

# Practical

## No.1

**AIM:** Using, linux-terminal or Windows-cmd, execute following networking commands and note the output: ping, traceroute, netstat, arp, ipconfig, Getmac, hostname, NSLookUp, pathping, SystemInfo.

### **PROGRAM:**

1. **ping:** ping is a computer network administration software utility used to test the reachability of a host on an Internet Protocol It is available for virtually all operating systems that have networking capability, including most embedded network administration software.

```
C:\WINDOWS\system32>ping www.google.com

Pinging www.google.com [142.250.192.4] with 32 bytes of data:
Request timed out.
Reply from 142.250.192.4: bytes=32 time=2ms TTL=58
Reply from 142.250.192.4: bytes=32 time=11ms TTL=58
Reply from 142.250.192.4: bytes=32 time=3ms TTL=58

Ping statistics for 142.250.192.4:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 2ms, Maximum = 11ms, Average = 5ms
```

2. **traceroute:** The traceroute command(tracert) is a utility designed for displaying the time it takes for a packet of information to travel between a host system and the final destination system. This command returns a list of the hops that the data packets take along their path along their way to the destination.

```
C:\WINDOWS\system32>traceroute www.toolsvilla.com
'traceroute' is not recognized as an internal or external command,
operable program or batch file.

C:\WINDOWS\system32>tracert www.toolsvilla.com

Tracing route to www.toolsvilla.com [172.66.43.34]
over a maximum of 30 hops:

  1  <1 ms    <1 ms    <1 ms  10.128.0.2
  2  3 ms      *       5 ms  static-17.218.143.114-tataidc.co.in [114.143.218.17]
  3  2 ms      2 ms   30 ms  10.124.253.101
  4  *         *       *       Request timed out.
  5  2 ms      2 ms   *       115.113.165.21.static-mumbai.vsnl.net.in [115.113.165.21]
  6  3 ms      2 ms   3 ms   172.28.176.217
  7  3 ms      *       3 ms   172.28.177.190
  8  4 ms      4 ms   4 ms   121.240.241.246
  9  6 ms      11 ms  35 ms  172.71.196.4
 10  *        3 ms   5 ms   172.66.43.34

Trace complete.
```

3. **netstat:** The netstat provides statistics about all active connections so you that we can find out which computers or networks a PC is connected to

Some of the netstat commands commonly used are:

#### (i) **netstat-in command**

This netstat function shows the state of all configured interfaces.

```
C:\WINDOWS\system32>netstat -in
Displays protocol statistics and current TCP/IP network connections.

NETSTAT [-a] [-b] [-e] [-f] [-n] [-o] [-p proto] [-r] [-s] [-t] [-x] [-y] [interval]

-a          Displays all connections and listening ports.
-b          Displays the executable involved in creating each connection or
           listening port. In some cases well-known executables host
           multiple independent components, and in these cases the
           sequence of components involved in creating the connection
           or listening port is displayed. In this case the executable
           name is in [] at the bottom, on top is the component it called,
           and so forth until TCP/IP was reached. Note that this option
           can be time-consuming and will fail unless you have sufficient
           permissions.
-e          Displays Ethernet statistics. This may be combined with the -s
           option.
-f          Displays Fully Qualified Domain Names (FQDN) for foreign
           addresses.
-n          Displays addresses and port numbers in numerical form.
-o          Displays the owning process ID associated with each connection.
-p proto    Shows connections for the protocol specified by proto; proto
           may be any of: TCP, UDP, TCPv6, or UDPv6. If used with the -s
           option to display per-protocol statistics, proto may be any of:
           IP, IPv6, ICMP, ICMPv6, TCP, TCPv6, UDP, or UDPv6.
-q          Displays all connections, listening ports, and bound
           nonlistening TCP ports. Bound nonlistening ports may or may not
           be associated with an active connection.
-r          Displays the routing table.
-s          Displays per-protocol statistics. By default, statistics are
           shown for IP, IPv6, ICMP, ICMPv6, TCP, TCPv6, UDP, and UDPv6;
           the -p option may be used to specify a subset of the default.
-t          Displays the current connection offload state.
-x          Displays NetworkDirect connections, listeners, and shared
           endpoints.
-y          Displays the TCP connection template for all connections.
           Cannot be combined with the other options.
```

## (ii) **netstat-a command**

The netstat-a command shows the state of all sockets.

Active Connections			
Proto	Local Address	Foreign Address	State
TCP	0.0.0.0:135	0:0	LISTENING
TCP	0.0.0.0:445	0:0	LISTENING
TCP	0.0.0.0:3306	0:0	LISTENING
TCP	0.0.0.0:4623	0:0	LISTENING
TCP	0.0.0.0:4624	0:0	LISTENING
TCP	0.0.0.0:5040	0:0	LISTENING
TCP	0.0.0.0:5357	0:0	LISTENING
TCP	0.0.0.0:7070	0:0	LISTENING
TCP	0.0.0.0:7680	0:0	LISTENING
TCP	0.0.0.0:33060	0:0	LISTENING
TCP	0.0.0.0:49664	0:0	LISTENING
TCP	0.0.0.0:49665	0:0	LISTENING
TCP	0.0.0.0:49666	0:0	LISTENING
TCP	0.0.0.0:49667	0:0	LISTENING
TCP	0.0.0.0:49668	0:0	LISTENING
TCP	0.0.0.0:49672	0:0	LISTENING
TCP	0.0.0.0:49715	0:0	LISTENING
TCP	10.128.0.177:139	0:0	LISTENING
TCP	10.128.0.177:49152	0:0	LISTENING
TCP	10.128.0.177:53480	relay-048e8b10:https	ESTABLISHED
TCP	10.128.0.177:53481	167.172.20.8:3333	ESTABLISHED
TCP	10.128.0.177:53530	20.198.118.190:https	ESTABLISHED
TCP	10.128.0.177:53567	172-105-129-132:https	CLOSE_WAIT
TCP	10.128.0.177:53569	mx01:8443	ESTABLISHED
TCP	10.128.0.177:53601	a23-54-82-234:https	ESTABLISHED
TCP	10.128.0.177:53681	152.195.38.76:http	CLOSE_WAIT
TCP	10.128.0.177:53724	a96-17-150-107:https	ESTABLISHED

## (iii) **netstat-s**

The netstat-s command shows statistics for each protocol(while the netstat-p command shows the statistics for the specified protocol).

```
C:\WINDOWS\system32>netstat -s

IPv4 Statistics

Packets Received = 1839475
Received Header Errors = 468
Received Address Errors = 33236
Datagrams Forwarded = 0
Unknown Protocols Received = 0
Received Packets Discarded = 9847
Received Packets Delivered = 1805150
Output Requests = 98165
Routing Discards = 0
Discarded Output Packets = 7
Output Packet No Route = 43
Reassembly Required = 726
Reassembly Successful = 151
Reassembly Failures = 0
Datagrams Successfully Fragmented = 0
Datagrams Failing Fragmentation = 0
Fragments Created = 0
```

(iv) **netstat-r**

Another option relevant to performance is the display of the discovered Path Maximum Transmission Unit (PMTU).

```
C:\WINDOWS\system32>netstat -r
=====
Interface List
 12...02 00 4c 4f 4f 50 .....Npcap Loopback Adapter
  4...c4 65 16 1c 67 11 .....Realtek PCIe GBE Family Controller
  1.....Software Loopback Interface 1
=====

IPv4 Route Table
=====
Active Routes:
Network Destination      Netmask        Gateway       Interface Metric
          0.0.0.0          0.0.0.0    10.128.0.2   10.128.0.177    35
          10.128.0.0    255.255.255.0  On-link        10.128.0.177    291
          10.128.0.177  255.255.255.255  On-link        10.128.0.177    291
          10.128.0.255  255.255.255.255  On-link        10.128.0.177    291
          127.0.0.0        255.0.0.0   On-link        127.0.0.1     331
          127.0.0.1        255.255.255.255  On-link        127.0.0.1     331
          127.255.255.255 255.255.255.255  On-link        127.0.0.1     331
          169.254.0.0      255.255.0.0   On-link      169.254.220.202    281
          169.254.220.202 255.255.255.255  On-link      169.254.220.202    281
          169.254.255.255 255.255.255.255  On-link      169.254.220.202    281
          224.0.0.0         240.0.0.0   On-link        127.0.0.1     331
          224.0.0.0         240.0.0.0   On-link        10.128.0.177    291
          224.0.0.0         240.0.0.0   On-link      169.254.220.202    281
          255.255.255.255 255.255.255.255  On-link        127.0.0.1     331
          255.255.255.255 255.255.255.255  On-link        10.128.0.177    291
          255.255.255.255 255.255.255.255  On-link      169.254.220.202    281
=====
Persistent Routes:
  None
```

4. **arp:** The ARP(Address Resolution Protocol) commands are used to view, display, or modify the details/information in an ARP table/cache.

Some of the common arp commands are as follows

- (i) arp-a: This command is used to display the ARP table for a particular It also shows all the entries of the ARP cache or table.

```
C:\WINDOWS\system32>arp -a

Interface: 10.128.0.177 --- 0x4
  Internet Address      Physical Address      Type
  10.128.0.2            e0-23-ff-61-cf-ee    dynamic
  10.128.0.6            a0-a3-f0-28-81-c0    dynamic
  10.128.0.7            a0-a3-f0-28-81-90    dynamic
  10.128.0.8            a0-a3-f0-28-77-d0    dynamic
  10.128.0.9            a0-a3-f0-22-81-30    dynamic
  10.128.0.10           a0-a3-f0-22-7e-00    dynamic
  10.128.0.11           a0-a3-f0-22-82-e0    dynamic
  10.128.0.13           a8-63-7d-58-c4-f0    dynamic
  10.128.0.14           a0-a3-f0-22-7b-c0    dynamic
  10.128.0.15           a8-63-7d-58-c4-60    dynamic
  10.128.0.16           a8-63-7d-58-c3-70    dynamic
  10.128.0.26           a0-a3-f0-bd-ca-b0    dynamic
  10.128.0.27           a0-a3-f0-bd-c9-30    dynamic
  10.128.0.28           a0-a3-f0-bd-c2-70    dynamic
  10.128.0.29           a0-a3-f0-bd-c5-70    dynamic
  10.128.0.30           a0-a3-f0-bd-ad-10    dynamic
  10.128.0.31           a8-63-7d-56-a2-30    dynamic
  10.128.0.32           a0-a3-f0-bd-ad-d0    dynamic
  10.128.0.33           a0-a3-f0-bd-aa-10    dynamic
  10.128.0.34           a0-a3-f0-bd-aa-d0    dynamic
  10.128.0.35           a0-a3-f0-bd-a9-b0    dynamic
```

(ii) rap-g: Same as the arp-a

(iii) arp -d: This command is used to delete an entry from the ARP table for a particular interface. To delete an entry, write arp -d command along with the IP address in a command prompt to be

(iv) arp -s: This command is used to add the static entry in the ARP table, which resolves theInetAddr(IPaddress) to the Ether Addr (physicaladdress). To add a static entry in an ARP table, we write arp -s command along with the IP address and MAC address of the device in a command.

```
C:\WINDOWS\system32>arp -s

Displays and modifies the IP-to-Physical address translation tables used by
address resolution protocol (ARP).

ARP -s [inet_addr eth_addr [if_addr]]
ARP -d [inet_addr [if_addr]]
ARP -a [inet_addr] [-N if_addr] [-v]

-a          Displays current ARP entries by interrogating the current
           protocol data. If inet_addr is specified, the IP and Physical
           addresses for only the specified computer are displayed. If
           more than one network interface uses ARP, entries for each ARP
           table are displayed.
-g          Same as -a.
-v          Displays current ARP entries in verbose mode. All invalid
           entries and entries on the loop-back interface will be shown.
inet_addr   Specifies an internet address.
-N if_addr  Displays the ARP entries for the network interface specified
           by if_addr.
-d          Deletes the host specified by inet_addr. inet_addr may be
           wildcarded with * to delete all hosts.
-s          Adds the host and associates the Internet address inet_addr
           with the Physical address eth_addr. The Physical address is
           given as 6 hexadecimal bytes separated by hyphens. The entry
           is permanent.
eth_addr    Specifies a physical address.
if_addr     If present, this specifies the Internet address of the
           interface whose address translation table should be modified.
           If not present, the first applicable interface will be used.

Example:
> arp -s 157.55.85.212 00-aa-00-62-c6-09 .... Adds a static entry.
> arp -a          .... Displays the arp table.
```

5. **ipconfig:** ipconfig (Internet Protocol CONFIGuration) is used to display and manage the IP address assigned to the In Windows, typing ipconfig without any parameters displays the computer's currently assigned IP, subnet mask and default gateway addresses.

```
C:\WINDOWS\system32>ipconfig

Windows IP Configuration

Ethernet adapter Ethernet 2:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::5253:f706:d192:6e42%12
  Autoconfiguration IPv4 Address. . . : 169.254.220.202
  Subnet Mask . . . . . : 255.255.0.0
  Default Gateway . . . . . :

Ethernet adapter Ethernet:

  Connection-specific DNS Suffix . :
  Link-local IPv6 Address . . . . . : fe80::4645:d670:d9d8:7d81%4
  IPv4 Address. . . . . : 10.128.0.177
  Subnet Mask . . . . . : 255.255.255.0
  Default Gateway . . . . . : 10.128.0.2

C:\WINDOWS\system32>
```

6. **getmac**: getmac is a Windows command used to display the Media Access Control (MAC) addresses for each network adapter in the computer.

```
C:\WINDOWS\system32>getmac

Physical Address      Transport Name
=====
C4-65-16-1C-67-11    \Device\Tcpip_{0E87EC1C-DEBF-4A2E-B0CB-FCD40560977A}
02-00-4C-4F-4F-50    \Device\Tcpip_{5EF10E6D-9D8D-42D9-93AA-E04973EAF914}

C:\WINDOWS\system32>
```

7. **hostname**: A hostname is a label that is assigned to a device connected to a computer network and it is used to identify the device.

```
C:\WINDOWS\system32>hostname
DESKTOP-UMG1R04
```

8. **NSlookUp**: Using this command we can find the corresponding IP address or domain name system record. The user can also enter a command for it to do a reverse DNS lookup and find the host name for an IP address that is specified.

```
C:\WINDOWS\system32>nslookup  
Default Server: ns3.tataidc.co.in  
Address: 103.8.45.5
```

1. **Pathping:** This command sends multiple echo Request messages to each router between a source and destination, over a period of time, and then computes results based on the packets returned from each router. It can be used to find the routers or links having network problems.

```
C:\WINDOWS\system32>pathping  
Usage: pathping [-g host-list] [-h maximum_hops] [-i address] [-n]  
                [-p period] [-q num_queries] [-w timeout]  
                [-4] [-6] target_name  
  
Options:  
  -g host-list      Loose source route along host-list.  
  -h maximum_hops  Maximum number of hops to search for target.  
  -i address        Use the specified source address.  
  -n               Do not resolve addresses to hostnames.  
  -p period         Wait period milliseconds between pings.  
  -q num_queries   Number of queries per hop.  
  -w timeout        Wait timeout milliseconds for each reply.  
  -4               Force using IPv4.  
  -6               Force using IPv6.  
  
C:\WINDOWS\system32>
```

10. **SystemInfo:** This command is use to display detailed configuration information about a computer and its operating system, including operating system configuration, security information, product ID, and hardware properties.

```
C:\WINDOWS\system32>systeminfo  
  
Host Name:          DESKTOP-UMG1R04  
OS Name:           Microsoft Windows 10 Pro  
OS Version:        10.0.19044 N/A Build 19044  
OS Manufacturer:  Microsoft Corporation  
OS Configuration: Standalone Workstation  
OS Build Type:    Multiprocessor Free  
Registered Owner: Windows User  
Registered Organization:  
Product ID:        00331-10000-00001-AA073  
Original Install Date: 25/11/2021, 12:40:36  
System Boot Time: 15/01/2024, 13:34:01  
System Manufacturer: HP  
System Model:      HP RCTO 280 G4 PCI MT PC  
System Type:       x64-based PC  
Processor(s):     1 Processor(s) Installed.  
                  [01]: Intel64 Family 6 Model 158 Stepping 10 GenuineIntel ~3000 Mhz
```

```
BIOS Version: AMI F.20, 01/11/2018
Windows Directory: C:\WINDOWS
System Directory: C:\WINDOWS\system32
Boot Device: \Device\HarddiskVolume1
System Locale: en-gb;English (United Kingdom)
Input Locale: en-us;English (United States)
Time Zone: (UTC+05:30) Chennai, Kolkata, Mumbai, New Delhi
Total Physical Memory: 8,028 MB
Available Physical Memory: 2,002 MB
Virtual Memory: Max Size: 10,076 MB
Virtual Memory: Available: 2,061 MB
Virtual Memory: In Use: 8,015 MB
Page File Location(s): C:\pagefile.sys
Domain: WORKGROUP
Logon Server: \\DESKTOP-UMG1R04
Hotfix(s): 18 Hotfix(s) Installed.
[01]: KB5022502
[02]: KB4562830
[03]: KB4570334
[04]: KB4580325
[05]: KB4586864
[06]: KB5003791
[07]: KB5012170
[08]: KB5021233
[09]: KB5006753
```

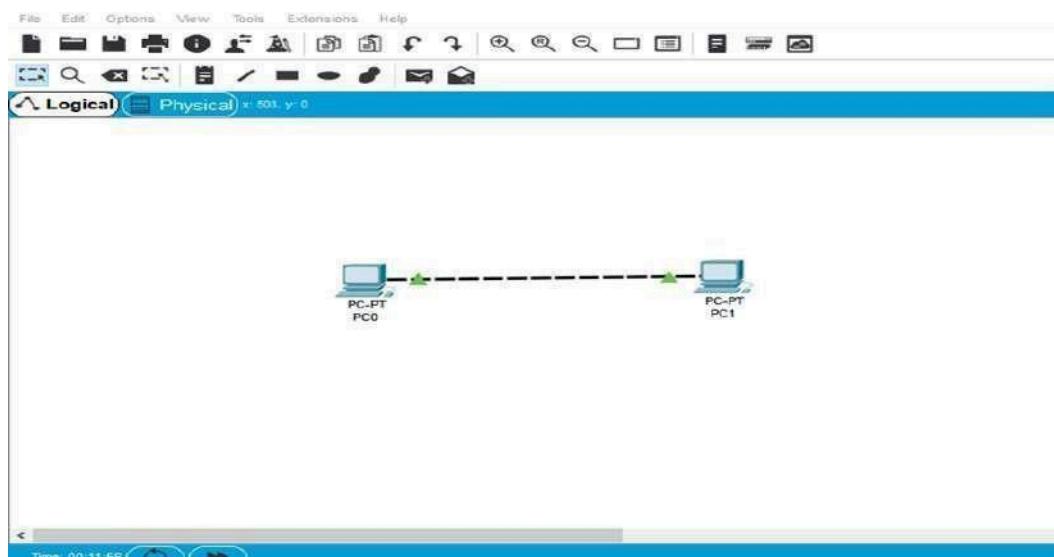
**CONCLUSION:** Hence we have successfully completed the practical.

# Practical

## No.2

**AIM:** Using Packet Tracer, create a basic network of two computers using appropriate network wire through Static IP address allocation and verify connectivity.

### **PROGRAM:**



### **PROGRAM (1st PC IP):**

<input type="radio"/> DHCP	<input checked="" type="radio"/> Static	
IP Address	192.168.1.2	
Subnet Mask	255.255.255.0	
Default Gateway	192.168.1.1	
DNS Server	0.0.0.0	
IPv6 Configuration		
<input type="radio"/> DHCP	<input type="radio"/> Auto Config	<input checked="" type="radio"/> Static
IPv6 Address	/	
Link Local Address	FE80::2E0:F9FF:FE42:57E5	
IPv6 Gateway		
IPv6 DNS Server		
802.1X		

### **PROGRAM (2nd PC IP):**

<input type="radio"/> DHCP	<input checked="" type="radio"/> Static	
IP Address	192.168.1.3	
Subnet Mask	255.255.255.0	
Default Gateway	192.168.1.1	
DNS Server	0.0.0.0	
IPv6 Configuration		
<input type="radio"/> DHCP	<input type="radio"/> Auto Config	<input checked="" type="radio"/> Static
IPv6 Address		
Link Local Address	FE80::201:42FF:FE88:2377	
IPv6 Gateway		
IPv6 DNS Server		

## OUTPUT:

```

Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=7ms TTL=128
Reply from 192.168.1.2: bytes=32 time=5ms TTL=128
Reply from 192.168.1.2: bytes=32 time=3ms TTL=128
Reply from 192.168.1.2: bytes=32 time=4ms TTL=128

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 3ms, Maximum = 7ms, Average = 4ms

C:\>ping 192.168.1.3

Pinging 192.168.1.3 with 32 bytes of data:

Reply from 192.168.1.3: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.1.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>

```

# **Practical**

## **No.3**

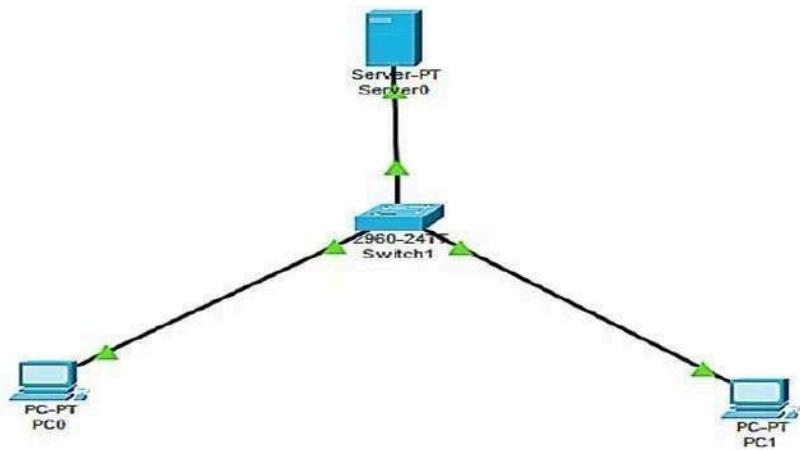
**AIM:** Using Packet Tracer, create a basic network of one server and two computers using appropriate network wire. Use Dynamic IP address allocation and show connectivity.

### **THEORY:**

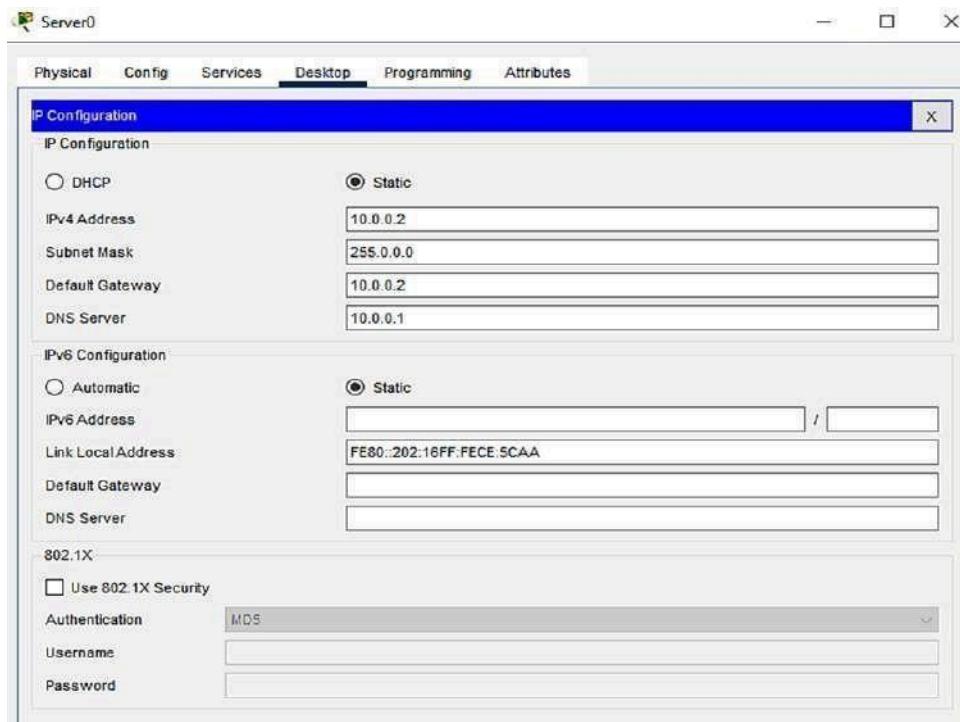
For assigning ip addresses dynamically we use the DHCP protocol Dynamic Host Configuration Protocol (DHCP) is a client/server protocol that automatically provides an Internet Protocol (IP) host with its IP address and other related configuration information such as the subnet mask and default gateway. The DHCP server maintains a pool of IP addresses and leases an address to any DHCP-enabled client when it starts up on the network. Because the IP addresses are dynamic (leased) rather than static (permanently assigned), addresses no longer in use are automatically returned to the pool for reallocation. DHCP provides the following benefits.

