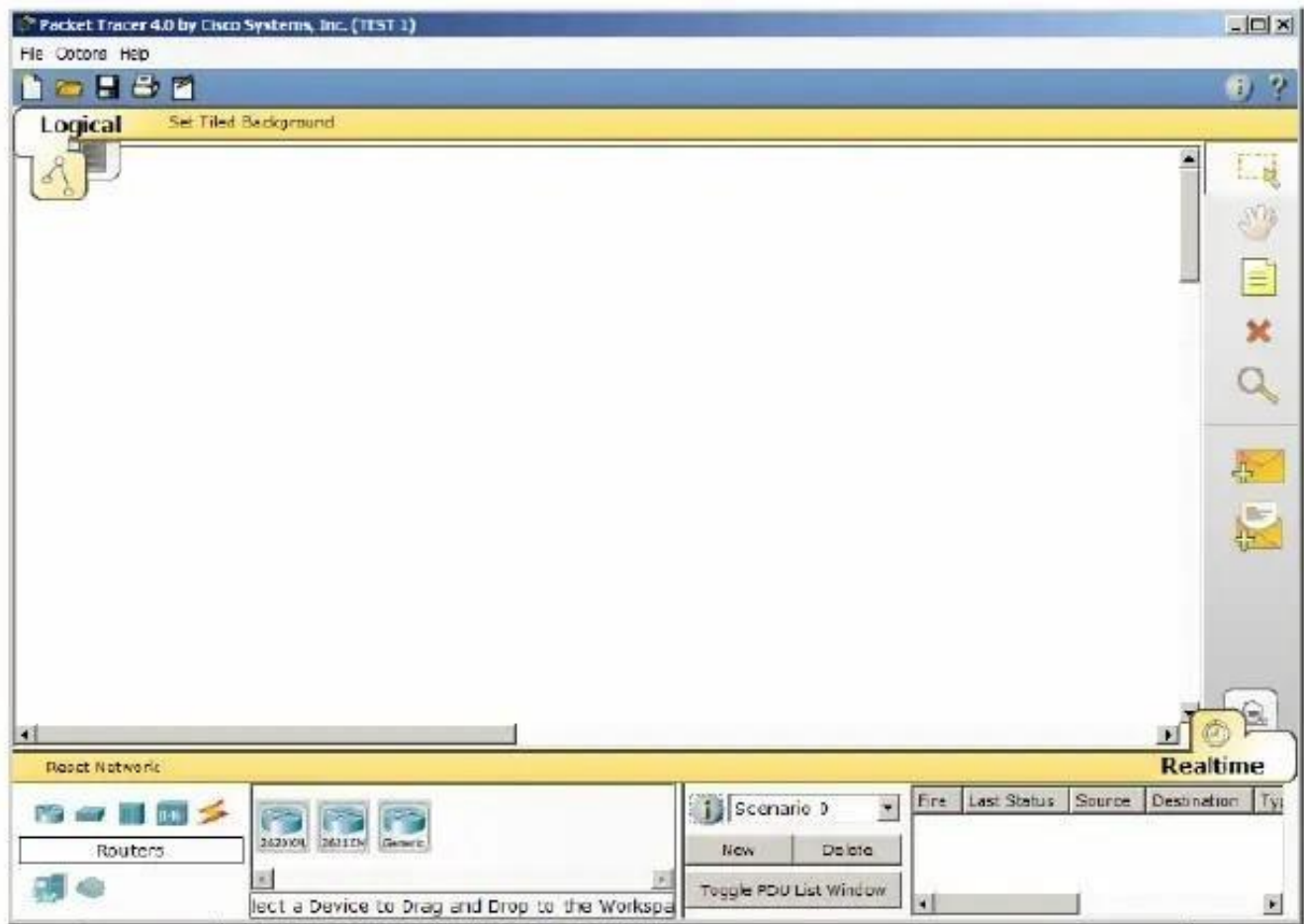
**Requisite knowledge:**

This lab assumes some understanding of the Ethernet protocol. At this point we have not discussed other protocols, but will use Packet Tracer in later labs to discuss those as well. Version: This lab is based on

Packet Tracer 7.3.

## Introduction to the Packet Tracer Interface using a Hub Topology

### Step 1: Start Packet Tracer and Entering Simulation Mode 1

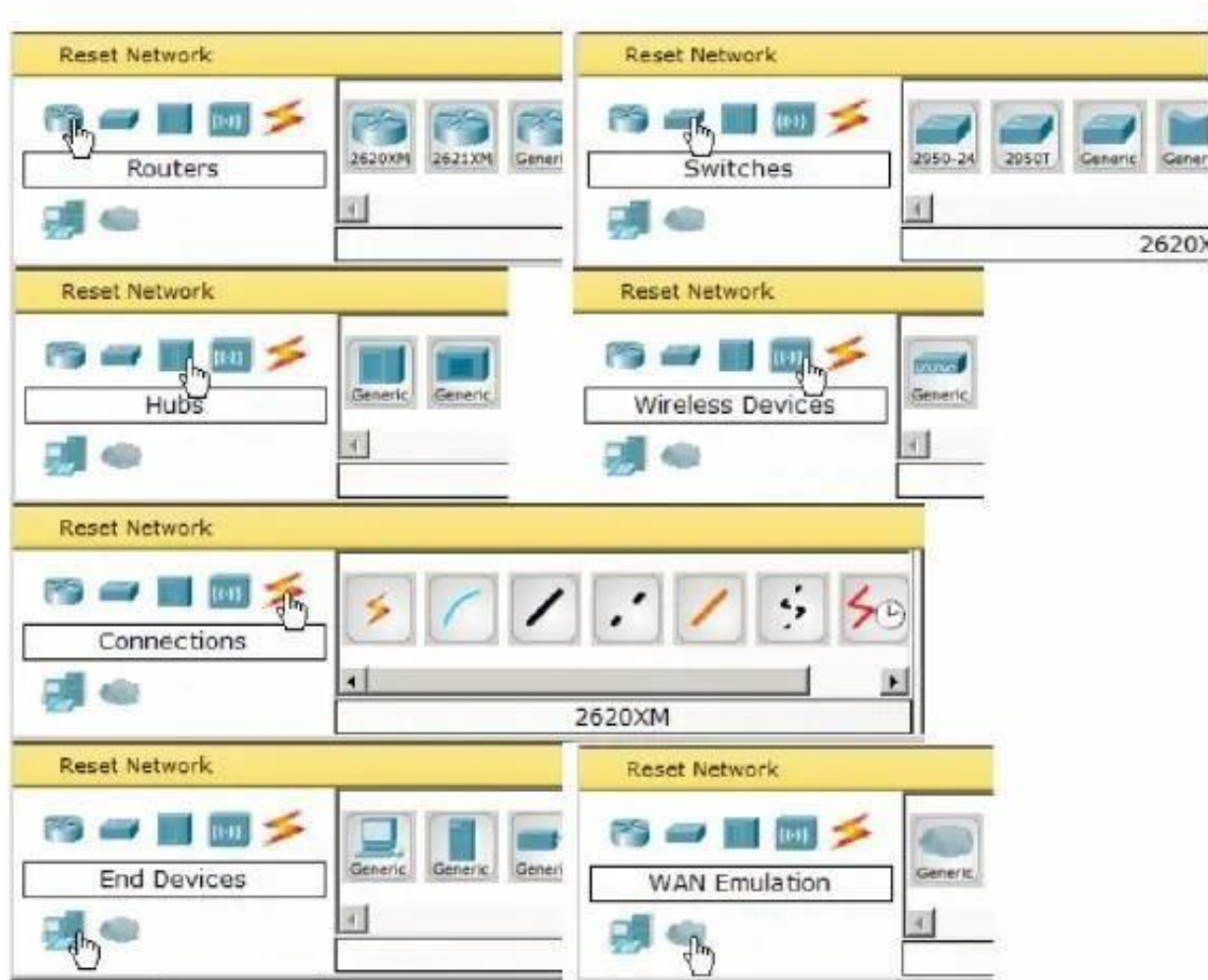


### Step 2: Choosing Devices and Connections

We will begin building our network topology by selecting devices and the media in which to connect them. Several types of devices and network connections can be used. For this lab we will keep it simple by using End Devices, Switches, Hubs, and Connections.

Single click on each group of devices and connections to display the various choices

**Step 3: Building the Topology – Adding Hosts Single click on the End Devices.**



## **EXPERIMENT NO. 2**

**AIM:** Study of following Network Devices in Detail

- Repeater
- Hub
- Switch
- Bridge
- Router
- Gate Way

**Apparatus (Software):** No software or hardware needed.

**Procedure:** Following should be done to understand this practical.

1. **Repeater:** Functioning at Physical Layer. A **repeater** is an electronic device that receives a signal and retransmits it at a higher level and/or higher power, or onto the other side of an obstruction, so that the signal can cover longer distances. Repeater have two ports, so cannot be use to connect for more than two devices
2. **Hub:** An **Ethernet hub**, **active hub**, **network hub**, **repeater hub**, **hub** or **concentrator** is a device for connecting multiple twisted pair or fiber optic Ethernet devices together and making them act as a single network segment. Hubs work at the physical layer (layer 1) of the OSI model. The device is a form of multiport repeater. Repeater hubs also participate in collision detection, forwarding a jam signal to all ports if it detects a collision.
3. **Switch:** A **network switch** or **switching hub** is a computer networking device that connects network segments. The term commonly refers to a network bridge that processes and routes data at the data link layer (layer 2) of the OSI model. Switches that additionally process data at the network layer (layer 3 and above) are often referred to as Layer 3 switches or multilayer switches.
4. **Bridge:** A **network bridge** connects multiple network segments at the data link layer (Layer 2) of the OSI model. In Ethernet networks, the term *bridge* formally means a device that behaves according to the IEEE 802.1D standard. A bridge and switch are very much alike; a switch being a bridge with numerous ports. *Switch* or *Layer 2 switch* is often used interchangeably with *bridge*. *Bridges* can analyse incoming data packets to determine if the bridge is able to send the given packet to another segment of the network.

5. **Router:** A **router** is an electronic device that interconnects two or more computer networks, and selectively interchanges packets of data between them. Each data packet contains address information that a router can use to determine if the source and destination are on the same network, or if the data packet must be transferred from one network to another. Where multiple routers are used in a large collection of interconnected networks, the routers exchange information about target system addresses, so that each router can build up a table showing the preferred paths between any two systems on the interconnected networks.
6. **Gate Way:** In a communications network, a network node equipped for interfacing with another network that uses different protocols.
- A gateway may contain devices such as protocol translators, impedance matching devices, rate converters, fault isolators, or signal translators as necessary to provide system interoperability. It also requires the establishment of mutually acceptable administrative procedures between both networks.

A protocol translation/mapping gateway interconnects networks with different network protocol technologies by performing the required protocol conversions.



## **EXPERIMENT NO. 3**

**AIM:** Study of basic network command and Network configuration commands.

**Apparatus (Software):** Command Prompt and Packet Tracer.

**Procedure:** To do this EXPERIMENT- follows these steps:

In this EXPERIMENT- students have to understand basic networking commands e.g. ping, tracert etc.

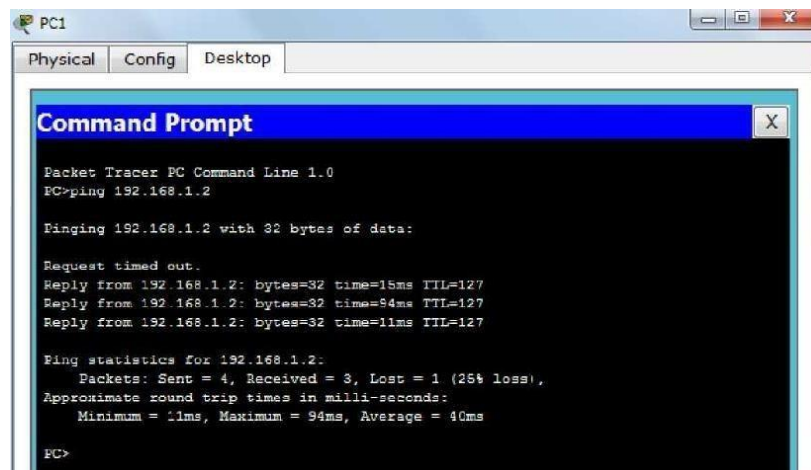
All commands related to Network configuration which includes how to switch to privilege mode and normal mode and how to configure router interface and how to save this configuration to flash memory or permanent memory.

These commands include

- Configuring the Router commands
- General Commands to configure network
- Privileged Mode commands of a router
- Router Processes & Statistics
- IP Commands
- Other IP Commands e.g. show Ip route etc.

### **ping:**

ping sends an ICMP ECHO\_REQUEST packet to the specified host. If the host responds, you get an ICMP packet back. Sound strange? Well, you can “ping” an IP address to see if a machine is alive. If there is no response, you know something is wrong.



```
PC1
Physical Config Desktop
Command Prompt
Packet Tracer PC Command Line 1.0
PC>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

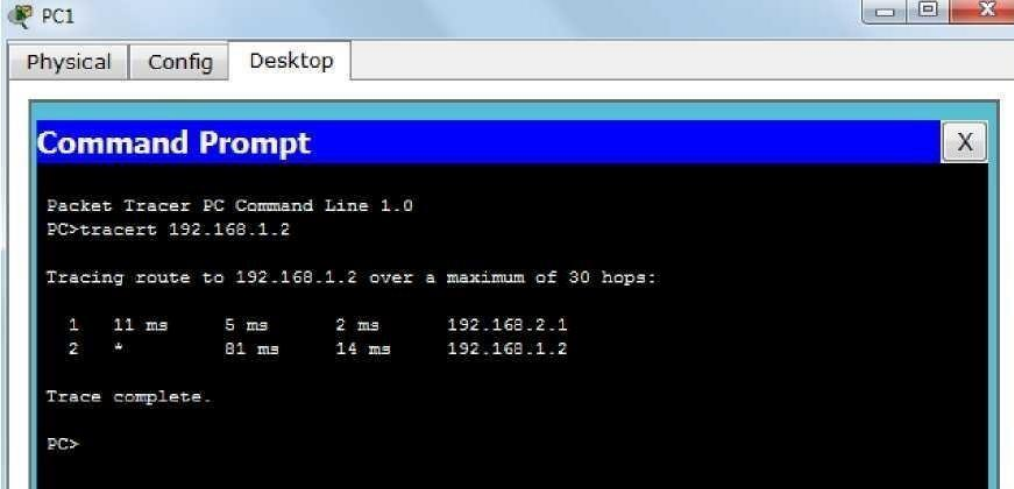
Request timed out.
Reply from 192.168.1.2: bytes=32 time=15ms TTL=127
Reply from 192.168.1.2: bytes=32 time=94ms TTL=127
Reply from 192.168.1.2: bytes=32 time=11ms TTL=127

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 11ms, Maximum = 94ms, Average = 40ms

PC>
```

## Traceroute:

Tracert is a command which can show you the path a packet of information taken from your computer to one you specify. It will list all the routers it passes through until it reaches its destination, or fails to and is discarded. In addition to this, it will tell you how long each 'hop' from router to router takes.



```
PC1
Physical Config Desktop
Command Prompt
Packet Tracer PC Command Line 1.0
PC>tracert 192.168.1.2

Tracing route to 192.168.1.2 over a maximum of 30 hops:

  0  11 ms    5 ms    2 ms    192.168.2.1
  1  *        81 ms   14 ms   192.168.1.2

Trace complete.

PC>
```

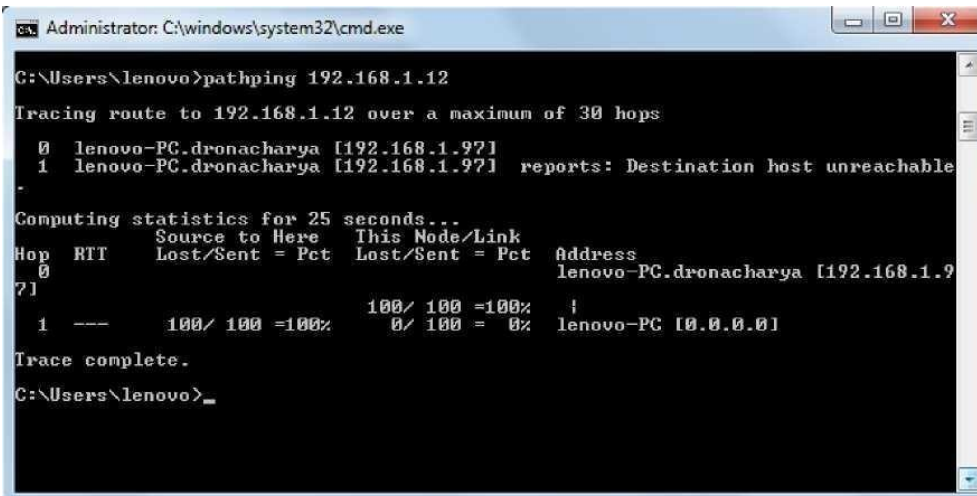
## nslookup:

Displays information from Domain Name System (DNS) name servers.

