PRACTICAL NO. 01

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

INTRODUCTION:-

1)PING:- The Ping command is one of the most widely used commands in the prompt tool, as it allows the user to check the connectivity of our system to another host.
This command sends four experimental packets to the destination host to check whether it receives them successfully, if so, then, we can communicate with the destination host. But in case the packets have not been received, that means, no communication can be established with the destination host.
Command to enter in Prompt - ping www.destination_host_name.com

2)TRACERT:- The TRACERT command is used to trace the route during the transmission of the data packet over to the destination host and also provides us with the "hop" count during transmission.
Using the number of hops and the hop IP address, we can troubleshoot network issues and identify the point of the problem during the transmission of the data packet.
Command to enter in Prompt- tracert IP-address OR tracert www.destination_host_name.com

3)NETSTAT:- The Netstat command as the name suggests displays an overview of all the network connections in the device. The table shows detail about the connection protocol, address, and the current state of the network.
Command to enter in Prompt - netstat

4)ARP(Address Resolution Protocol):- The ARP command is used to access the mapping structure of IP addresses to the MAC address. This provides us with a better understanding of the transmission of packets in the network channel.
Command to enter in Prompt – arp

5)IPCONFIG:- The IPCONFIG network command provides a comprehensive view of information regarding the IP address configuration of the device we are currently working on.
The IPConfig command also provides us with some variation in the primary command that targets specific system settings or data, which are:

- IPConfig/all - Provides primary output with additional information about network adapters.
- IPConfig/renew - Used to renew the system's IP address.
- IPConfig/release - Removes the system's current IP address.

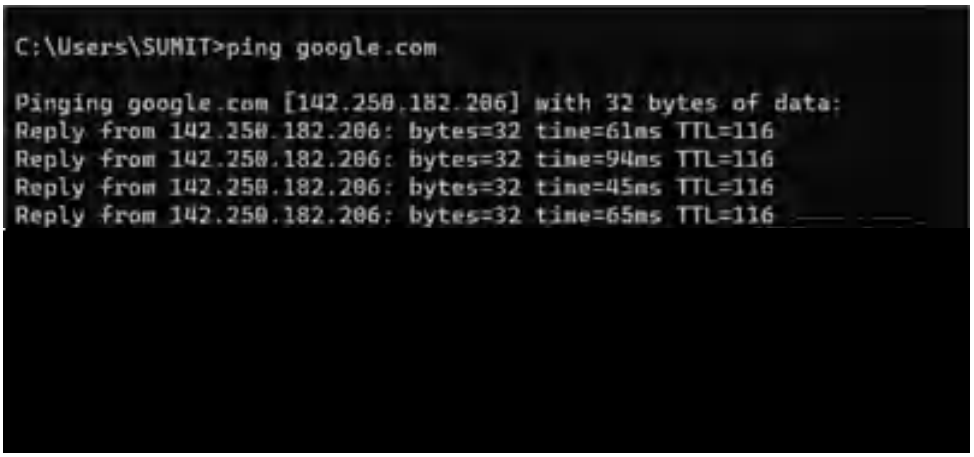
Command to enter in Prompt - ipconfig

6)HOSTNAME:- The HOSTNAME command displays the hostname of the system. The hostname command is much easier to use than going into the system settings to search for it.
Command to enter in Prompt - hostname

OUTPUT:-

1)PING:-

ping google.com



2)TRACERT:-

trace www.google.com

3)NETSTAT:-

Netstat

4)ARP:-

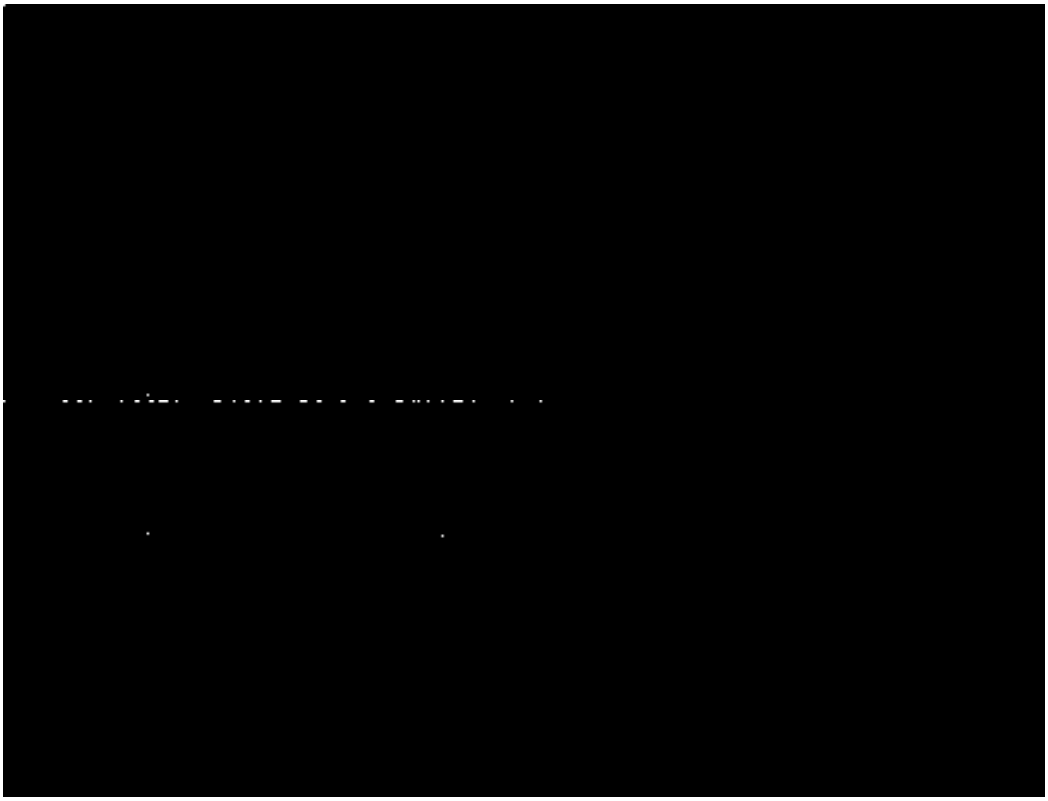
Arp

```
C:\Users\SUMIT>arp -a

Interface: 192.168.246.11 --- 0xa
  Internet Address      Physical Address      Type
  192.168.246.50        7e-43-e3-a5-92-09     dynamic
  192.168.246.255       ff-ff-ff-ff-ff-ff     static
  224.0.0.22            01-00-5e-00-00-16     static
  224.0.0.251           01-00-5e-00-00-fb     static
  224.0.0.252           01-00-5e-00-00-fc     static
  239.255.102.18        01-00-5e-7f-66-12     static
  239.255.255.250       01-00-5e-7f-ff-fa     static
  255.255.255.255       ff-ff-ff-ff-ff-ff     static
```

5)IPCONFIG:-

Ipconfig



6)HOSTNAME:-

Hostname

```
C:\Users\SUMIT>hostname
SKING
```

PRACTICAL NO. 02

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

INTRODUCTION:-

A static Internet Protocol (IP) address (static IP address) is a permanent number assigned to a computer by an Internet service provider (ISP).

A static IP address is also known as a fixed IP address or dedicated IP address, and is the opposite of a dynamic IP address.

A computer with an assigned static IP address uses the same IP address when connecting to the Internet.

Static IP addresses are useful for gaming, website hosting or Voice over Internet Protocol (VoIP) services.

Speed and reliability are key advantages. Because a static address is constant, systems with static IP addresses are vulnerable to data mining and increased security risks.

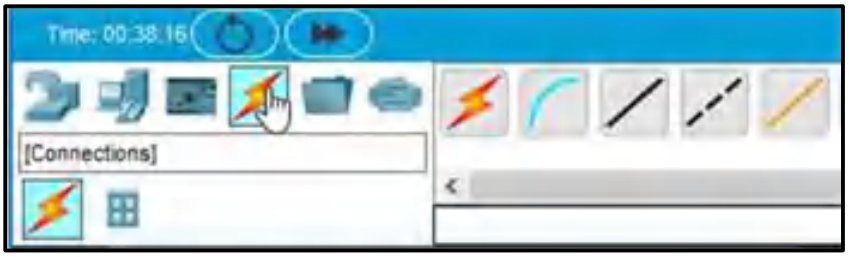
The Static Allocation Method assigns a single persistent IP address to each interface selected in the pool, leaving additional IP addresses in the pool unassigned if the number of IP addresses is greater than interfaces. The lowest IP address of the pool is assigned to the lowest Logical Node Number (LNN) from the selected interfaces, subsequently for the second lowest IP address and LNN. In the event a node or interface becomes unavailable, this IP address does not move to another node or interface. Additionally, when the node or interface becomes unavailable, it is removed from the SmartConnect Zone, and new connections will not be assigned to the node. Once the node is available again, SmartConnect adds it back into the zone and assigns new connections.

OUTPUT:-

Step 1: From the bottom toolbar, click on **'End Devices'** and select **'PC'** and then click on the screen (for two PC's do this step twice).

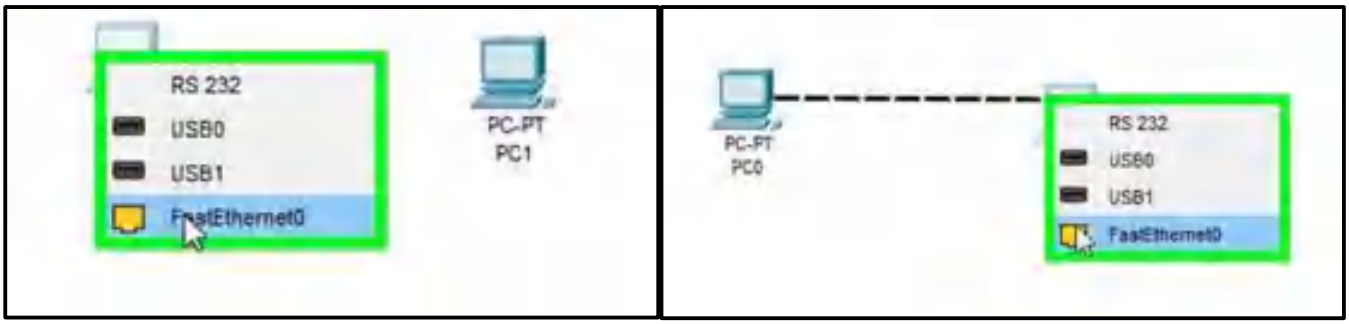
Bottom toolbar->End devices->PC
This is how it will appear on the screen

Step 2: Now to connect the PC's, we require a wire; we use cross-over wire to connect similar devices. Select Connections from the bottom toolbar, and select cross-over wire (that is the fourth wire).