1. Reliable IP address configuration. DHCP minimizes configuration errors caused by manual IP address configuration, such as typographical errors, or address conflicts caused by the assignment of an IP address to more than one computer at the same time.
2. Reduced network administration. DHCP includes the following features to reduce network administration DHCP runs at the application layer of the Transmission Control Protocol/IP (TCP/IP) stack to dynamically assign IP addresses to DHCP clients and to allocate TCP/IP configuration information to DHCP clients. This includes subnet mask information, default gateway IP addresses and domain name system (DNS) addresses

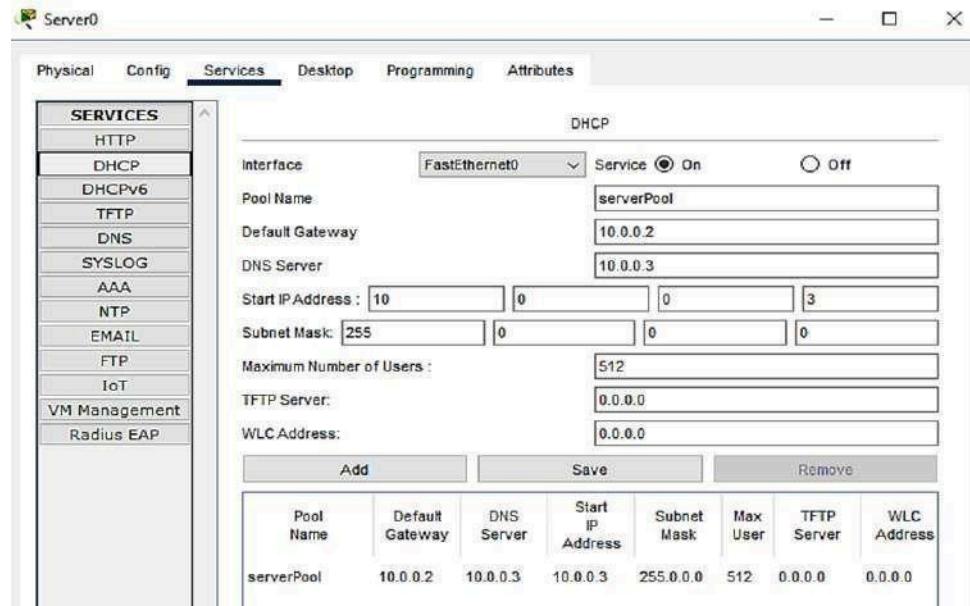
**PROGRAM 1:** (Make this type of diagram)



**PROGRAM 2:** (Now configure the Server-Pt Server 0)

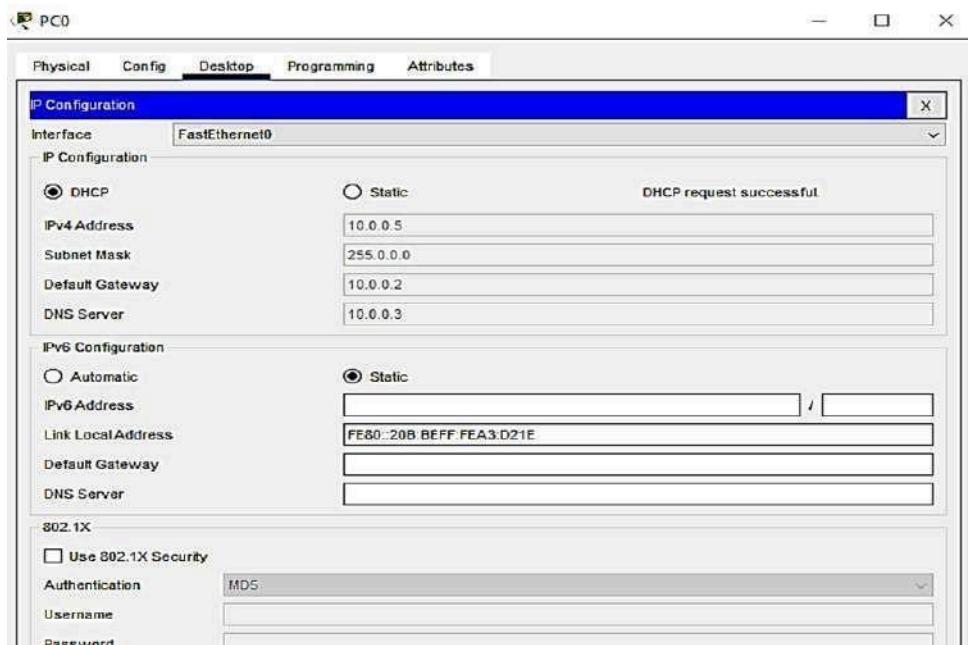


**PROGRAM 3:** (Now enable and set the DHCP Service on the Server)

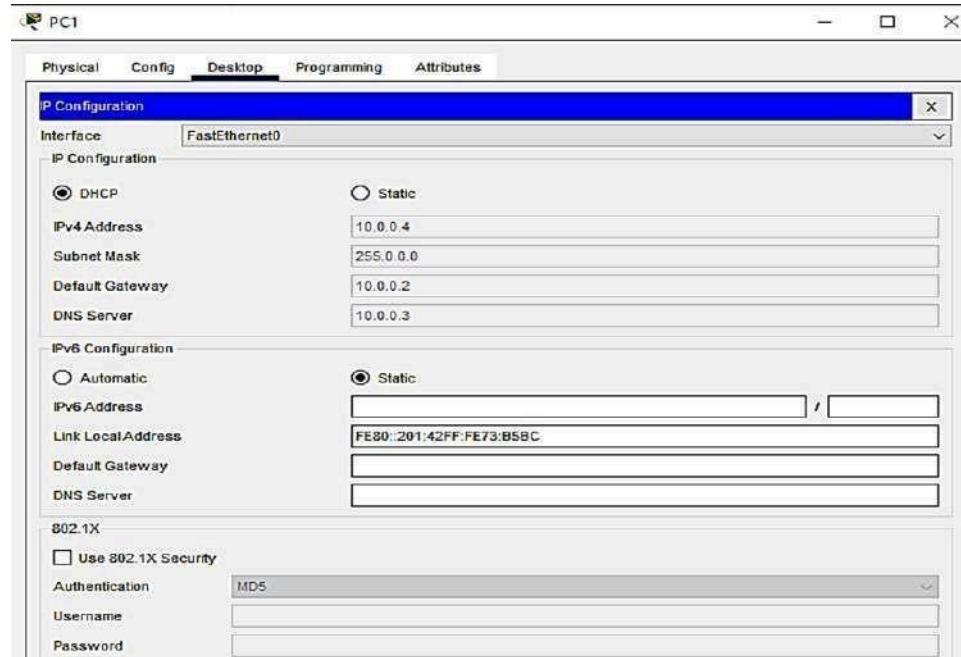


**PROGRAM 4:** (Change the IP Address on both the PC)

**4(A): PC-PT PC 0 :It will be set on Static you have to choose the DHCP option**

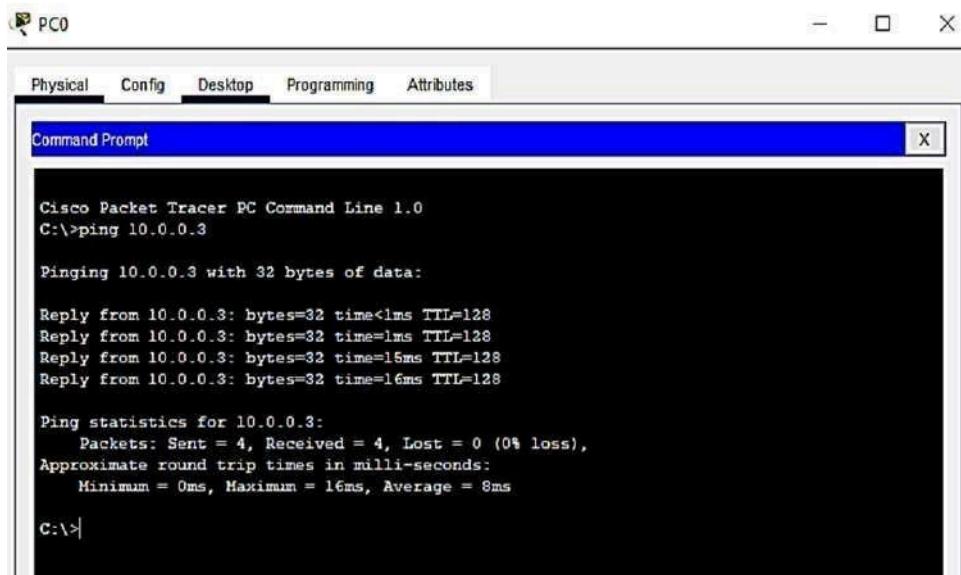


**4(B): PC-PT PC 1 :It will be set on Static you have to choose the DHCP option**

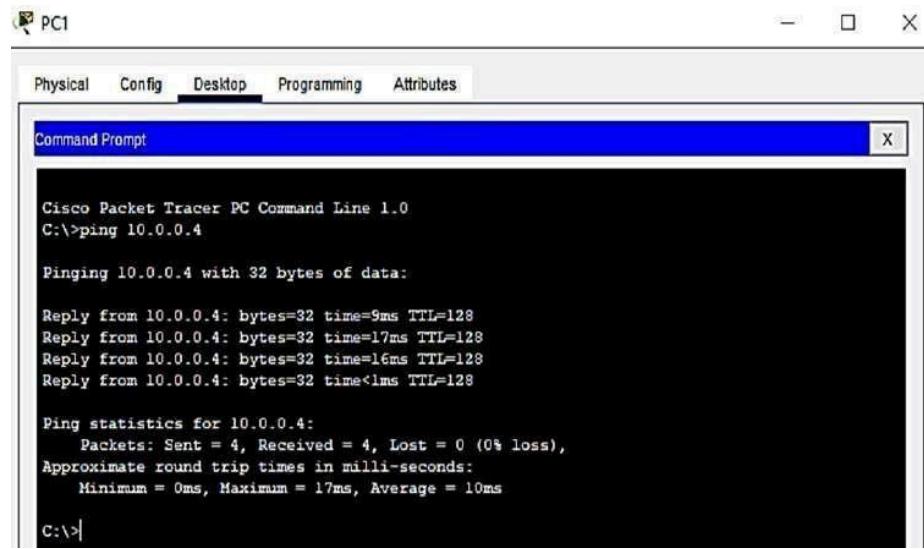


### **PROGRAM 5:** (Check the connectivity)

**5(A): PC-PT PC 0> write the command in cmd : ping 10.0.0.**



**5(B): PC-PT PC 1 : Write the command in cmd : ping 10.0.0.4**



# Practical

## No.4

**AIM:** Using Packet Tracer, Create a basic network of two computer's using appropriate network wire. Use Static IP Address allocation and show connectivity.

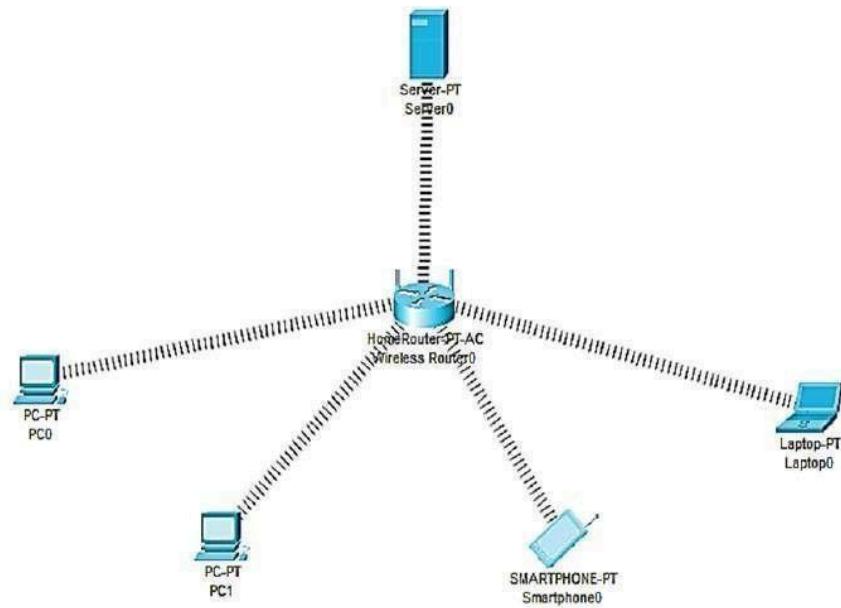
### **THEORY:**

A wireless access point (WAP) is a networking device that enables wireless devices to connect to a wired network. It acts as a central hub for wireless devices, allowing them to communicate with each other and with devices on the wired network.

A wireless access point typically connects to a wired network, such as a local area network (LAN), and broadcasts a wireless signal using radio waves. Wireless devices, such as laptops, smartphones, and tablets, can connect to the WAP and access the network resources that are available on the wired network.

Wireless access points are commonly used in homes, offices, and public places such as airports and cafes to provide wireless connectivity to users. They can be stand alone devices or built into other networking equipment such as routers or switches.

### **PROGRAM 1:** (This the the following topology)



## **PROGRAM 2: (HomeRouter PT-AC Wireless Router 0 : follow given)**

Wireless Router0

Physical Config GUI Attributes

Wireless Tri-Band Home Router

Firmware Version: v0.9.7

**Setup**      **Wireless**      **Security**      **Access Restrictions**      **Applications & Gaming**      **Wireless Tri-Band Home Router**      **Administration**      **Status**

Basic Setup      DDNS      MAC Address Clone      HomeRouter PT-AC      Advanced Routing

**Internet Setup**

Internet Connection type: Automatic Configuration - DHCP

Host Name:

Domain Name:

MTU:  Size: 1500

Optional Settings (required by some internet service providers)

**Network Setup**

Router IP: IP Address: 192.168.0.1      Subnet Mask: 255.255.255.0

DHCP Server Settings:  Enabled       Disabled      DHCP Reservation

Start IP Address: 192.168.0.100      Maximum number of Users: 50

IP Address Range: 192.168.0.100 – 149

Help...

Client Lease Time: 0 minutes (0 means one day)

Static DNS 1: 0.0.0.0      Static DNS 2: 0.0.0.0      Static DNS 3: 0.0.0.0      WINS: 0.0.0.0

**ISP Vlans**

Enabled       Disabled

Vlan IDs: Internet: 10 VoIP: 20 IPTV: 30

Port Vlans:

Port 1: Internet      Port 2: Internet      Port 3: Internet      Port 4: Internet

2.4GHz: Internet      5GHz - 1: Internet      5GHz - 2: Internet

Save Settings      Cancel Changes

Wireless Router0

Physical Config **GUI** Attributes

Wireless Tri-Band Home Router

Firmware Version: v0.9.7

Wireless **Setup** Wireless Security Access Restrictions Applications & Gaming Administration Status

Basic Wireless Settings Wireless Security Guest Network Wireless MAC Filter Advanced Wireless Settings

**Basic Wireless Settings**

**2.4 GHz**

Network Mode: Auto  
Network Name (SSID): Default  
SSID Broadcast:  Enabled  Disabled  
Standard Channel: 1 - 2.412GHz  
Channel Bandwidth: Auto

**5 GHz - 2**

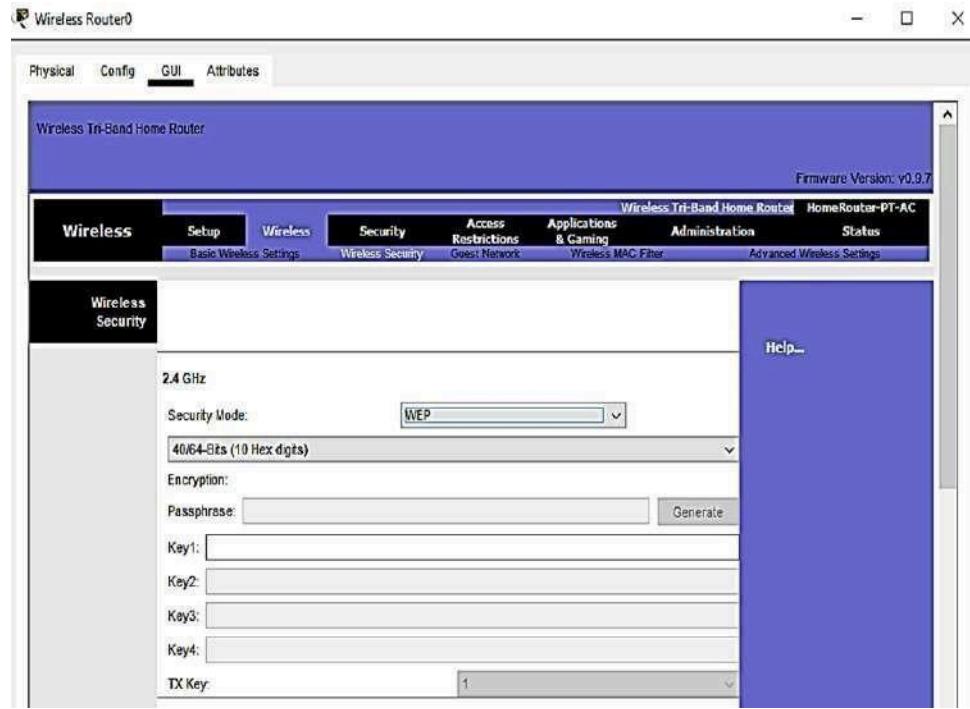
Network Mode: Auto  
Network Name (SSID): Default  
SSID Broadcast:  Enabled  Disabled  
Standard Channel: Auto  
Channel Bandwidth: Auto

**5 GHz - 1**

Network Mode: Auto  
Network Name (SSID): Default  
SSID Broadcast:  Enabled  Disabled  
Standard Channel: Auto  
Channel Bandwidth: Auto

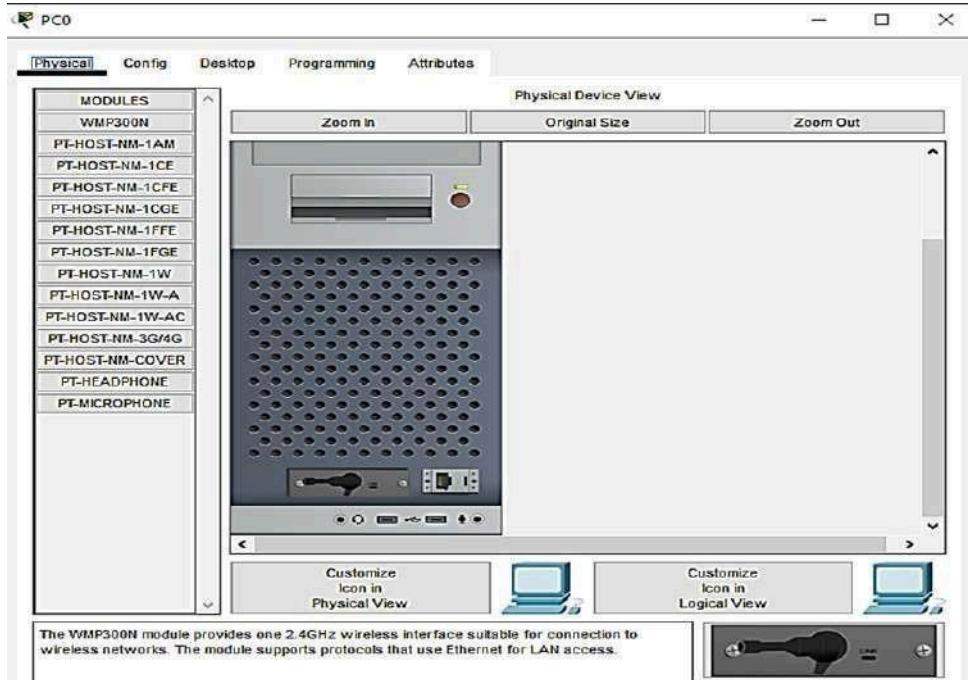
Help...

This screenshot shows a software interface for managing a Wireless Tri-Band Home Router. The top navigation bar includes tabs for Physical, Config, GUI (which is selected), and Attributes. Below the title 'Wireless Tri-Band Home Router' and 'Firmware Version: v0.9.7' is a main menu with tabs: Wireless, Setup, Wireless Security, Access Restrictions, Applications & Gaming, Administration, and Status. Under the Wireless tab, there are sub-options: Basic Wireless Settings, Wireless Security, Guest Network, Wireless MAC Filter, and Advanced Wireless Settings. On the left, a sidebar titled 'Basic Wireless Settings' is open, showing configuration for three bands: 2.4 GHz, 5 GHz - 2, and 5 GHz - 1. Each band section contains fields for Network Mode (Auto), Network Name (SSID) (Default), SSID Broadcast (Enabled or Disabled), Standard Channel, and Channel Bandwidth (Auto). A 'Help...' button is located on the right side of the configuration area.

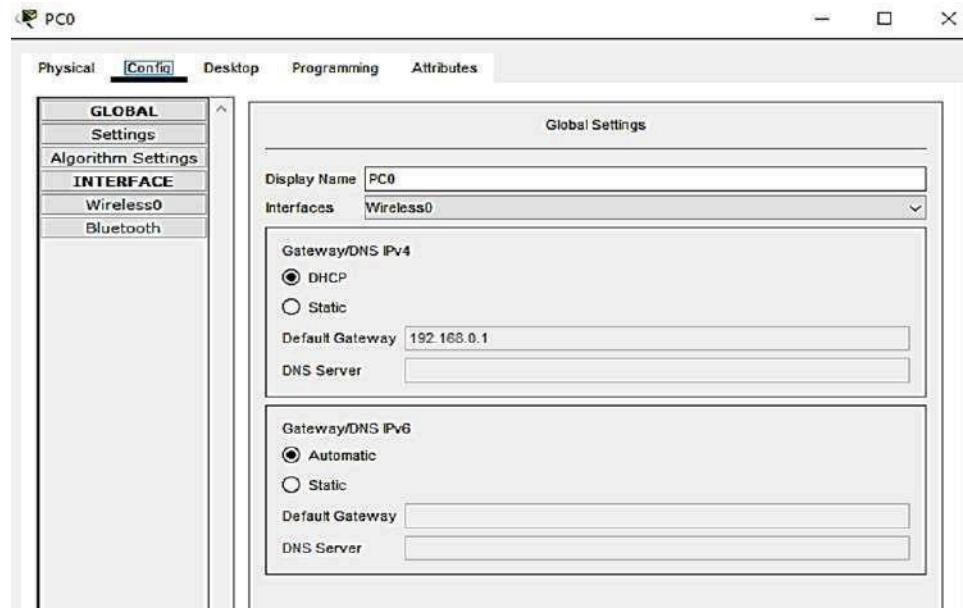


### **PROGRAM 3: (Change the physical configuration in PC-PT PC**

#### **0) 3(A): Change PT-HOST-NM-1CFE to Linksys-WMP300N**

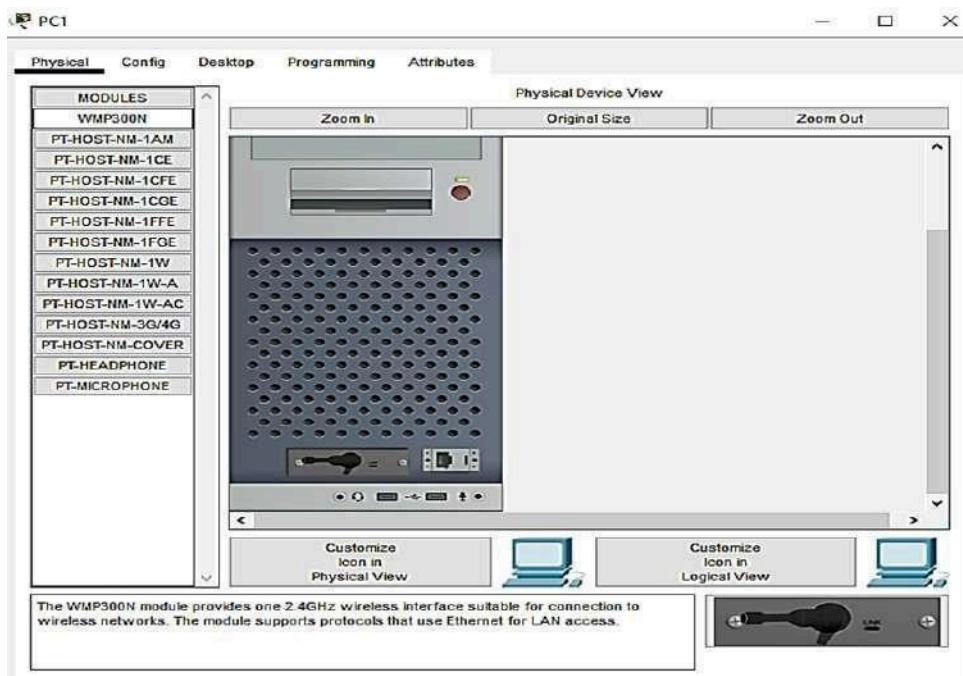


#### **3(B): And now check the default gateway in configure section**

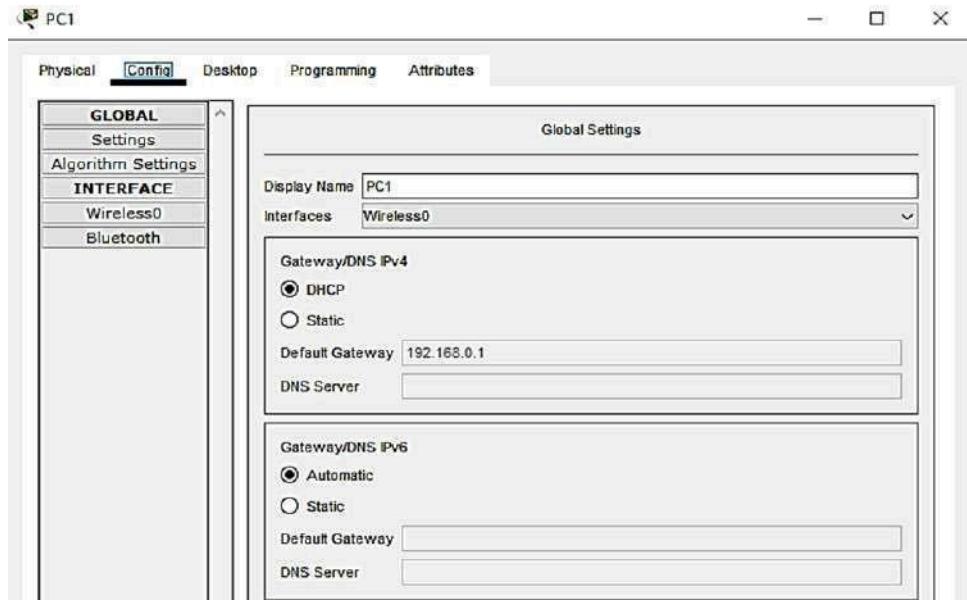


#### **PROGRAM 4: (Change the physical configuration in PC-PT PC**

##### **1) 4(A): Change PT-HOST-NM-1CFE to Linksys-WMP300N**



##### **4(B): And now check the default gateway in configure section**

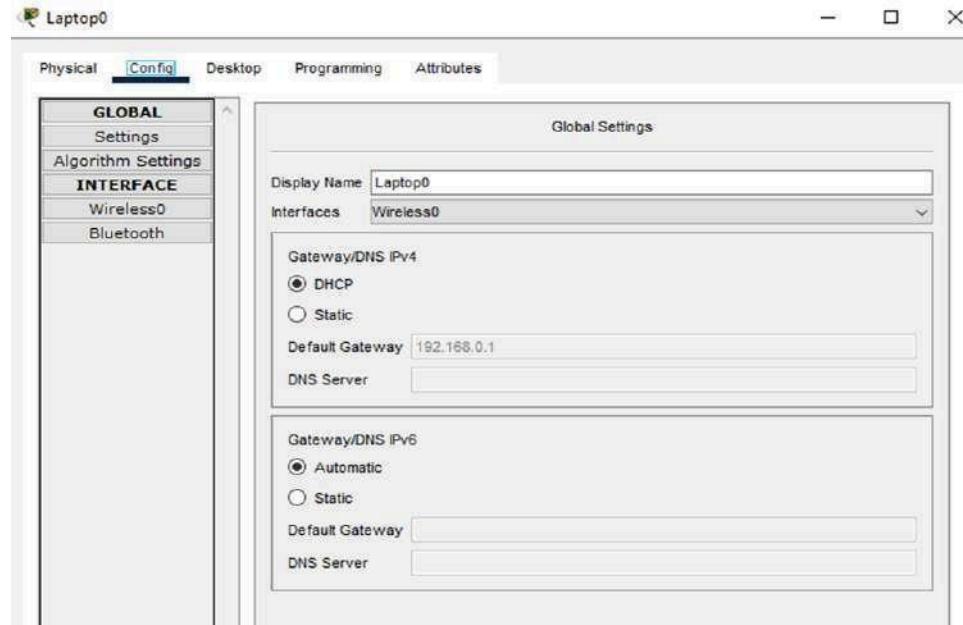


## **PROGRAM 5: (Change the physical configuration in Laptop-PT Laptop 0)**

### **5(A): Change PT-LAPTOP-NM-1AM to PT-LAPTOP-NM-1W**

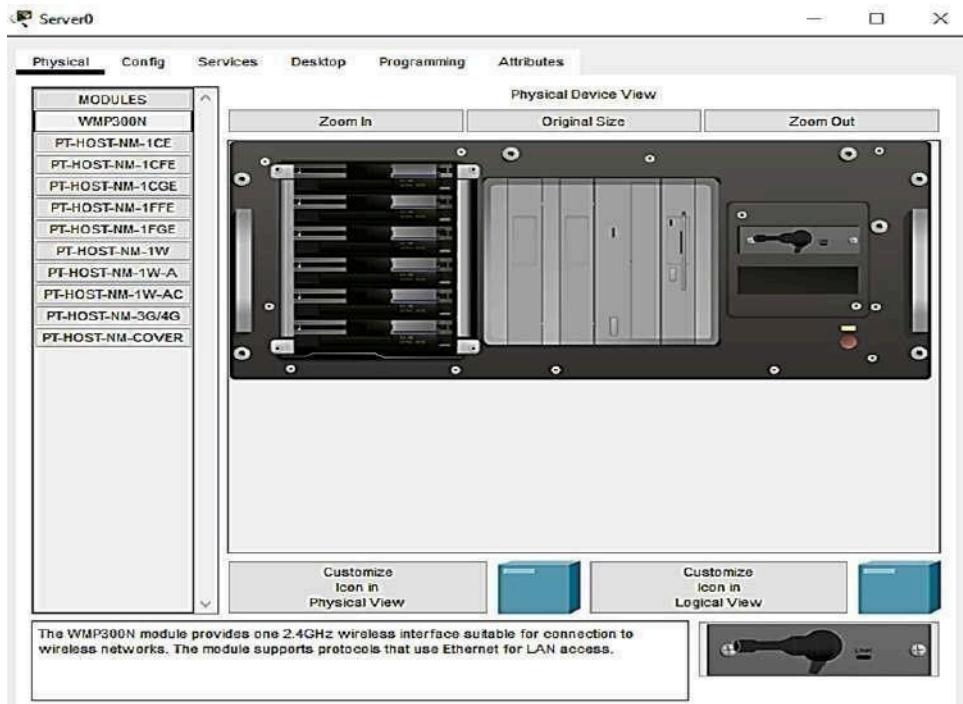


### **5(B): And now check the default gateway in configure section**

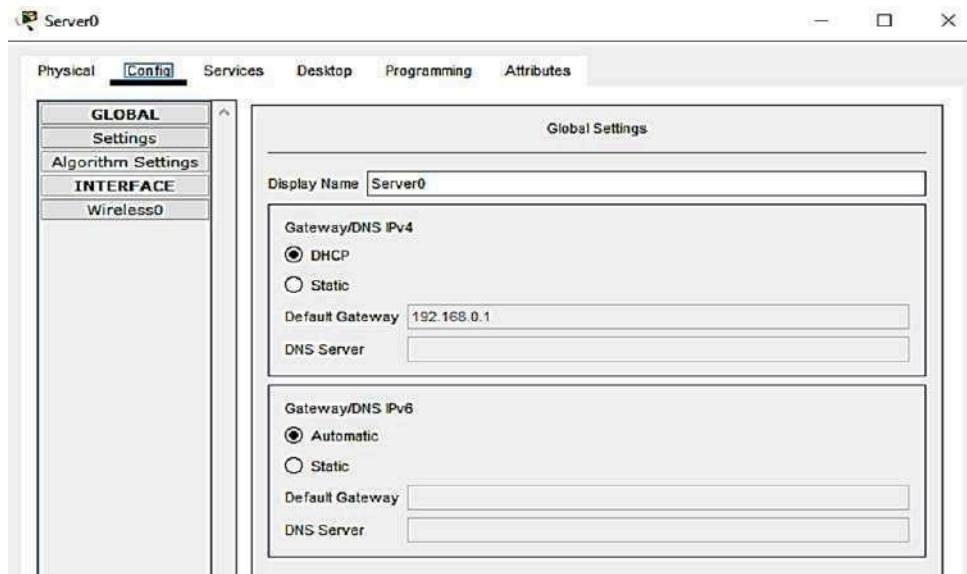


## **PROGRAM 6: (Change the physical configuration in Server-PT server 0)**

### **6(A): Change PT-HOST-NM-1CFE to Linksys-WMP300N**



### **6(B): And now check the default gateway in configure section**



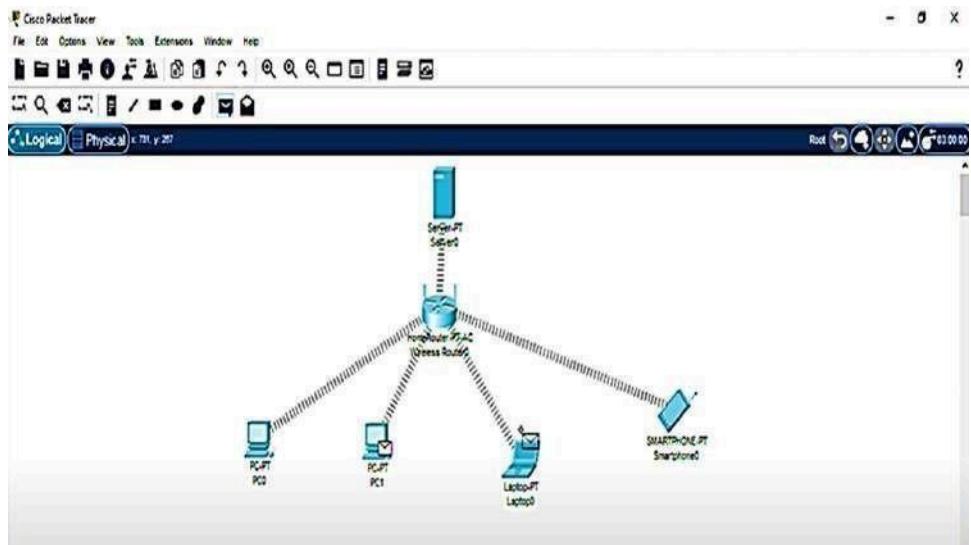
### **PROGRAM 7: (Click on: PC-PT PC Q Desktop>PC Wirelss)**