NOTE :If you write the command as above it shows as default your pc's server name firstly.

## pathping:

A better version of tracert that gives you statistics about packet lost and latency.



```
Administrator: C:\windows\system32\cmd.exe

C:\Users\lenovo>pathping 192.168.1.12

Tracing route to 192.168.1.12 over a maximum of 30 hops:

  0  lenovo-PC.dronacharya [192.168.1.97]
  1  lenovo-PC.dronacharya [192.168.1.97] reports: Destination host unreachable

Computing statistics for 25 seconds...
Hop  RTT      Source to Here   This Node/Link   Address
  0  ---      Lost/Sent = Pct  Lost/Sent = Pct  lenovo-PC.dronacharya [192.168.1.97]
  1  ---      100/ 100 =100%   0/ 100 = 0%      lenovo-PC [0.0.0.0]

Trace complete.

C:\Users\lenovo>
```

### **Getting Help:**

In any command mode, you can get a list of available commands by entering a question mark (?). Router>?

To obtain a list of commands that begin with a particular character sequence, type in those characters followed immediately by the question mark (?).

Router#co?

### **configure connect copy:**

To list keywords or arguments, enter a question mark in place of a keyword or argument. Include a space before the question mark.

Router#configure ? memory Configure from NV memory network Configure from a TFTP network host terminal Configure from the terminal .

You can also abbreviate commands and keywords by entering just enough characters to make the command unique from other commands. For example, you can abbreviate the show command to sh.

### **Configuration Files:**

Any time you make changes to the router configuration, you must save the changes to memory because if you do not, they will be lost if there is a system reload or power outage. There are two types of configuration files: the running (current operating) configuration and the startup configuration.

Use the following privileged mode commands to work with configuration files.

## **EXPERIMENT NO. 4**

**AIM: a) To configure a Bus Topology Network using CISCO Packet Tracer Software.**

**Packet tracer:** Packet Tracer is a cross-platform visual simulation tool designed by Cisco Systems that allows users to create network topologies and imitate modern computer networks. The software allows users to simulate the configuration of Cisco routers and switches using a simulated command line interface. Packet Tracer makes use of a drag and drop user interface, allowing users to add and remove simulated network devices as they see fit.

**Bus Topology:** Bus topology is a network type in which every computer and network devices is connected to single cable.

**Advantages:**

- The bus topology is easy to understand, install, and use for small network.
- Cable required is least compared to other network topology.
- Cost effective.
- Easy to joining two cables together.

**Disadvantages:**

- Entire network shuts down if there is a break in the main cable.
- Terminators are required at both ends of the backbone cable.
- Difficult to identify the problem if the entire network shuts down.
- Not meant to be used as a stand-alone solution.

### **Introduction to the Packet Tracer Interface using a Bus Topology**

**Step 1:** Start Packet Tracer and Entering Simulation Mode 1

**Step 2:** Choose switch then select generic

**Step 3:** After selecting generic click on the main area.

**Step 4:** Select end devices and then click on generic.

**Step 5:** click at workspace to see the PC.

**Step 6:** select connections from power cycle devices and click on automatically choose connection type.



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**Step 7:** Draw connections from switch to PC.

**Step 8:** Double click on a PC, a box will appear, click on the Desktop tab. **Step 9:** Then select IP configuration.

**Step 10:** Write the IP address of your network and click at the Subnet mask field. Subnet mask will appear automatically.

**Step 11:** Repeat step 10 to set the IPs for all the PCs.

**Step 12:** now add a router and repeat the above step for connecting second LAN.

**Step 13:** Select “ADD simple message”.

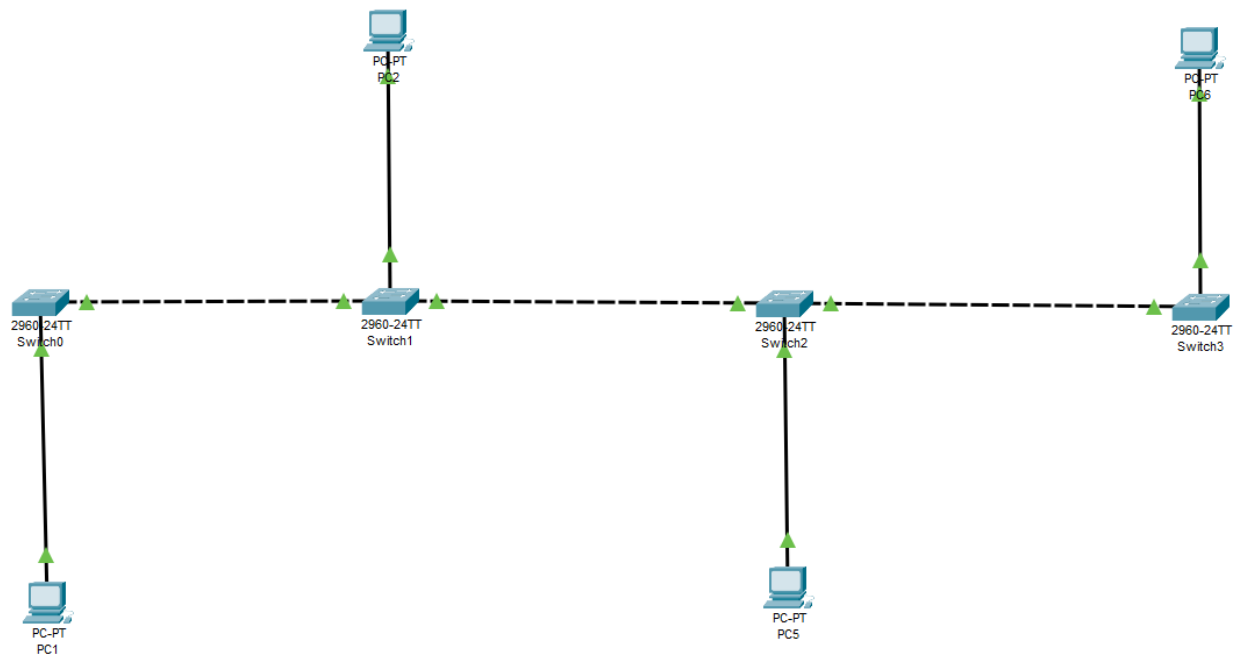
**Step 14:** Drag and drop the message to the source device and then to the destination device.

**Step 15:** Select the simulation mode at the bottom right corner. Step 16:

Click at “Auto capture/play”

**Step 17:** Observe the path of the message from source to switch. Then to all devices and then move to the destination.

**Step 18:** Finally observe the marks. If the source PC is marked correct it means you have successfully established connection.



## **b) To Configure a star Topology network using CISCO packet tracer software.**

**Packet tracer:** Packet Tracer is a cross-platform visual simulation tool designed by Cisco Systems that allows users to create network topologies and imitate modern computer networks. The software allows users to simulate the configuration of Cisco routers and switches using a simulated command line interface. Packet Tracer makes use of a drag and drop user interface, allowing users to add and remove simulated network devices as they see fit.

**Star Topology:** A star topology is a topology for a Local Area Network (LAN) in which all nodes are individually connected to a central connection point, like a hub or a switch. A star takes more cable than e.g. a bus, but the benefit is that if a cable fails, only one node will be brought down.

### **Advantages:**

- Low network traffic.
- No disruptions to the network when connecting or removing devices.
- Easy to detect faults and to remove parts.

### **Disadvantages:**

- Requires more cable length than a linear topology.
- If the hub, switch, or concentrator fails, nodes attached are disabled.
- More expensive than linear bus topologies because of the cost of the hubs, etc.

## **Introduction to the Packet Tracer Interface using a Star Topology**

**Step 1:** Start packet tracer

**Step 2:** Choose Hub then select generic

**Step 3:** After selecting generic click on the main area.

**Step 4:** Select end devices and then click on generic.

**Step 5:** click at workspace to see the PC.

**Step 6:** select connections from power cycle devices and click on automatically choose connection type.

**Step 7:** Draw connections from switch to PC.

**Step 8:** Double click on a PC, a box will appear, click on the Desktop tab.

**Step 9:** Then select IP configuration.



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**Step 10:** Write the IP address of your network and click at the Subnet mask field. Subnet mask will appear automatically.

**Step 11:** Repeat step 10 to set the IPs for all the PCs.

**Step 12:** now add a router and repeat the above step for connecting second LAN.

**Step 13:** Select "ADD simple message".

**Step 14:** Drag and drop the message to the source device and then to the destination device.

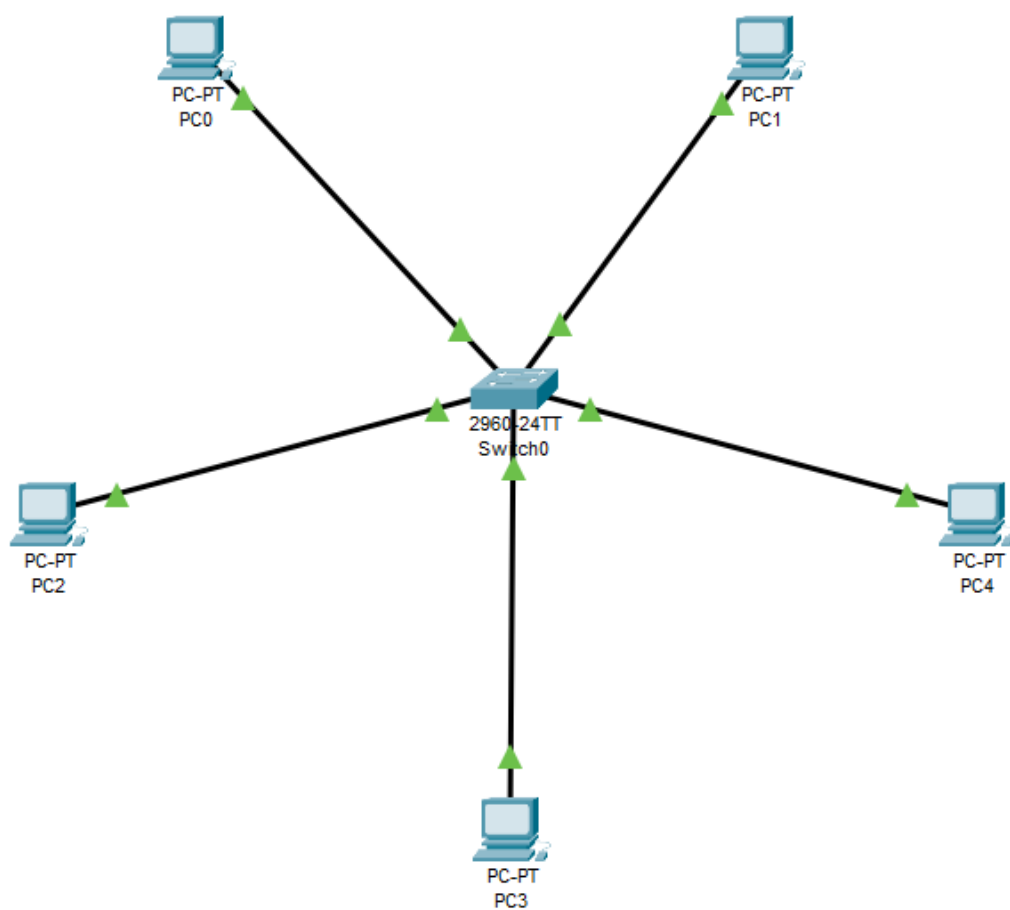
**Step 15:** Select the simulation mode at the bottom right corner.

**Step 16:** Click at "Auto capture/play"

**Step 17:** Observe the path of the message from source to switch. Then to all devices and then move to the destination.

**Step 18:** Finally observe the marks. If the source PC is marked correct it means you have successfully established connection.





### **c) To Configure a Ring Topology network using CISCO packet tracer software.**

**Packet tracer:** Packet Tracer is a cross-platform visual simulation tool designed by Cisco Systems that allows users to create network topologies and imitate modern computer networks. The software allows users to simulate the configuration of Cisco routers and switches using a simulated command line interface. Packet Tracer makes use of a drag and drop user interface, allowing users to add and remove simulated network devices as they see fit.

**Ring Topology:** A ring topology is a network configuration in which device connections create a circular data path. Each networked device is connected to two others, like points on a circle. Together, devices in a ring topology are referred to as a ring network.

#### **Advantages:**

- Cheap to install and expand.
- No one is master in the Network.
- Data can transfer between workstations at high speeds.
- Additional workstations can be added without impacting performance of the network.

#### **Disadvantages:**

- Design complex compare to Bus topology.
- Single node failure collapse full network.
- Failure of one computer disturbs the whole network.

### **Introduction to the Packet Tracer Interface using a Ring Topology**

**Step 1:** Start packet tracer

**Step 2:** Choose switch then select generic.

**Step 3:** After selecting generic click on the main area.

**Step 4:** Select end devices and then click on generic.

**Step 5:** Click at workspace to see the PC.

**Step 6:** Select connections from power cycle devices and click on automatically choose connection type.

**Step 7:** Draw connections from switch to PC.

**Step 8:** Double click on a PC, a box will appear, click on the Desktop tab.

**Step 9:** Then select IP configuration.

**Step 10:** Write the IP address of your network and click at the Subnet mask filed. Subnet mask will appear automatically.