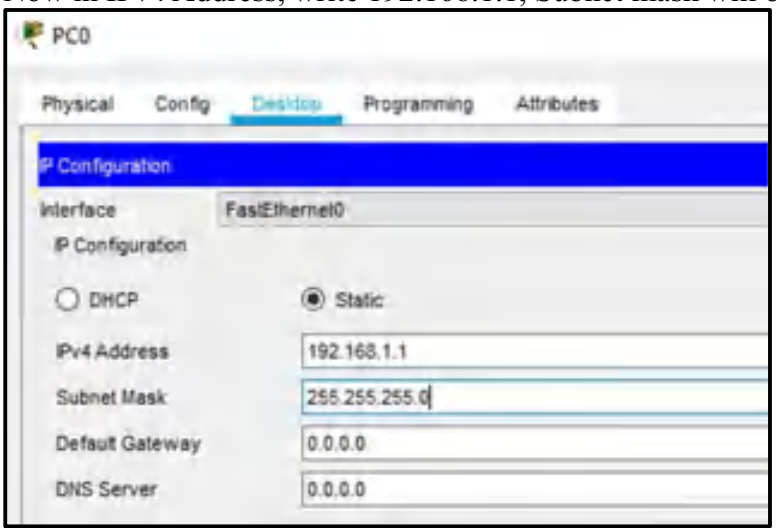
A **Cross-Over Wire** is largely used to connect the computing gadgets, additionally, cross wire cables are used to connect devices of equal type.

Step 3: After selecting the wire click on the computer on the screen(here PC0) and select FastEthernet0. Then, drag the wire to the other pc (here PC1) and do the same.

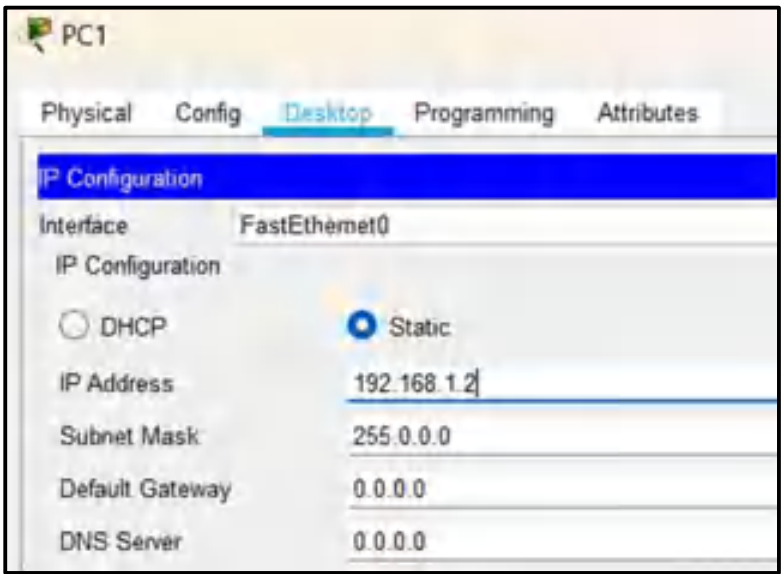


Step 4: Now, we will assign the IP address to both the PCs (PC0 & PC1).
Click on PC0. A dialog box will appear on the screen, select Desktop and then select IP configuration :

After clicking on IP configuration this is what will appear
Now in IPv4 Address, write 192.168.1.1, Subnet mask will be 255.255.2550



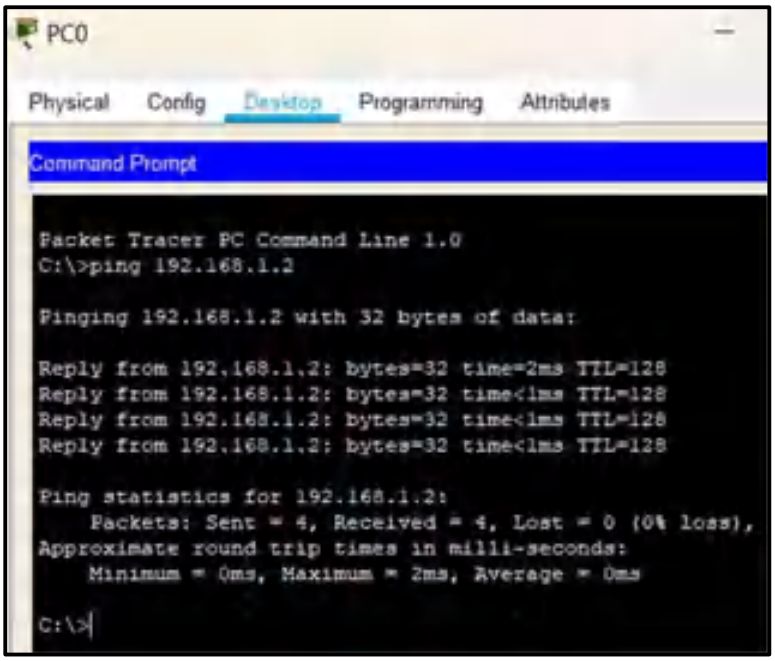
Similarly, assign 192.168.1.2 to PC1



We have successfully connected two computers.

Now to check this, we will transfer data from one computer to another and check whether the transfer is successful or not.
Click on PC0. A dialog box will appear on the screen, select Desktop and then select Command Prompt:

Now in Command Prompt of PC0 use command ping to check the connection.



If the connection is successful then it will reply with this output.
Otherwise, it will return with Request Time Out.

PRACTICAL NO. 03

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.

INTRODUCTION:-

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.

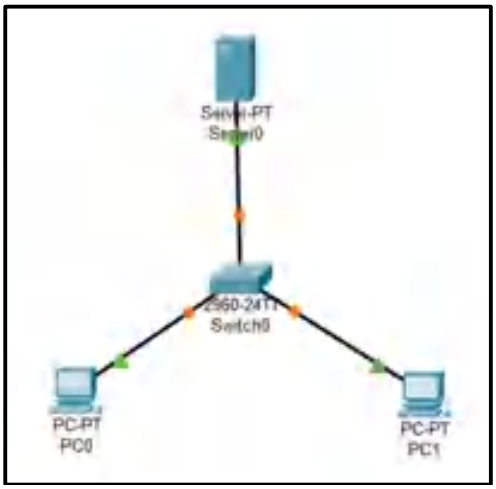
1) Reliable IP address configuration. DHCP minimizes configuration errors caused by manual IP address configuration, such as typographical errors, or address conflicts caused by the assignment of an IP address to more than one computer at the same time.

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.

OUTPUT:-

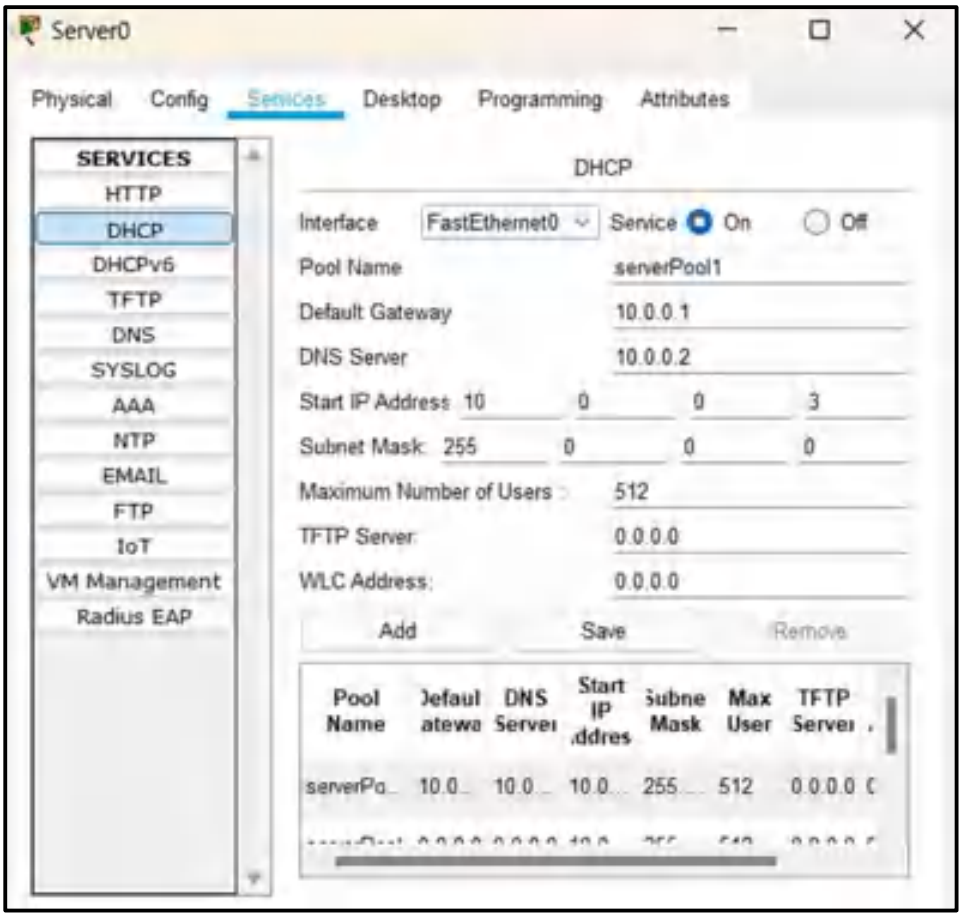
Step 1: From the bottom toolbar, click on **'End Devices'** and select **'PC'** and then click on the screen (for two PC's do this step twice) and then select **'Server'** and then click on screen.
From the toolbar, click on **'Network Devices'** then click **'Switches'** and select **'2960 Switch'**.
This is how it will appear on screen.

Step 2: Now to connect the PC's, Select Connections from the bottom toolbar, and select **'Automatically Choose Connection Type for each Connection'**.