**And Now Click on The Connect Option and in Site Information click on Wireless Mode it will show (infrastructure) :**



## **PROGRAM 8:** (Now you have to add the PDU P ( ) IN PC 0, PC 1, Laptop, Smart Phone and Server)



## **PROGRAM 9:** (Final Output)

Realtime  Simulation

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Peri
	Successful	PC0	PC1	ICMP		0.000	
	Successful	PC1	Smartphone0	ICMP		0.000	
	Successful	Smart...	PC1	ICMP		0.000	
	Successful	Laptop0	Smartphone0	ICMP		0.000	

Realtime  Simulation

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Peri
	Successful	Laptop0	Smartphone0	ICMP		0.000	
	Successful	Smart...	Laptop0	ICMP		0.000	
	Successful	PC0	Server0	ICMP		0.000	

# **Practical**

## **No.5**

**AIM:** Using Packet Tracer to create a network with three routers with RIPv1 and each router associated network will have minimum three PC and show the connectivity.

### **THEORY:**

RIP is one of the dynamic routing protocols and the first distance-vector routing protocol that uses the hop count as a routing metric. A lower hop count is preferred.

Each router between the source and destination network is counted as one hop. RIP prevents routing loops by imposing a maximum number of hops on the path between source and destination.

In RIP, Every 30 seconds, each router broadcasts its entire routing table to its nearest neighbors.

### **Pros and Cons of RIP Protocol**

Pros:

1. 1. The RIP protocol is ideal for small networks since it is simple to learn and configure.
1. 2. RIP routing is guaranteed to work with nearly all routers.
2. 3. When the network topology changes, RIP does not require an update.

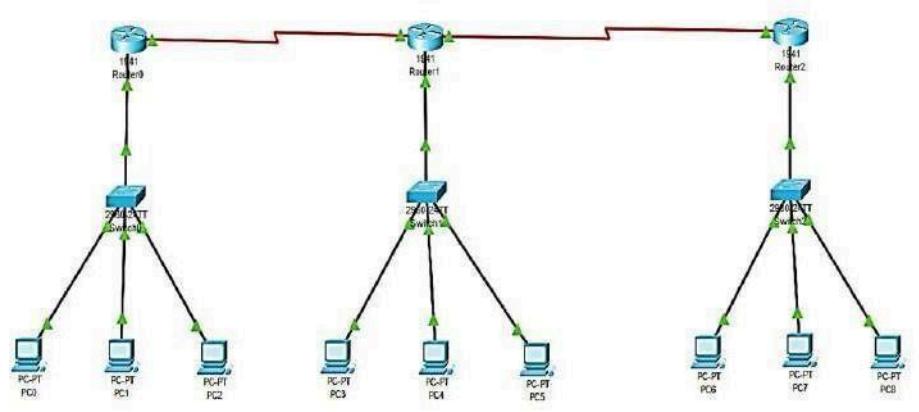
Cons:

1. 1. RIP does not support variable length subnet masks
2. 2. RIP transmits updates every 30 seconds, which cause traffic and consumes bandwidth.
1. 3. RIP hop counts are restricted to 15, hence any router beyond that distance is deemed infinity and becomes unreachable.
2. 4. The rate of convergence is slow in RIP compared to other routing protocols.

When a link fails, finding alternate network paths takes a long time.

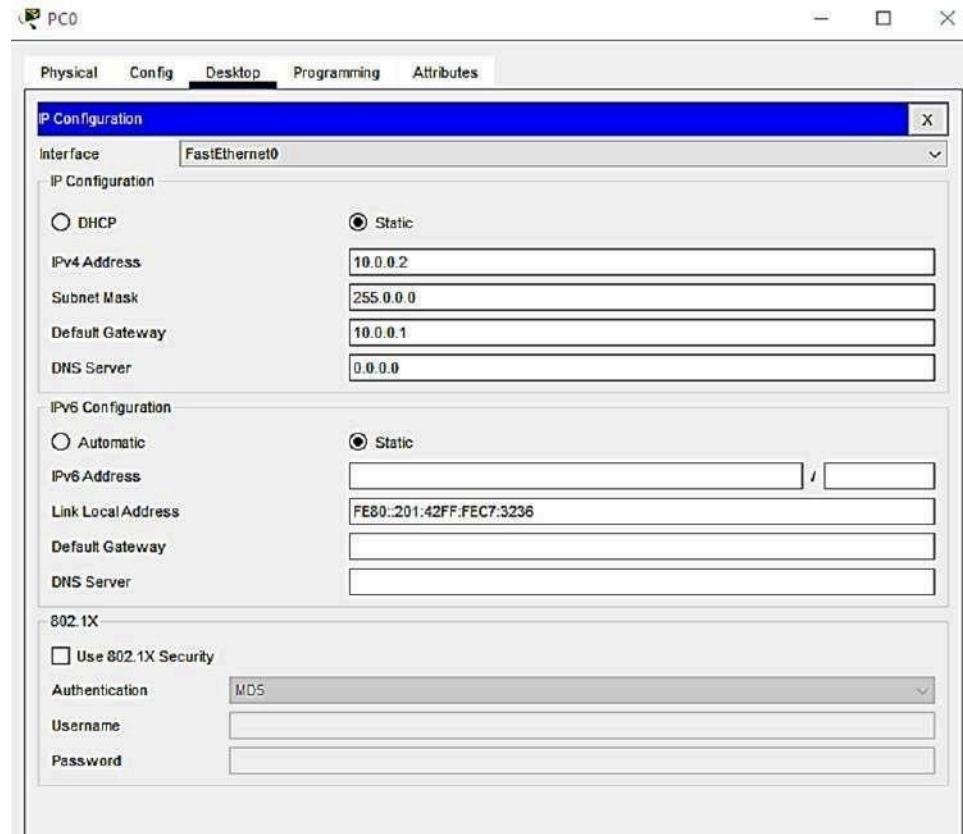
1. 5. RIP does not support multiple paths on the same route, which may result in extra routing loops.

**PROGRAM 1:** (We got the following topology)

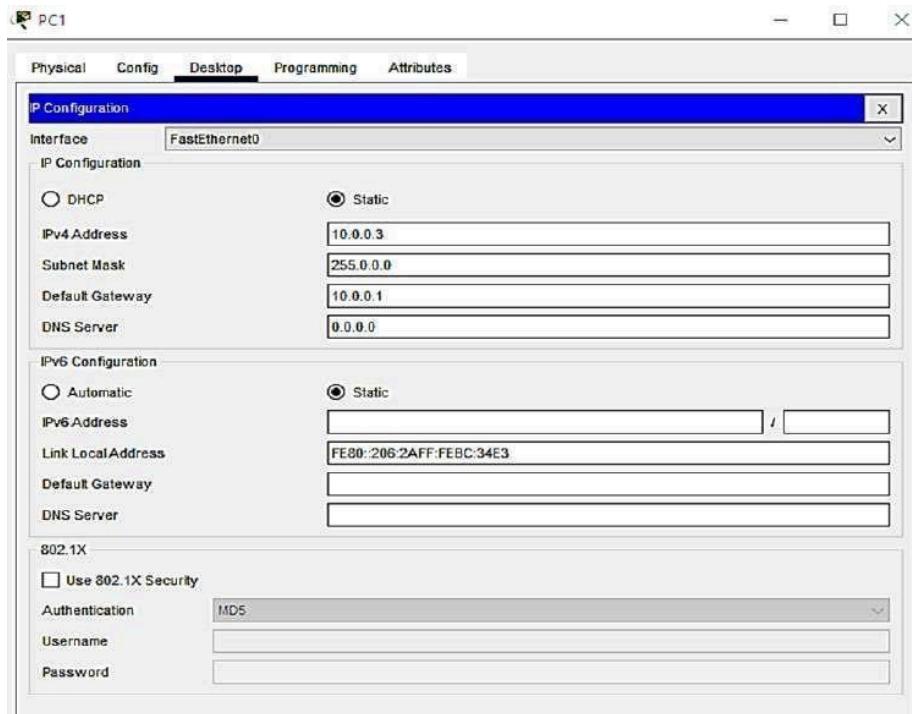


**PROGRAM 2:**

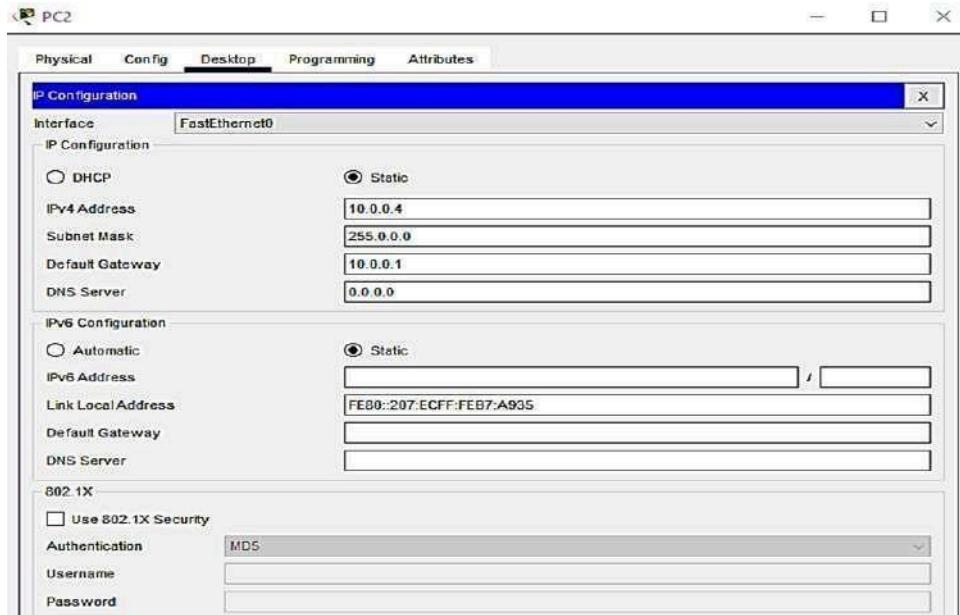
**2(A):** Now configure the PC 0 IP Address



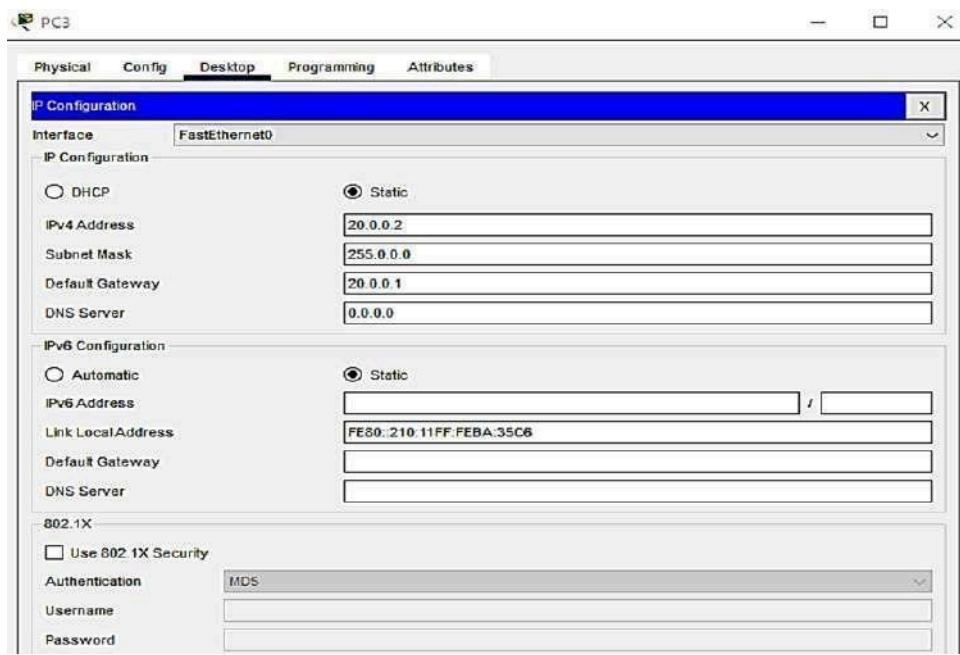
**2(B):** Now configure the PC 1 IP Address



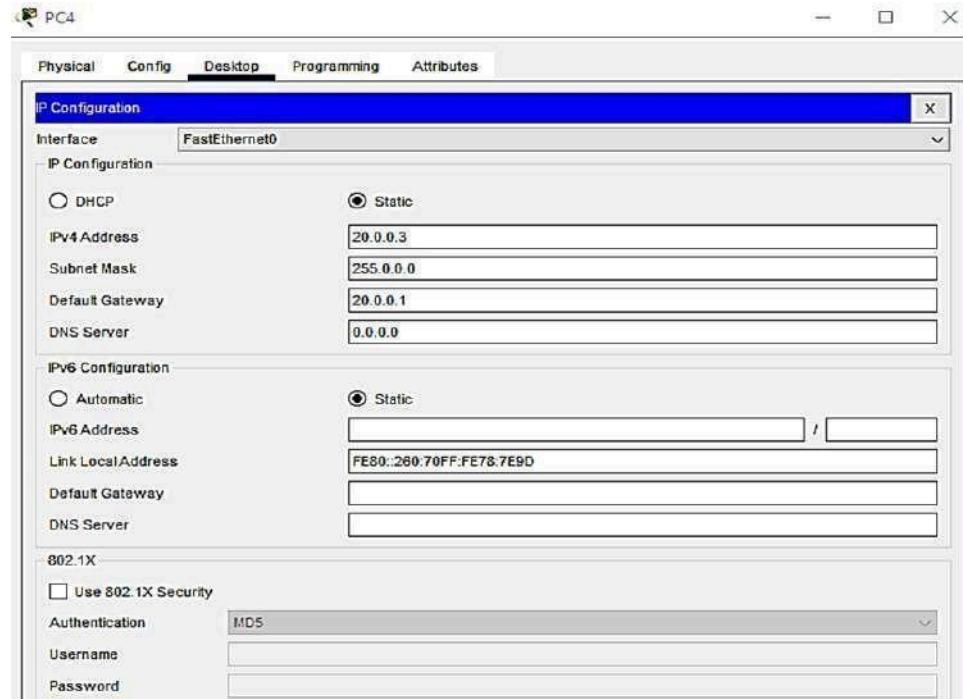
**2(C):** Now configure the PC 2 IP Address



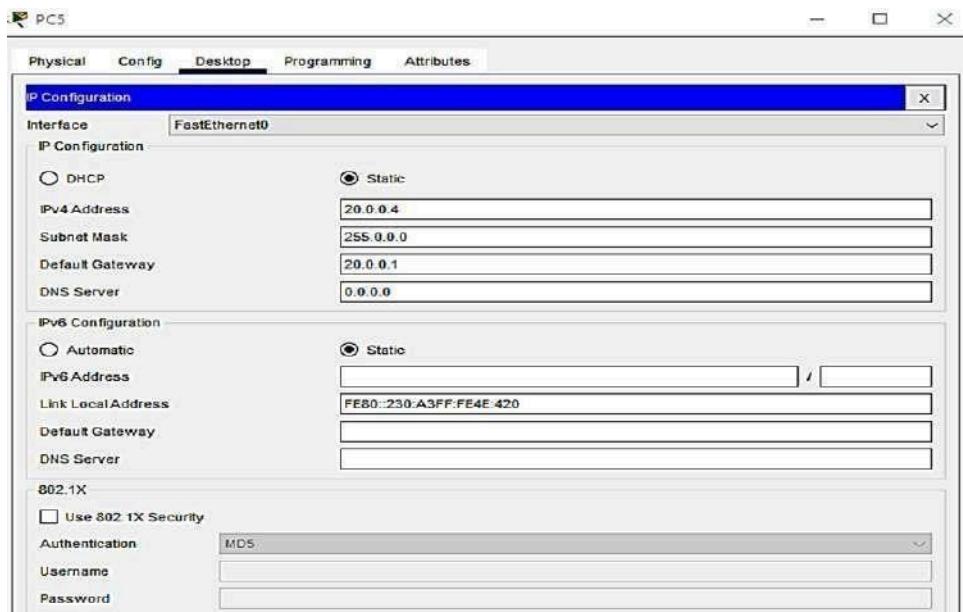
**2(D):** Now configure the PC 3 IP Address



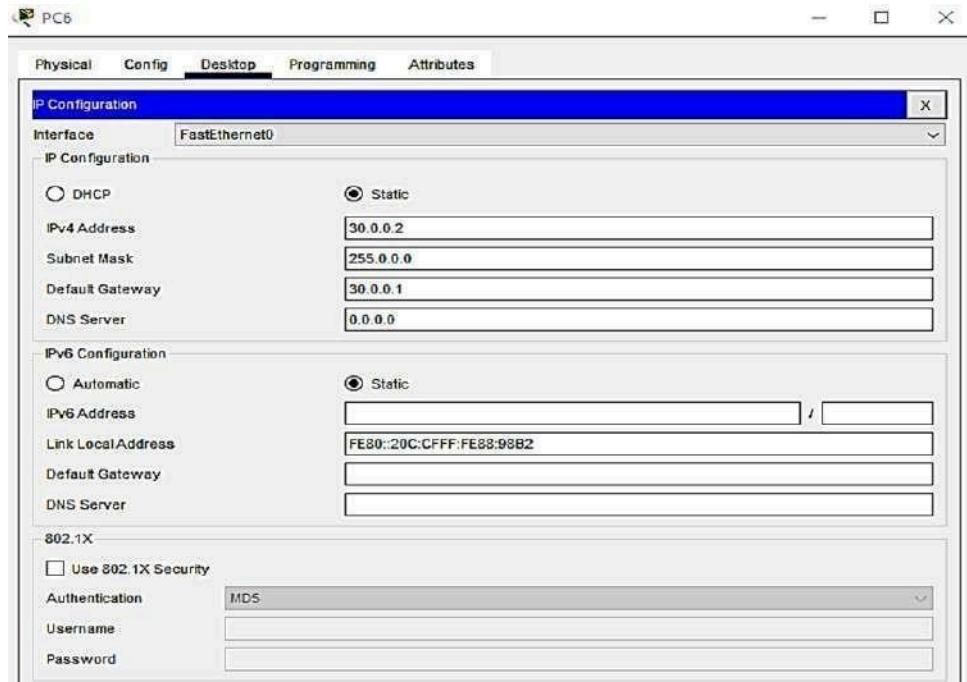
**2(E):** Now configure the PC 4 IP Address



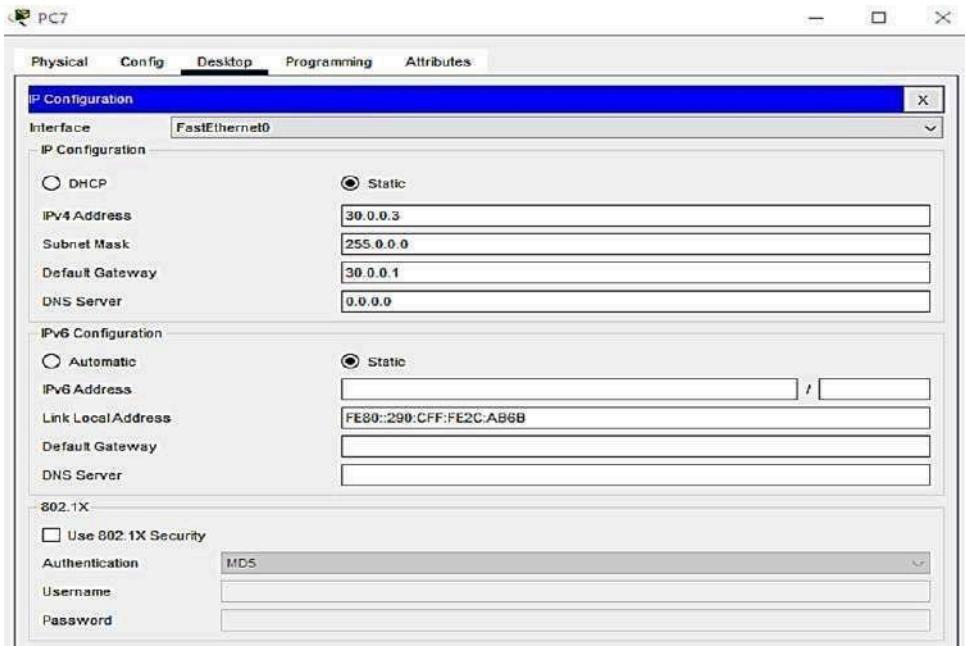
**2(F):** Now configure the PC 5 IP Address



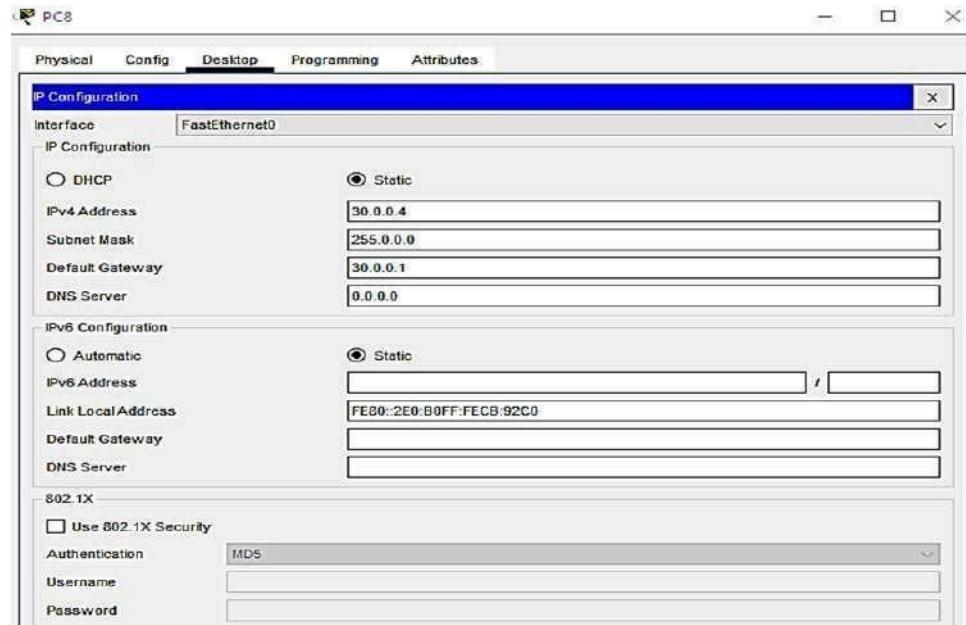
**2(G):** Now configure the PC 6 IP Address



**2(H):** Now configure the PC 7 IP Address

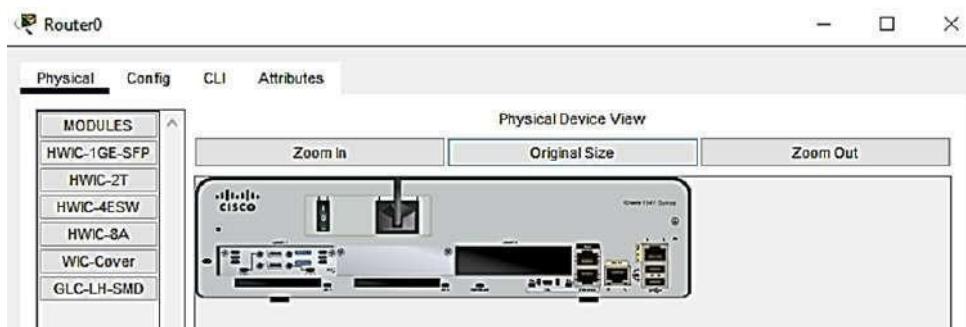


**2(I):** Now configure the PC 8 IP Address

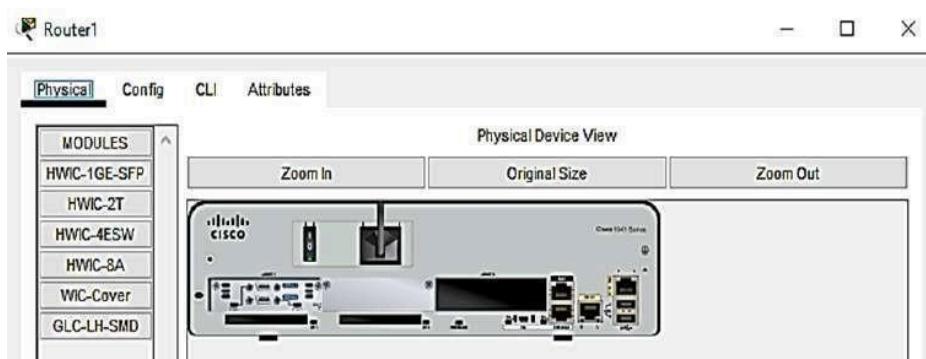


### **PROGRAM 3:**

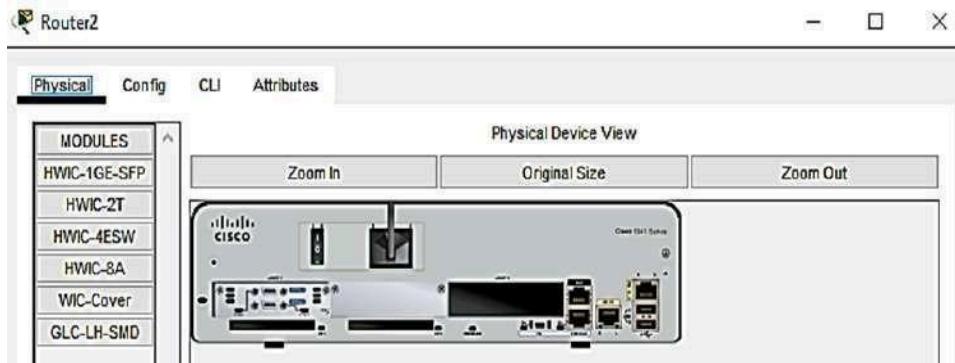
#### **3(A): Router 0**



#### **3(B): Router 1**



### **3(C): Router 2**



**Remember You have to OFF the switch while adding Serial Interface and ON the Switch after adding the interface in all the Routers**