**Step 11:** Repeat step 10 to set the IPs for all the PCs.

**Step 12:** Select "ADD simple message".

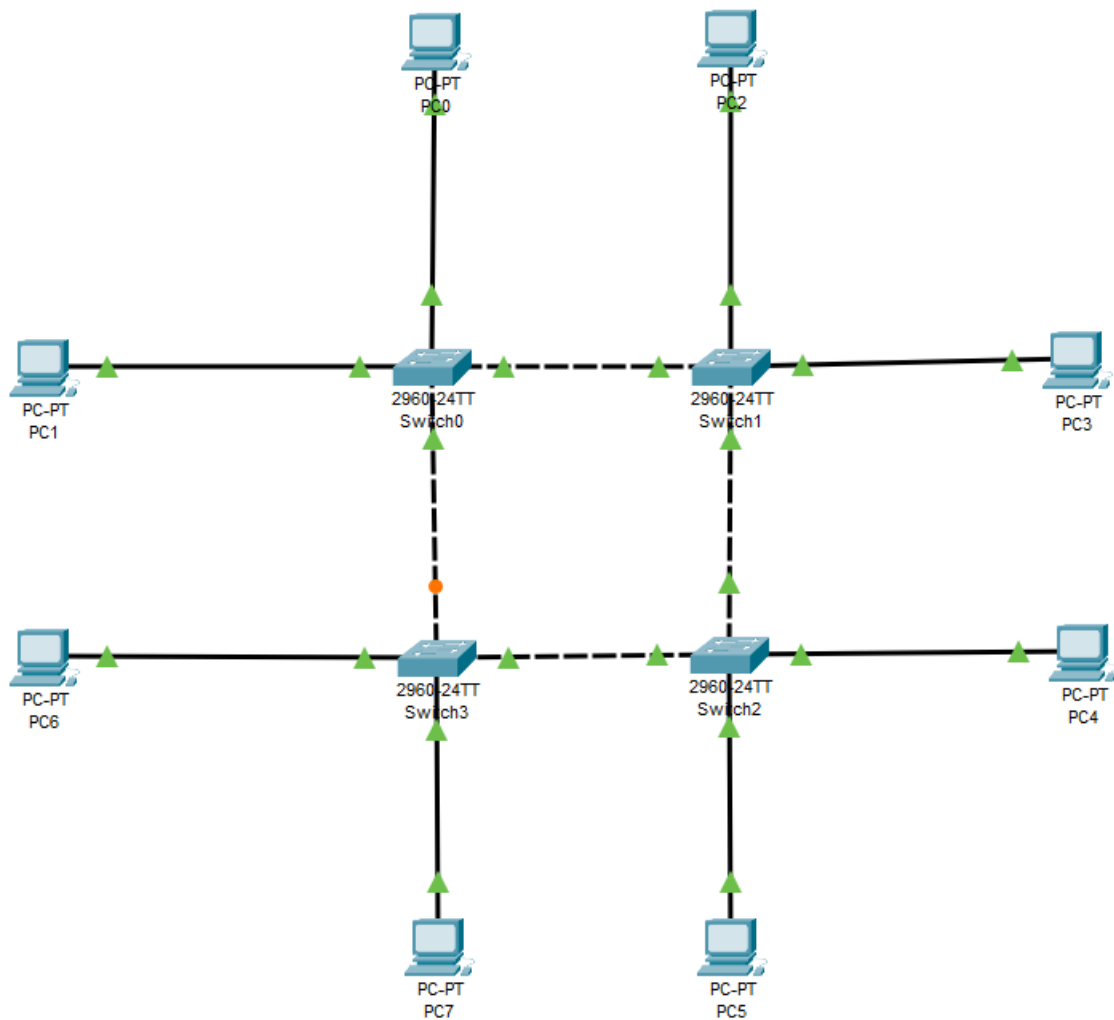
**Step 13:** Drag and drop the message to the source device and then to the destination device.

**Step 14:** Select the simulation mode at the bottom right corner.

**Step 15:** Click at "Auto capture/play"

**Step 16:** Observe the path of the message from source to switch. Then to all devices and then move to the destination.

**Step 17:** Finally observe the marks. If the source PC is marked correct it means you have successfully established connection.



#### **d) To Configure a Mesh Topology network using CISCO packet tracer software.**

**Packet tracer:** Packet Tracer is a cross-platform visual simulation tool designed by Cisco Systems that allows users to create network topologies and imitate modern computer networks. The software allows users to simulate the configuration of Cisco routers and switches using a simulated command line interface. Packet Tracer makes use of a drag and drop user interface, allowing users to add and remove simulated network devices as they see fit.

**Mesh Topology:** A mesh topology is a network topology in which all the network nodes are individually connected to most of the other nodes. There is not a concept of a central switch, hub or computer which acts as a central point of communication to pass on the messages.

A fully connected mesh topology has all the nodes connected to every other node. If you know the graph theory, then it is like a fully connected graph where all the nodes are connected to every other node. On the other hand, a partially connected mesh topology does not have all the nodes connected to each other.

#### **Advantages:**

- Each connection can carry its own data load.
- It is robust.
- A fault is diagnosed easily
- Provides security and privacy

#### **Disadvantages:**

- Installation and configuration are difficult if the connectivity gets more
- Cabling cost is more and the most in case of a fully connected mesh topology
- Bulk wiring is required

#### **Introduction to the Packet Tracer Interface using a Mesh Topology**

**Step 1:** Start packet trace.

**Step 2:** Choose switch then select generic.

**Step 3:** After selecting generic click on the main area.

**Step 4:** Select end devices and then click on generic.

**Step 5:** click at workspace to see the PC.

**Step 6:** select connections from power cycle devices and click on automatically choose connection type.

**Step 7:** Draw connections from switch to PC.

**Step 8:** Double click on a PC, a box will appear, click on the Desktop tab.

**Step 9:** Then select IP configuration.

**Step 10:** Write the IP address of your network and click at the Subnet mask field. Subnet mask will appear automatically.

**Step 11:** Repeat step 10 to set the Ips for all the PCs.

**Step 12:** Select “ADD simple message”.

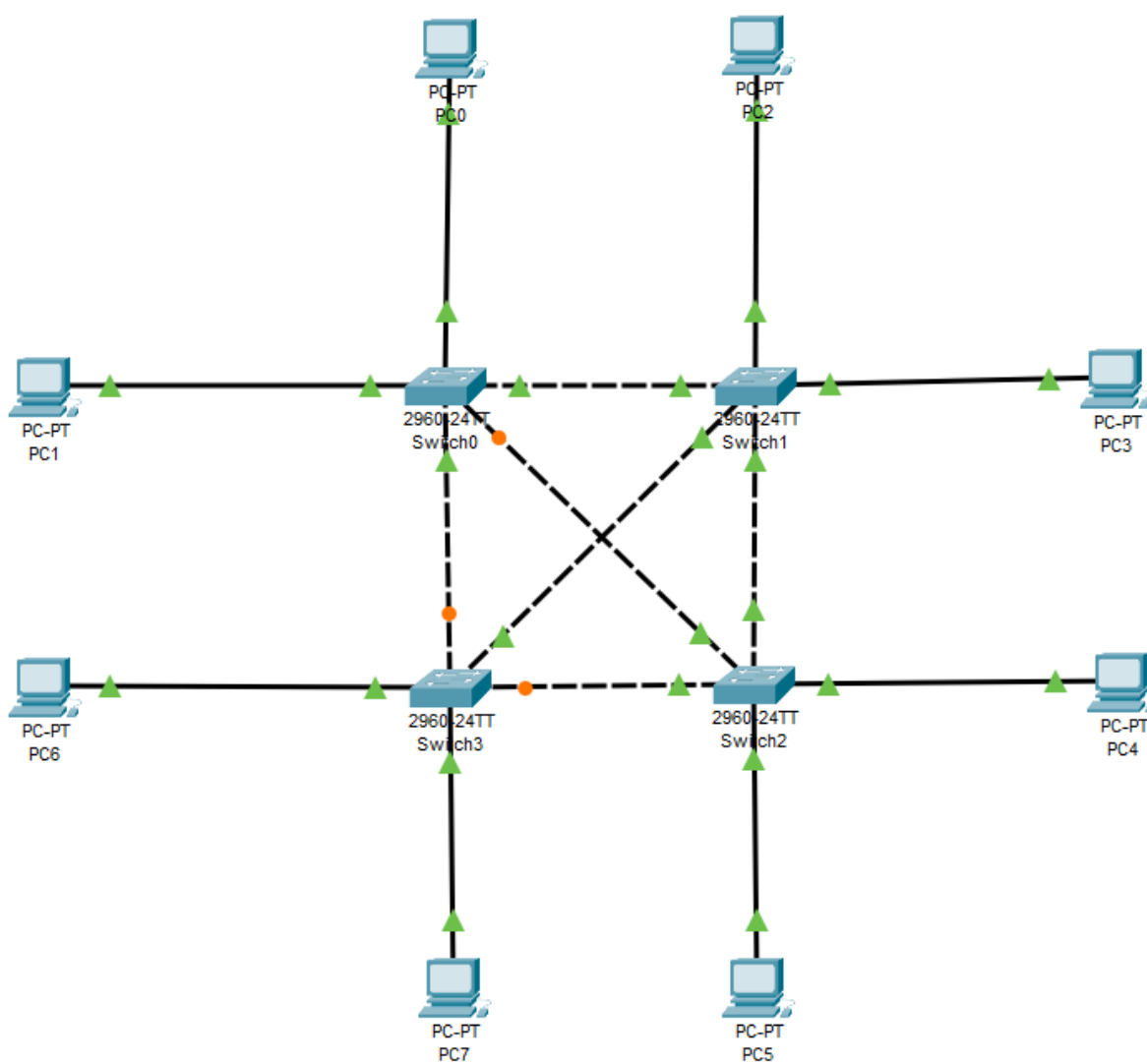
**Step 13:** Drag and drop the message to the source device and then to the destination device.

**Step 14:** Select the simulation mode at the bottom right corner.

**Step 15:** Click at "Auto capture/play"

**Step 16:** Observe the path of the message from source to switch. Then to all devices and then move to the destination.

**Step 17:** Finally observe the marks. If the source PC is marked correct it means you have successfully established connection.



## **EXPERIMENT NO. 5**

**AIM:** To understand the operation of TELNET by accessing the router in server room from a PC.

**THEORY: -**

### **Telnet:**

- Telnet is an application layer protocol that allows a network administrator to access and manage remote devices.
- A user on a client machine can use a software (also known as a Telnet client) to access a command-line interface of another, remote machine that is running a Telnet server program.
- A network administrator can access the device by telnetting to the IP address or hostname of a remote device. The network administrator will then be presented with a virtual terminal that can interact with the remote host.

**STEPS: -**

1. For PC choose fast Ethernet and for Router choose Gigabit ethernet 0/0/0

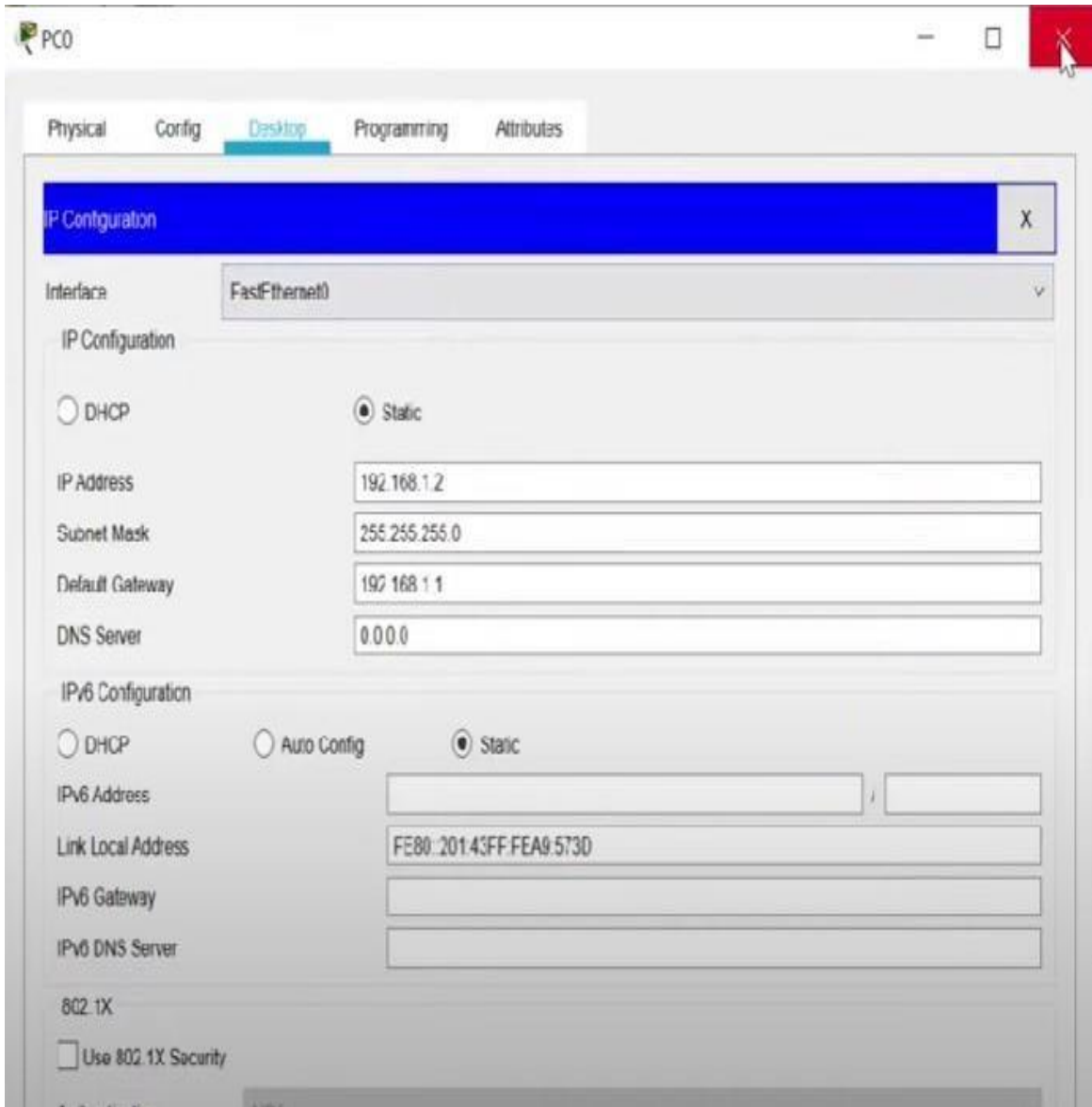




## 2. Setting in end device

Choose Ip config from desktop from the end device

Set the Ip address, subnet mask and default gateway as shown.



The screenshot shows the configuration window for a PC0 in a network simulator. The 'Desktop' tab is selected, and the 'IP Configuration' window is open. The 'Interface' is set to 'FastEthernet0'. Under 'IP Configuration', the 'Static' radio button is selected. The fields are filled with the following values:

Field	Value
IP Address	192.168.1.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.1.1
DNS Server	0.0.0.0

Below the IP Configuration section, the 'IPv6 Configuration' section is visible. The 'Static' radio button is selected. The fields are filled with the following values:

Field	Value
IPv6 Address	
Link Local Address	FE80::2014:3FF:FEA9:573D
IPv6 Gateway	
IPv6 DNS Server	

At the bottom, the '802.1X' section is visible, with the 'Use 802.1X Security' checkbox unchecked.