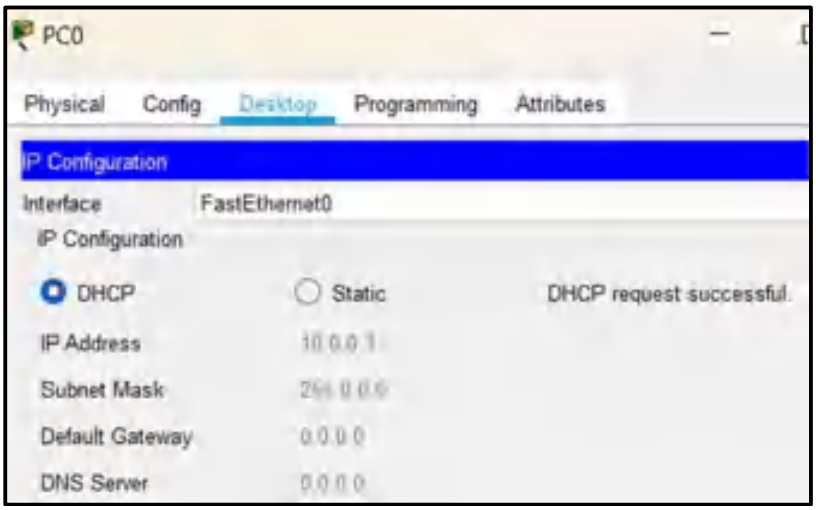


Step 3: Now, we will assign the IP address to the Server.
Click on Server0. A dialog box will appear on the screen, select Desktop and then select IP configuration :
Now in IPv4 Address, write 10.0.0.2 and in Default Gateway, write 10.0.0.1

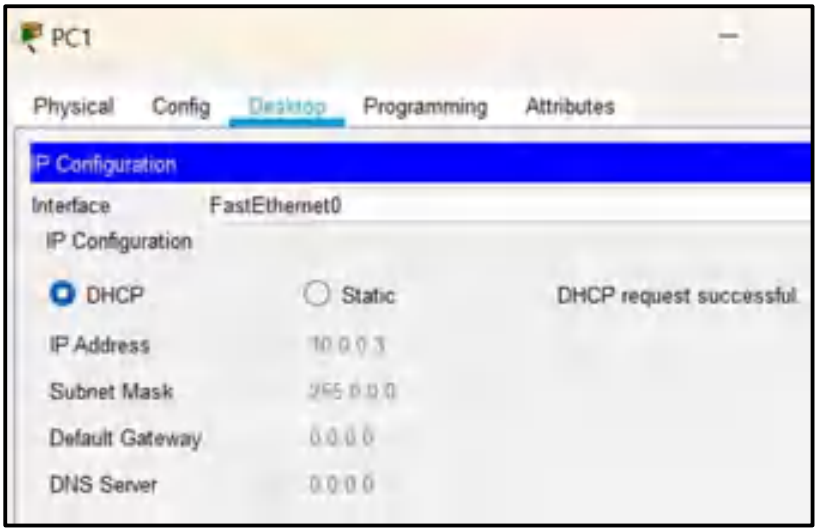
Step 4: Now, we will enabling and setting the DHCP Services on the Server.
Click on Server0. A dialog box will appear on the screen, select Services
In Services, click on DHCP and click on 'on Services', set a Pool Name according to you.
For Default Gateway, write 10.0.0.1 and in DNS Server, write 10.0.0.2
And in Start IP Address, write 10 0 0 3 in each cell after then click on add and then click on save.



Step 5: Now, we will assign the IP address to both the PCs (PC0 & PC1).
Click on PC0. A dialog box will appear on the screen, select Desktop and then select IP configuration.
In IP configuration, click on DHCP, it will automatically assign IP address to the PC.

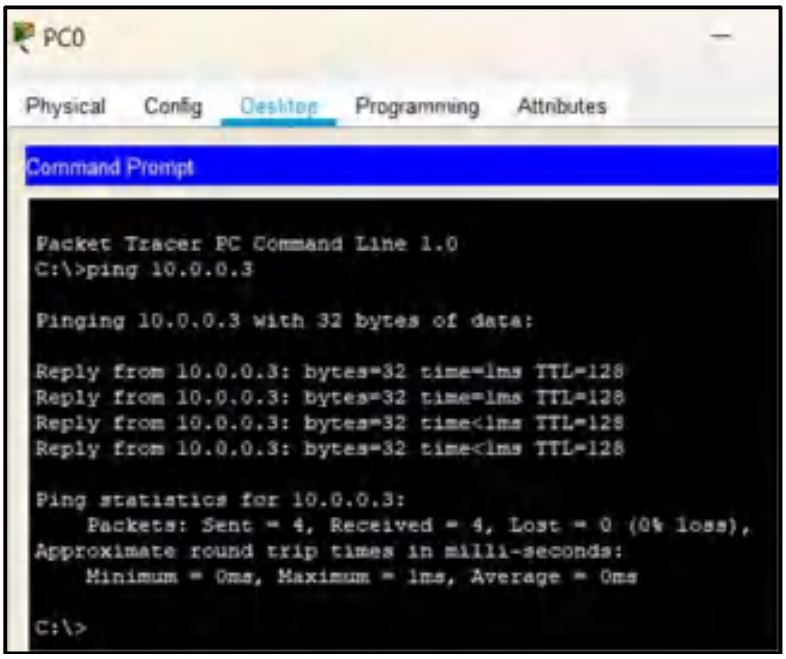


Similarly, do this process again for PC.



We have successfully connected two computers and one server.

Step 6: To check the connection, go to command prompt of any device and ping the other device.



PRACTICAL NO. 04

AIM:- Using Packet Tracer, create a basic network of One server and two computers and two mobile / movable devices using appropriate network wire. Show connectivity.

INTRODUCTION:-

A Wireless Access Point (WAP) is a networking device that allows wireless-capable devices to connect to a wired network. Instead of using wires and cables to connect every computer or device in the network, installing WAPs is a more convenient, more secure, and cost-efficient alternative.

Setting up a wireless network provides a lot of advantages and benefits for you and your small business.

1) It is easier to set up compared to setting up a wired network.
2) It is more convenient to access.
3) It is less complicated to add new users in the network.
4) It gives users more flexibility to stay online even when moving from one area in the office to another.
5) Guest users can have Internet access by just using a password.
6) Wireless network protection can be set up even if the network is visible to the public by configuring maximum wireless security.
7) Segmentation of users, such as guests and employees, is possible by creating Virtual Local Area Networks (VLANs) to protect your network resources and assets.

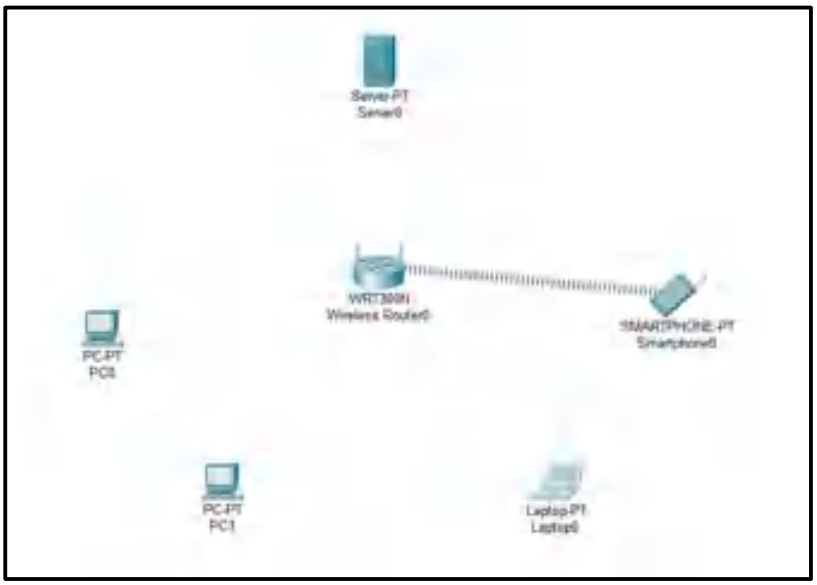
There are different purposes of setting up a wireless network using a WAP.

With a WAP, the following can be done:

1) Create a wireless network within your existing wired network.
2) Extend the signal range and strength of your wireless network to provide complete wireless coverage and get rid of dead spots especially in larger office spaces or buildings.
3) Accommodate wireless devices within a wired network.
4) Configure the settings of your wireless access points in one device.

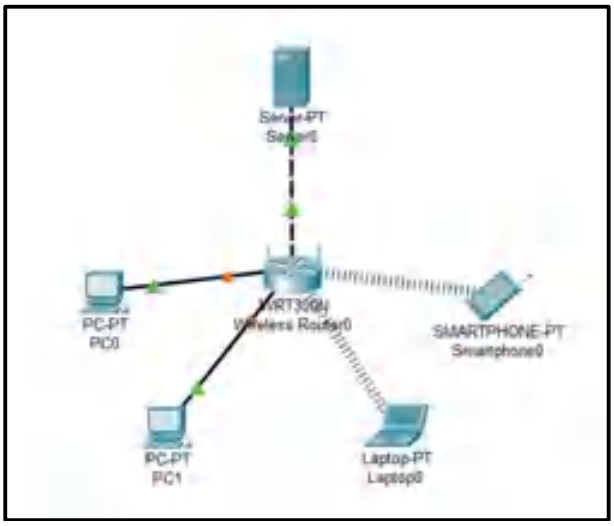
OUTPUT:-

Step 1: From the bottom toolbar, click on **'End Devices'** and select **'PC'** and then click on the screen (for two PC's do this step twice), From **'End Devices'** select **'Laptop'** and **'Smartphones'** and then select **'Server'** and then click on screen. **Step 1:** From the bottom toolbar, click on **'End Devices'** and select **'PC'** and then click on the screen (for two PC's do this step twice) and then select **'Server'** and then click on screen.
From the toolbar, click on **'Network Devices'** then click **'Wireless Devices'** and select **'WRT300N'** Router. This is how it will appear on screen.