### **PROGRAM 4:**

#### **4(A): Router 0**

```
Router>enable
Router>configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface gigabitEthernet 0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown

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

%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up
exit
Router(config)#interface serial 0/1/0
Router(config-if)#ip address 192.168.0.1 255.255.255.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/0, changed state to down
Router(config-if)#exit
Router(config)#
Router(config)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up
```

**Type the following command in CLI :**

Router>en

Router>enable

Router#

Router#configure terminal

Enter configuration commands, one per line. End with CNTL/Z. Router(config)#interface gigabitEthernet 0/0

Router(config-if)#ip address 10.0.0.1 255.0.0.0

Router(config-if)#no shutdown

Router(config-if)#exit

Router(config)#interface serial 0/1/0

Router(config-if)#ip address 192.168.0.1 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#exit

Router(config)#interface serial 0/1/1

Router(config-if)#ip address 192.168.1.1 255.255.255.0

Router(config-if)#no shutdown

#### **4(B): Router 1**

```
Physical Config CLI Attributes
IOS Command Line Interface

Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface gigabitEthernet 0/0
Router(config-if)#ip address 10.0.0.1 255.0.0.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface GigabitEthernet0/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface GigabitEthernet0/0, changed state to up

Router(config-if)#exit
Router(config)#interface serial 0/1/0
Router(config-if)#ip address 192.168.0.1 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up
%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up

Router(config-if)#exit
Router(config)#
%LINK-5-CHANGED: Interface Serial0/1/0, changed state to up

Router(config)#interface serial 0/1/1
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown

%LINK-5-CHANGED: Interface Serial0/1/1, changed state to down
Router(config-if)#exit
Router(config)#
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up
```

Copy Paste

**Type the Following Command in CLI :**

**Router>enable**

Router#configure terminal

Router(config)#interface gigabitEthernet 0/0

Router(config-if)#ip address 20.0.0.1 255.0.0.0

Router(config-if)#no shutdown

Router(config-if)#exit

Router(config)#interface serial 0/1/0

Router(config-if)#ip address 192.168.0.2 255.255.255.0

Router(config-if)#no shutdown

Router(config-if)#exit

Router(config)#interface serial 0/1/1

Router(config-if)#ip address 192.168.1.1 255.255.255.0

Router(config-if)#no shutdown

**4(C): Router 2**

```
Router#enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface gigabitEthernet 0/0
Router(config-if)#ip address 30.0.0.1 255.0.0.0
Router(config-if)#no shutdown
Router(config-if)#exit
Router(config)#interface serial 0/1/1
Router(config-if)#ip address 192.168.1.2 255.255.255.0
Router(config-if)#no shutdown

Router(config-if)#
%LINK-5-CHANGED: Interface Serial0/1/1, changed state to up

$LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to up
```

**Type the following Command in CLI :**

Router>enable

Router#configure terminal

Router(config)#interface gigabitEthernet 0/0

Router(config-if)#ip address 30.0.0.1 255.0.0.0

Router(config-if)#no shutdown

Router(config-if)#exit

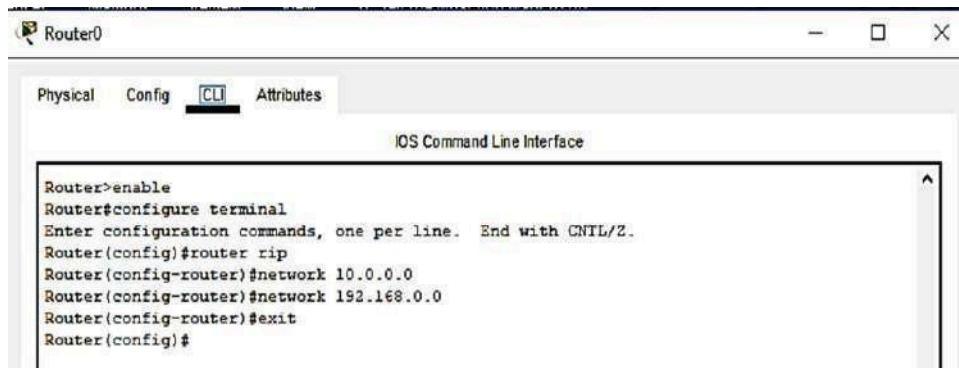
Router(config)#interface serial 0/1/1

Router(config-if)#ip address 192.168.1.2 255.255.255.0

Router(config-if)#no shutdown

PROGRAM 5:

**5(A): Router 0**

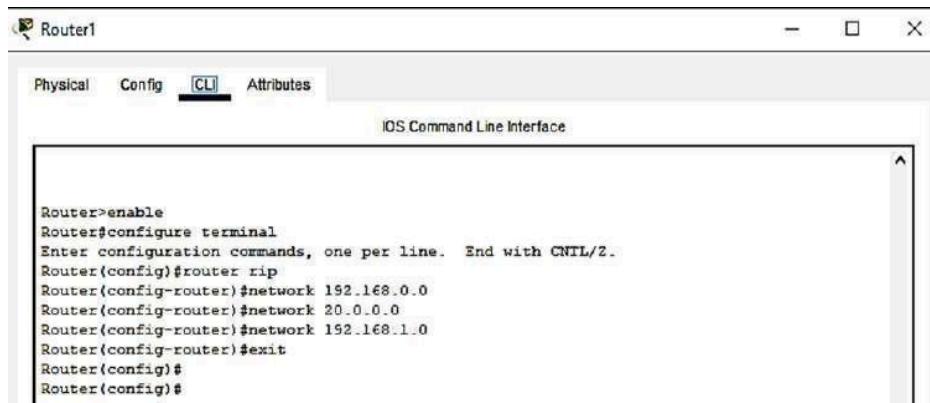


The screenshot shows the Cisco Configuration Constructor interface for Router0. The window title is "Router0". The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is titled "IOS Command Line Interface". The command history is as follows:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 10.0.0.0
Router(config-router)#network 192.168.0.0
Router(config-router)#exit
Router(config)#

```

**5(B): Router 1**

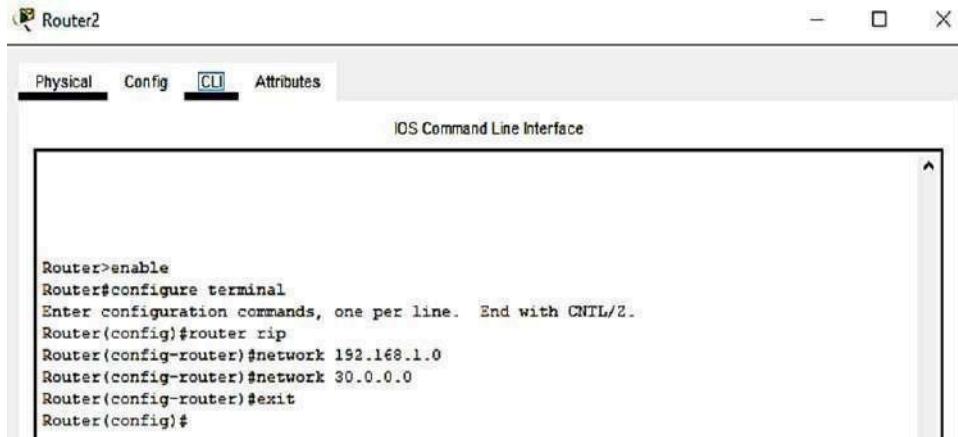


The screenshot shows the Cisco Configuration Constructor interface for Router1. The window title is "Router1". The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area is titled "IOS Command Line Interface". The command history is as follows:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 192.168.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#network 192.168.1.0
Router(config-router)#exit
Router(config)#
Router(config)#

```

### **5(C): Router 2**



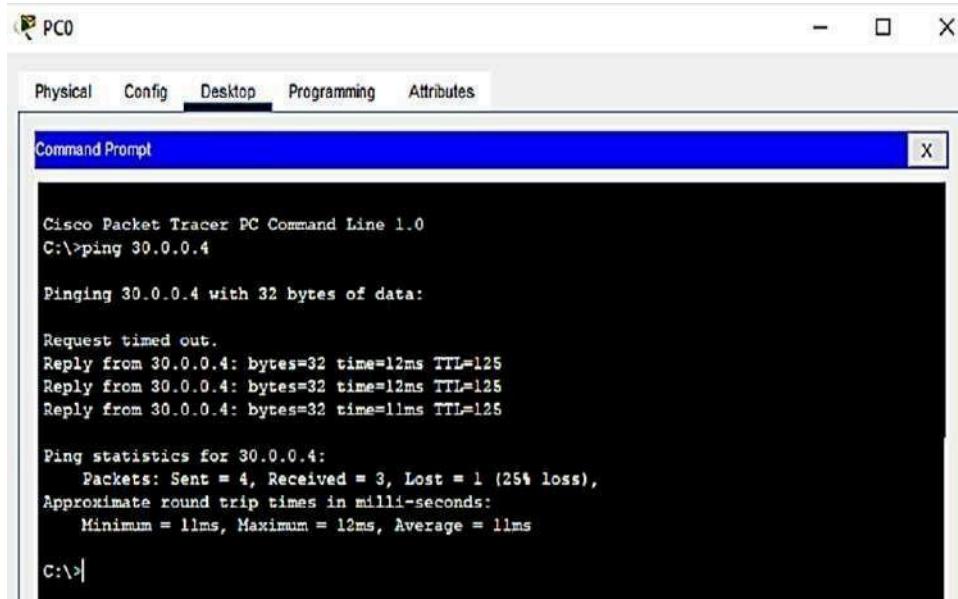
The screenshot shows a window titled "Router2" with a tab bar containing "Physical", "Config", "CLI" (which is selected), and "Attributes". Below the tab bar is a title "IOS Command Line Interface". The main area displays the following CLI session:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 192.168.1.0
Router(config-router)#network 30.0.0.0
Router(config-router)#exit
Router(config)#

```

### **PROGRAM 6:**

#### **6(A): PC 0**



The screenshot shows a window titled "PC0" with a tab bar containing "Physical", "Config", "Desktop" (which is selected), "Programming", and "Attributes". Below the tab bar is a title "Command Prompt". The main area displays the following output from the Cisco Packet Tracer Command Line 1.0:

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 30.0.0.4

Pinging 30.0.0.4 with 32 bytes of data:

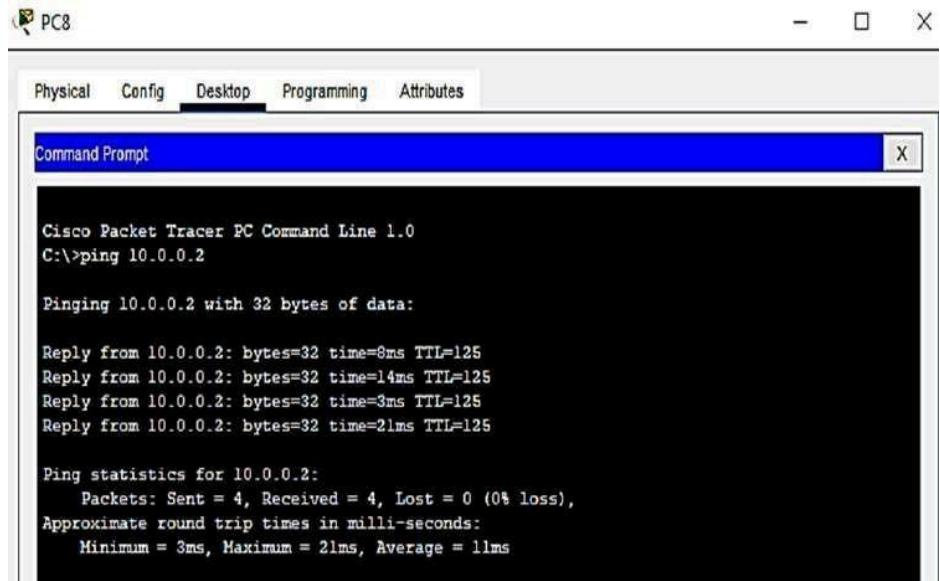
Request timed out.
Reply from 30.0.0.4: bytes=32 time=12ms TTL=125
Reply from 30.0.0.4: bytes=32 time=12ms TTL=125
Reply from 30.0.0.4: bytes=32 time=11ms TTL=125

Ping statistics for 30.0.0.4:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 11ms, Maximum = 12ms, Average = 11ms

C:\>|

```

#### **6(B): PC 8**



# **Practical**

## **No.6**

**AIM: Using Packet Tracer to create a network with three routers with RIPv1 and each router associated network will have minimum three PC and show the connectivity.**

### **THEORY:**

RIPv2 is an enhancement to the original RIP protocol developed in 1994. RIPv2 is also a distance vector routing protocol but has a few enhancements to make it more efficient than RIPv1.

RIPv2 is more efficient than RIPv1, but is not suitable for larger, more complex networks. It simply provides more flexibility on smaller networks.

RIPv2 uses the same routing metric as RIPv1, the hop count. Updates with RIPv2 are sent via multicasts and not broadcasts.

RIPv2 can also be configured to do classless routing. When configured for classless routing, RIPv2 will transmit subnet masks when it sends routing updates. This allows for the use of subnetting and discontiguous networks. RIPv2 allows for authentication to be required for updates. When authentication is enabled, each router is configured with the RIP update password. The password sent with the RIP update must match the password configured on the destination router. If the passwords do not match, then the receiving router will not process the update.

Advantages of RIPv2

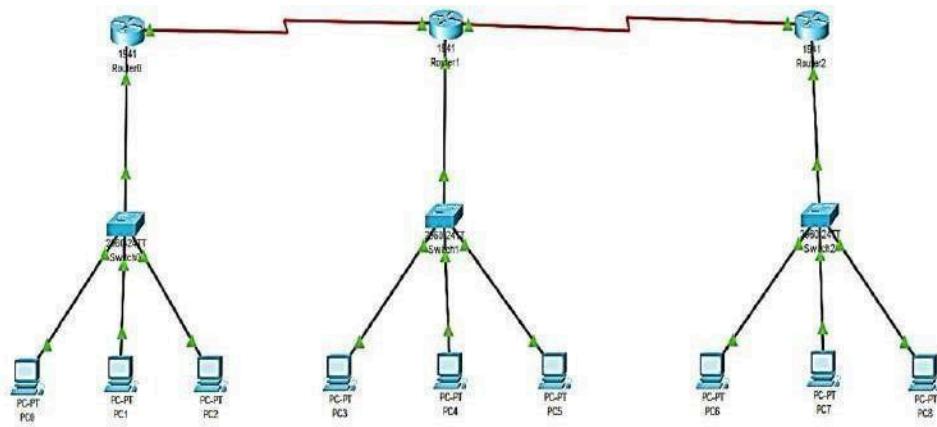
1. It's a standardized protocol.
2. It's VLSM compliant.
3. Provides fast convergence.
4. It sends triggered updates when the network changes.
5. Works with snapshot routing – making it ideal for dial networks.

Disadvantage of RIPv2

6. Max hop count of 15, due to the 'count-to-infinity' vulnerability.
7. No concept of neighbors.

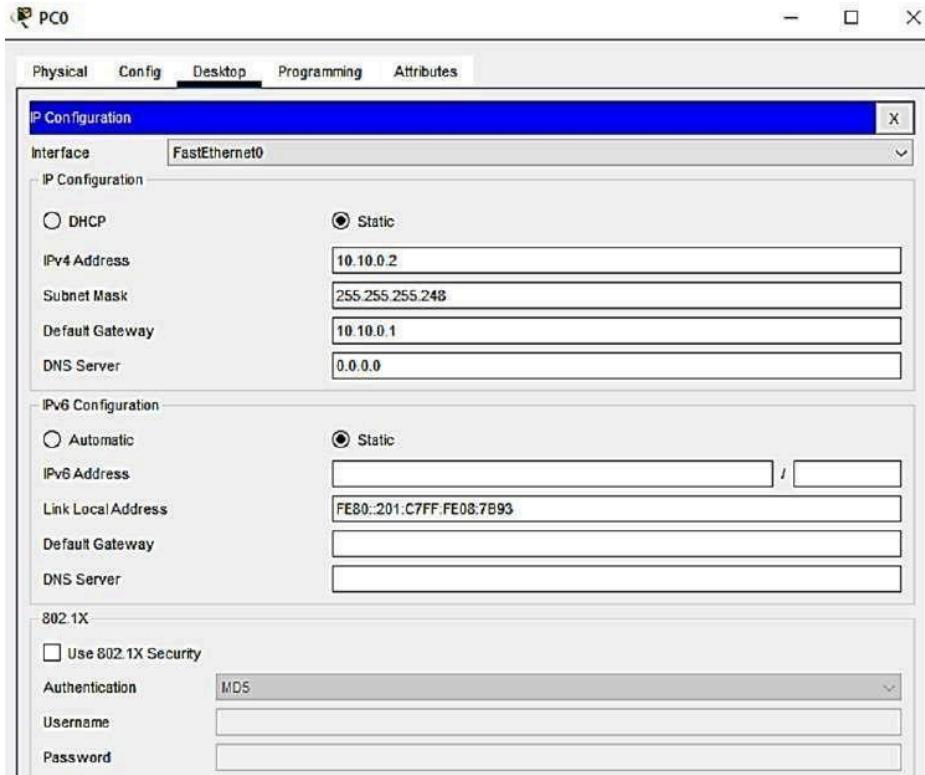
8. Exchanges entire table with all neighbors every 30 seconds (except in the case of a triggered update).

**PROGRAM 1:** (We got the following topology)

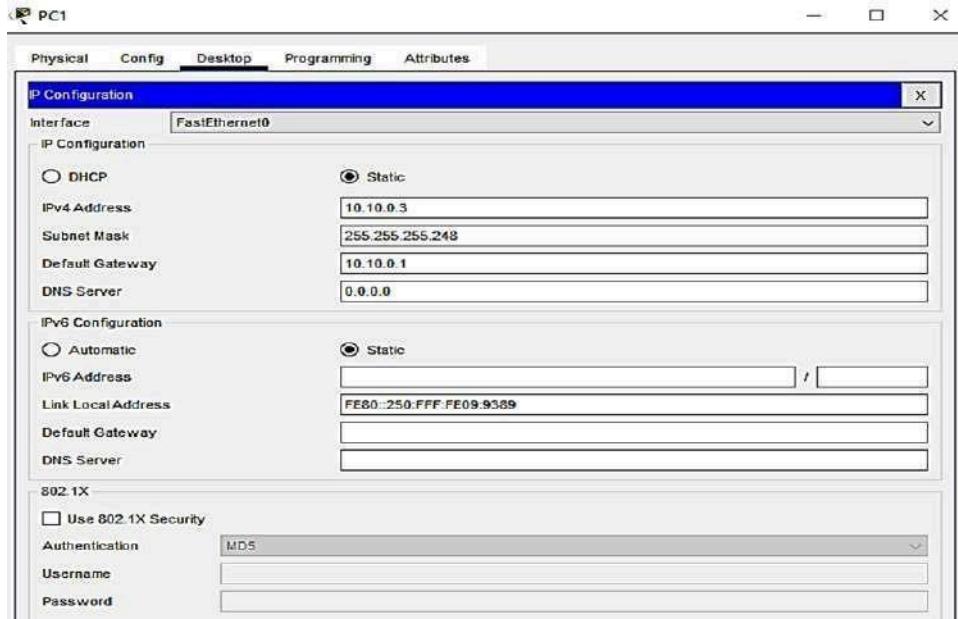


**PROGRAM 2:**

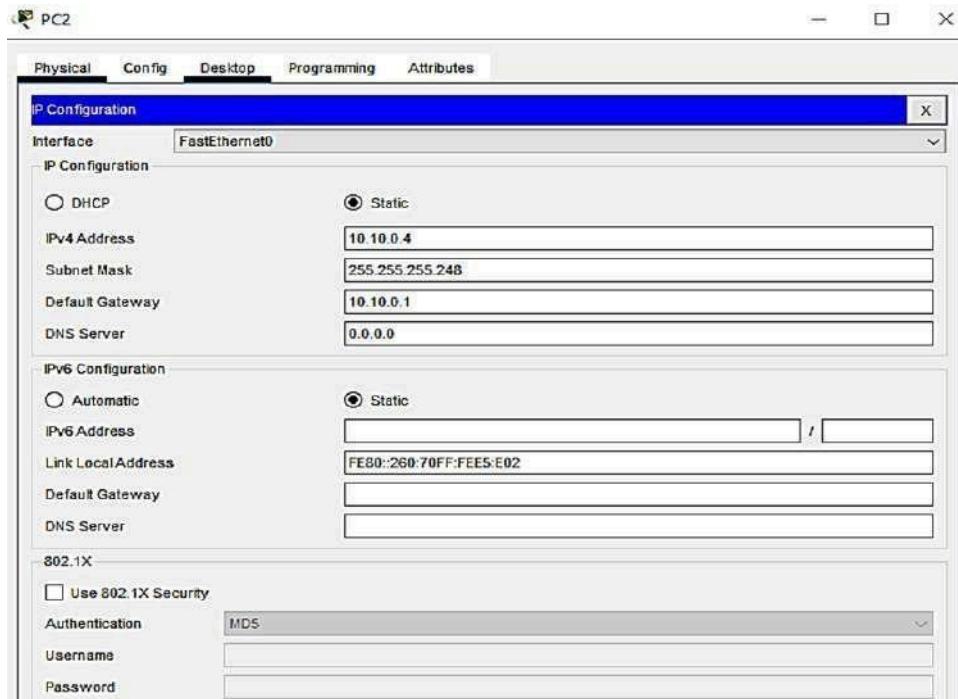
**2(A):** Now configure the PC 0 IP Address



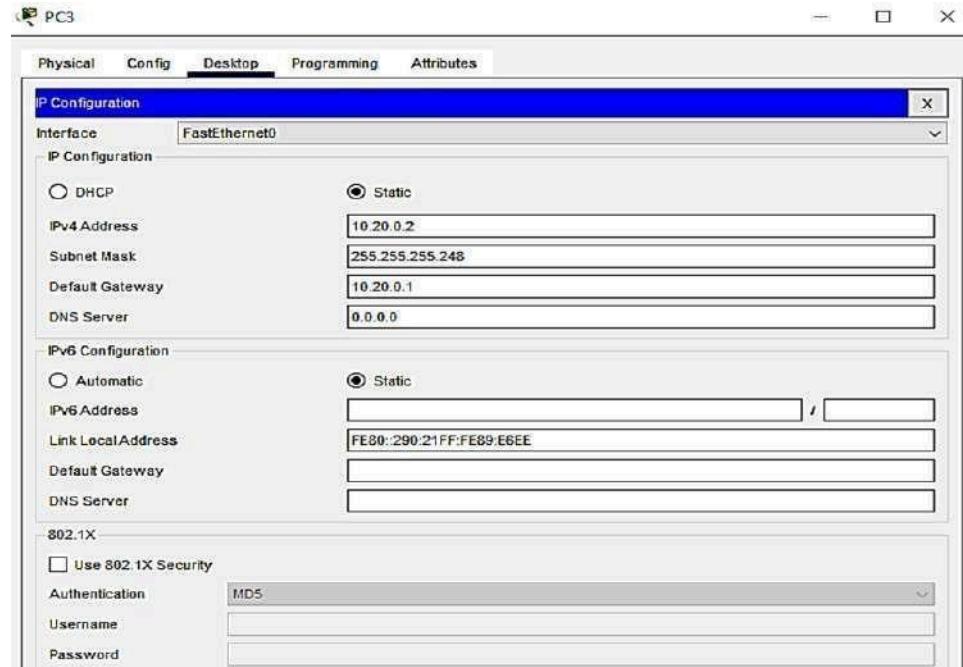
**2(B):** Now configure the PC 1 IP Address



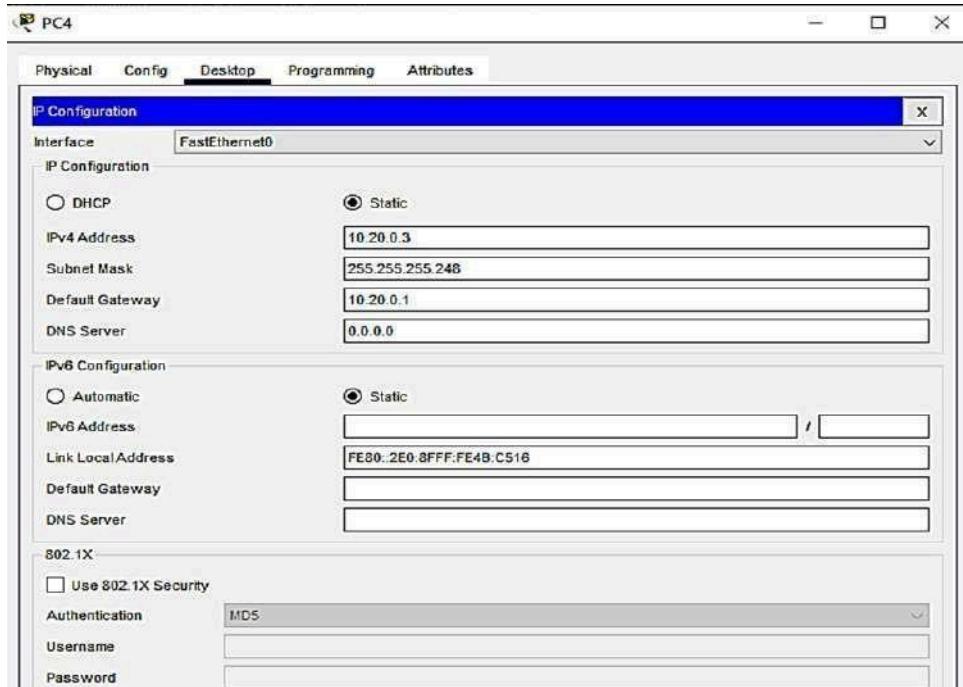
**2(C):** Now configure the PC 2 IP Address