### 3. Setting in Router

Choose CLI then type the following

```
Would you like to enter the initial configuration dialog? [yes/no]: n

Press RETURN to get started!

Router>
Router>en
Router#
Router#
Router#
Router#conf t
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#hostname R1
R1(config)#enable secret rp
R1(config)#int g0/0/0
R1(config-if)#ip add 192.168.1.1 255.255.255.0
R1(config-if)#no shut
```

```
R1(config-if)#no shut

R1(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0/0, changed state to up

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

R1(config-if)#
R1(config-if)#line vty 0 5
R1(config-line)#login
% Login disabled on line 2, until 'password' is set
% Login disabled on line 3, until 'password' is set
% Login disabled on line 4, until 'password' is set
% Login disabled on line 5, until 'password' is set
% Login disabled on line 6, until 'password' is set
% Login disabled on line 7, until 'password' is set
R1(config-line)#password tp
R1(config-line)#exit
R1(config)#
R1(config)#
R1(config)#exit
R1#
%SYS-5-CONFIG_I: Configured from console by console

R1#wr
Building configuration...
[OK]
R1#
R1#
```

4. In the pc

```
Command Prompt

Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.1

Pinging 192.168.1.1 with 32 bytes of data:

Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255
Reply from 192.168.1.1: bytes=32 time<1ms TTL=255

Ping statistics for 192.168.1.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>telnet 192.168.1.1
Trying 192.168.1.1 ...Open

User Access Verification

Password:
R1>
R1>
R1>

Password:
R1#
R1#
R1#
R1#|
```

## EXPERIMENT NO. 6

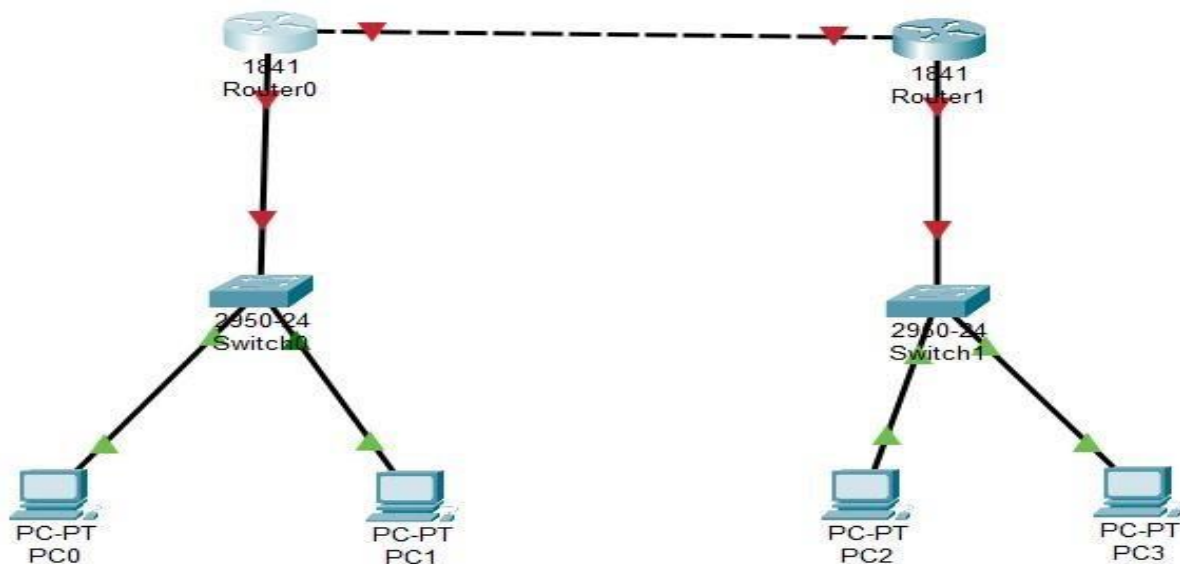
**AIM:** To implement the static routing using Cisco Packet Tracer.

### Static routing:

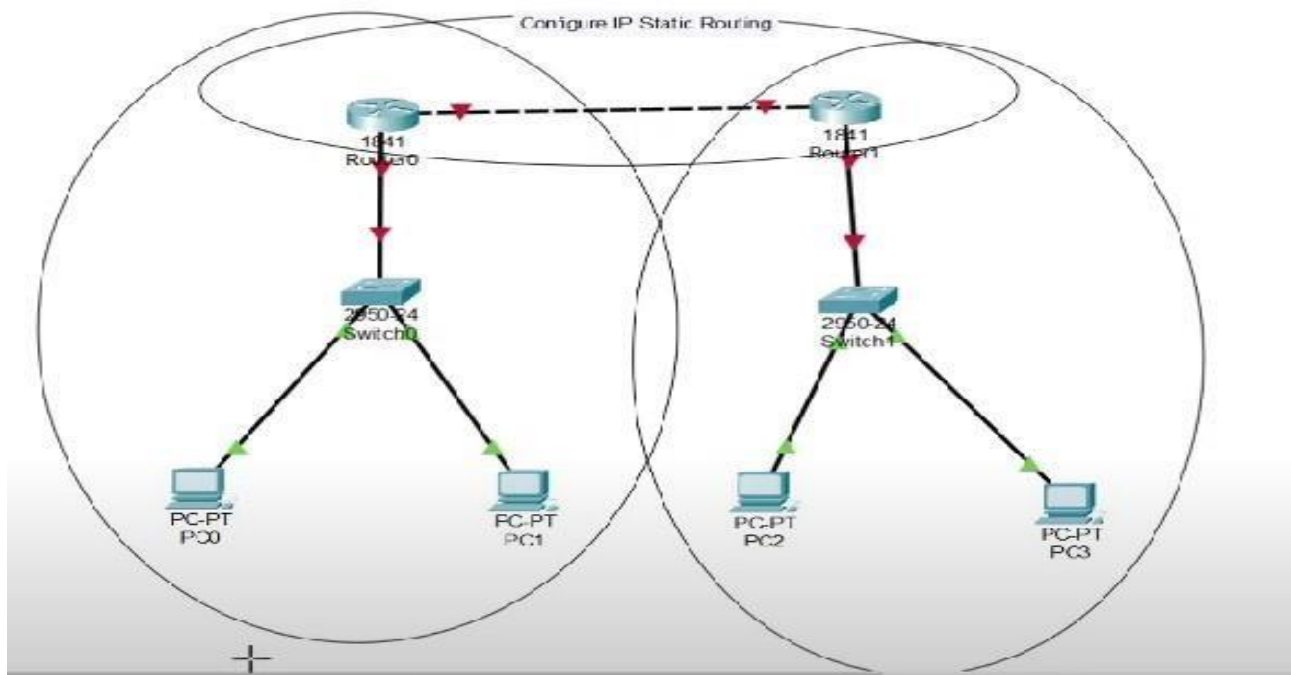
Static routing is a form of routing that occurs when a router uses a manually-configured routing entry, rather than information from dynamic routing traffic.

### Steps:

Develop the network using two routers (1841) from networking devices, two switches (2950-24) from networking devices and 4 PCs from end devices.



Here in total three networks are there



Next step is configuration

In all the four PC IP addresses are set. Two in one network and two is another (Desktop-IP configuration)

PC0

Physical Config **Desktop** Programming Attributes

**IP Configuration** X

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.1.1

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.1.3

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::201:42FF:FED9:E9B5

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

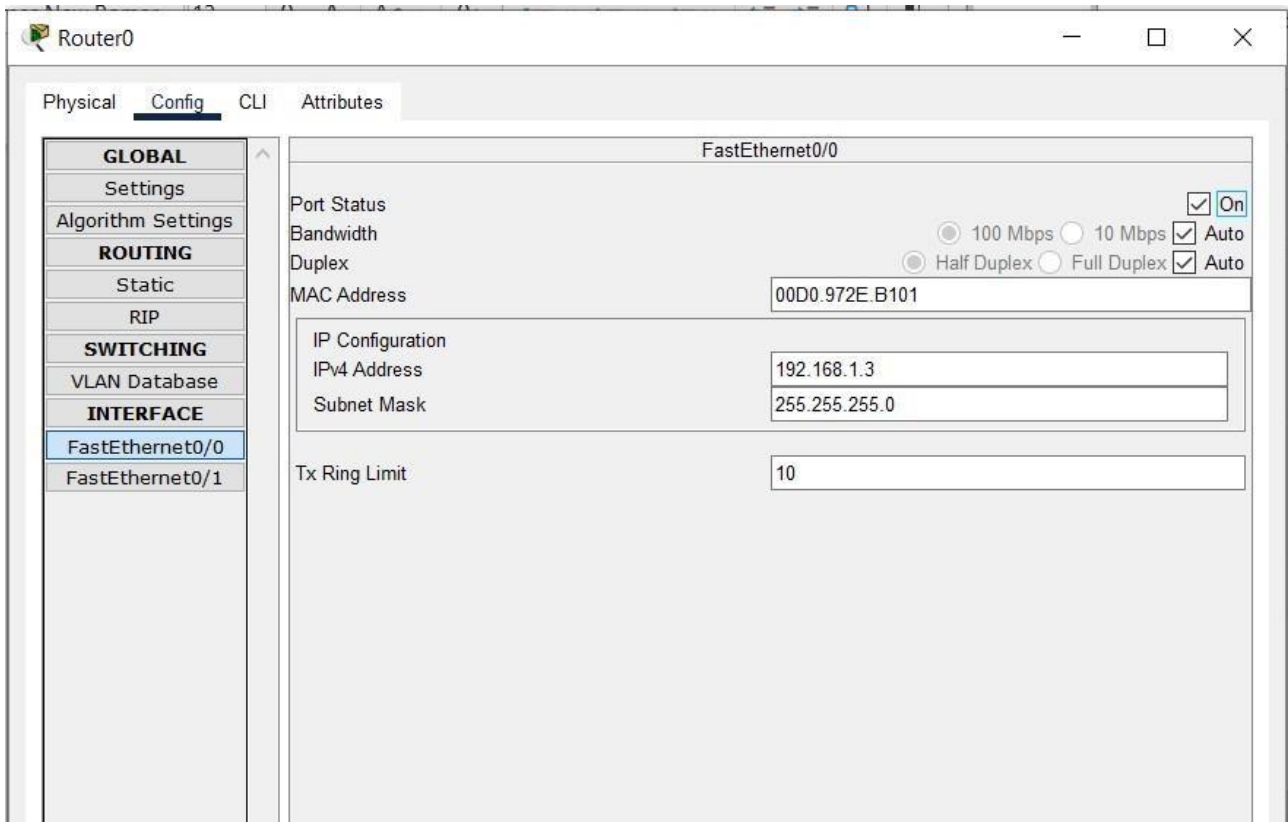
Authentication: MD5

Username:

Password:

Similarly setting for router

(config-fastethernet 0/0 for the networks connected pcs)




The screenshot shows the configuration window for Router0. The 'Config' tab is selected, and the 'FastEthernet0/0' interface is chosen from the left sidebar. The configuration details are as follows:

FastEthernet0/0	
Port Status	<input checked="" type="checkbox"/> On
Bandwidth	<input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="checkbox"/> Auto
Duplex	<input checked="" type="radio"/> Half Duplex <input type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto
MAC Address	00D0.972E.B101
IP Configuration	
IPv4 Address	192.168.1.3
Subnet Mask	255.255.255.0
Tx Ring Limit	10



Set Ip address. Subnet mask will appear automatically. Click on “on” on the top.

For router to router connecting network ((config-fastethernet 0/1)

 Router0
 —
□
X

Physical
 **Config**
CLI
 Attributes

**GLOBAL**
Settings
Algorithm Settings
**ROUTING**
Static
RIP
**SWITCHING**
VLAN Database
**INTERFACE**
FastEthernet0/0
**FastEthernet0/1**

FastEthernet0/1

Port Status ☐ On  
Bandwidth ☒ 100 Mbps ☐ 10 Mbps ☒ Auto  
Duplex ☒ Half Duplex ☐ Full Duplex ☒ Auto  
MAC Address 00D0.972E.B102

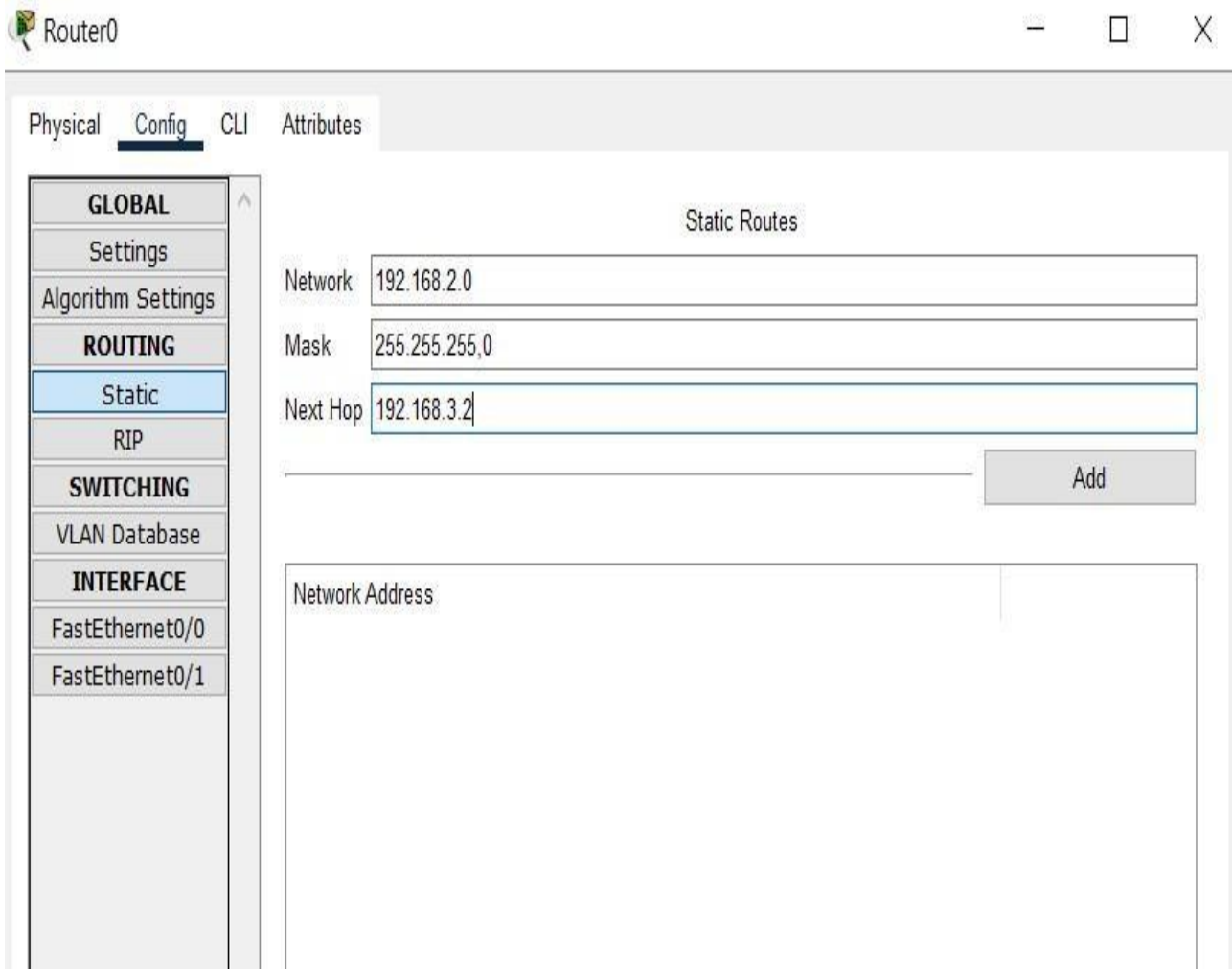
IP Configuration  
IPv4 Address 192.168.3.1  
Subnet Mask 255.255.255.0

Tx Ring Limit 10

Set Ip address. Subnet mask will appear automatically. Click on “on” on the top.