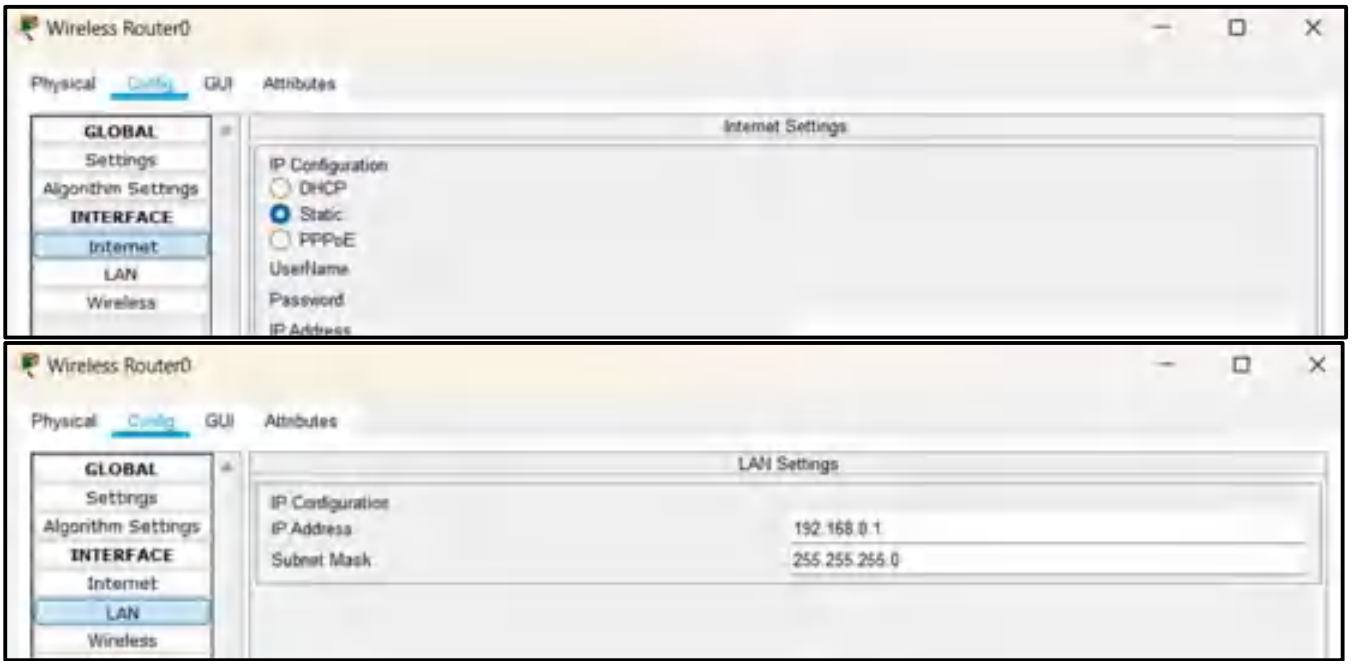


Step 2: Now, we will make the Laptop wireless, for that Click on Laptop, dialog box will appear.
In dialog box, in Physical section, first turn off the power button then remove the ethernet port from laptop and assign the **'PT-LAPTOP-NM-1W'** port, then turn on the power button.

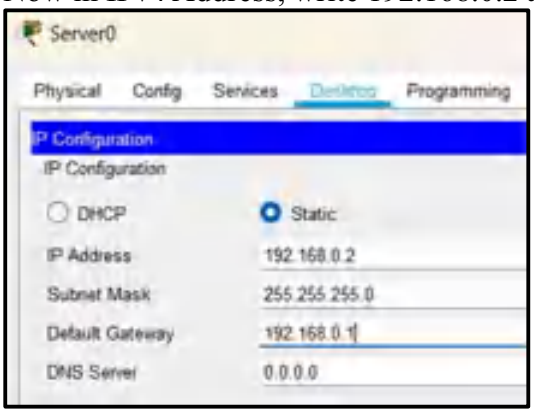
Step 3: Now to connect the PC's, Select Connections from the bottom toolbar, and select **'Automatically Choose Connection Type for each Connection'**.



Step 4: Change the Configurations of wireless network, By clicking on wireless network a dialog box appears. In the dialog box, select **'config'** then select **'Internet'** and there change ip configuration from DHCP to Static. And from **'LAN'** note down the IP address.

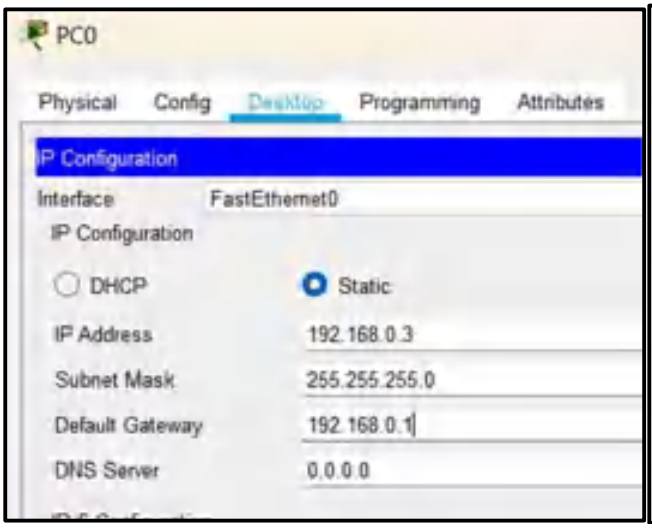


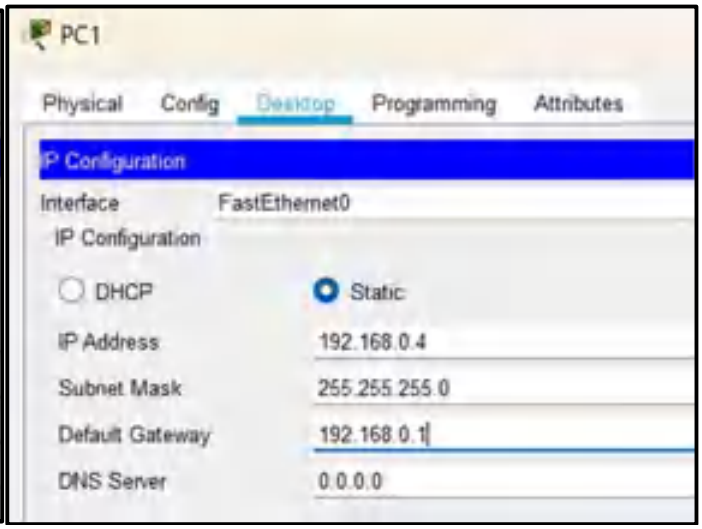
Step 5: Now, we will assign the IP address to the Server.
Click on Server0. A dialog box will appear on the screen, select Desktop and then select IP configuration. Now in IPv4 Address, write 192.168.0.2 and in Default Gateway, write 192.168.0.1



Step 6: Now, we will assign the IP address to both the PCs (PC0 & PC1).

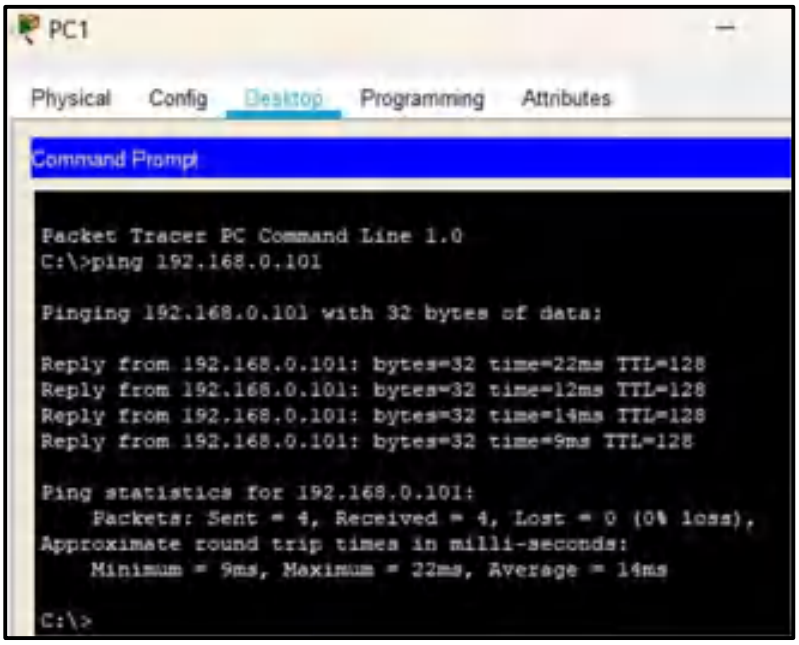
Click on PC0. A dialog box will appear on the screen, select Desktop and then select IP configuration.
Now in IPv4 Address, write 192.168.0.3 and in Default Gateway, write 192.168.0.1
Similarly, do the step for PC1 and write 192.168.0.4 for IPv4 Address with Similar Default Gateway.





We have successfully connected with every device.

Step 7: To check the connection, go to command prompt of any device and ping the other device.



PRACTICAL NO. 05

AIM:- Using Packet Tracer, create a network with three routers with RIPv1 and each router associated network will have minimum three PC. Show Connectivity

INTRODUCTION:-

RIP Version-1:

It is an open standard protocol means it works on the various vendor's routers. It works on most of the routers, it is classful routing protocol. Updates are broadcasted. Its administrative distance value is 120, it means it is not reliable, The lesser the administrative distance value the reliability is much more. Its metric is hop count and max hop count is 15. There will be a total of 16 routers in the network. When there will be the same number of hop to reach the destination, Rip starts to perform load balancing. Load balancing means if there are three ways to reach the destination and each way has same number of routers then packets will be sent to each path to reach the destination. This reduces traffic and also the load is balanced. It is used in small companies, in this protocol routing tables are updated in each 30 sec. Whenever link breaks rip trace out another path to reach the destination. It is one of the slowest protocol.