**2(D):** Now configure the PC 3 IP Address

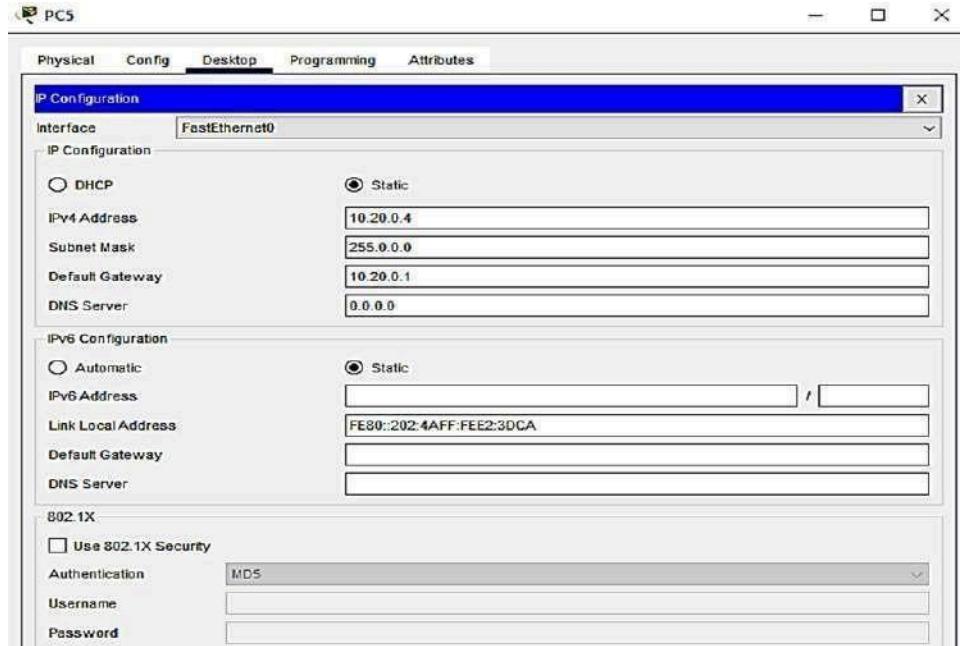


**2(E):** Now configure the PC 4 IP Address

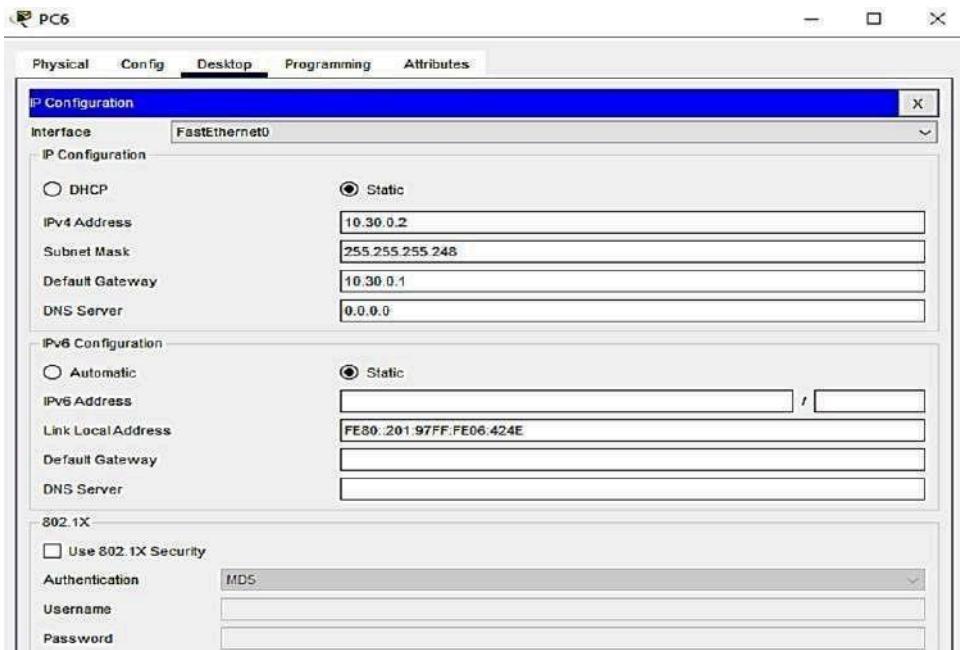


**2(F):** Now configure the PC 5 IP Address

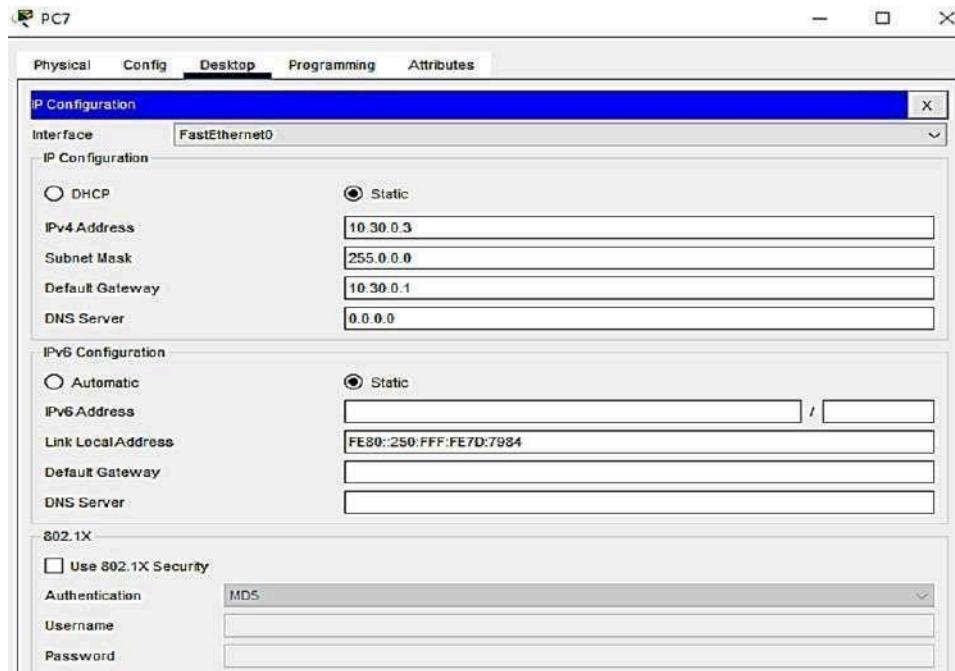
J



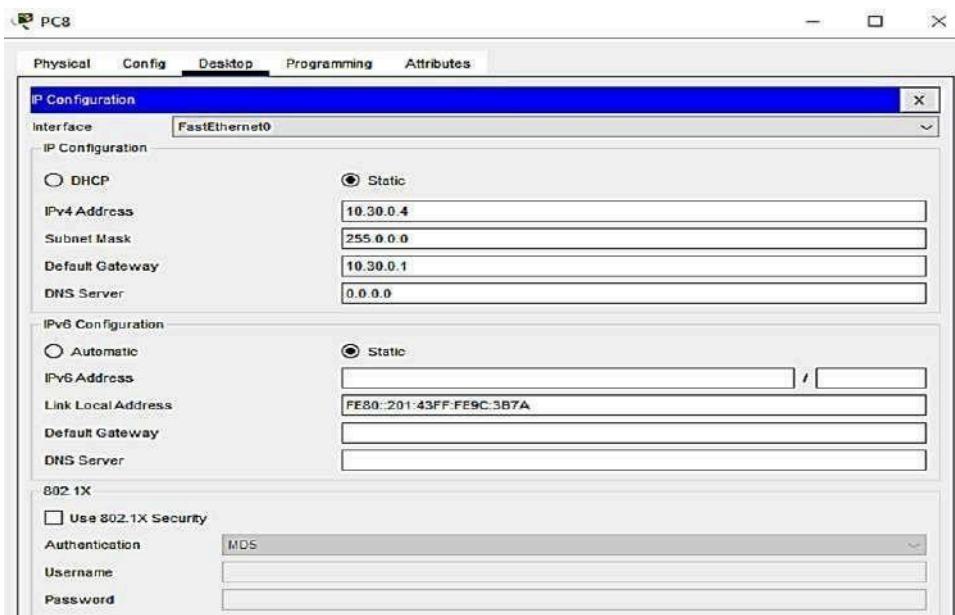
**2(G):** Now configure the PC 6 IP Address



**2(H):** Now configure the PC 7 IP Address

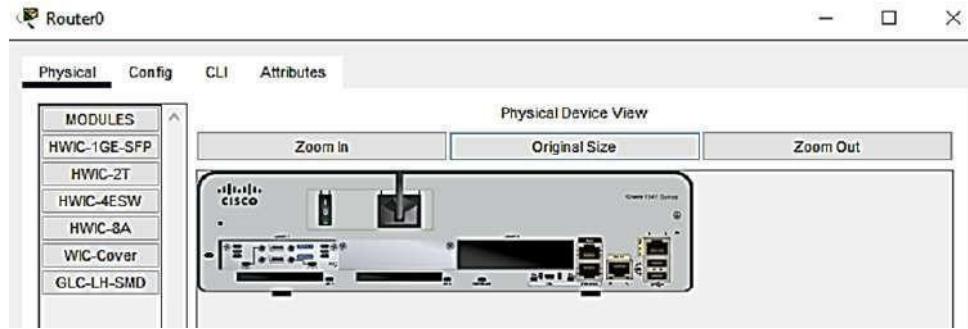


**2(I):** Now configure the PC 8 IP Address

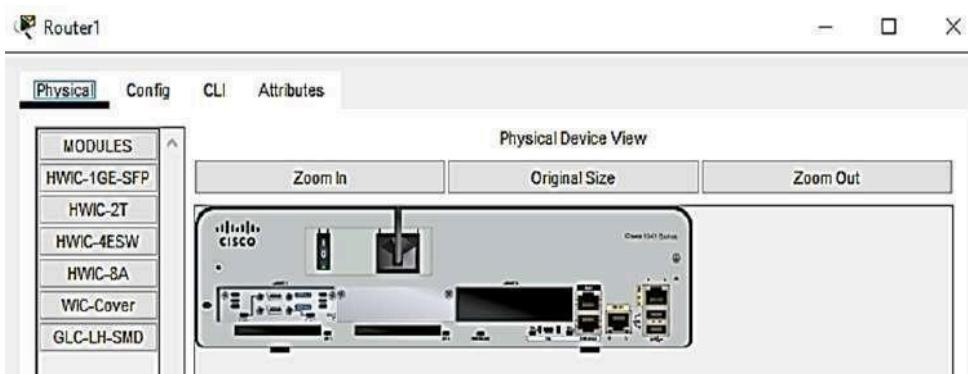


**PROGRAM 3: Now in All Router's Physical Section add the Serial Interface of : HWIC-2T**

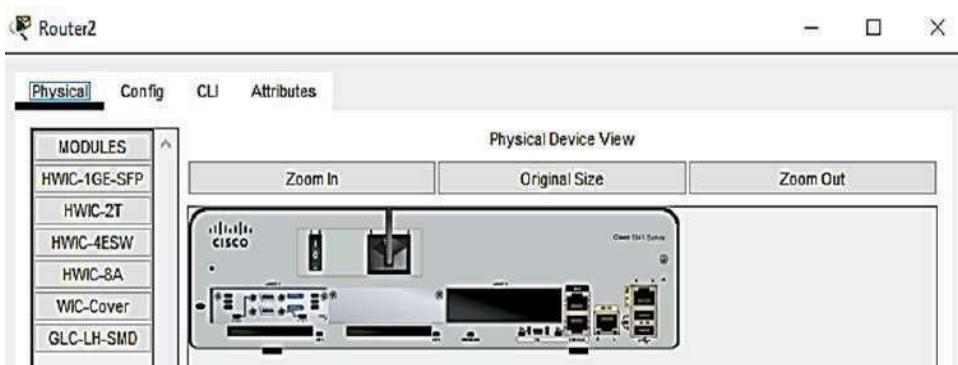
**3(A):** Router 0



**3(B):** Router 1



**3(C):** Router 2

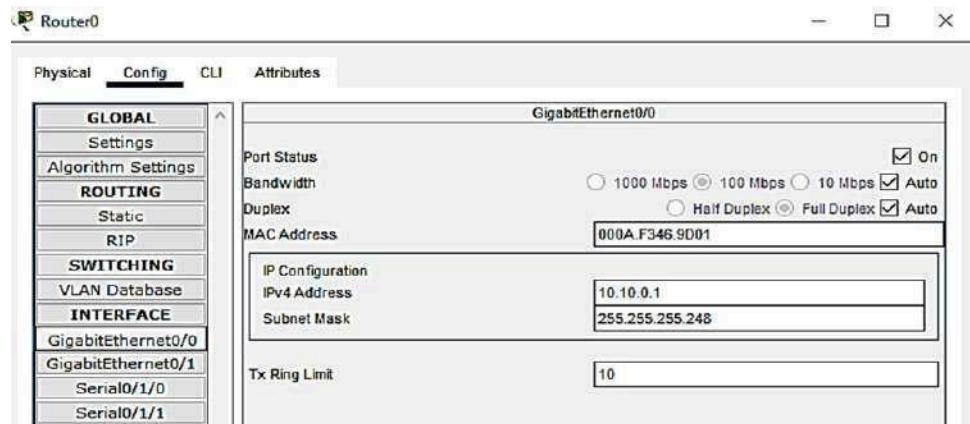


**Remember You have to OFF the switch while adding Serial Interface and ON the Switch after adding the interface in all the Routers**

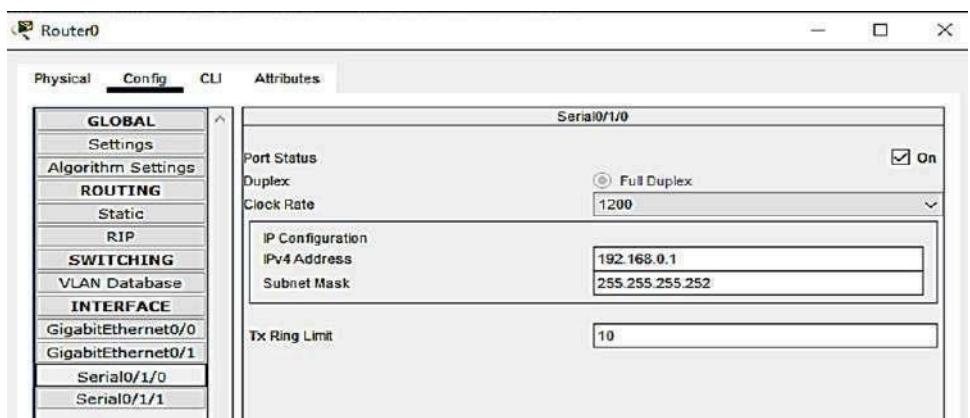
**PROGRAM 4:**

**4(A):** Router 0

- (i) GigabitEthernet 0/0

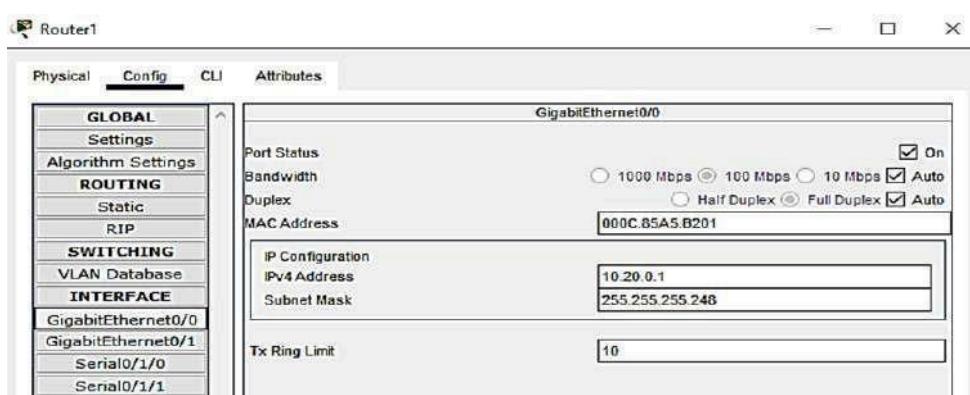


(ii) Serial 0/1/0

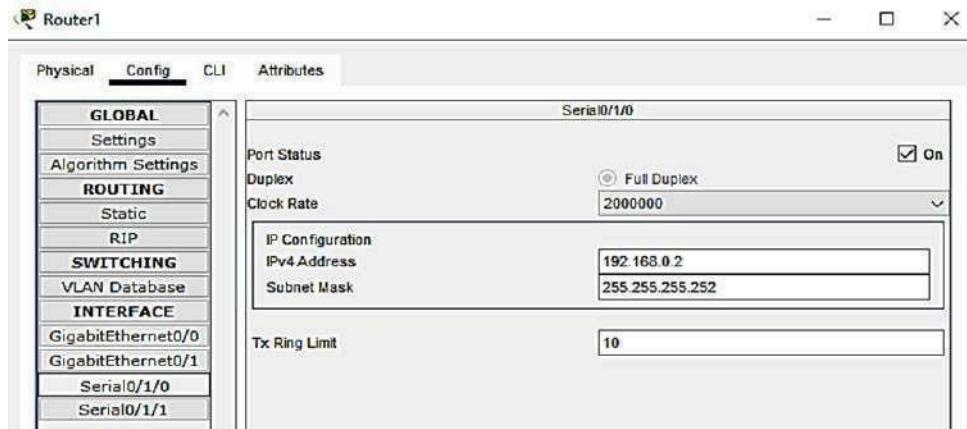


## 4(B): Router 1

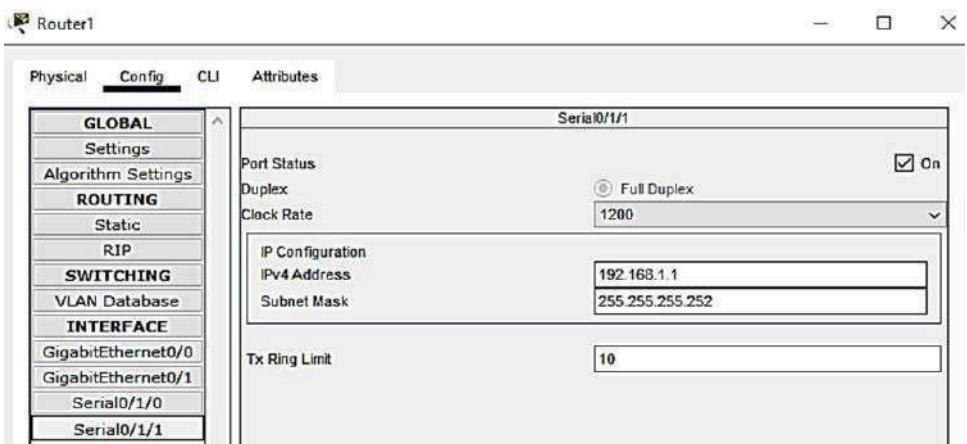
(i) GigabitEthernet 0/0



(ii) Serial 0/1/0

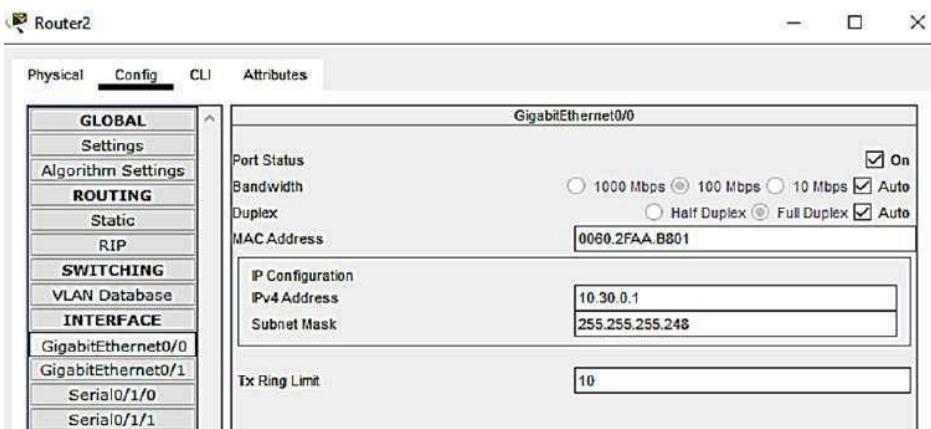


(iii) Serial 0/1/1

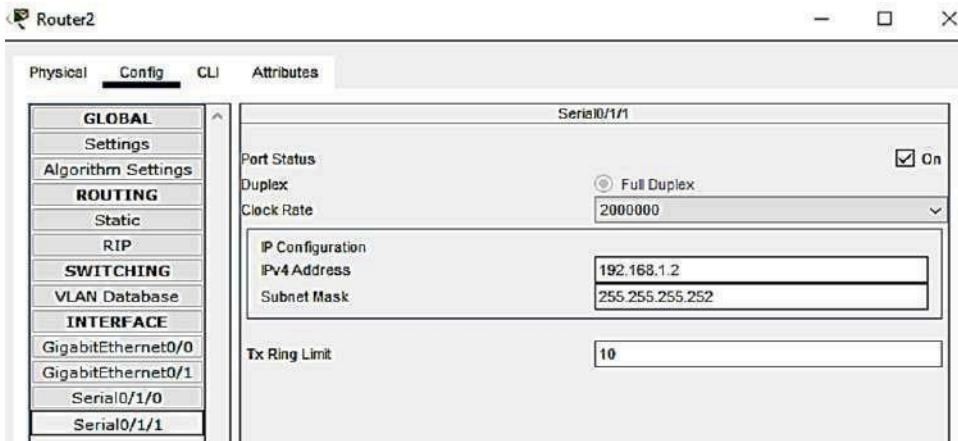


## 4(C): Router 2

(i) GigabitEthernet 0/0

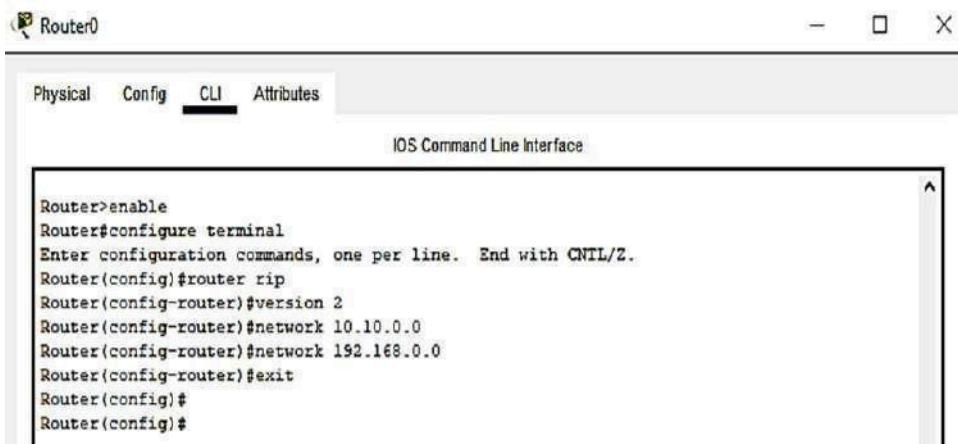


(ii) Serial 0/1/1

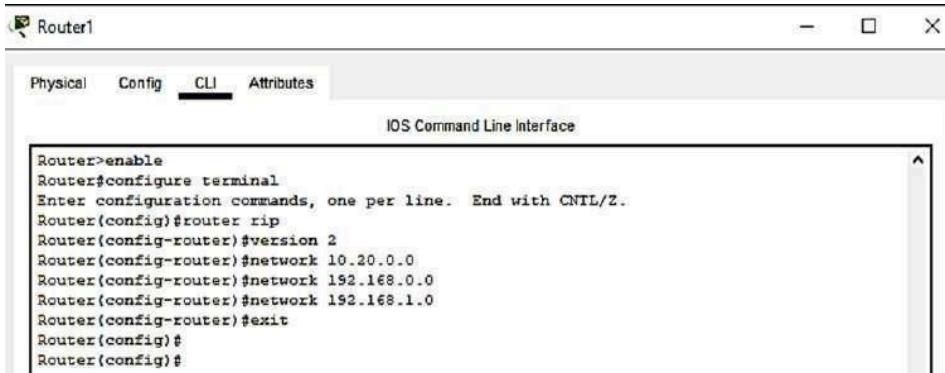


## **PROGRAM 5:**

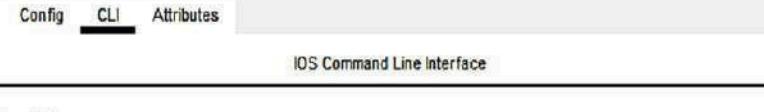
## **5(A): Router 0**



**5(B):** Router 1



## **5(C): Router 2**



The screenshot shows a Windows application window titled "Router2". The window has a menu bar with "Physical", "Config", "CLI" (which is selected and highlighted in blue), and "Attributes". Below the menu is a title bar "IOS Command Line Interface". The main area contains the following command-line session:

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 10.30.0.0
Router(config-router)#network 192.168.1.0
Router(config-router)#exit
Router(config)#
Router(config)#

```

#### **PROGRAM 6: (Now check the connectivity by using ping command with CMD)**

## **6(A):** PC 0: ping 10.0.0.4



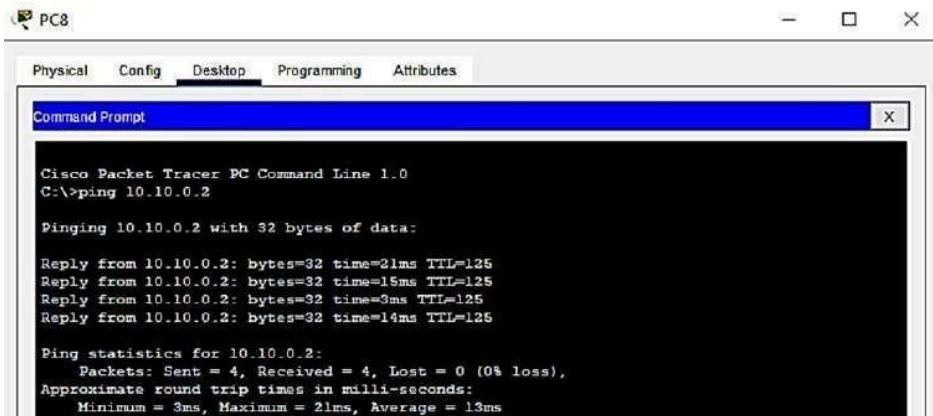
Cisco Packet Tracer PC Command Line 1.0  
C:\>ping 10.0.0.4

Pinging 10.0.0.4 with 32 bytes of data:

Reply from 10.0.0.4: bytes=32 time<1ms TTL=128  
Reply from 10.0.0.4: bytes=32 time<1ms TTL=128  
Reply from 10.0.0.4: bytes=32 time<1ms TTL=128  
Reply from 10.0.0.4: bytes=32 time<1ms TTL=128

Ping statistics for 10.0.0.4:  
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),  
Approximate round trip times in milli-seconds:  
Minimum = 0ms, Maximum = 1ms, Average = 0ms

**6(B):** PC 8: ping 10.0.0.2



# **Practical**

## **No.7**

**AIM:** Using Packet Tracer to create a network with three routers with RIPv1 and each router associated network will have minimum three PC and show the connectivity.

### **THEORY:**

Open shortest path first (OSPF) is a link-state routing protocol that is used to find the best path between the source and the destination router using its own shortest path first (SPF) algorithm. A link-state routing protocol is a protocol that uses the concept of triggered updates, i.e., if there is a change observed in the learned routing table then the updates are triggered only,

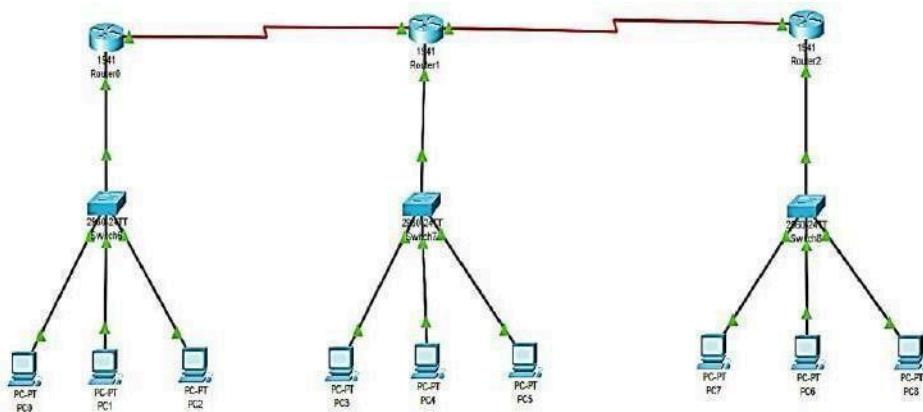
Open shortest path first (OSPF) is developed by Internet Engineering Task Force (IETF) as one of the Interior Gateway Protocol (IGP), i.e., the protocol which aims at moving the packet within a large autonomous system or routing domain.

OSPF advantages –

1. Both IPv4 and IPv6 routed protocols
2. Load balancing with equal-cost routes for the same destination
3. Unlimited hop counts
4. Trigger updates for fast convergence
5. A loop-free topology using SPF algorithm
6. Run-on most routers
7. Classless protocol

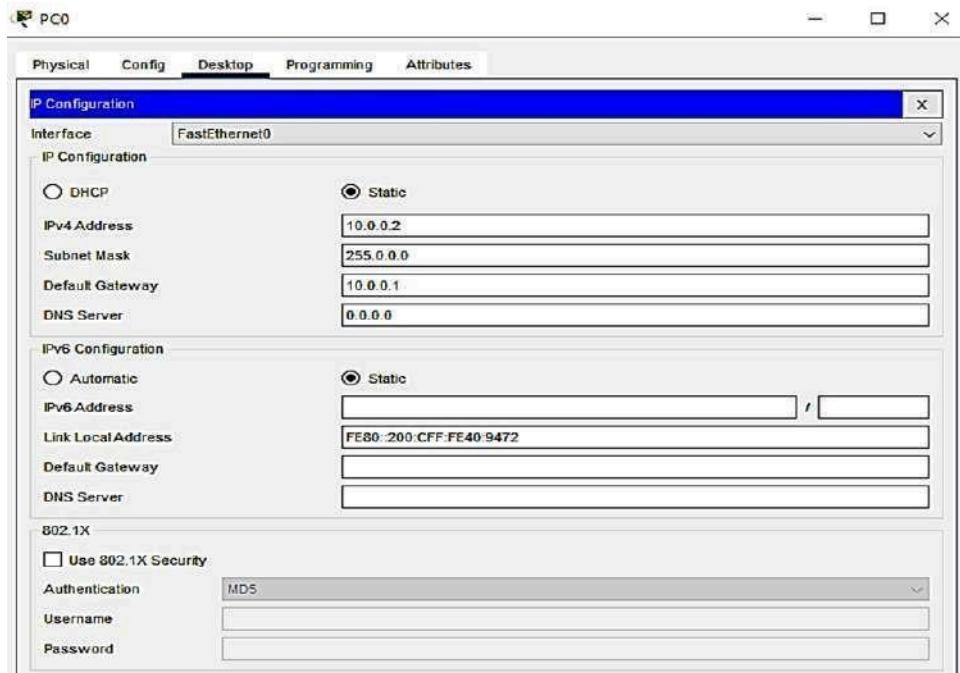
There are some disadvantages of OSPF like, it requires an extra CPU process to run the SPF algorithm, requiring more RAM to store adjacency topology, and being more complex to set up and hard to troubleshoot.

**PROGRAM 1:** (We get the following topology)

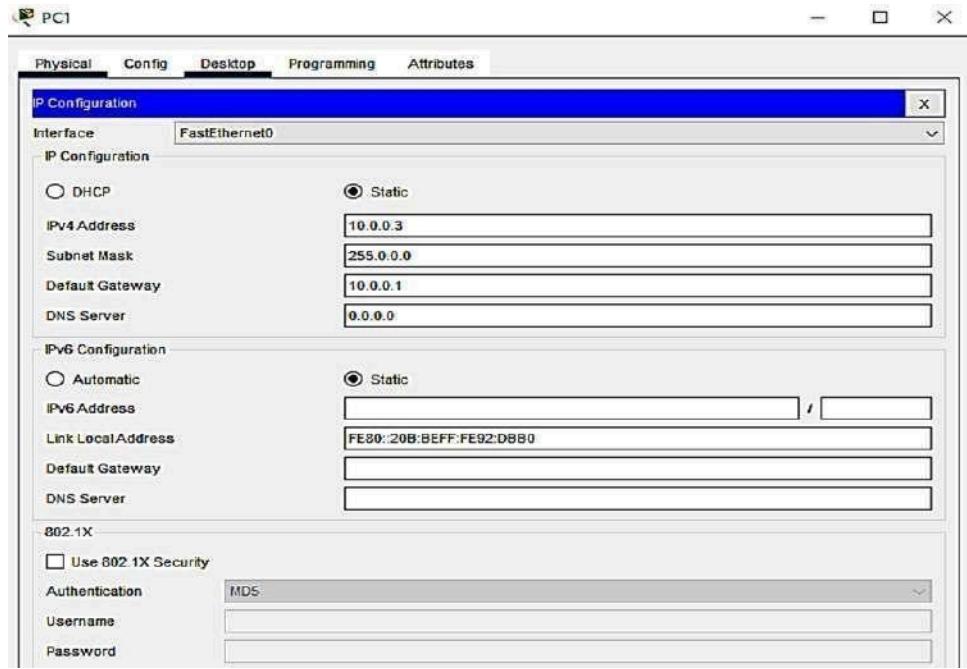


## **PROGRAM 2:**

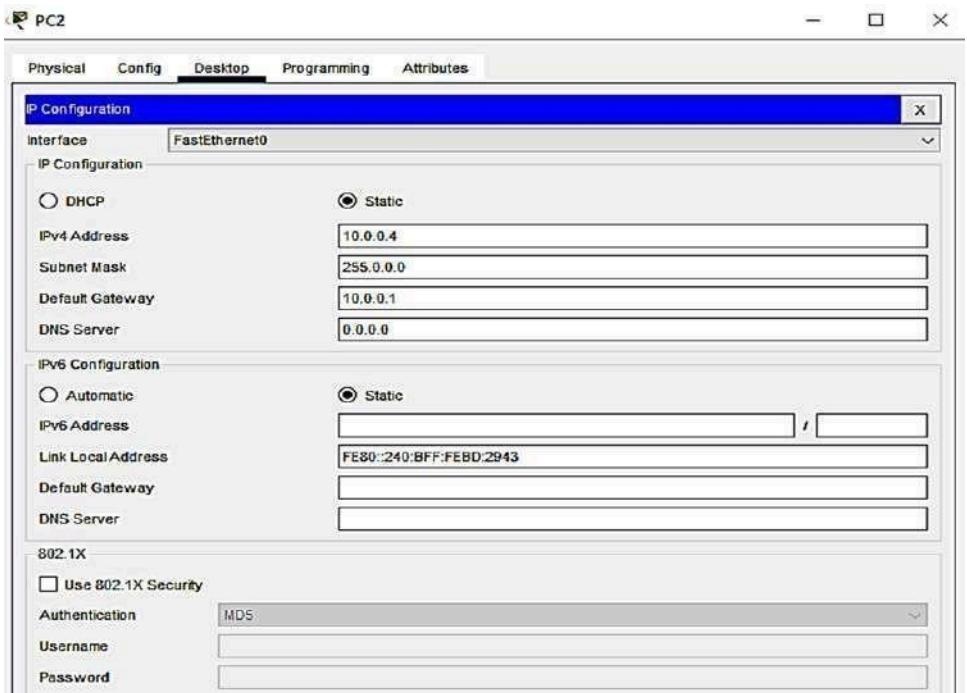
**2(A):** Now configure the PC 0 IP Address



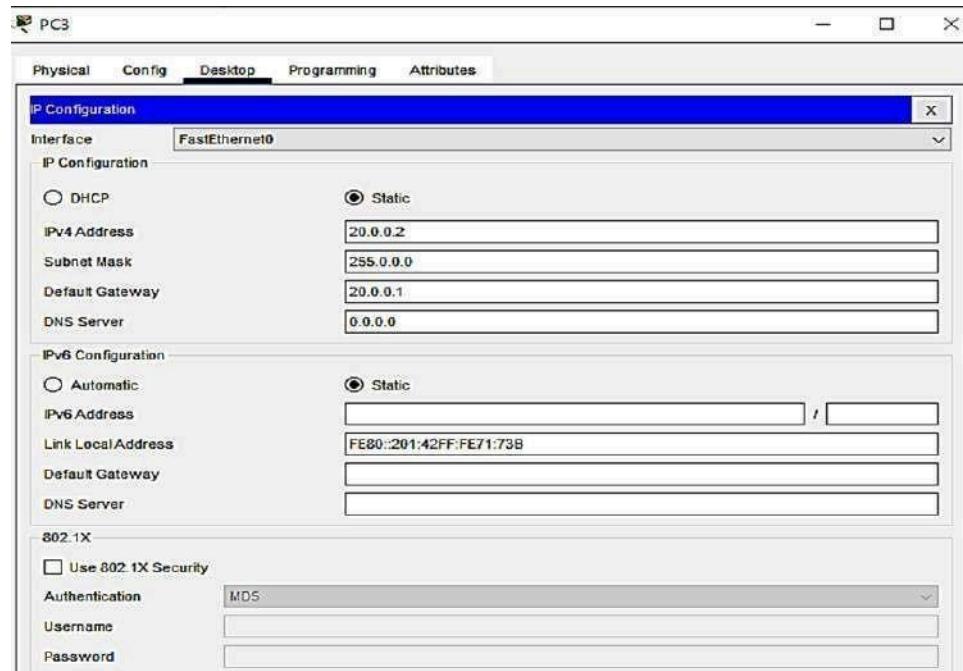
**2(B):** Now configure the PC 0 IP Address



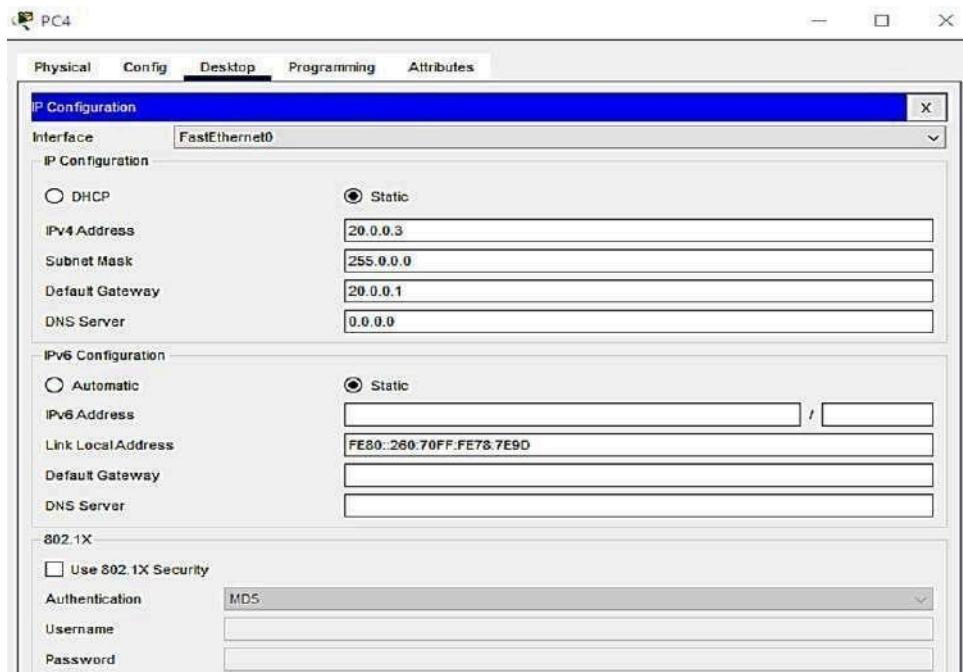
**2(C):** Now configure the PC 0 IP Address



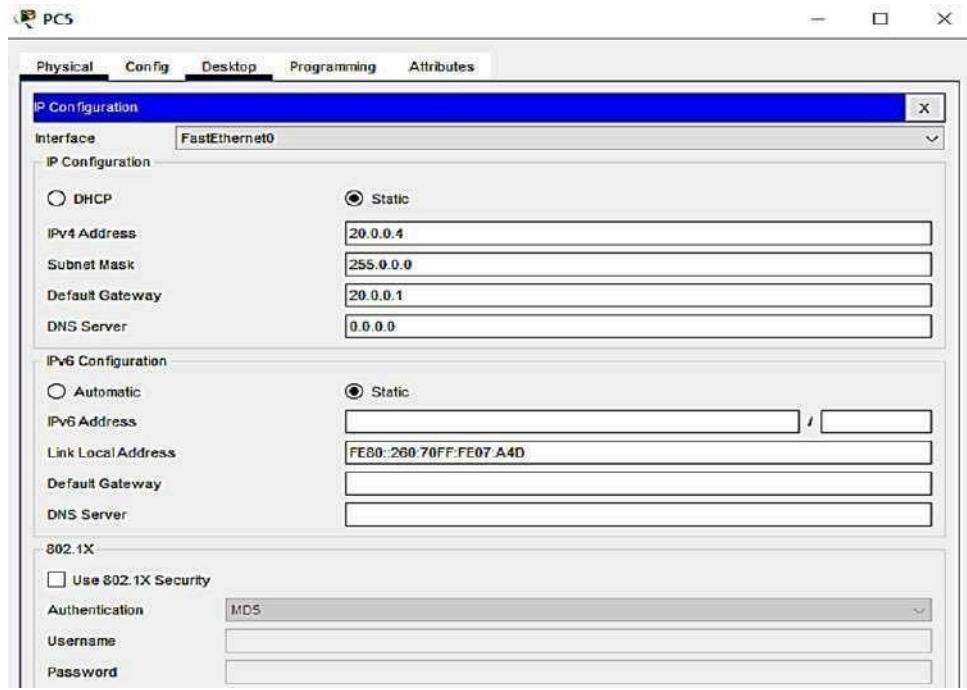
**2(D):** Now configure the PC 0 IP Address



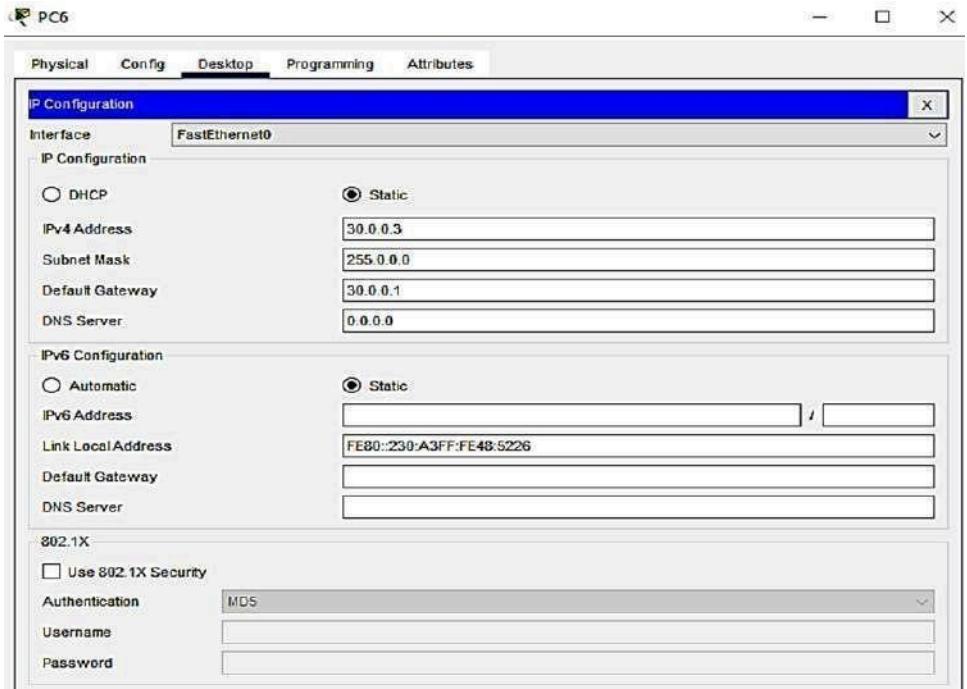
**2(E):** Now configure the PC 0 IP Address



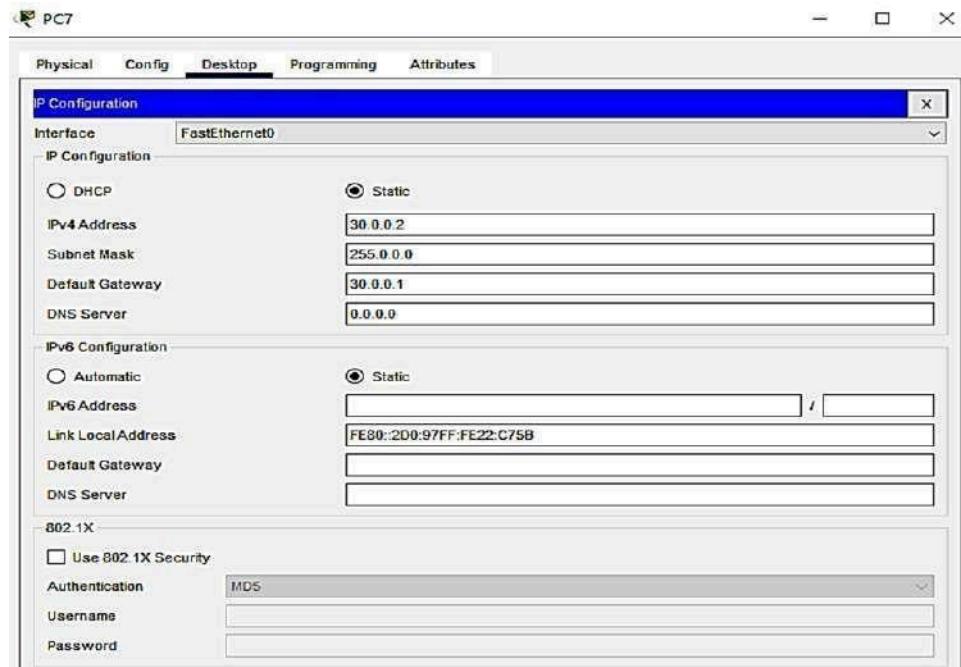
**2(F):** Now configure the PC 0 IP Address



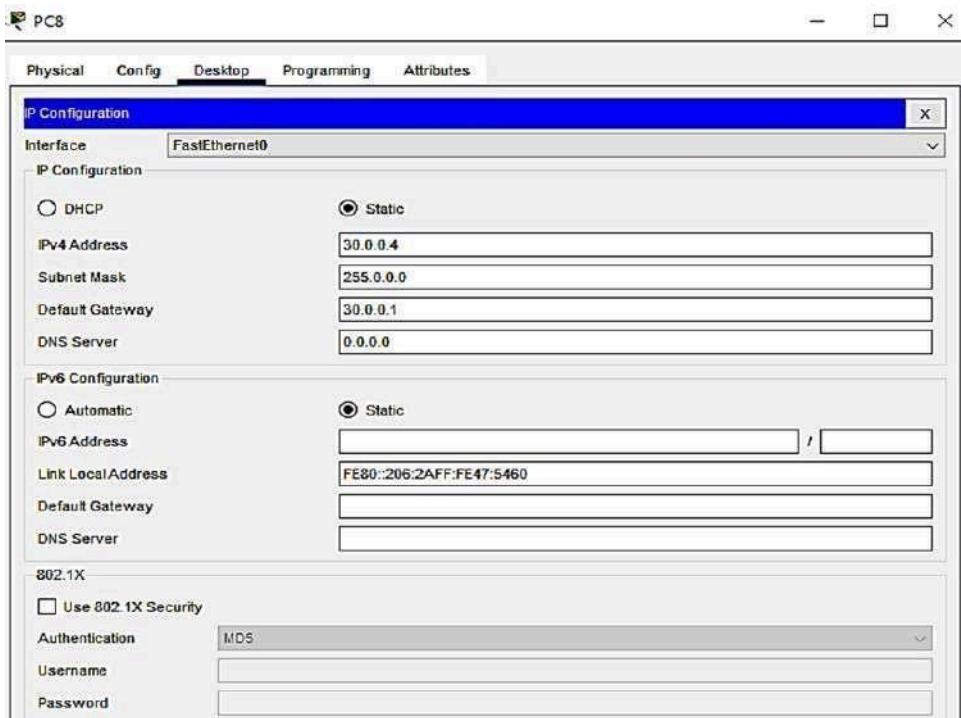
**2(G):** Now configure the PC 0 IP Address



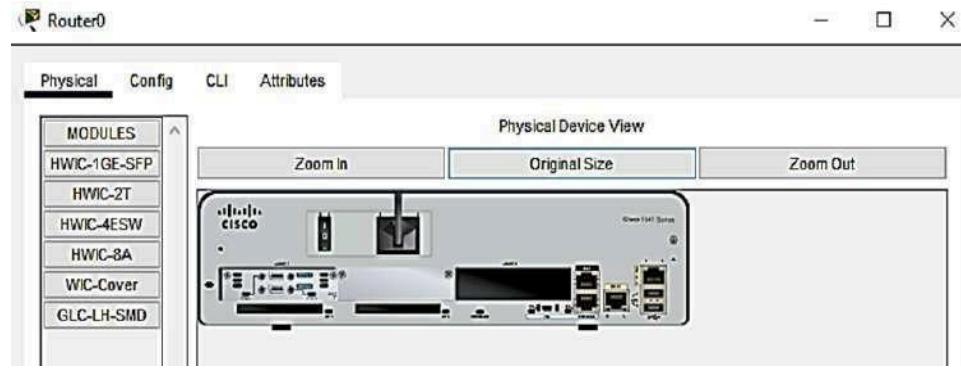
**2(H):** Now configure the PC 0 IP Address



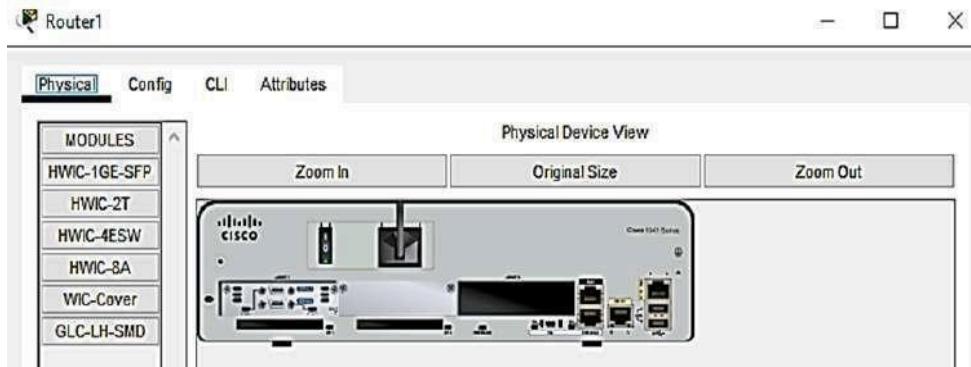
**2(I):** Now configure the PC 0 IP Address



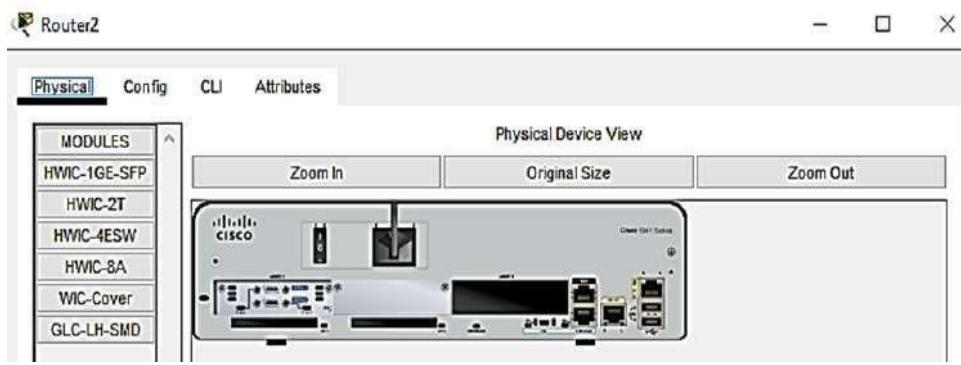
**PROGRAM 3:** Now in All Router's Physical Section add the Serial Interface of : HWIC-2T



**3(B):** Router 1



**3(C):** Router 2

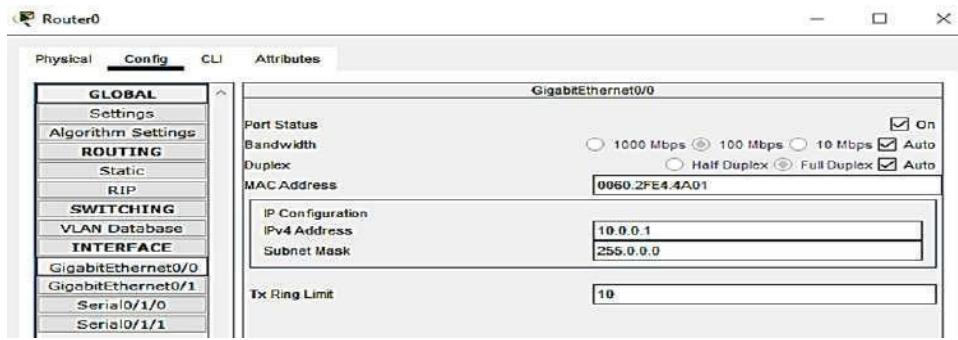


**Remember You have to OFF the switch while adding Serial Interface and ON the Switch after adding the interface in all the Routers**

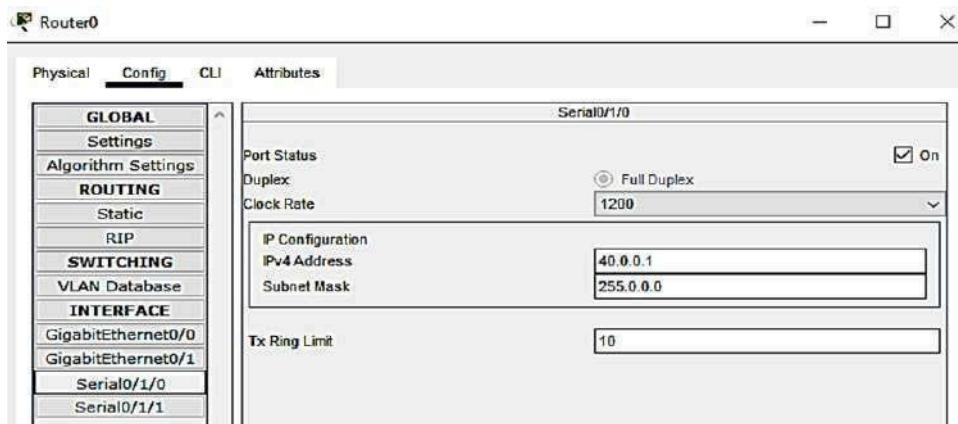
**PROGRAM 4: (Now Configure IP Address on all the router)**

## **4(A): Router 0**

### (i) GigabitEthernet 0/0

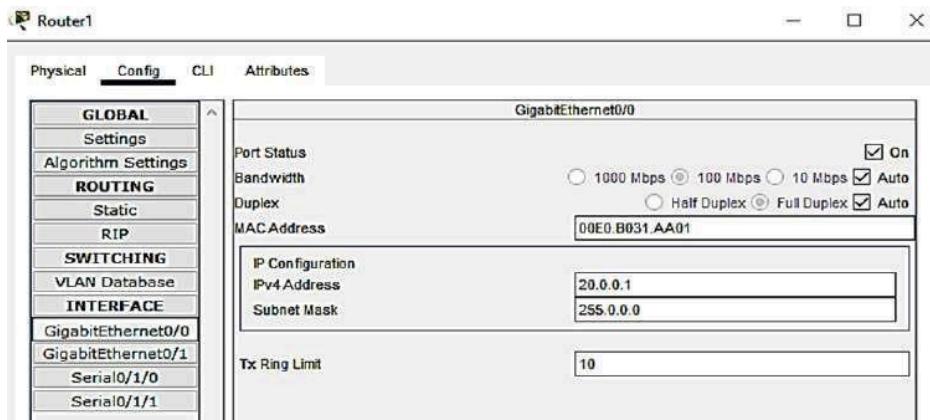


### (ii) Serial 0/1/0

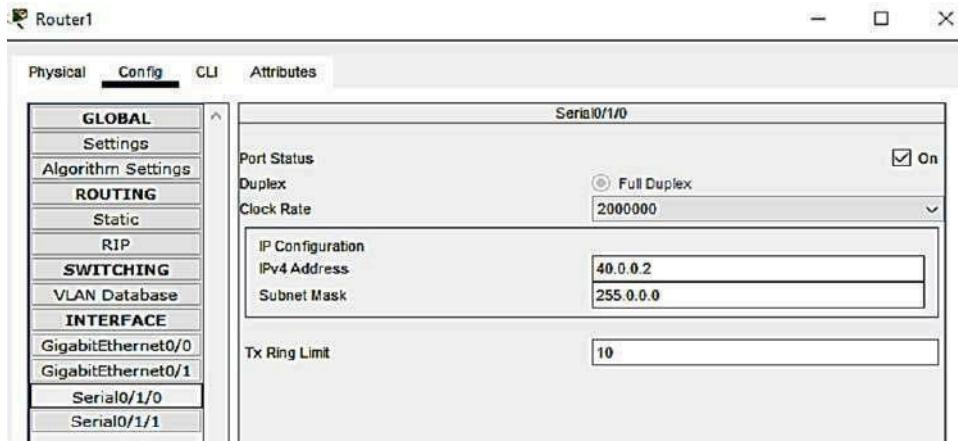


## **4(B): Router 1**

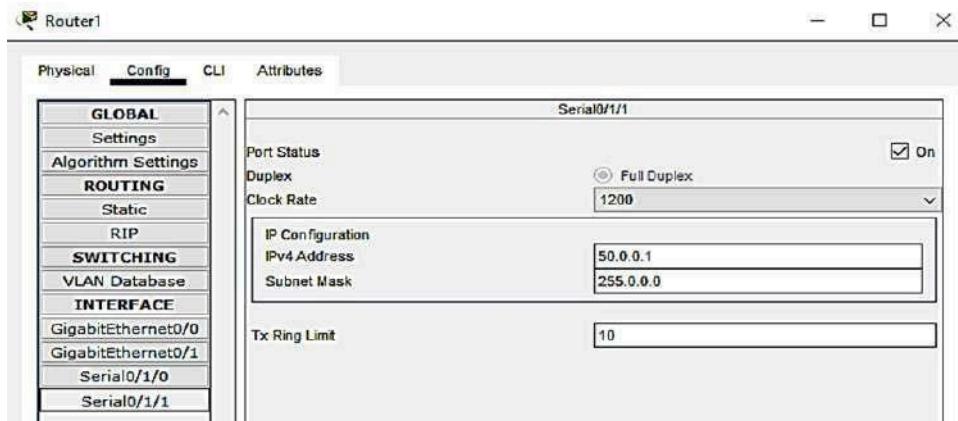
### (i) GigabitEthernet 0/0



(ii) Serial 0/1/0

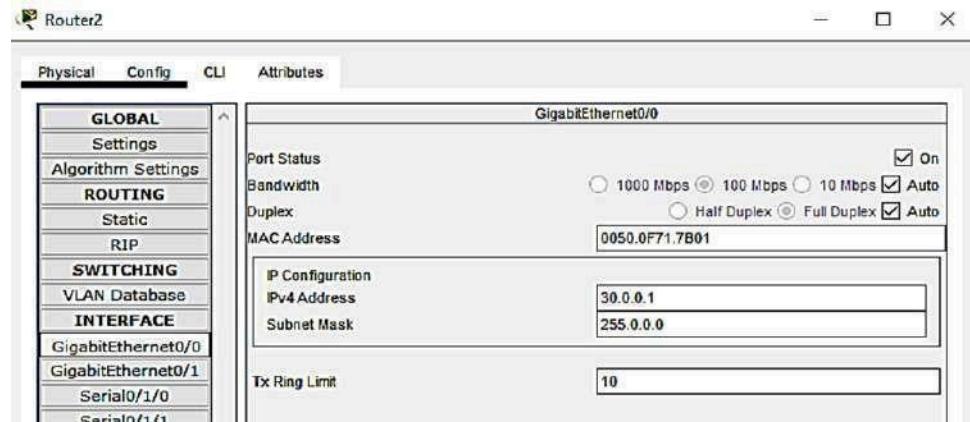


(iii) Serial 0/1/1

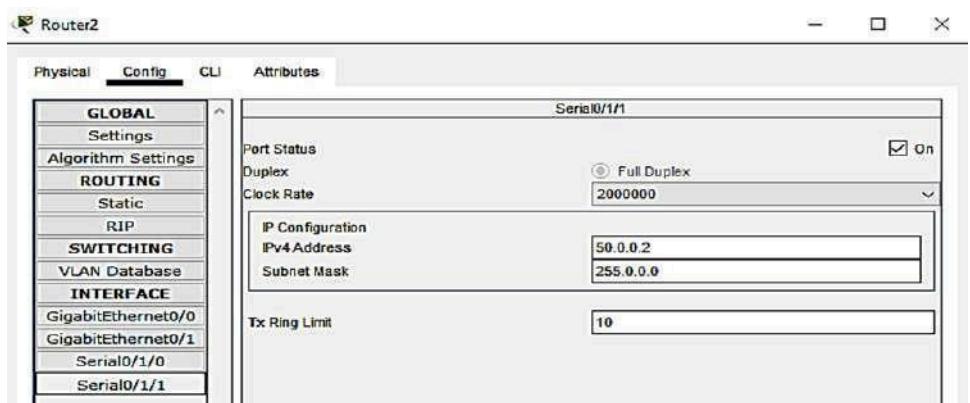


#### **4(C): Router 2**

(i) GigaabitEthernet 0/0



(ii) Serial 0/1/1



## **PROGRAM 5: Now Configure All the Router with (CLI Mode)**

**5(A):** Router 0

Router0

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#router ospf 1
Router(config-router)#network 10.0.0.0 0.0.0.255 area 1
^
% Invalid input detected at '^' marker.

Router(config-router)#network 10.0.0.0 0.0.0.255 area 1
Router(config-router)#network 40.0.0.0 0.0.0.255 area 1
Router(config-router)#exit
Router(config)#
00:18:19: %OSPF-5-ADJCHG: Process 1, Nbr 50.0.0.1 on Serial0/1/0 from LOADING to FULL,
Loading Done

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to down

00:26:43: %OSPF-5-ADJCHG: Process 1, Nbr 50.0.0.1 on Serial0/1/0 from FULL to DOWN,
Neighbor Down: Interface down or detached

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/0, changed state to up

00:26:53: %OSPF-5-ADJCHG: Process 1, Nbr 50.0.0.1 on Serial0/1/0 from LOADING to FULL,
Loading Done
```