Now the router-to-router connection is required.

For this for the router in network 1, set the following from config then static



Router0

Physical **Config** CLI Attributes

**GLOBAL**

Settings

Algorithm Settings

**ROUTING**

Static

RIP

**SWITCHING**

VLAN Database

**INTERFACE**

FastEthernet0/0

FastEthernet0/1

Static Routes

Network 192.168.2.0

Mask 255.255.255.0

Next Hop 192.168.3.2

Add

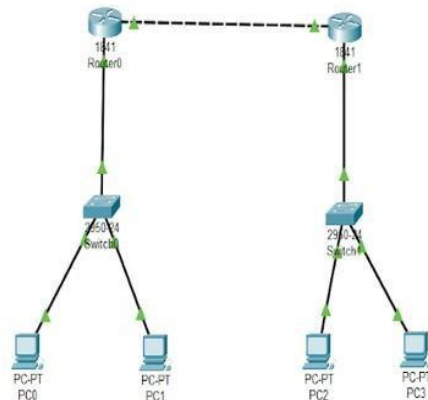
Network Address

Click on add

For the router in network 2, set the following from

Click on add

Now check message passing from pc no 3 to pc no 0. It is successful



32:08:48

Realtime Simulation

Scenario 0

New Delete

Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
Successful		PC0	PC3	ICMP		0.000	N	0	(edit)	(delete)

Automatically Choose Connection Type

## **EXPERIMENT NO. 7**

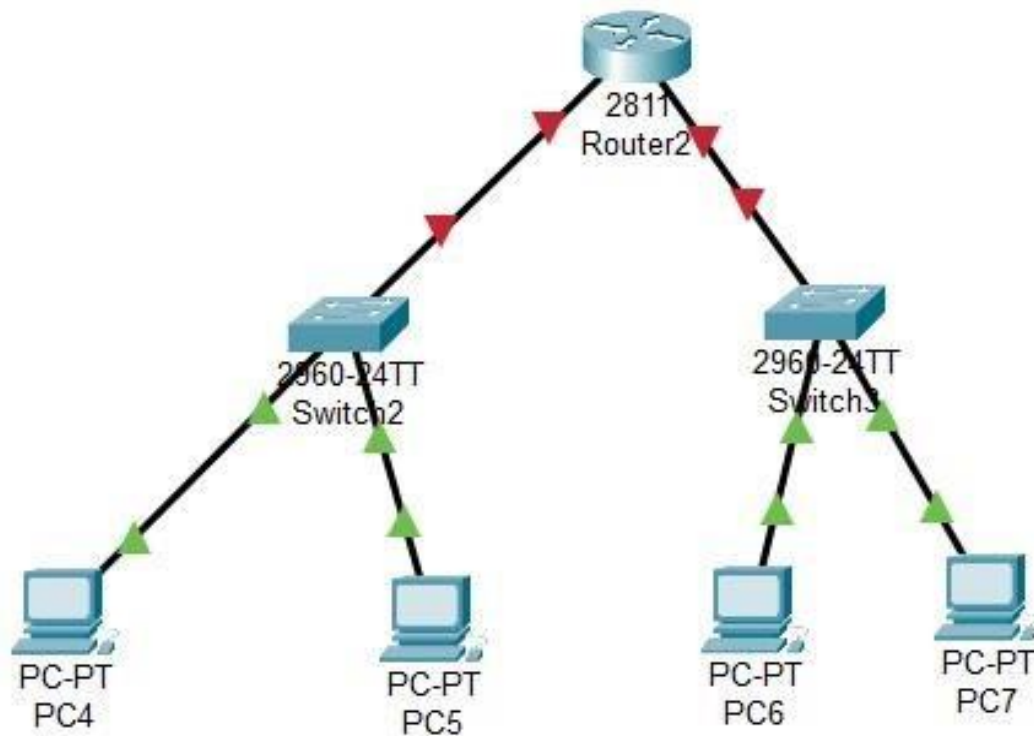
**AIM:** To implement an IP Addressing Scheme and Subnetting in small networks using Cisco Packet Tracer.

### **Subnetting:**

The practice of dividing a network into two or more networks is called subnetting. Creating a subnet by dividing the host identifier. Computers that belong to the same subnet are addressed with an identical group of its most-significant bits of their IP addresses.

### **Steps:**

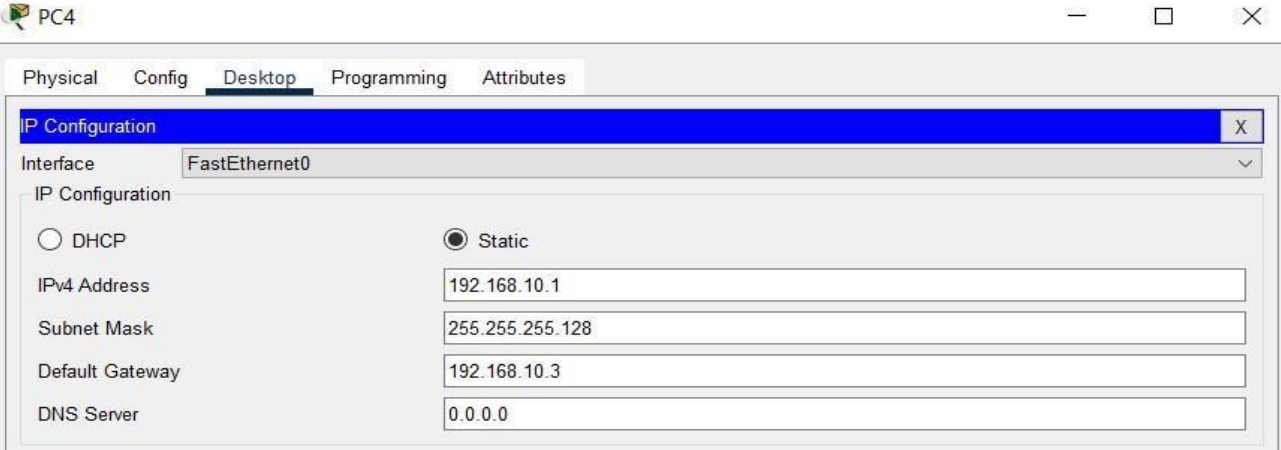
Develop a network using a router (2811), two switches (2960-24TT) and four PCs



Then configure the IP addresses in each pc

Here subnet mask will be divided in to two parts so instead of 255 we have to take 128

In one side



PC4

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

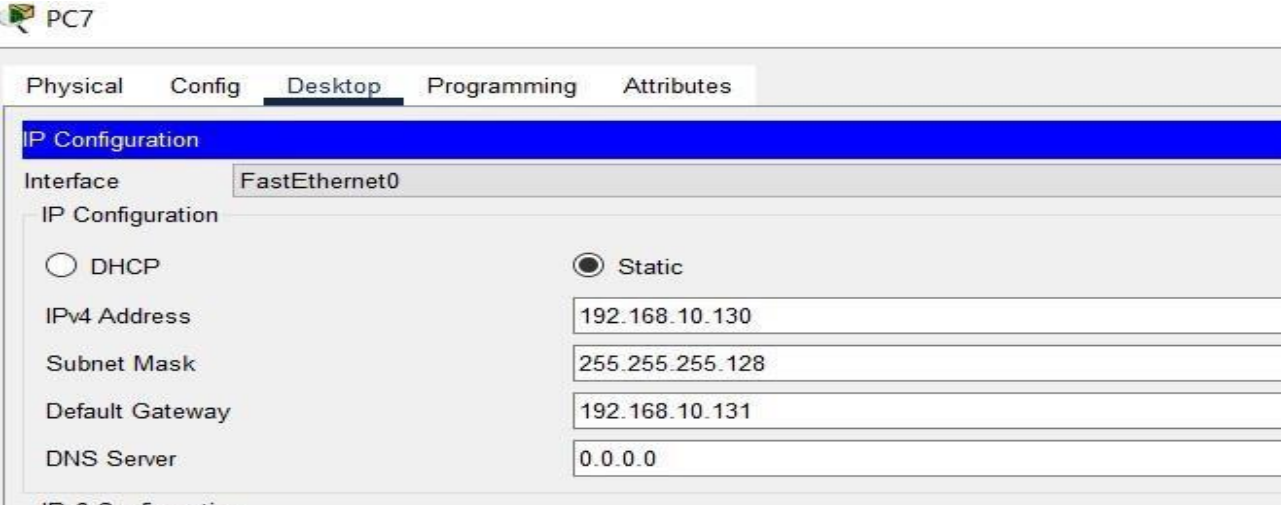
IPv4 Address 192.168.10.1

Subnet Mask 255.255.255.128

Default Gateway 192.168.10.3

DNS Server 0.0.0.0

In the other side



PC7

Physical Config **Desktop** Programming Attributes

IP Configuration

Interface FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address 192.168.10.130

Subnet Mask 255.255.255.128

Default Gateway 192.168.10.131

DNS Server 0.0.0.0

Then configuration for the router for both fastethernet 0/0 and fastethernet 0/1

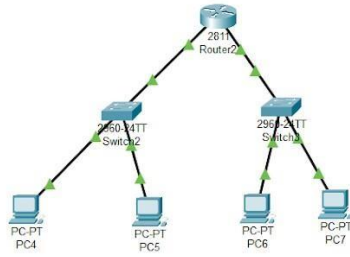
Physical	Config	CLI	Attributes
<div> <div> <b>GLOBAL</b>            Settings            Algorithm Settings  <b>ROUTING</b>            Static            RIP  <b>SWITCHING</b>            VLAN Database  <b>INTERFACE</b>            FastEthernet0/0            FastEthernet0/1         </div> <div> <p align="center"><b>FastEthernet0/0</b></p> <div> Port Status <input checked="" type="checkbox"/> On  Bandwidth <input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="checkbox"/> Auto  Duplex <input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto  MAC Address <input type="text" value="0001.9630.7101"/>  <hr/> <div> IP Configuration  IPv4 Address <input type="text" value="192.168.10.3"/>  Subnet Mask <input type="text" value="255.255.255.128"/>  <hr/> Tx Ring Limit <input type="text" value="10"/> </div> </div> </div> </div>			

And

Router2

Physical	Config	CLI	Attributes
<div> <div> <b>GLOBAL</b>            Settings            Algorithm Settings  <b>ROUTING</b>            Static            RIP  <b>SWITCHING</b>            VLAN Database  <b>INTERFACE</b>            FastEthernet0/0            FastEthernet0/1         </div> <div> <p align="center"><b>FastEthernet0/1</b></p> <div> Port Status <input checked="" type="checkbox"/> On  Bandwidth <input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="checkbox"/> Auto  Duplex <input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto  MAC Address <input type="text" value="0001.9630.7102"/>  <hr/> <div> IP Configuration  IPv4 Address <input type="text" value="192.168.10.131"/>  Subnet Mask <input type="text" value="255.255.255.128"/>  <hr/> Tx Ring Limit <input type="text" value="10"/> </div> </div> </div> </div>			

Then check the message passing is successful



11:47 [Icons]

Realtime

Scenario 0

New Delete

Toggle PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC4	PC7	ICMP		0.000	N	0	(edit)	(delete)

Automatically Close Connection Time



## **EXPERIMENT NO. 8**

**AIM:** To Connect two LAN networks through Router.

### **Introduction to the packet tracer interface using a LAN network**

**Step 1:** Start packet tracer

**Step 2:** Choose switch then select generic

**Step 3:** After selecting generic click on the main area.

**Step 4:** Select end devices and then click on generic.

**Step 5:** click at workspace to see the PC.

**Step 6:** select connections from power cycle devices and click on automatically choose connection type.

**Step 7:** Draw connections from switch to PC.

**Step 8:** Double click on a PC, a box will appear, click on the Desktop tab.

**Step 9:** Then select IP configuration.

**Step 10:** Write the IP address of your network and click at the Subnet mask filed.

Subnet mask will appear automatically.

**Step 11:** Repeat step 10 to set the IPs for all the PCs.

**Step 12:** Now add a router and repeat the above step for connecting second LAN.

**Step 13:** The second LAN would be configured with different class of IP.

**Step 14:** Configure the router's fast ethernet ports to the IP of both classes and green light will blink.

**Step 15:** Now to connect both LAN, we need a gateway which is set by configuring the gateway of each device in the LAN with it's router IP address for that particular class.

All the lights turn green and both the LAN would be connected.

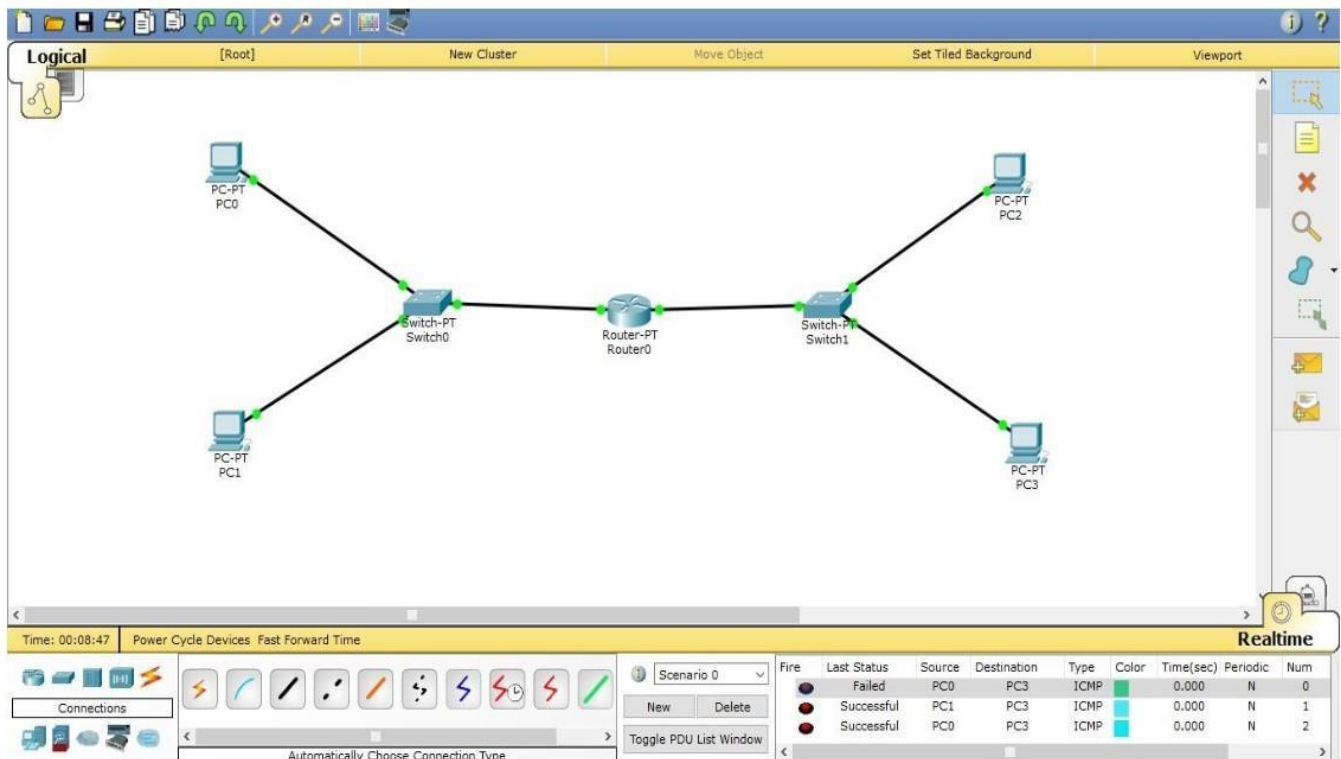
**Step 16:** Select "Add simple message".