Advantages of RIP ver1 –

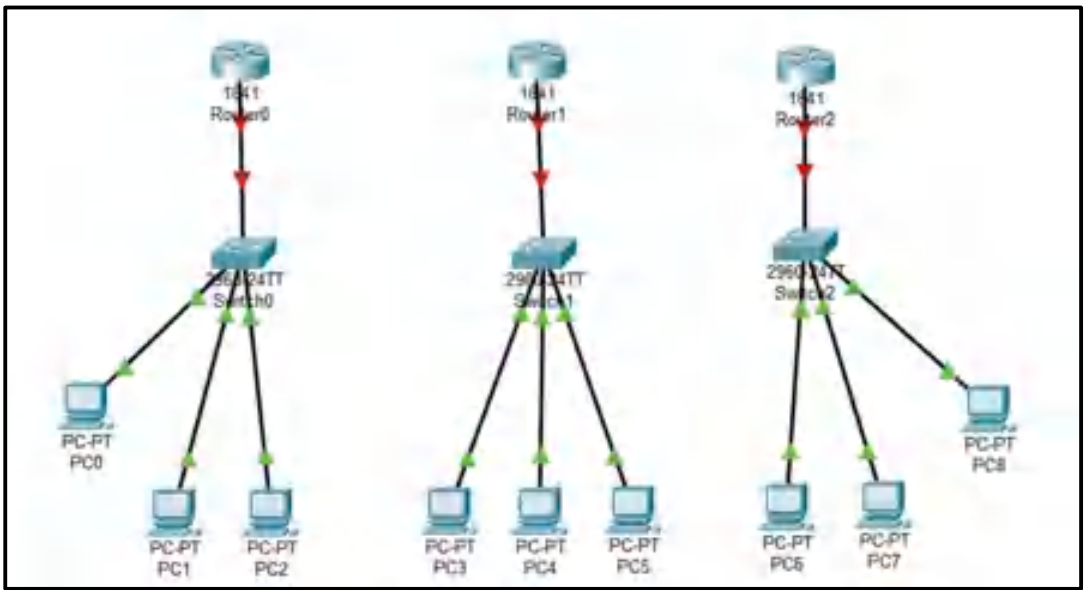
- Easy to configure, static router are complex.
- Less overhead
- No complexity.

Disadvantage of RIP ver1 –

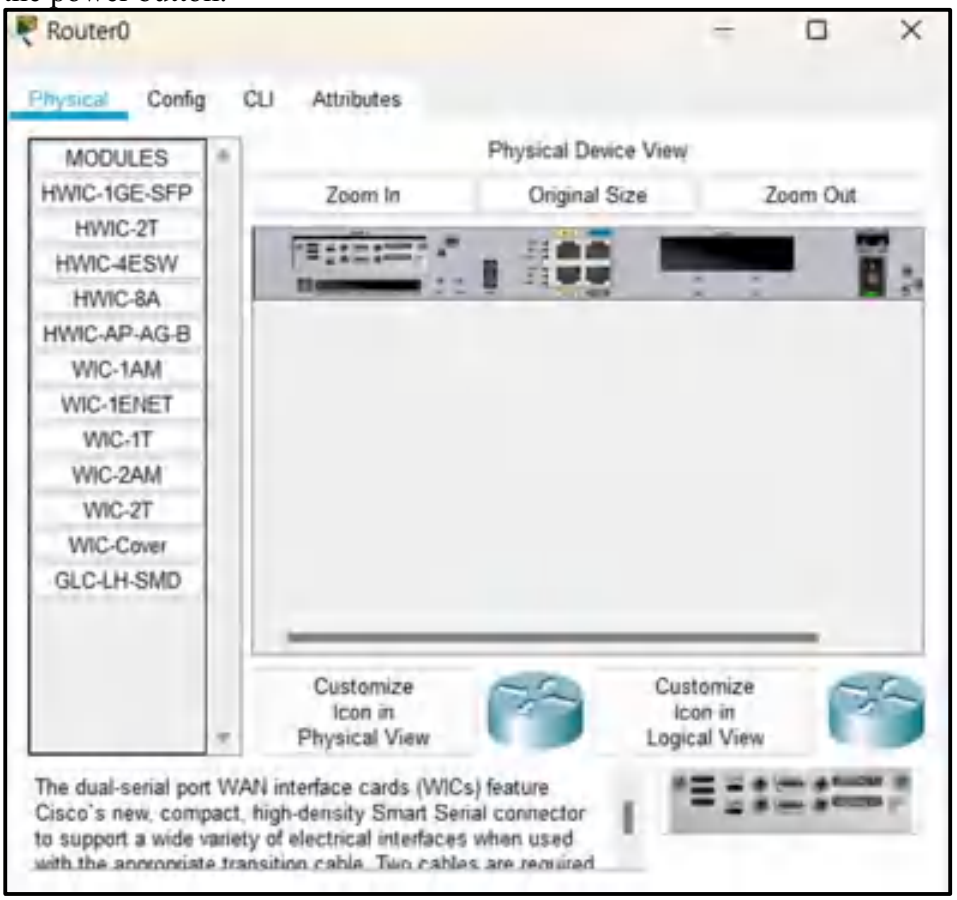
- Bandwidth utilization is very high as broadcast for every 30 seconds.
- It works only on hop count.
- It is not scalable as hop count is only 15. If there will be requirement of more routers in the network it would be a problem .
- Convergence is very slow, wastes a lot of time in finding alternate path.

OUTPUT:-

Step 1: From the Toolbar, select 3 Routers **'1841'**, 3 switches **'2960-24TT'** and 9 PC's.
Connect Routers to Switches and Switches to PC's by using **'Automatically Choose Connection Type for each Connection'.**

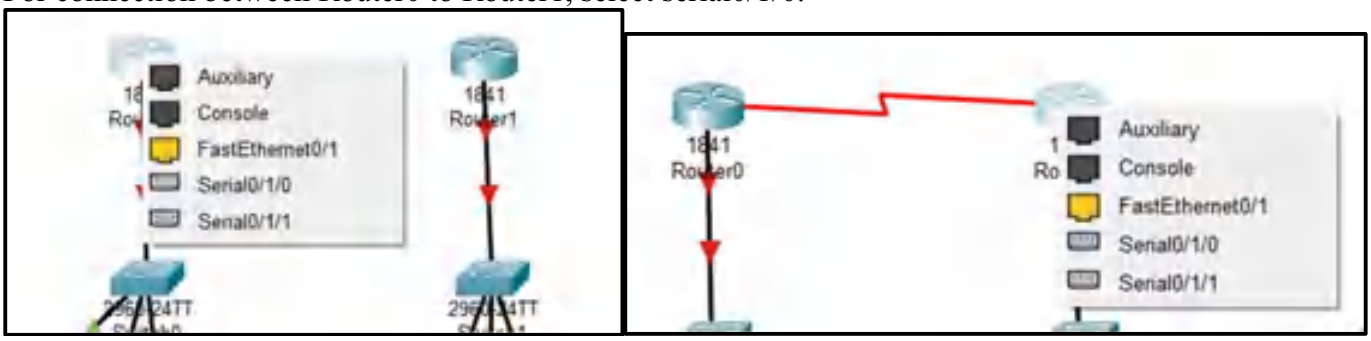


Step 2: Add Serial Interface in Each Router.
Click on Router0, dialog box will appear.
In dialog box, in Physical section, first turn off the power button then assign the **'WIC-2T'** port, then turn on the power button.

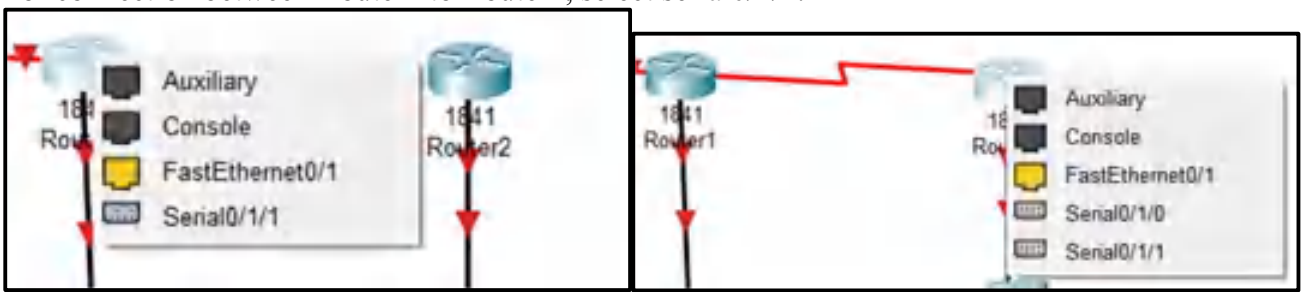


Similarly, do this with Router1 and Router2.

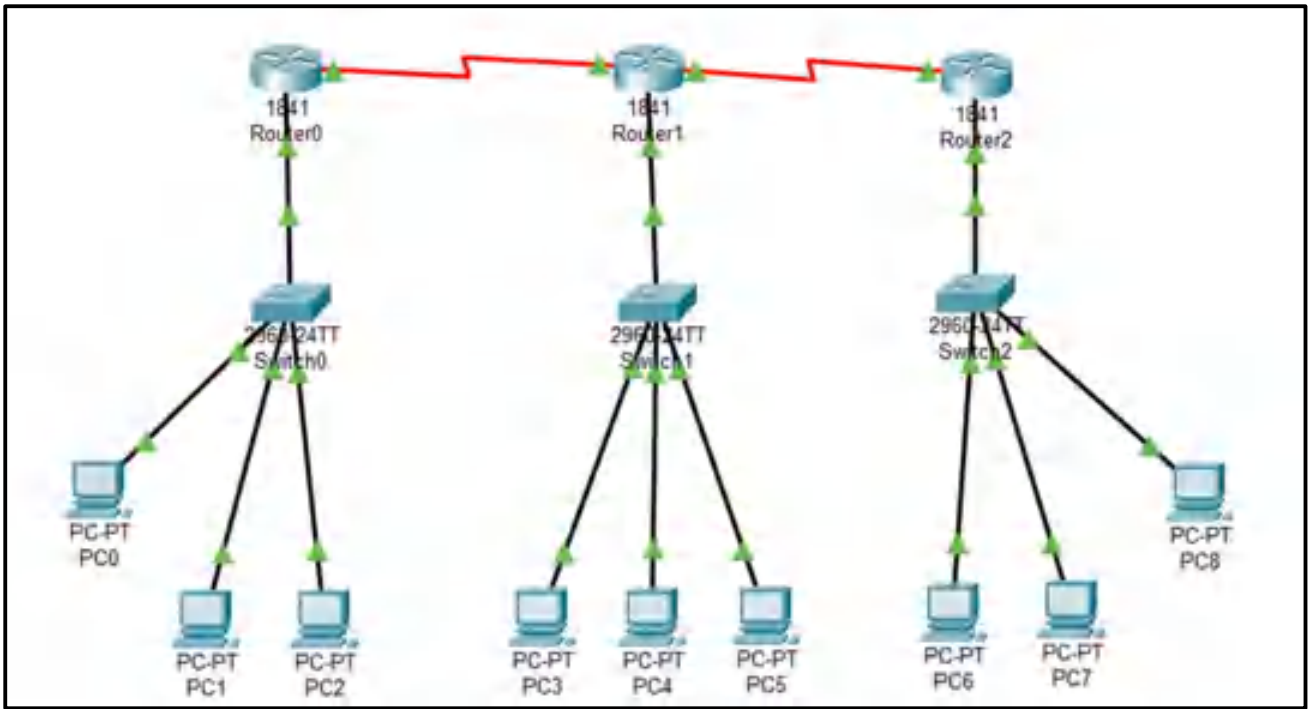
Step 3: Now, Connect the Routers with **'Serial DCE'** wire.
For connection between Router0 to Router1, select serial0/1/0.