### 5(B): Router 1

Router1

Physical Config **CLI** Attributes

IOS Command Line Interface

```
Router>enable
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#
Router(config)#router ospf 1
Router(config-router)#
Router(config-router)#network 20.0.0.0 0.0.0.255 area 1
Router(config-router)#network 40.0.0.0 0.0.0.255 area 1
Router(config-router)#network 50.0.0.0 0.0.0.255 area 1
Router(config-router)#exit
Router(config)#
00:21:13: %OSPF-5-ADJCHG: Process 1, Nbr 50.0.0.2 on Serial0/1/1 from LOADING to FULL,
Loading Done

%LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to down

00:26:03: %OSPF-5-ADJCHG: Process 1, Nbr 50.0.0.2 on Serial0/1/1 from FULL to DOWN,
Neighbor Down: Interface down or detached
```

### 5(C): Router 2

The screenshot shows the Cisco IOS Command Line Interface (CLI) for Router2. The window title is "Router2". The tabs at the top are "Physical", "Config", "CLI" (which is selected), and "Attributes". The main area displays the following command output:

```
Router(config)#  
Router(config)#router ospf 1  
Router(config-router)#  
Router(config-router)#network 30.0.0.0 0.0.0.255 area 1  
Router(config-router)#network 50.0.0.0 0.0.0.255 area 1  
Router(config-router)#exit  
Router(config)#  
00:21:05: %OSPF-5-ADJCHG: Process 1, Nbr 50.0.0.1 on Serial0/1/1 from LOADING to FULL,  
Loading Done  
  
*LINEPROTO-5-UPDOWN: Line protocol on Interface Serial0/1/1, changed state to down  
  
00:25:55: %OSPF-5-ADJCHG: Process 1, Nbr 50.0.0.1 on Serial0/1/1 from FULL to DOWN,  
Neighbor Down: Interface down or detached
```

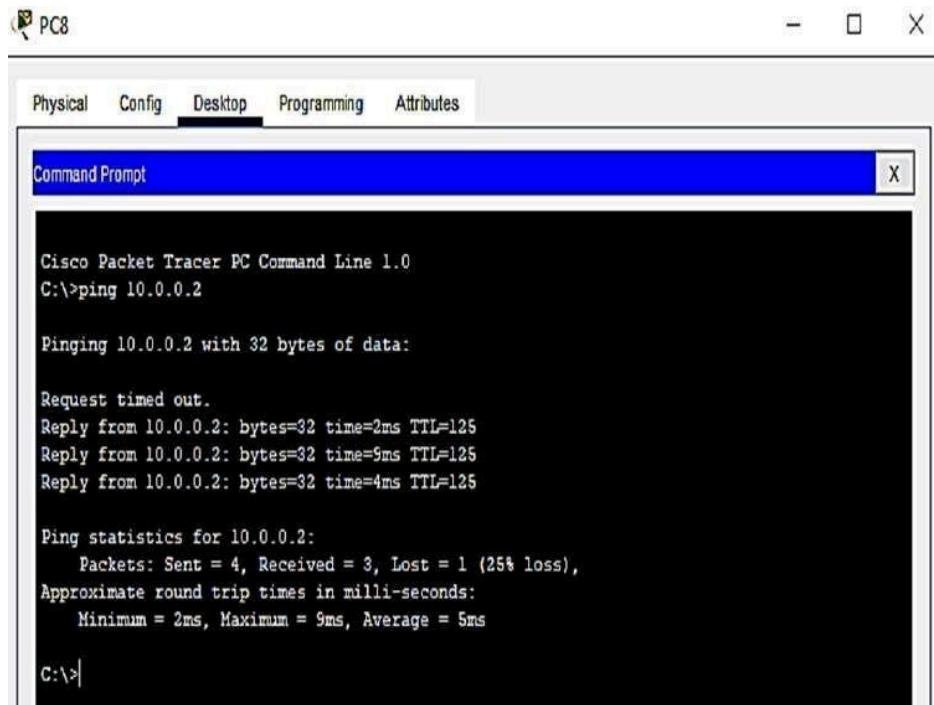
## **PROGRAM 6: (Now check the connectivity by using ping command with CMD)**

### **6(A): PC 0 : ping 30.0.0.3**

The screenshot shows the Cisco Packet Tracer PC Command Line 1.0 interface for PC1. The window title is "PC1". The tabs at the top are "Physical", "Config", "Desktop" (selected), "Programming", and "Attributes". A blue bar at the top says "Command Prompt". The main area displays the following ping command and its results:

```
Cisco Packet Tracer PC Command Line 1.0  
C:\>ping 30.0.0.3  
  
Pinging 30.0.0.3 with 32 bytes of data:  
  
Request timed out.  
Reply from 30.0.0.3: bytes=32 time=37ms TTL=125  
Reply from 30.0.0.3: bytes=32 time=11ms TTL=125  
Reply from 30.0.0.3: bytes=32 time=13ms TTL=125  
  
Ping statistics for 30.0.0.3:  
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),  
    Approximate round trip times in milli-seconds:  
        Minimum = 11ms, Maximum = 37ms, Average = 20ms
```

### **6(B): PC 8 : ping 10.0.0.2**



# **Practical**

## **No.8**

**AIM: Using Packet Tracer, create a network with three routers with BGP and each router associated network will have minimum three PC. Show Connectivity.**

THEORY:

Border Gateway Protocol (BGP) is used to Exchange routing information for the internet and is the protocol used between ISP which are different Autonomous Systems (AS).

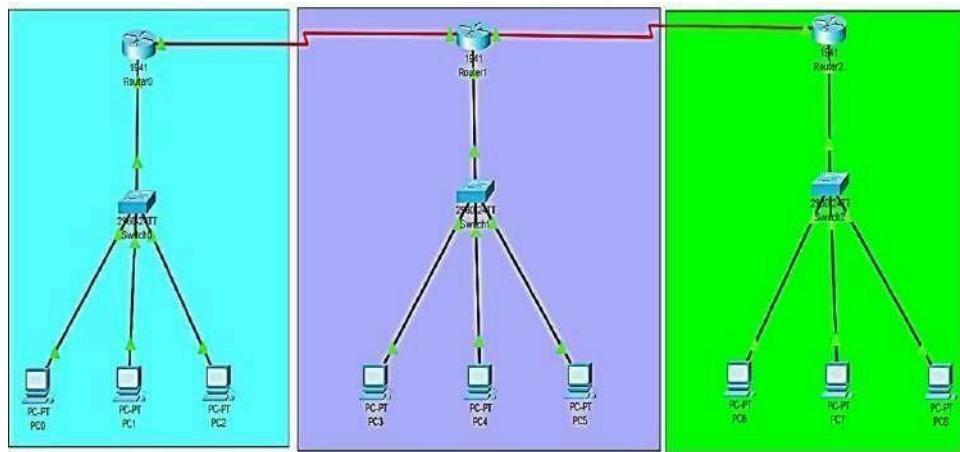
The protocol can connect together any internetwork of autonomous system using an arbitrary topology. The only requirement is that each AS have at least one router that is able to run BGP and that is router connect to at least one other AS's BGP router.

BGP's main function is to exchange network reach-ability information with other BGP systems.

Characteristics of Border Gateway Protocol (BGP):

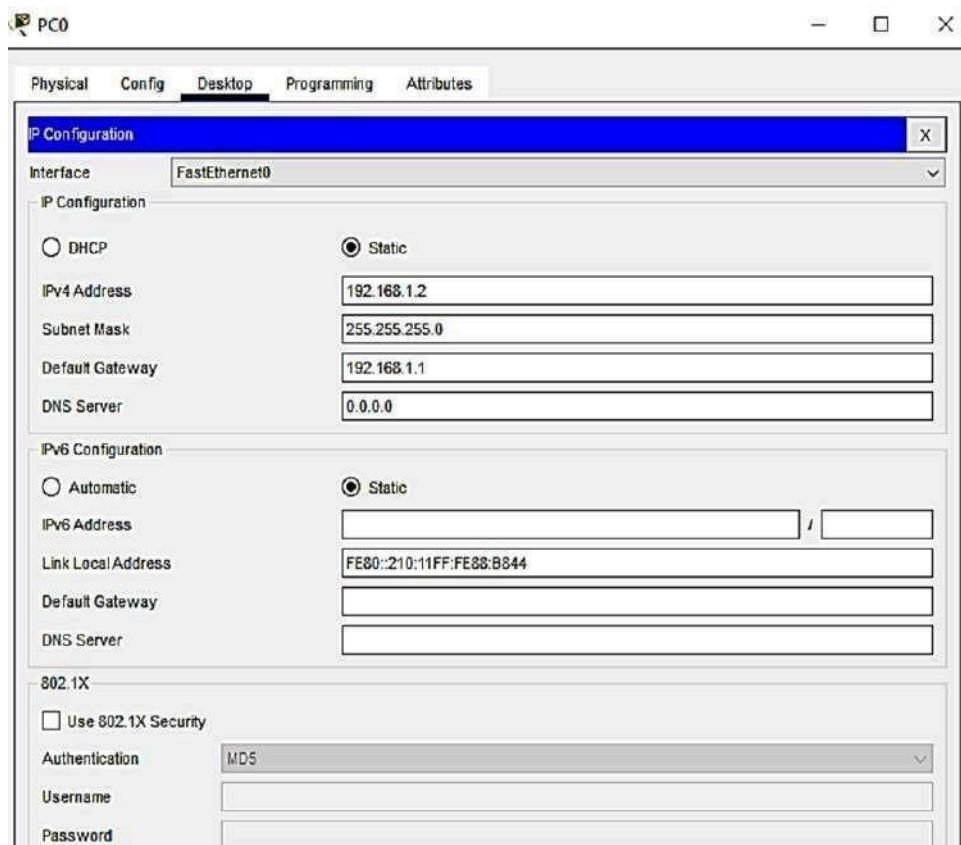
1. a) The main role of BGP is to provide communication between two autonomous systems.
2. b) BGP supports Next-Hop Paradigm.
3. c) Coordination among multiple BGP speakers within the AS (Autonomous System).
4. d) BGP advertisement also include path information, along with the reachable destination and next destination pair.
5. e) BGP can implement policies that can be configured by the administrator.
6. f) BGP runs Over TCP.
7. g) BGP conserve network Bandwidth.
8. h) BGP supports CIDR. i) BGP also supports Security

**PROGRAM 1:** (We got the following topology)

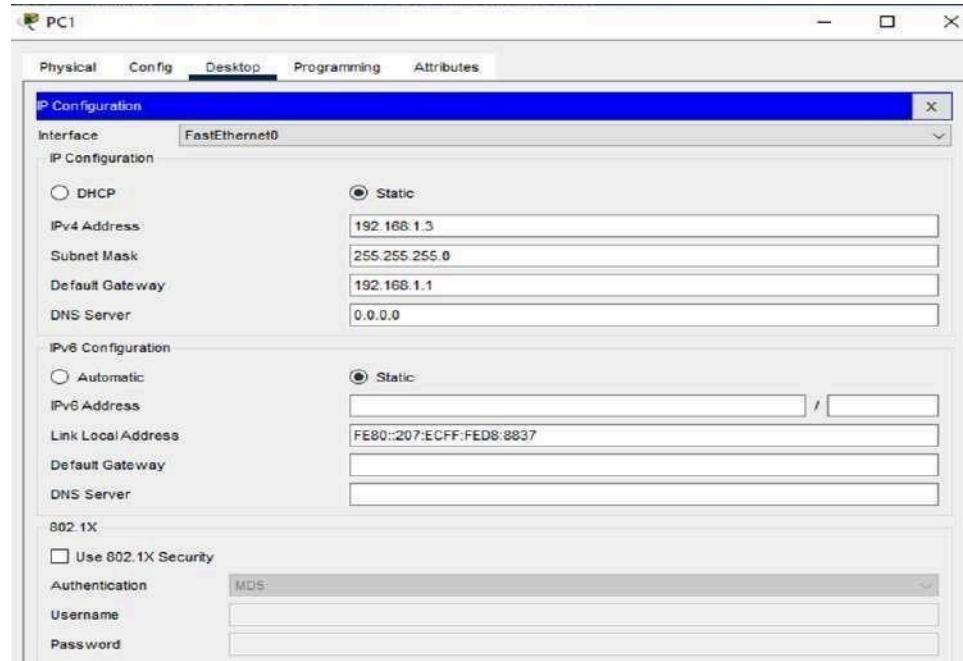


## **PROGRAM 2:**

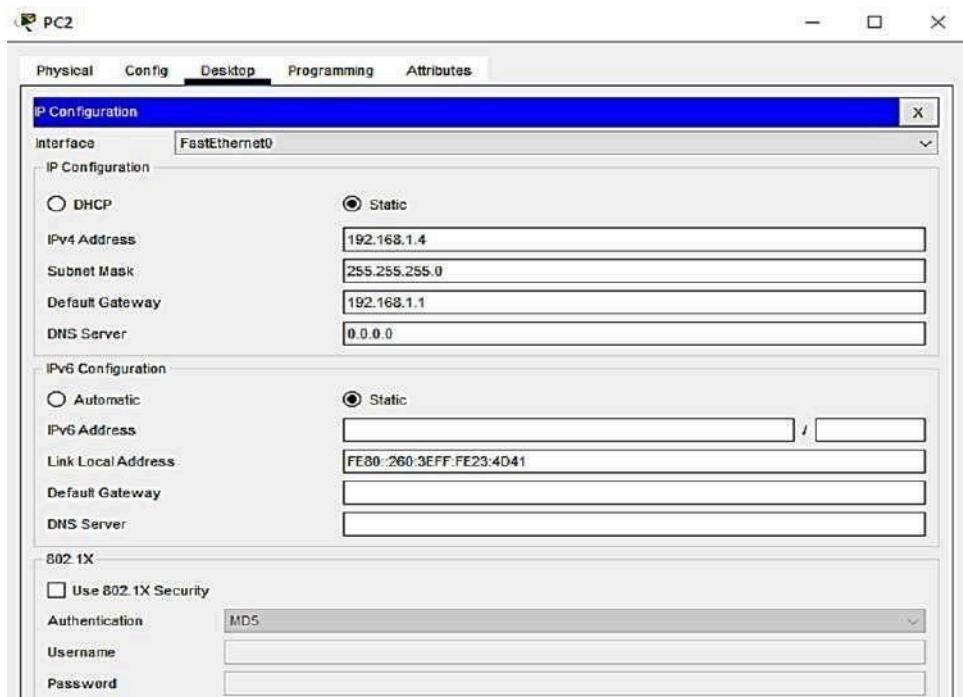
**2(A):** Now configure the PC 0 IP Address



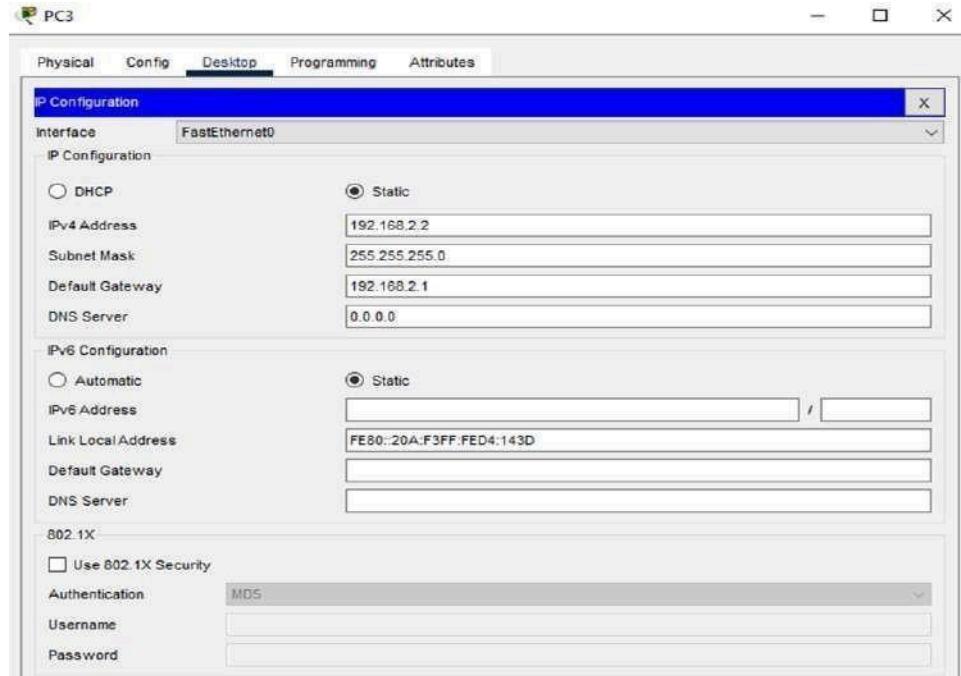
**2(B):** Now configure the PC 1 IP Address



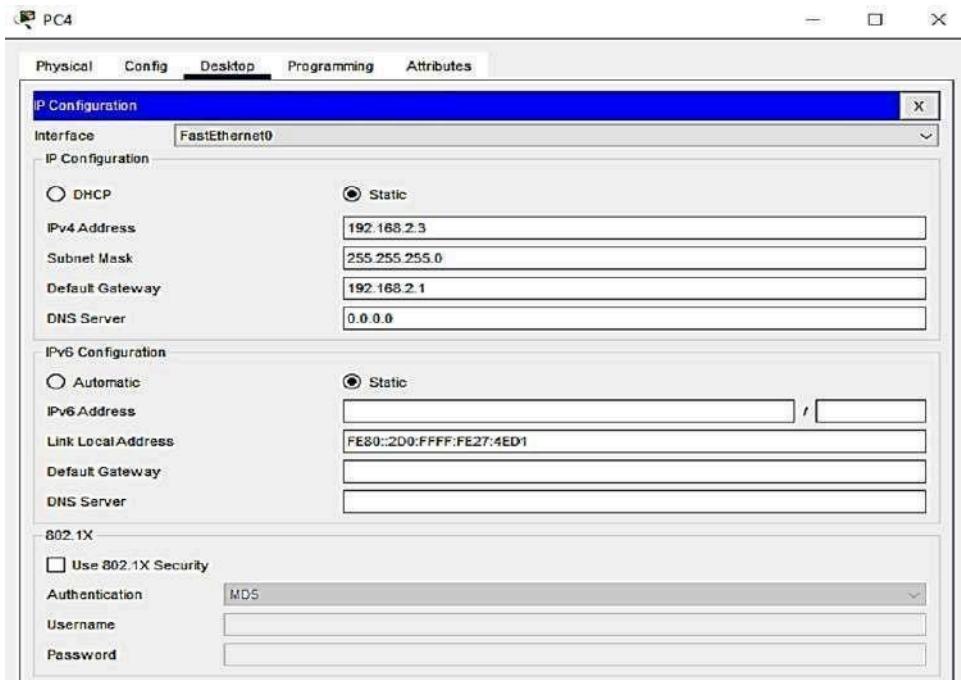
**2(C):** Now configure the PC 2 IP Address



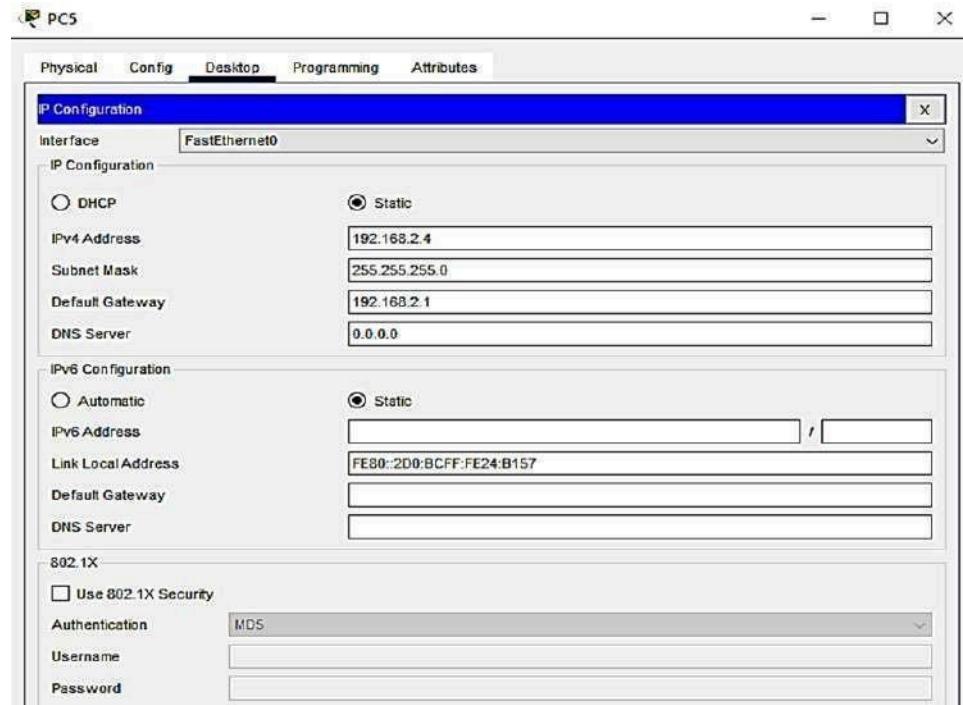
**2(D):** Now configure the PC 3 IP Address