**Step 17:** Drag and drop the message to the source device and then to the destination device.

**Step 18:** Observe the path of the message from source to switch. Then to all devices and then move to the destination.

**Step 19:** Finally observe the marks. If the source PC is marked correct it means you have successfully established connection.



## **EXPERIMENT NO. 9**

**AIM:** To implement the DHCP onto the Network Topology using Cisco Packet Tracer.

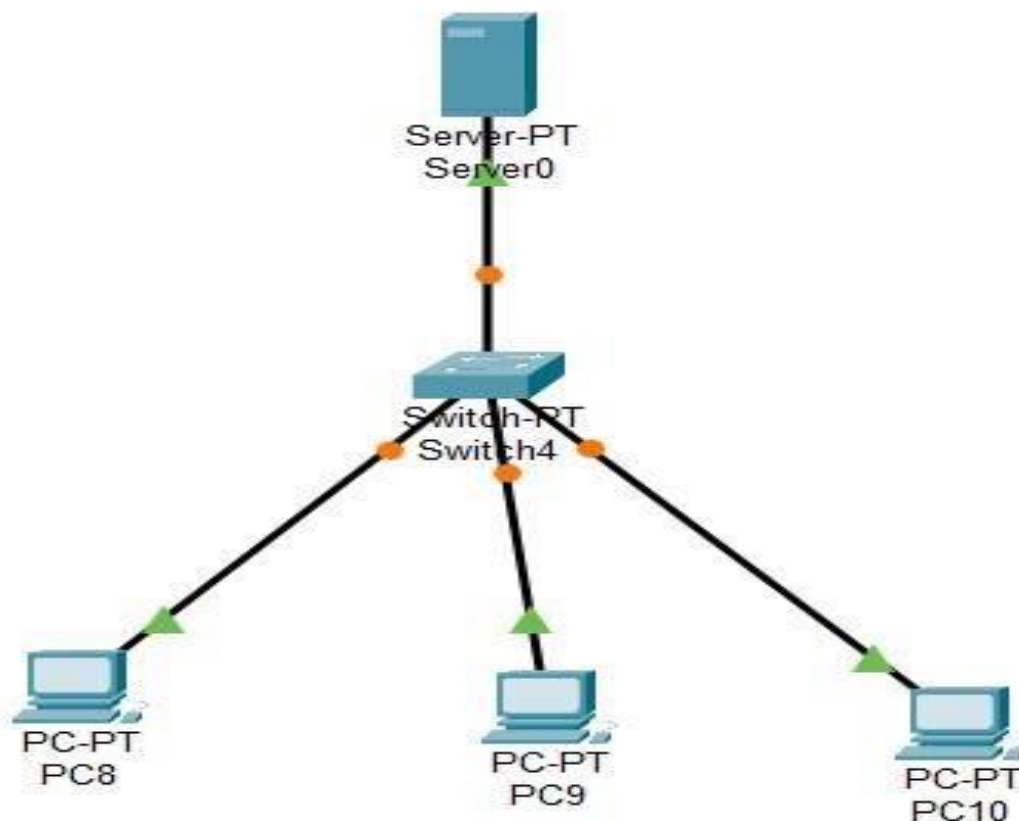
### **DHCP:**

Dynamic Host Configuration Protocol (DHCP) is a network protocol used to automate the process of configuring devices on IP networks. it's the standard mechanism to dynamically assign IP addresses within a network.

### **Steps:**

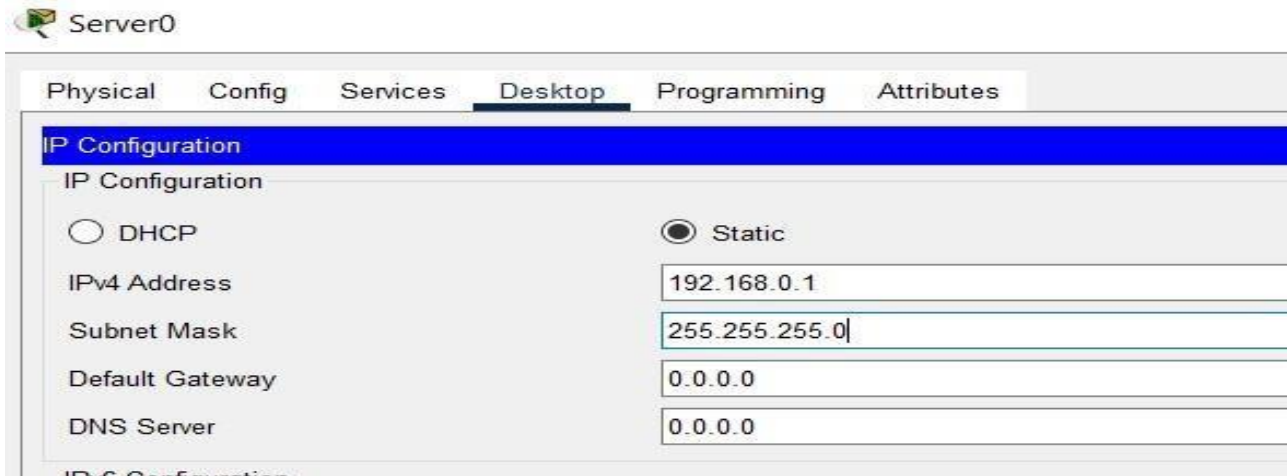
Develop a network using a server (Server-PT), a switch ( Switch-PT) and few no. of PCs.

Here three PCs are taken



Set the configuration in server

First from desktop – Ip configuration, set the following



Server0

Physical Config Services **Desktop** Programming Attributes

**IP Configuration**

IP Configuration

☐ DHCP ☒ Static

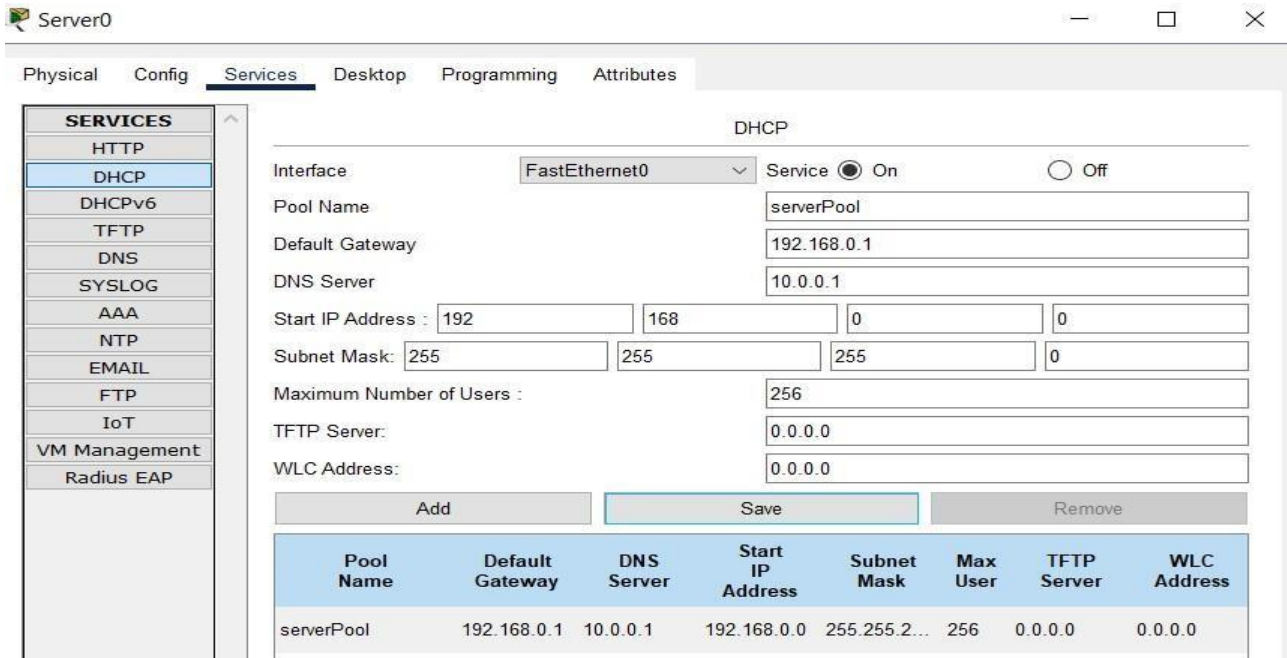
IPv4 Address: 192.168.0.1

Subnet Mask: 255.255.255.0

Default Gateway: 0.0.0.0

DNS Server: 0.0.0.0

Then go to services click on DHCP then set the following



Server0

Physical Config **Services** Desktop Programming Attributes

**SERVICES**

- HTTP
- DHCP**
- DHCPv6
- TFTP
- DNS
- SYSLOG
- AAA
- NTP
- EMAIL
- FTP
- IoT
- VM Management
- Radius EAP

**DHCP**

Interface: FastEthernet0 Service: ☒ On ☐ Off

Pool Name: serverPool

Default Gateway: 192.168.0.1

DNS Server: 10.0.0.1

Start IP Address: 192 168 0 0

Subnet Mask: 255 255 255 0

Maximum Number of Users: 256

TFTP Server: 0.0.0.0

WLC Address: 0.0.0.0

Add Save Remove

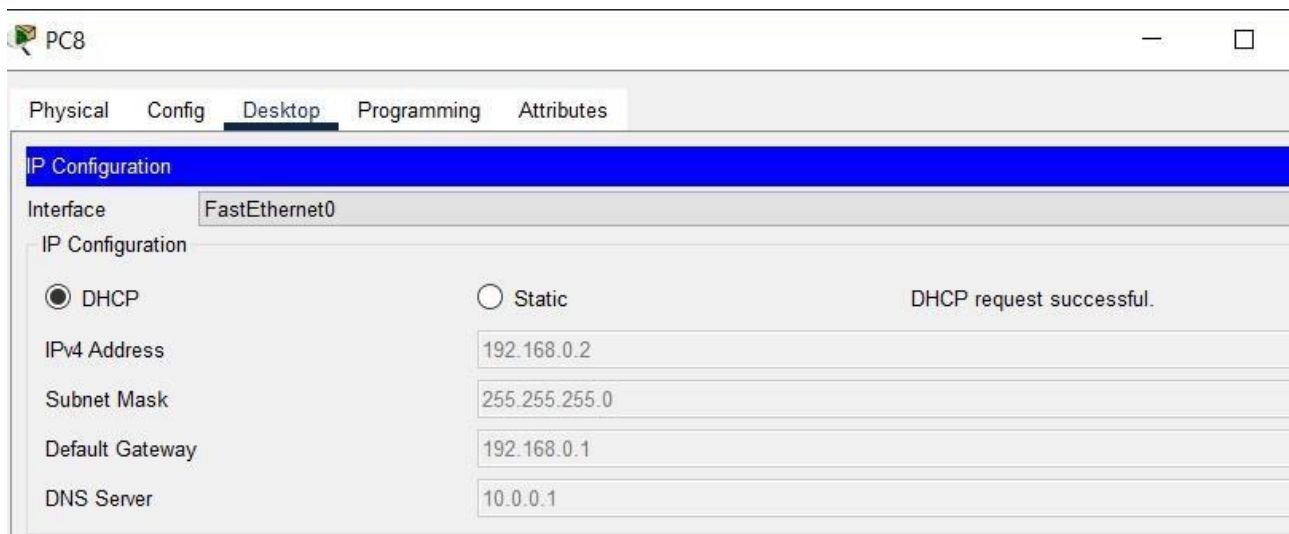
Pool Name	Default Gateway	DNS Server	Start IP Address	Subnet Mask	Max User	TFTP Server	WLC Address
serverPool	192.168.0.1	10.0.0.1	192.168.0.0	255.255.255.0	256	0.0.0.0	0.0.0.0

Click on “on”

Set default gateway, DNS server then click on “save”

Back to the end devices

Set the following in PCs Desktop- Ip configuration



The screenshot shows the 'PC8' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is highlighted. The 'Interface' is 'FastEthernet0'. The 'IP Configuration' section shows 'DHCP' selected and 'Static' unselected. The 'DHCP request successful.' message is displayed. The 'IPv4 Address' is '192.168.0.2', 'Subnet Mask' is '255.255.255.0', 'Default Gateway' is '192.168.0.1', and 'DNS Server' is '10.0.0.1'.

Interface	FastEthernet0
IP Configuration	
<input checked="" type="radio"/> DHCP	<input type="radio"/> Static
DHCP request successful.	
IPv4 Address	192.168.0.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.0.1
DNS Server	10.0.0.1

Click on DHCP, The Ip address will appear automatically.

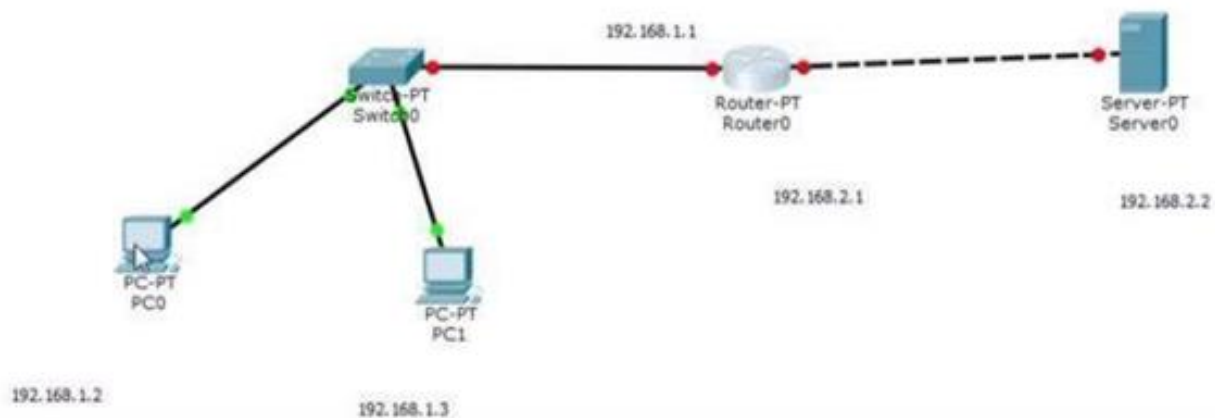
## **EXPERIMENT NO. 10**

**AIM:** To implement the Email Services in the Network using Cisco Packet Tracer.

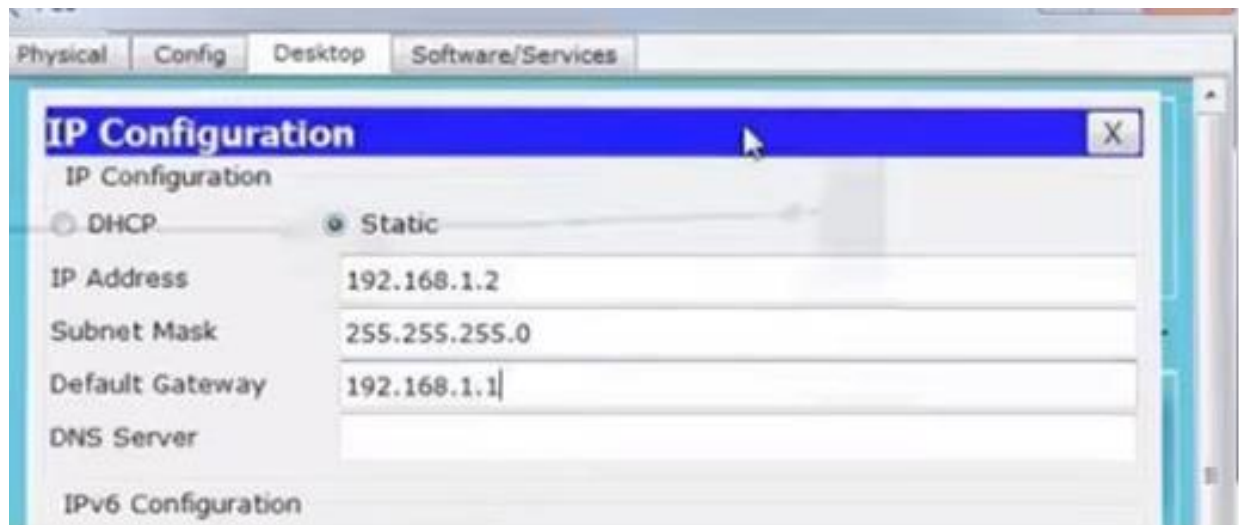
A mail server (sometimes called an email server) is a software program that sends and receives email