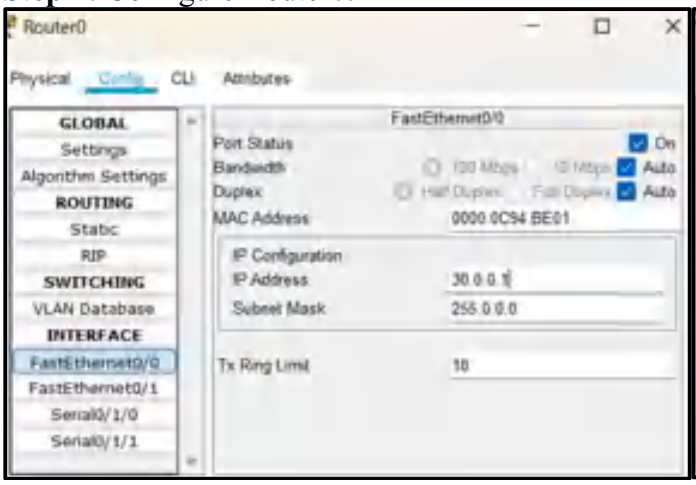
For connection between Router1 to Router2, select serial0/1/1.

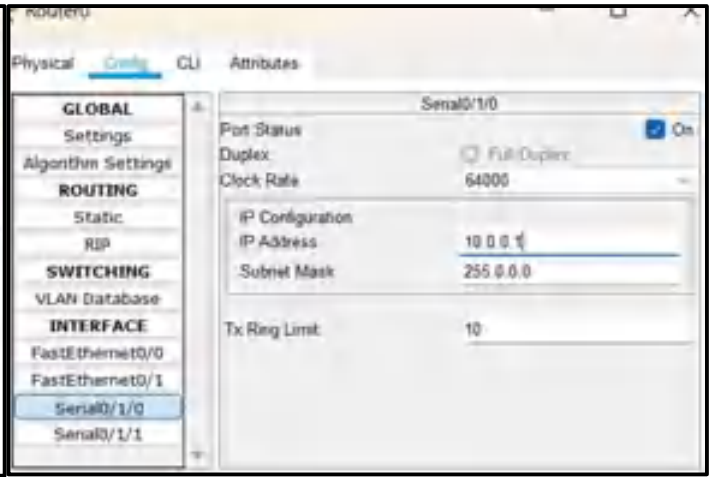


Final Connection must look like this.

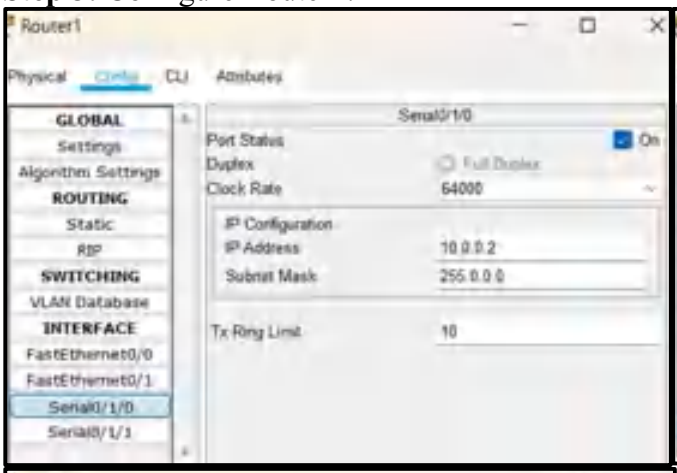


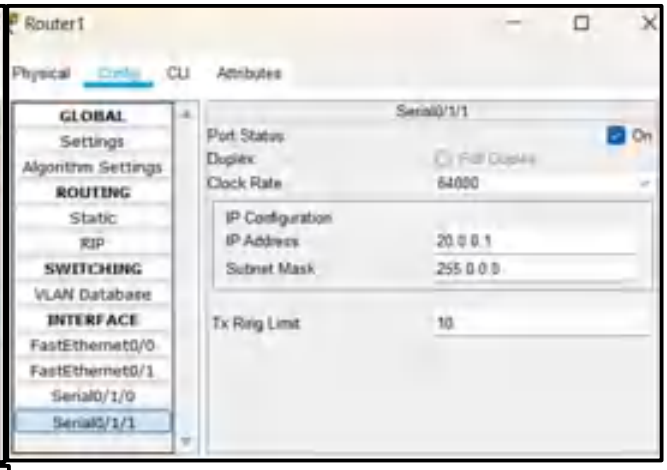
Step 4: Configure Router0.

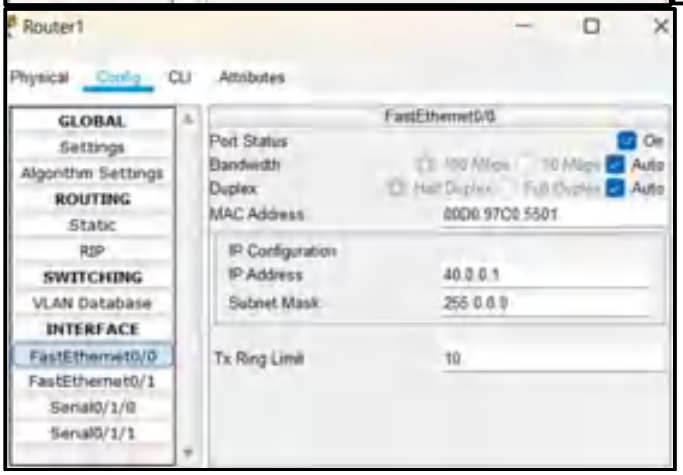




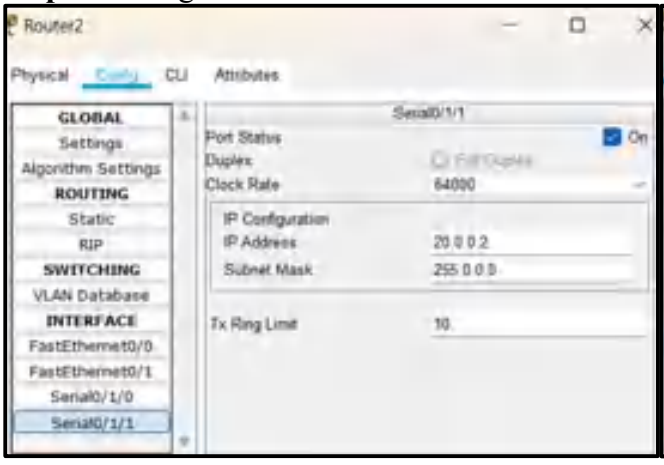
Step 5: Configure Router1.

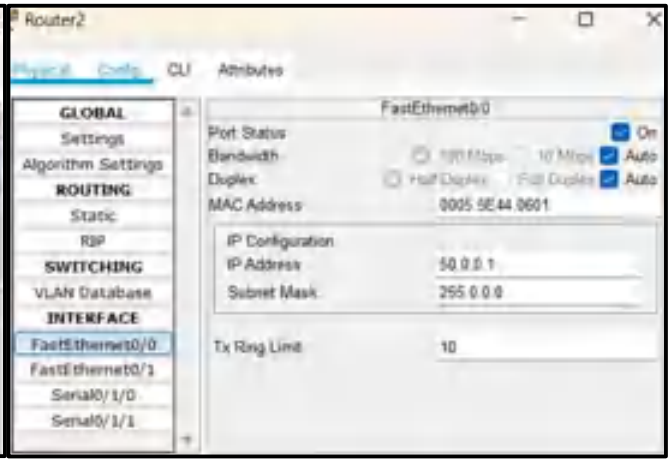




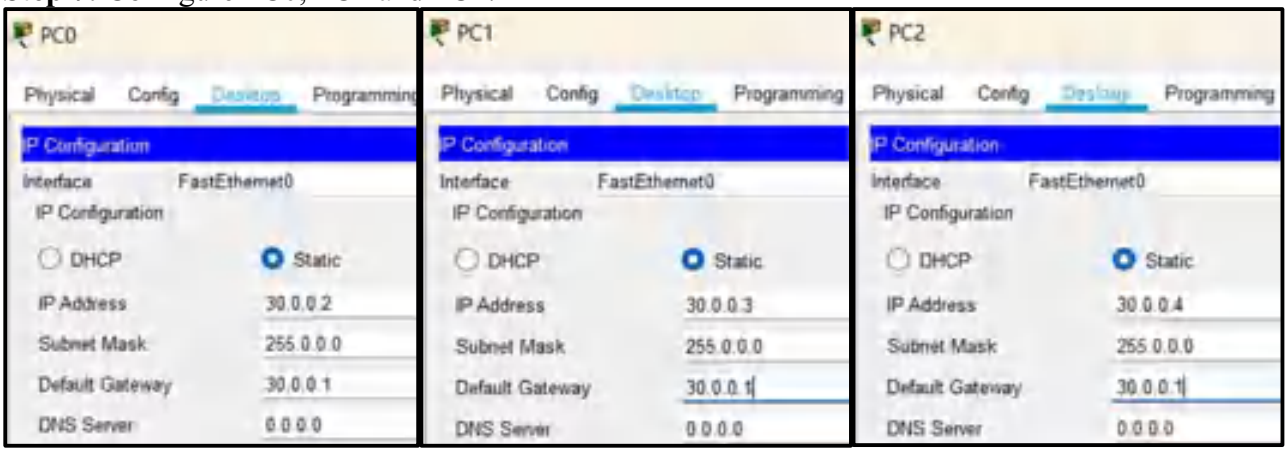


Step 6: Configure Router2.