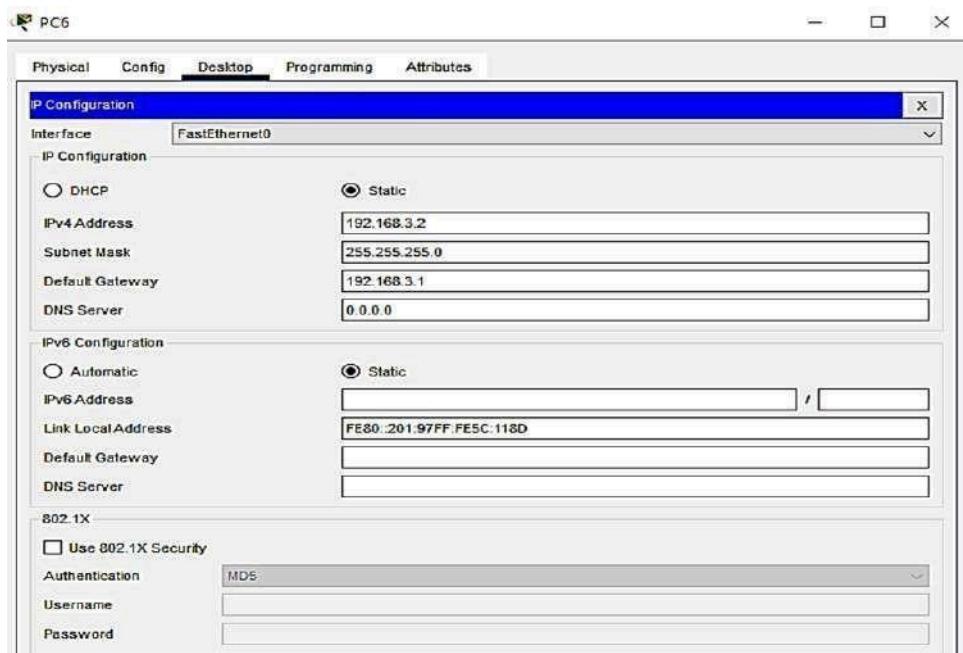
**2(E):** Now configure the PC 4 IP Address



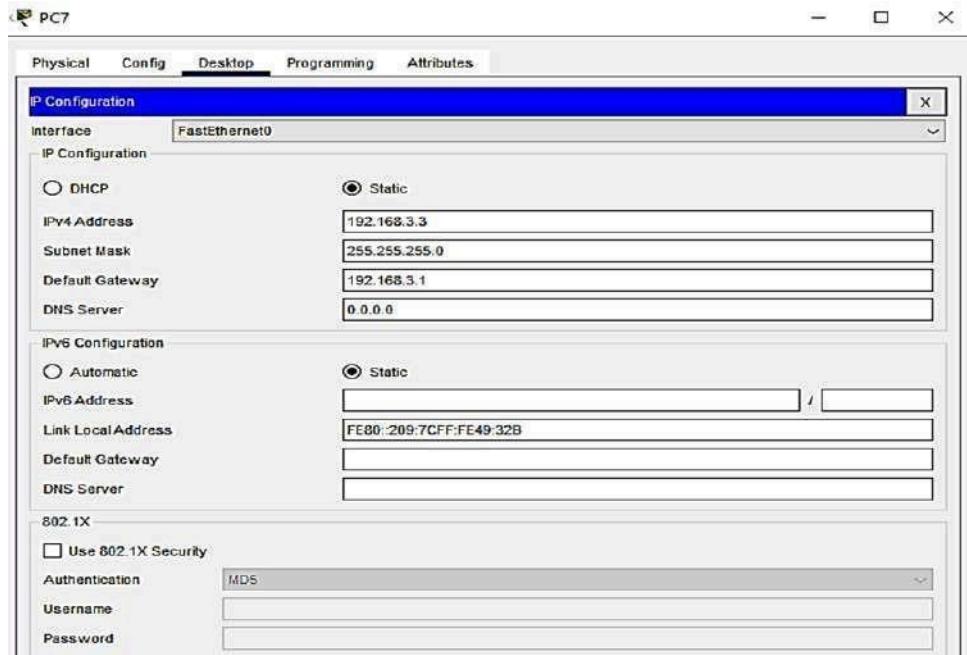
**2(F):** Now configure the PC 5 IP Address



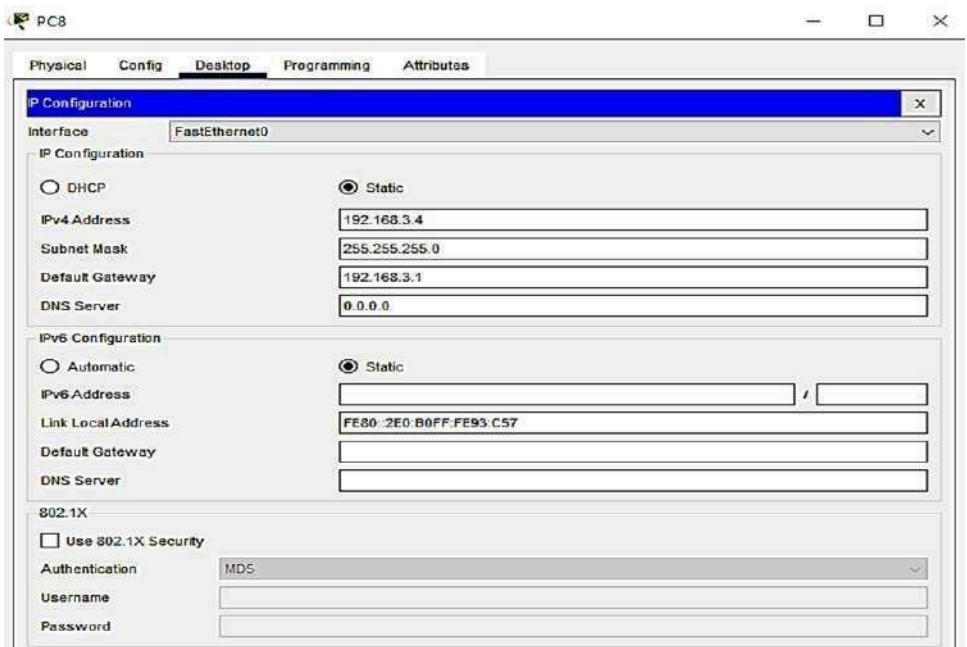
**2(G):** Now configure the PC 6 IP Address



**2(H):** Now configure the PC 7 IP Address

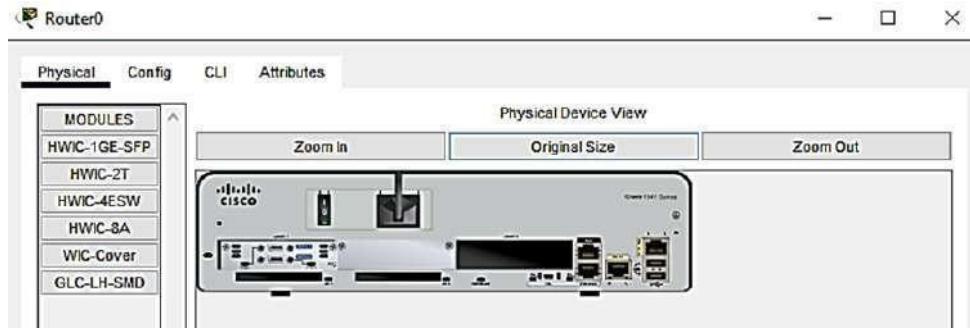


**2(I):** Now configure the PC 8 IP Address

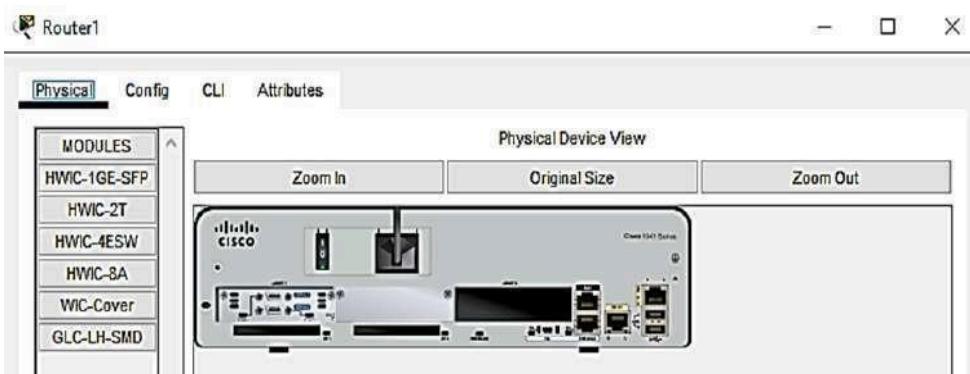


**PROGRAM 3: (Now in All Router's Physical Section add the Serial Interface of : HWIC-2T)**

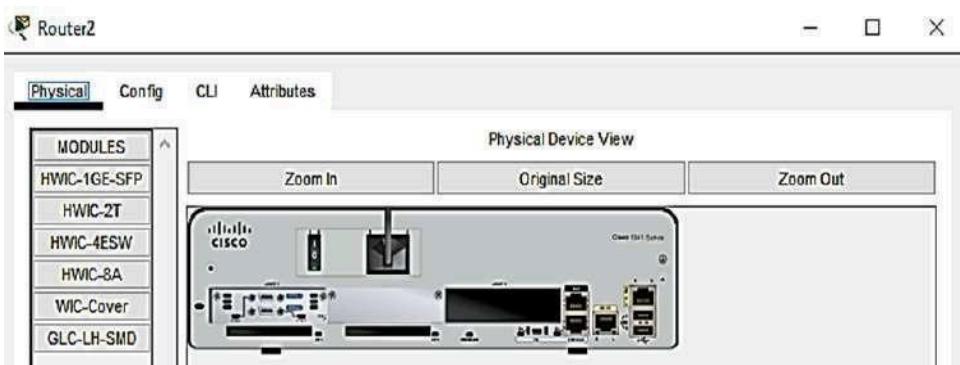
**3(A):** Router 0



**3(B):** Router 1



**3(C):** Router 2



**Remember You have to OFF the switch while adding Serial Interface and ON the Switch after adding the interface in all the Routers**

**PROGRAM 4:** (Now configure All the Router with (CLI Mode)

**4(A):** Router 0

```
Router>enable
Router#configure terminal
Router(config)#
Router(config)#router bgp 1000
Router(config-router)#
Router(config-router)#network 10.0.0.0
Router(config-router)#network 192.168.1.0
Router(config-router)#neighbor 10.0.0.2 remote-as 2000
```

**4(B):** Router 1

```
Router>enable
Router#configure terminal
Router(config)#
Router(config)#router bgp 2000
Router(config-router)#network 10.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#network 192.168.2.0
Router(config-router)#neighbor 10.0.0.1 remote-as 1000
Router(config-router)#neighbor 20.0.0.2 remote-as 3000
```

**4(C):** Router 2 Router>enable

```
Router#configure terminal
Router(config)#
Router(config)#router bgp
3000 Router(config-router)#
Router(config-router)#network 20.0.0.0
Router(config-router)#network 192.168.3.0
Router(config-router)#neighbor 20.0.0.1 remote-as 2000
```

**Program 6: (Now check the connectivity by using ping command with**

**CMD) 6(A): PC 0 : ping 192.168.3.4**

PC0

Physical Config Desktop Programming Attributes

Command Prompt X

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.3.4

Pinging 192.168.3.4 with 32 bytes of data:

Request timed out.
Reply from 192.168.3.4: bytes=32 time=12ms TTL=125
Reply from 192.168.3.4: bytes=32 time=8ms TTL=125
Reply from 192.168.3.4: bytes=32 time=13ms TTL=125

Ping statistics for 192.168.3.4:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 8ms, Maximum = 13ms, Average = 11ms
```

### **6(B): PC 8 : ping 192.168.1.2**

PC8

Physical Config Desktop Programming Attributes

Command Prompt X

```
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.2

Pinging 192.168.1.2 with 32 bytes of data:

Reply from 192.168.1.2: bytes=32 time=13ms TTL=125
Reply from 192.168.1.2: bytes=32 time=13ms TTL=125
Reply from 192.168.1.2: bytes=32 time=12ms TTL=125
Reply from 192.168.1.2: bytes=32 time=12ms TTL=125

Ping statistics for 192.168.1.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 12ms, Maximum = 13ms, Average = 12ms
C:\>
```

# **Practical**

## **No.9**

**AIM:** Using Packet Tracer, create a wireless network of multiple PCs using appropriate access point.

### **THEORY:**

A Wireless Access Point (WAP) is a networking device that allows connecting the devices with

the wired network. A Wireless Access Point (WAP) is used to create the WLAN (Wireless Local

Area Network), it is commonly used in large offices and buildings which have expanded businesses.

A wireless AP connects the wired networks to the wireless client. It eases access to the network

for mobile users which increases productivity and reduces the infrastructure cost.

Advantages of Wireless Access Point (WAP):

1. More User Access
2. Broader Transmission Range
3. Flexible Networking

Disadvantages of Wireless Access Point (WAP):

4. High cost
5. Poor stability
6. Less Secure

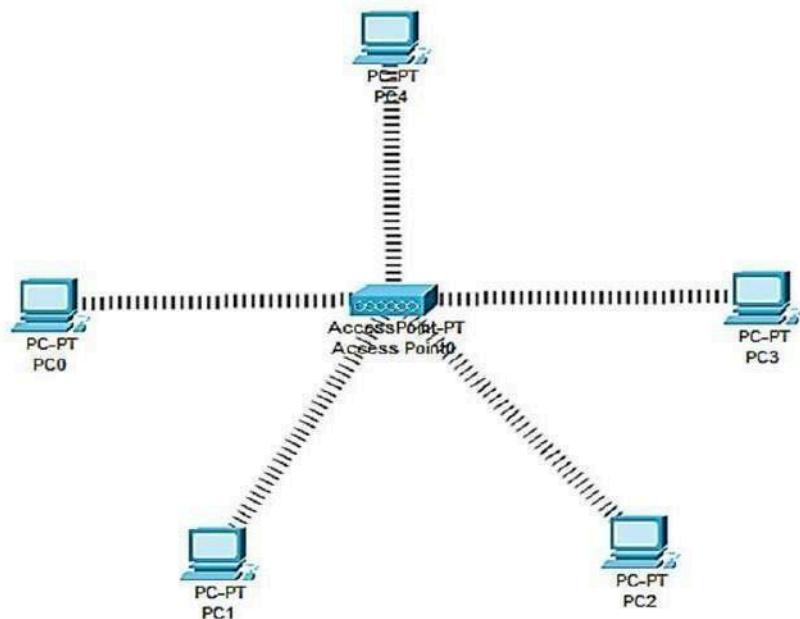
Application of Wireless Access Point:

7. It is a device that creates a WLAN (Wireless Local Area Network) in large enterprises.

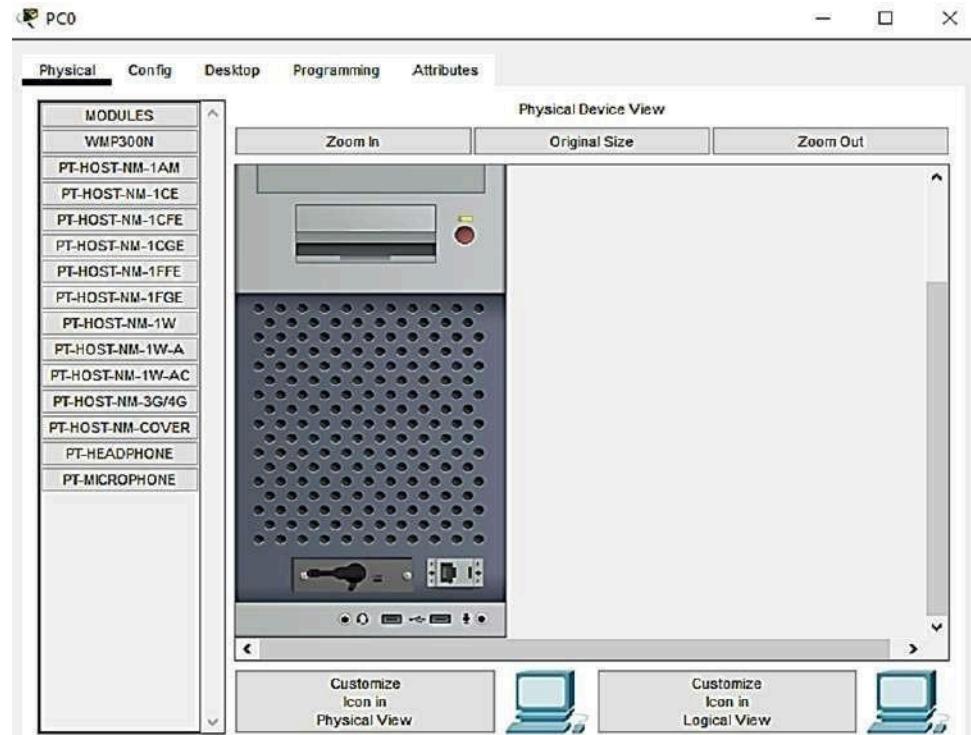
8. It is used to extend the coverage area of the network so that it can't disconnect which allows more users to connect to the network easily.

9. An access point connects a switch, Ethernet cable, wired router, and Wi-fi to designate the particular area.
10. It is used to provide connectivity to the users in large offices or enterprises which allows users to roam easily anywhere in the office and be connected to a network.
11. LANs can also be provided in public places such as coffee shops, restaurants, airports,etc

**PROGRAM 1:** (We got the following topology)

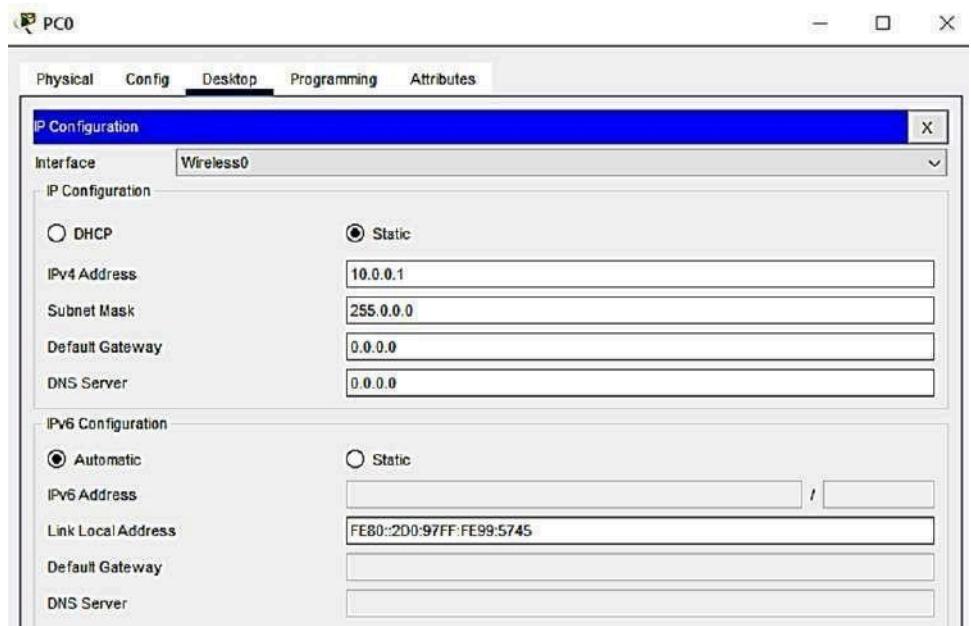


**PROGRAM 2:** (Now Change all 5 PC'S Serial Interface from **PT-HOST-NM-1CFE** to **PT-HOST-NM-1W**)

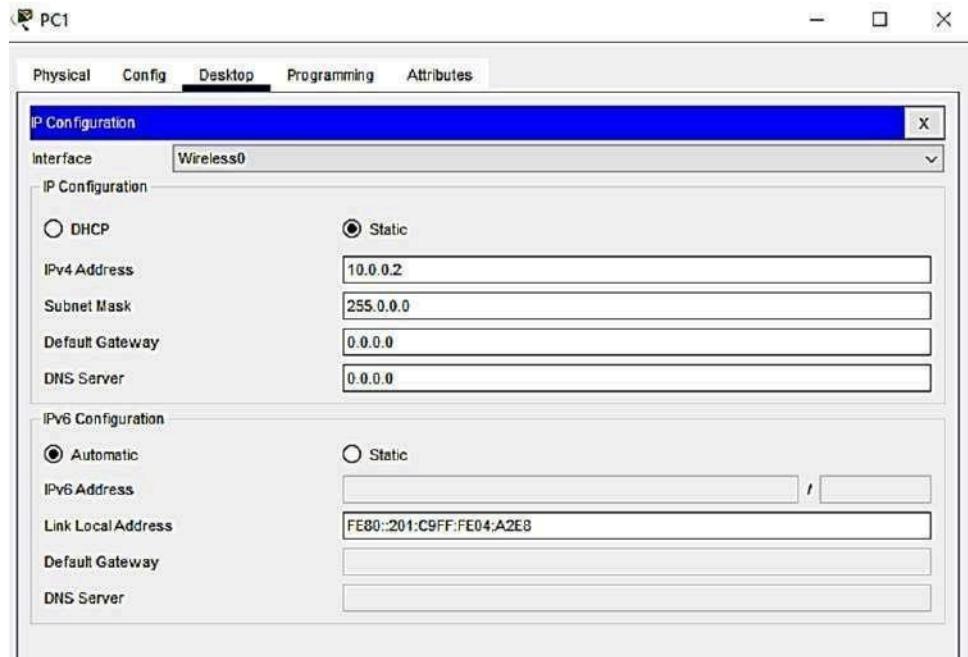


### PROGRAM 3:

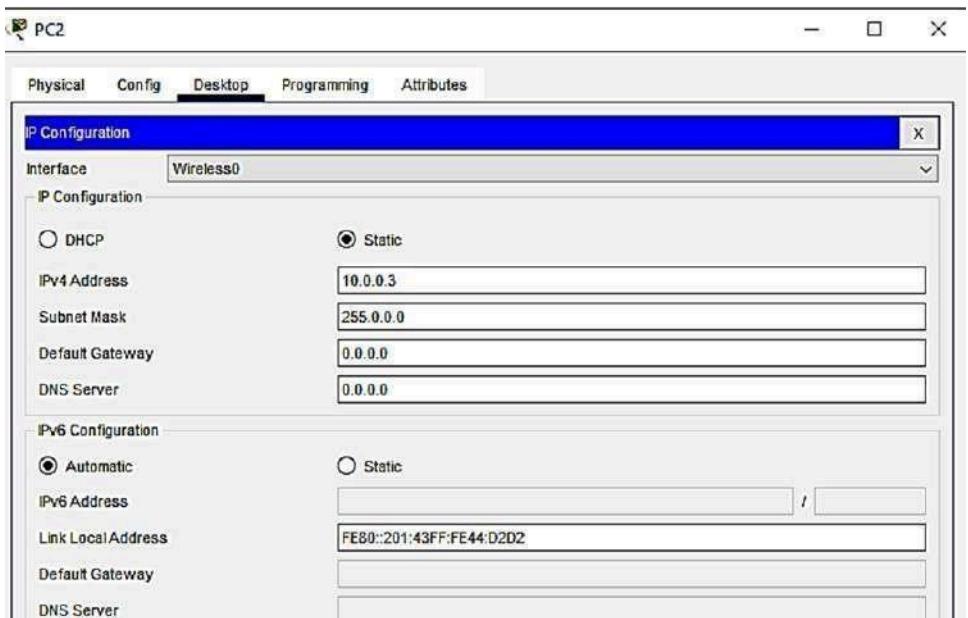
**3(A):** Now configure the PC 0 IP Address



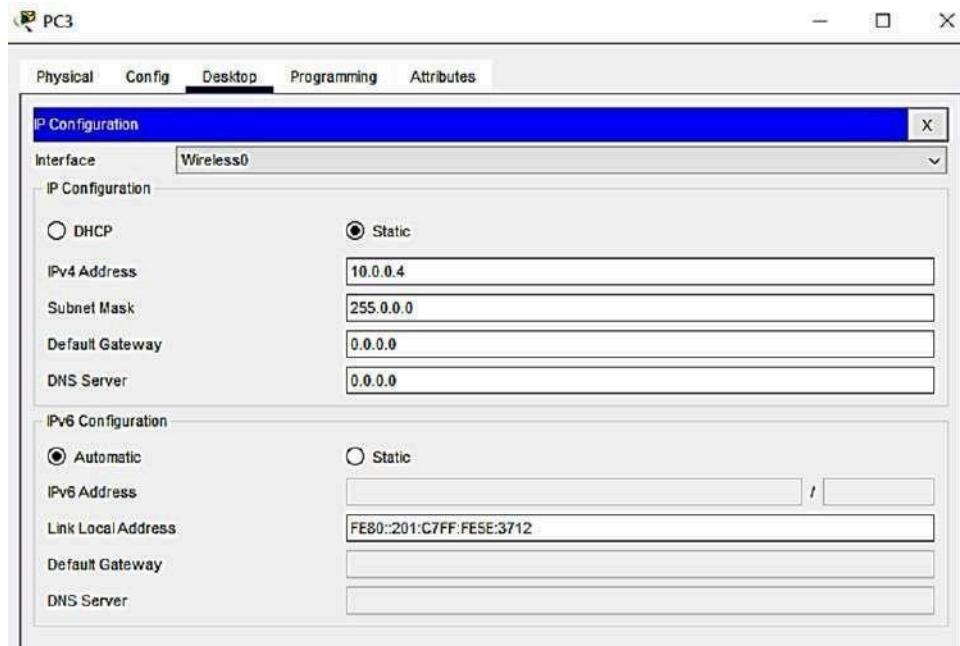
**3(B):** Now configure the PC 1 IP Address



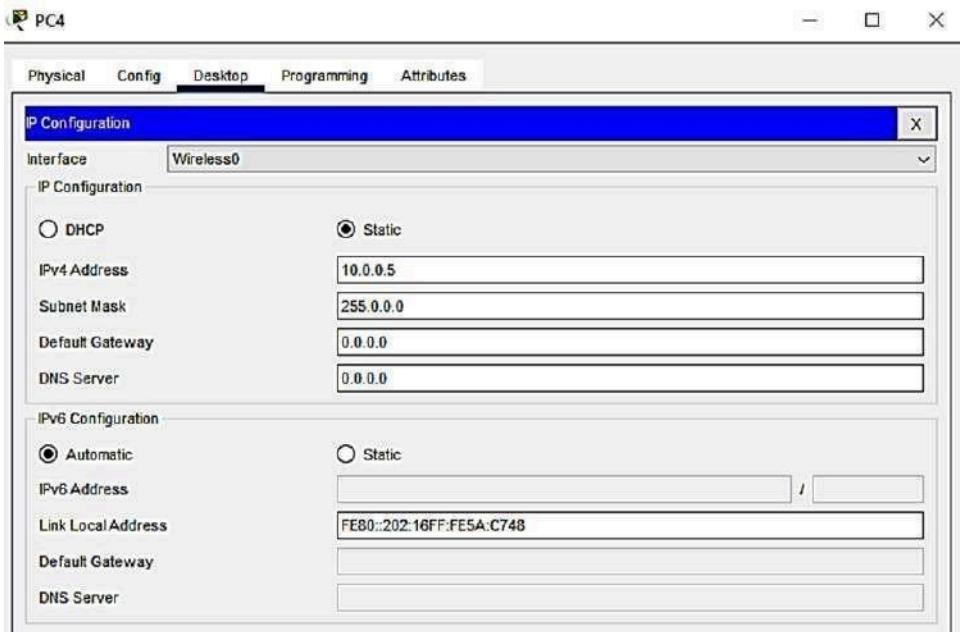
**3(C):** Now configure the PC 2 IP Address



**3(D):** Now configure the PC 3 IP Address



**3(E):** Now configure the PC 4 IP Address



**3(F):** Now check the connectivity by using ping command with CMD

(i) **PC 0 : ping 10.0.0.3**

PC0

Physical Config Desktop Programming Attributes

Command Prompt X

```
Cisco Packet Tracer PC Command Line 1.0
C:>

ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data:

Reply from 10.0.0.3: bytes=32 time=45ms TTL=128
Reply from 10.0.0.3: bytes=32 time=44ms TTL=128
Reply from 10.0.0.3: bytes=32 time=43ms TTL=128
Reply from 10.0.0.3: bytes=32 time=34ms TTL=128

Ping statistics for 10.0.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 34ms, Maximum = 45ms, Average = 41ms

C:>|
```

(ii) PC 4 :

PC4

Physical Config Desktop Programming Attributes

Command Prompt X

```
Cisco Packet Tracer PC Command Line 1.0
C:>
ping 10.0.0.1

Pinging 10.0.0.1 with 32 bytes of data:

Reply from 10.0.0.1: bytes=32 time=26ms TTL=128
Reply from 10.0.0.1: bytes=32 time=29ms TTL=128
Reply from 10.0.0.1: bytes=32 time=44ms TTL=128
Reply from 10.0.0.1: bytes=32 time=29ms TTL=128

Ping statistics for 10.0.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 26ms, Maximum = 44ms, Average = 32ms

C:>|
```