### **Steps:**

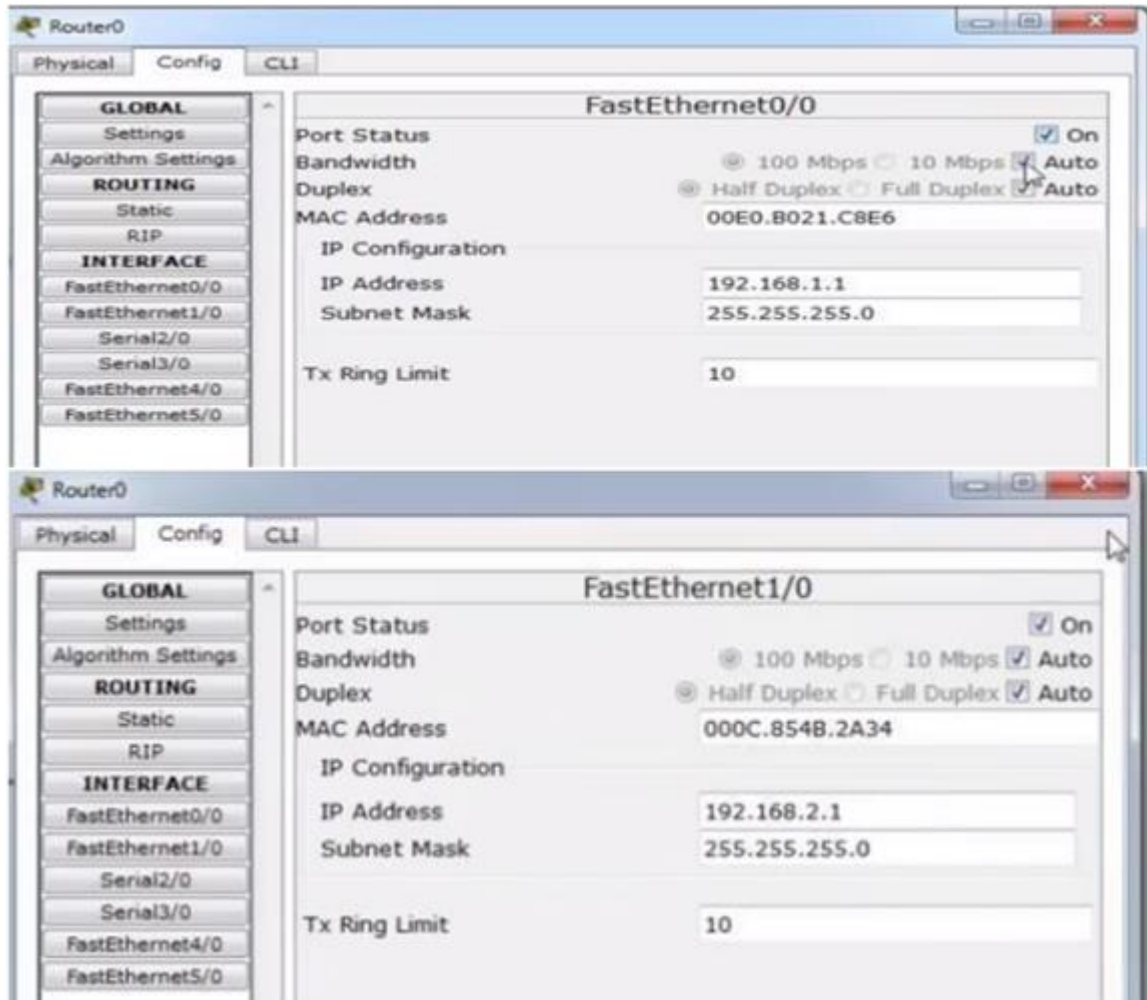
1. Make the network



2. Set all the Ip config as shown from Desktop-Ip config in end devices



3. Set the router ip address also.



The image displays two screenshots of the Router0 configuration interface, showing the configuration for FastEthernet0/0 and FastEthernet1/0.

**FastEthernet0/0 Configuration:**

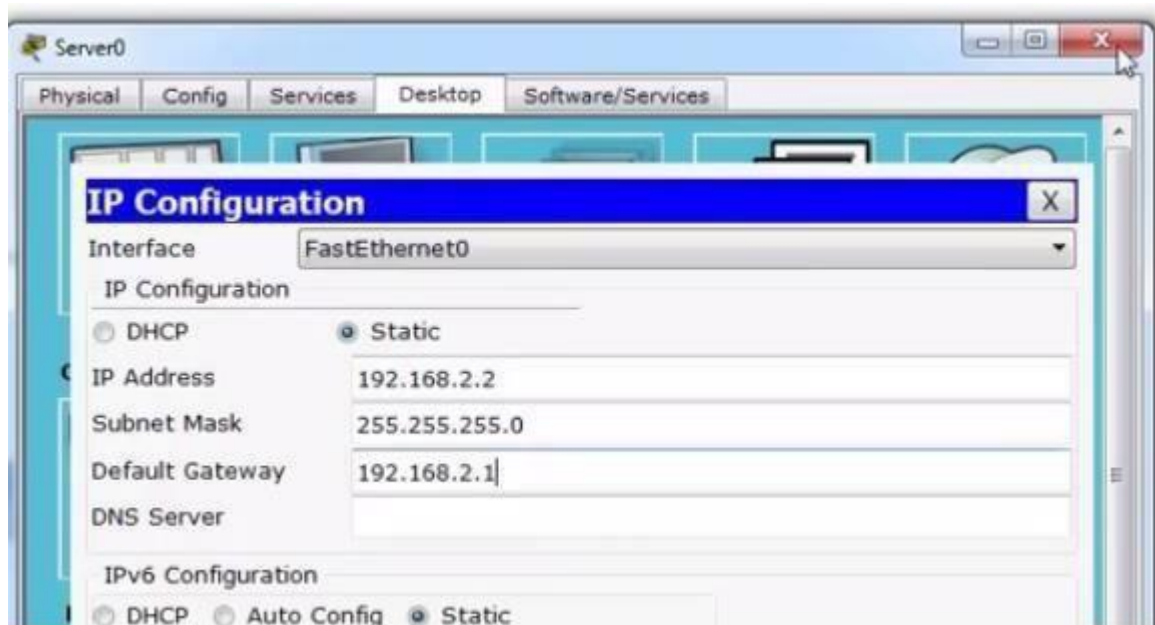
- Port Status: ☒ On
- Bandwidth: ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex: ☒ Half Duplex ☐ Full Duplex ☒ Auto
- MAC Address: 00E0.B021.C8E6
- IP Configuration:
  - IP Address: 192.168.1.1
  - Subnet Mask: 255.255.255.0
- Tx Ring Limit: 10

**FastEthernet1/0 Configuration:**

- Port Status: ☒ On
- Bandwidth: ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex: ☒ Half Duplex ☐ Full Duplex ☒ Auto
- MAC Address: 000C.854B.2A34
- IP Configuration:
  - IP Address: 192.168.2.1
  - Subnet Mask: 255.255.255.0
- Tx Ring Limit: 10



4. Set the IP Config in server



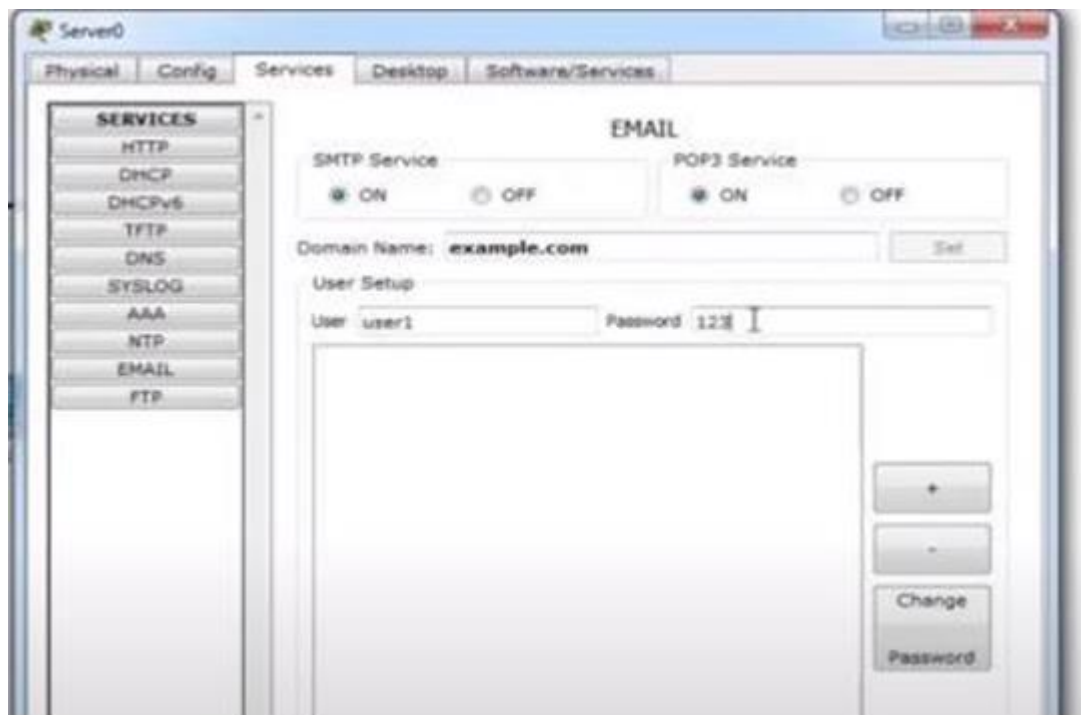
5. Set the service in server

Click on services then to setup Email, click on EMAIL

Then set the Domain name and click on set. Here we set Email as example.com

Then User and password are need to be added. Here we set user as user1 and password 123.

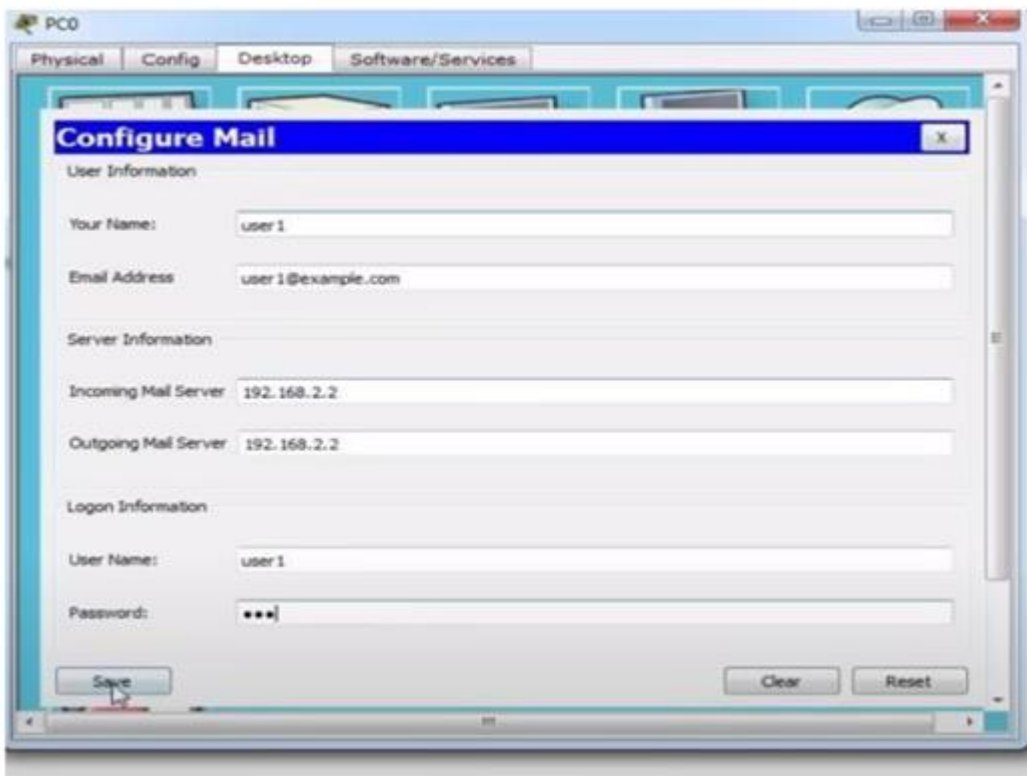
Then click on + . We can create a number of users by adding this way.





6. Then go to the end device and set the following

From desktop choose configure mail. Then set the details as follow and save.



**Configure Mail**

User Information

Your Name: user 1

Email Address: user1@example.com

Server Information

Incoming Mail Server: 192.168.2.2

Outgoing Mail Server: 192.168.2.2

Logon Information

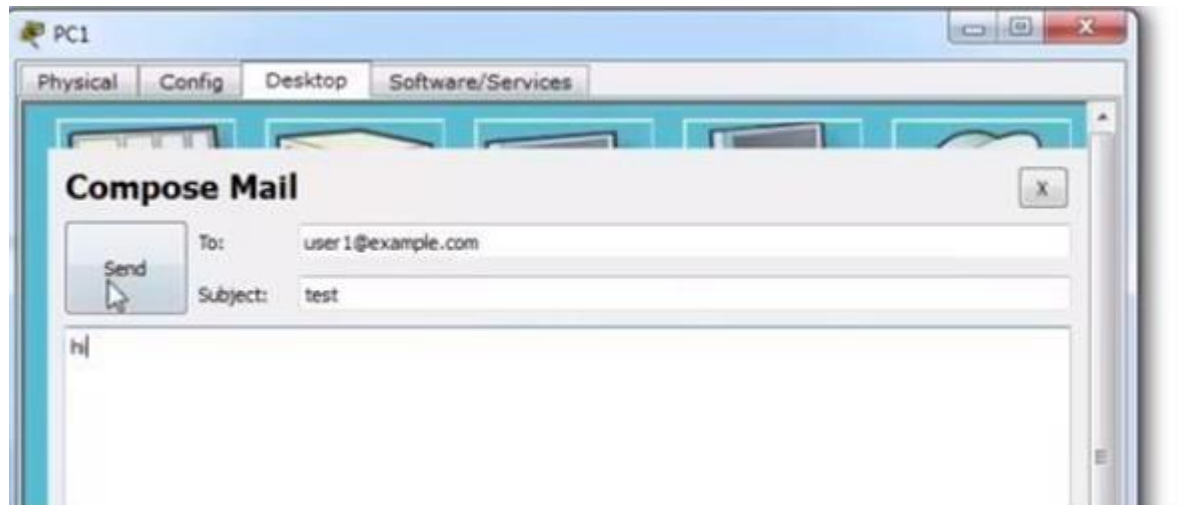
User Name: user 1

Password: \*\*\*

Save Clear Reset

7. Then from desktop click on Mail browser then compose mail.

In that compose mail fill the details liketo, subject and then message. At last click on send



8. Then from the other pc click on desktop then mail browser.

Then click on receive, it will show the received message. Click on the message, the message will appear below.