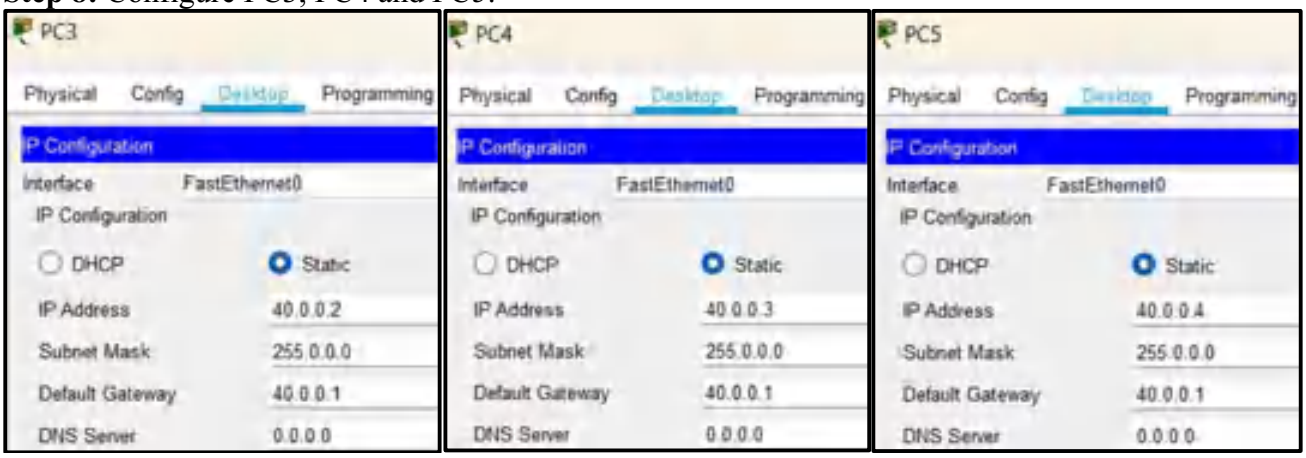




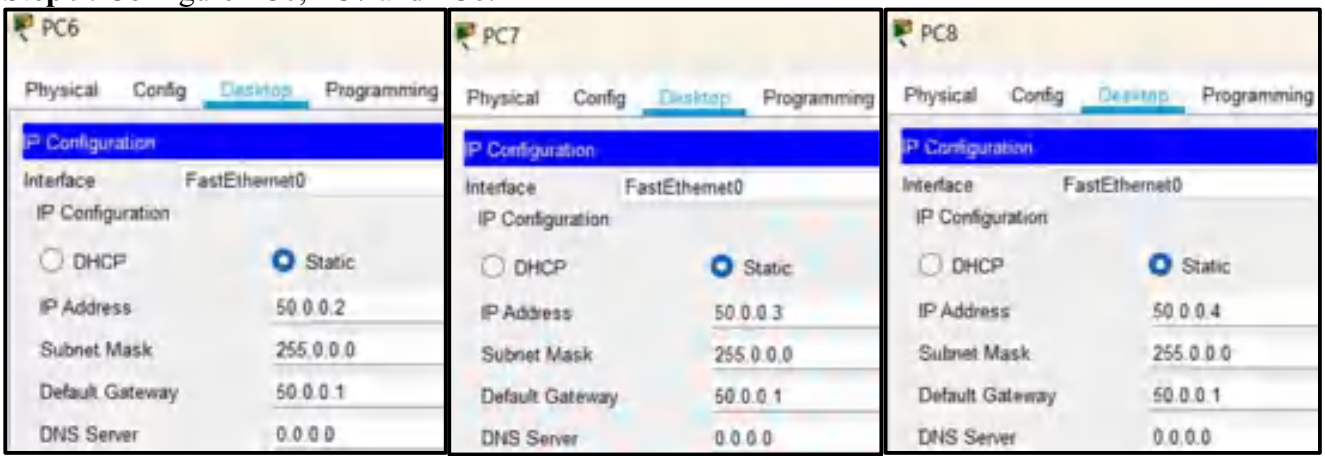
Step 7: Configure PC0, PC1 and PC2.



Step 8: Configure PC3, PC4 and PC5.



Step 9: Configure PC6, PC7 and PC8.



Step 10:- Configure Router0 using CLI mode.

```
Router>en
Router#conf t
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 30.0.0.0
Router(config-router)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Step 11:- Configure Router1 using CLI mode.

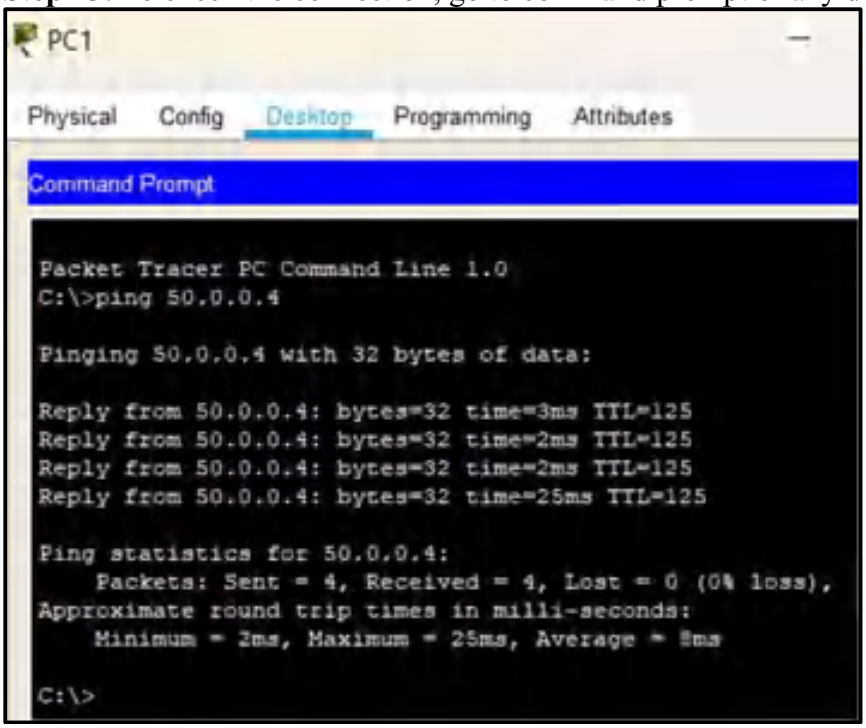
```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 10.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#network 40.0.0.0
Router(config-router)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Step 12:- Configure Router2 using CLI mode.

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#network 20.0.0.0
Router(config-router)#network 50.0.0.0
Router(config-router)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

We have successfully connected with every device.

Step 13: To check the connection, go to command prompt of any device and ping the other device.



PRACTICAL NO. 06

AIM:- Using Packet Tracer, create a network with three routers with RIPv2 and each router associated network will have minimum three PC. Show Connectivity

INTRODUCTION:-

RIP Version-2:

Due to some deficiencies in the original RIP specification, RIP version 2 was developed in 1993. It supports classless Inter-Domain Routing (CIDR) and has the ability to carry subnet information, its metric is also hop count, and max hop count 15 is same as rip version 1. It supports authentication and does subnetting and multicasting. Auto summary can be done on every router. In RIPv2 Subnet masks are included in the routing update. RIPv2 multicasts the entire routing table to all adjacent routers at the address 224.0.0.9, as opposed to RIPv1 which uses broadcast (255.255.255.255).

Advantages of RIP ver2 –

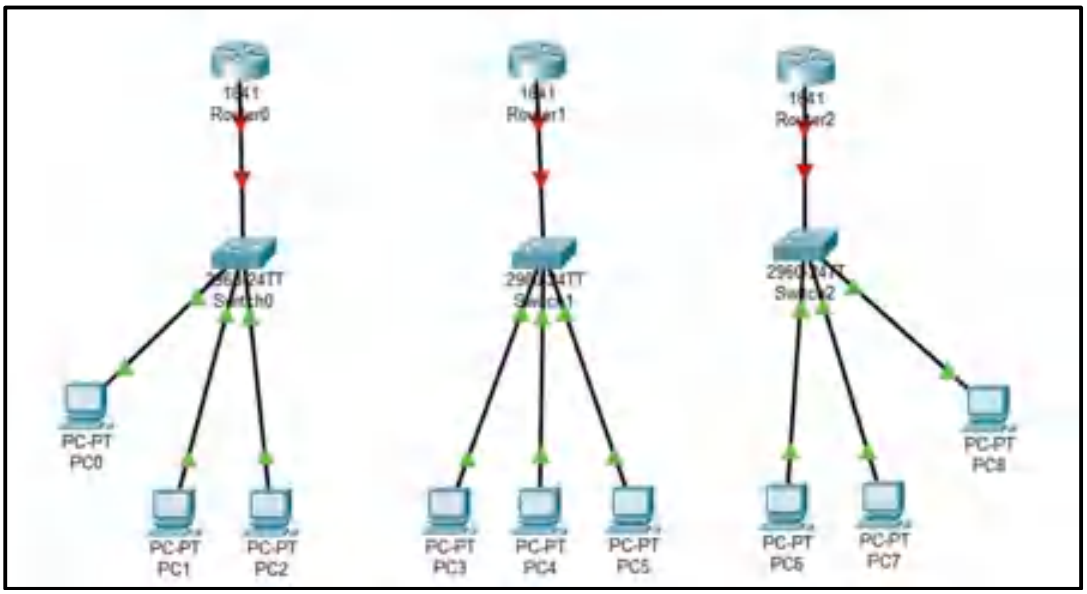
- It's a standardized protocol.
- It's VLSM compliant.
- Provides fast convergence.
- It sends triggered updates when the network changes.
- Works with snapshot routing – making it ideal for dial networks.