## **EXPERIMENT NO. 11**

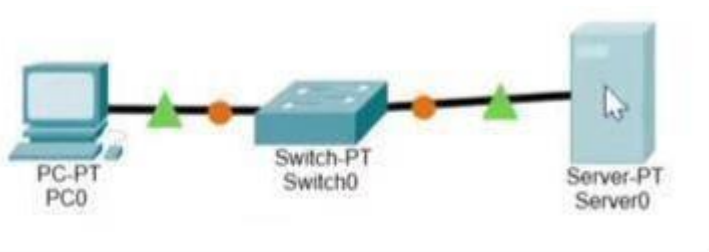
**AIM:** To implement the DNS server in the Network using Cisco Packet Tracer.

DNS servers translate domain names into IP addresses, enabling DNS clients to reach the origin server.

Learn about the different types of DNS servers.

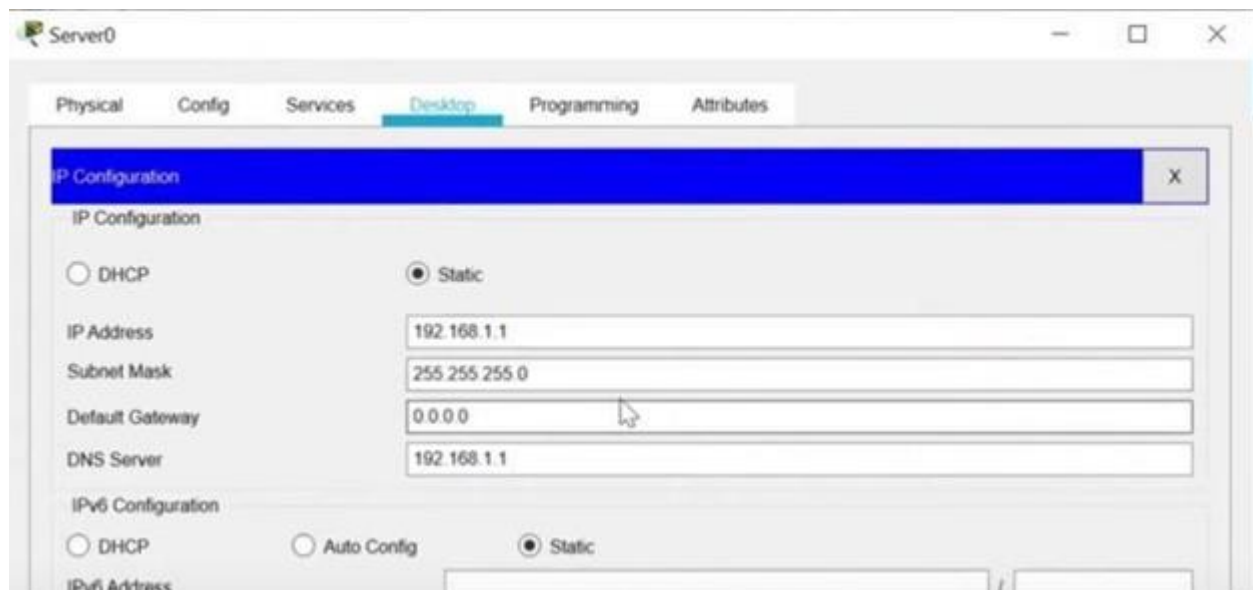
### **Steps:**

1. Design the network first

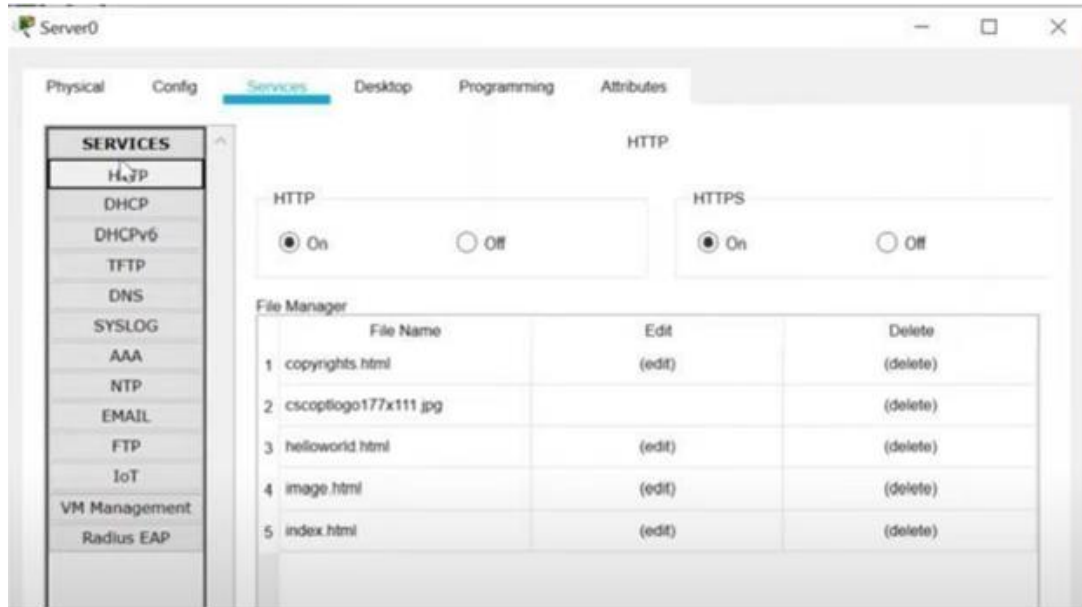


2. Set the server ip.

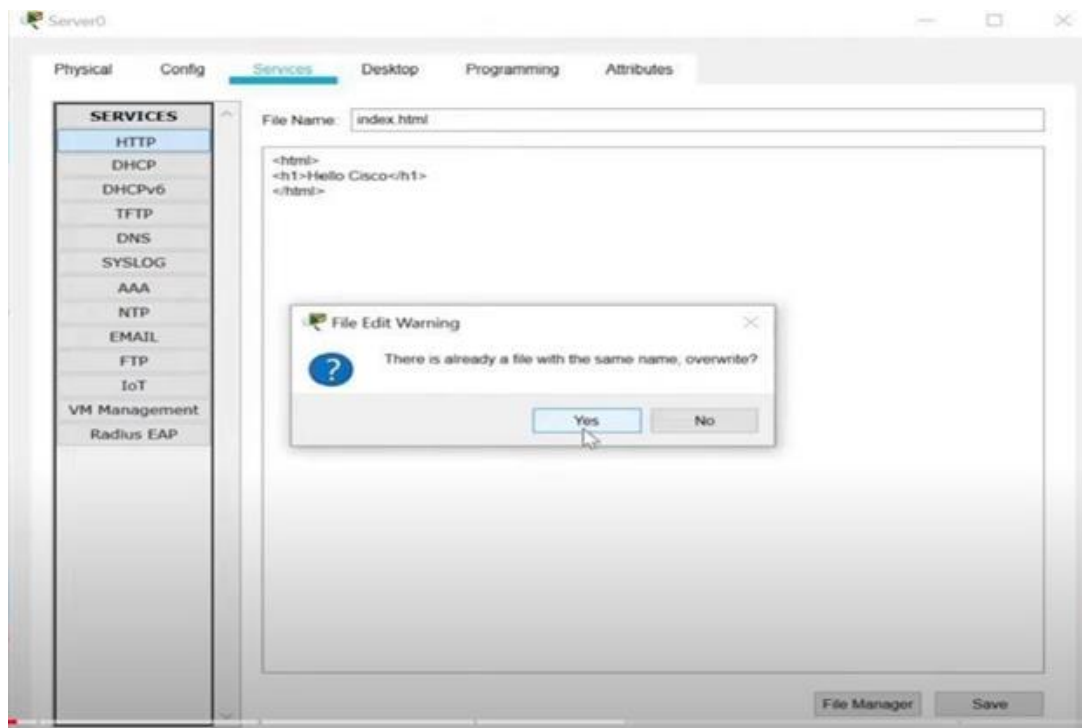
Choose Ip configuration from desktop. Fill IP address and DNS server. Make sure both are same.



3. Then click on services. To make a website click on HTTP

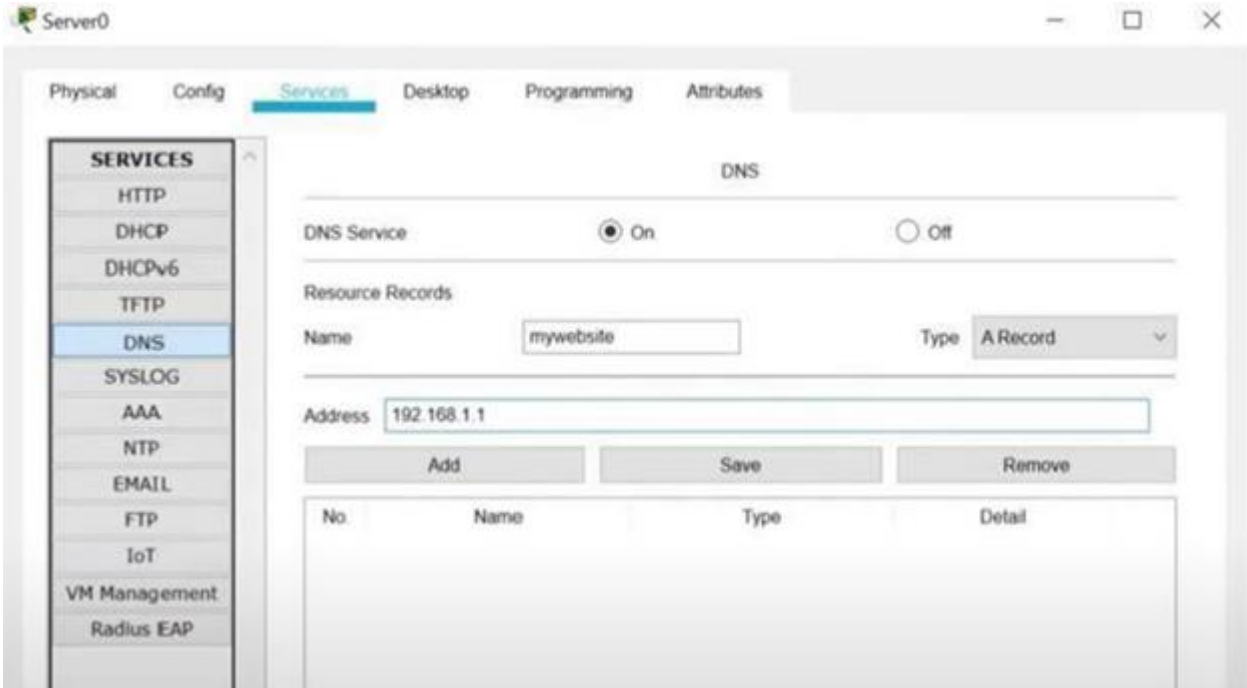


4. Go to any website name, for example last one index.html click on edit button. Change the codes as per your choice and then click on save. It will ask about overwriting, click yes



5. Second setup in server only.

Click on DNS from left side then click on the DNS radio button. Fill the web site name and address.

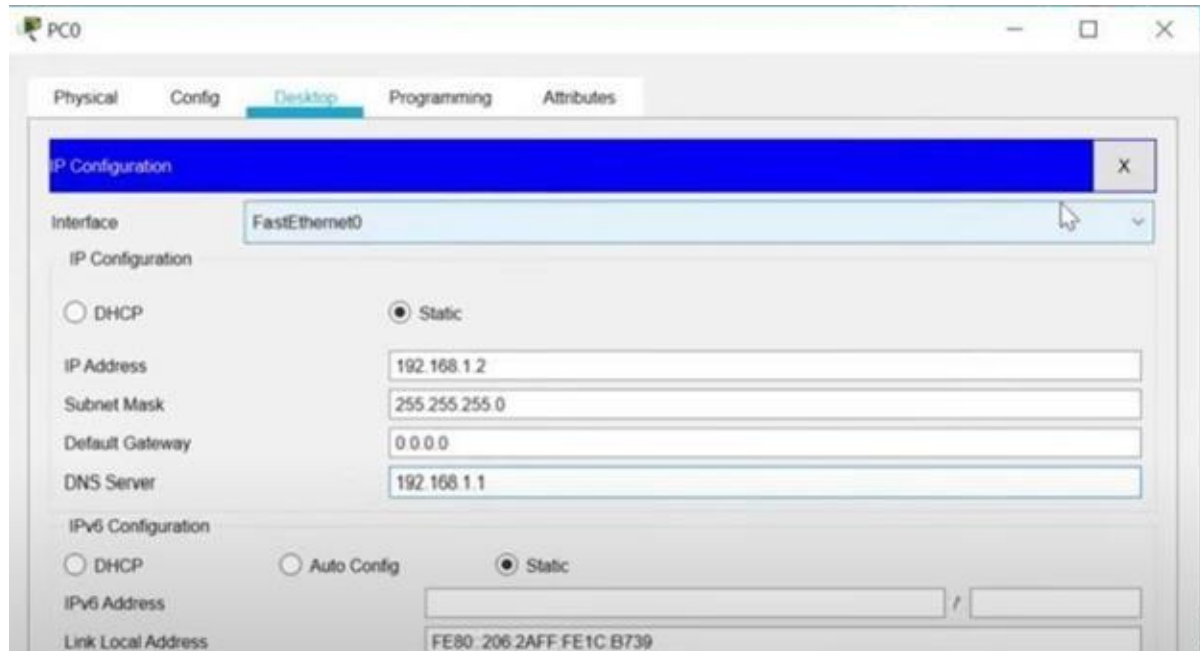


The screenshot shows the 'Server0' configuration window with the 'Services' tab selected. The 'DNS' service is highlighted in the left sidebar. The main area shows the 'DNS' configuration with the 'DNS Service' radio button set to 'On'. The 'Resource Records' section has a 'Name' field containing 'mywebsite' and a 'Type' dropdown set to 'A Record'. The 'Address' field contains '192.168.1.1'. Below these fields are 'Add', 'Save', and 'Remove' buttons. At the bottom, there is a table with columns 'No.', 'Name', 'Type', and 'Detail'.

No.	Name	Type	Detail
-----	------	------	--------

The address is the Ip address of the server only. Click on add. The name reflect below.

6. In the end device assign the IP address and DNS server. DNS server is the ip address of the server only.



7. From desktop only select web browser. Write the website name and click on go button then the web page is visible.