Disadvantage of RIP ver2 – There lies some disadvantages as well:

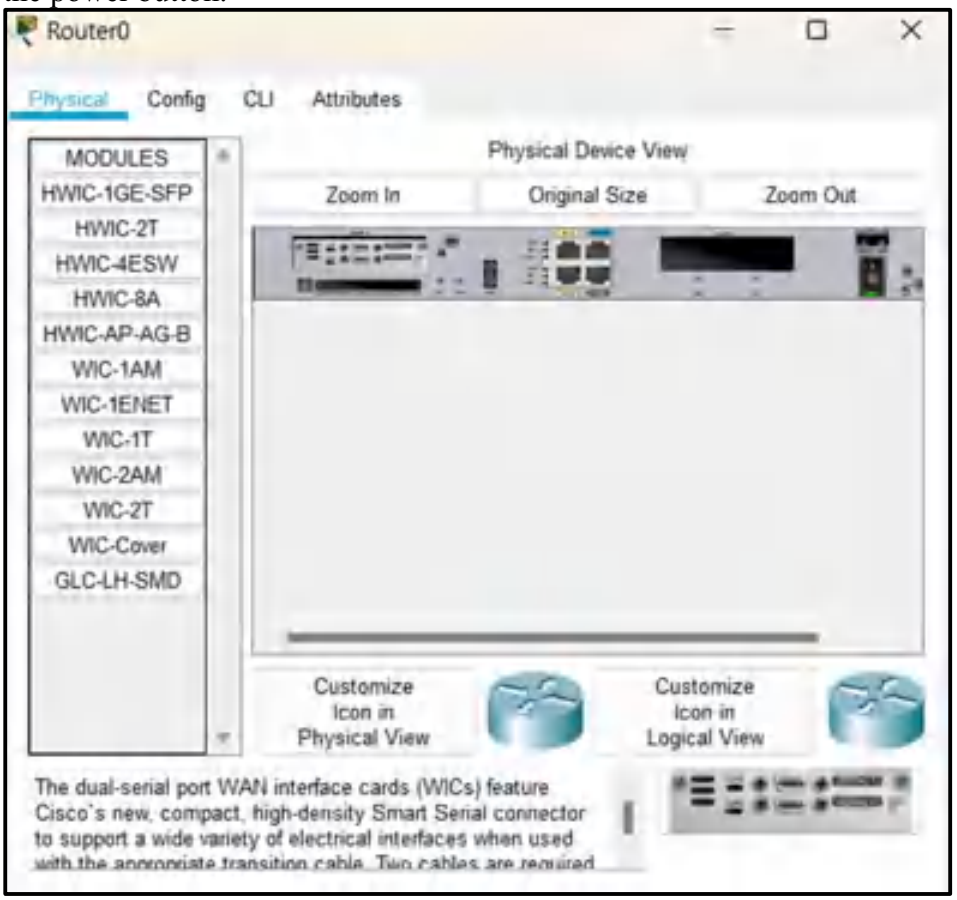
- Max hopcount of 15, due to the 'count-to-infinity' vulnerability.
- No concept of neighbours.
- Exchanges entire table with all neighbours every 30 seconds (except in the case of a triggered update).

OUTPUT:-

Step 1: From the Toolbar, select 3 Routers **'1841'**, 3 switches **'2960-24TT'** and 9 PC's.
Connect Routers to Switches and Switches to PC's by using **'Automatically Choose Connection Type for each Connection'.**

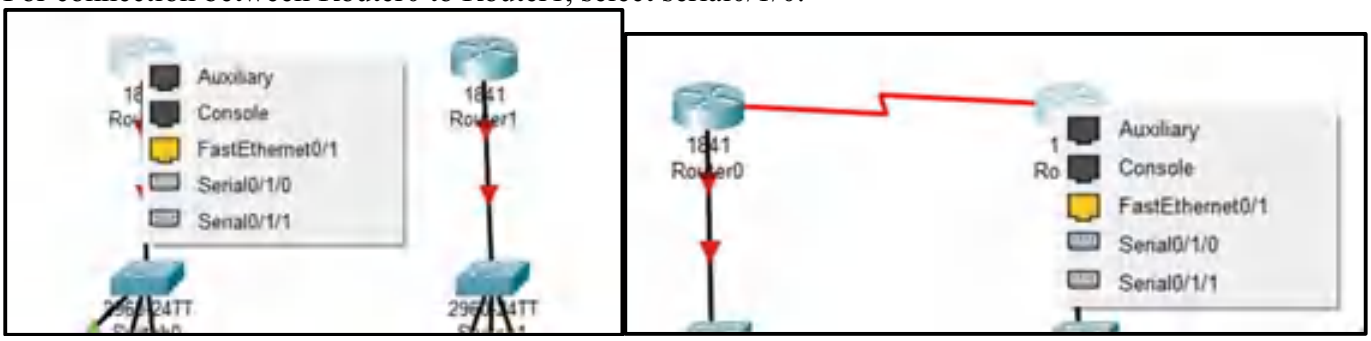


Step 2: Add Serial Interface in Each Router.
Click on Router0, dialog box will appear.
In dialog box, in Physical section, first turn off the power button then assign the **'WIC-2T'** port, then turn on the power button.

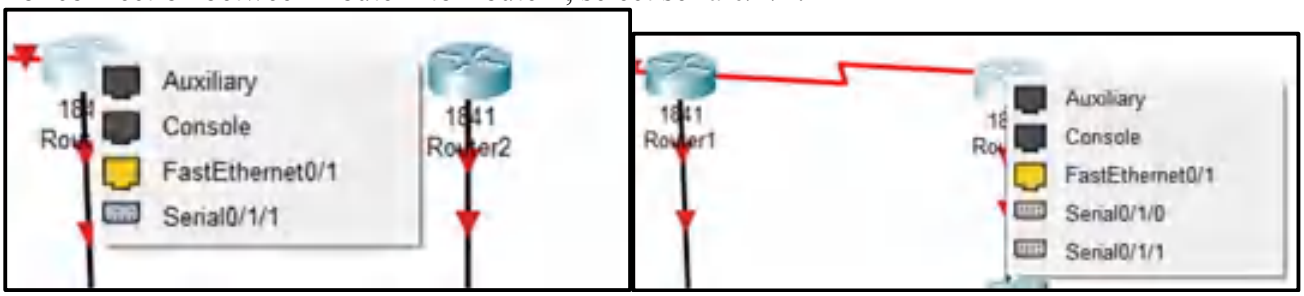


Similarly, do this with Router1 and Router2.

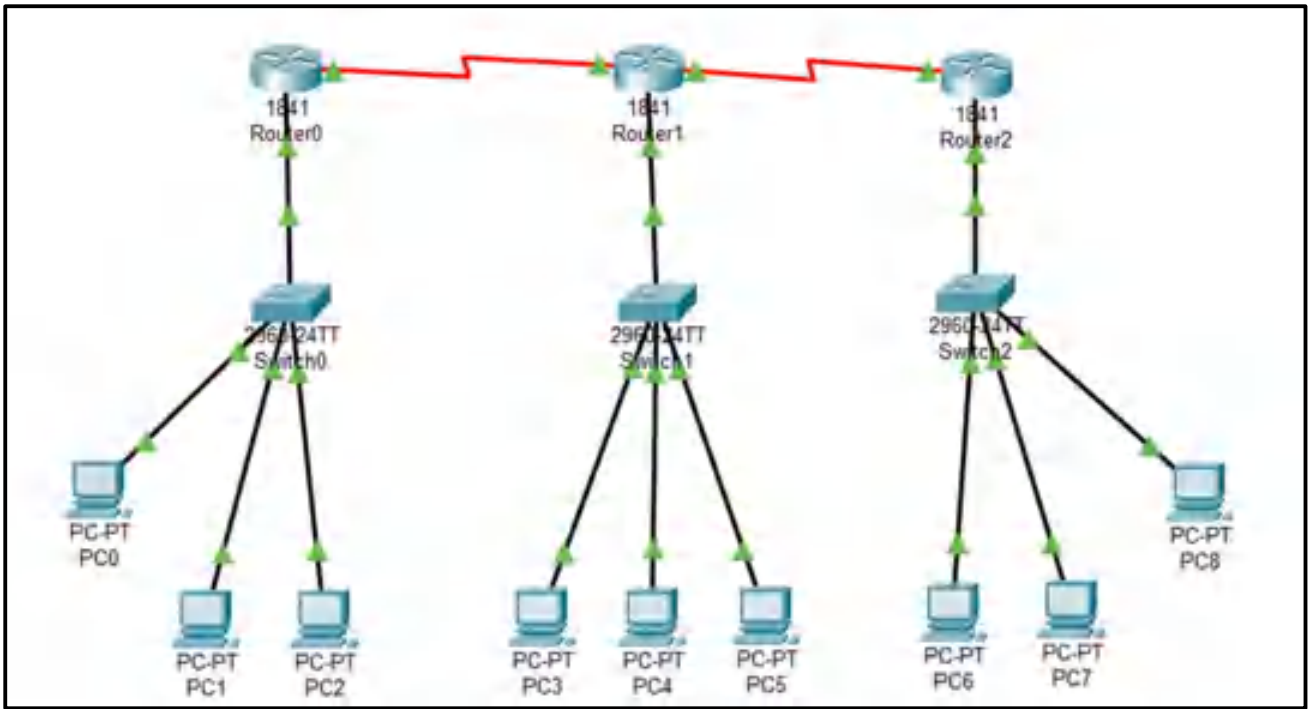
Step 3: Now, Connect the Routers with **'Serial DCE'** wire.
For connection between Router0 to Router1, select serial0/1/0.



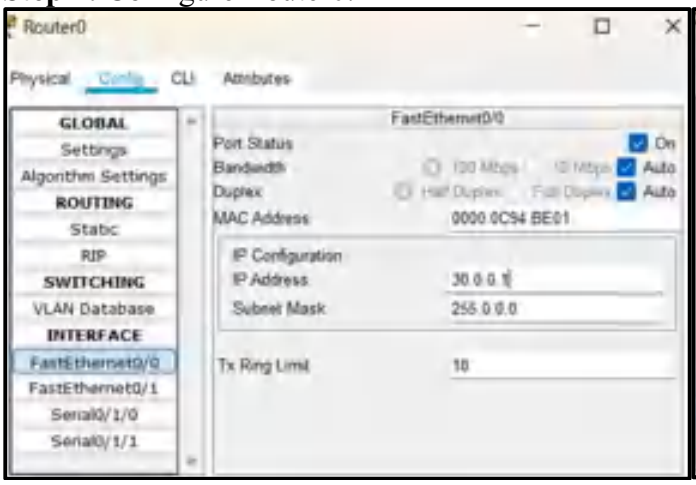
For connection between Router1 to Router2, select serial0/1/1.

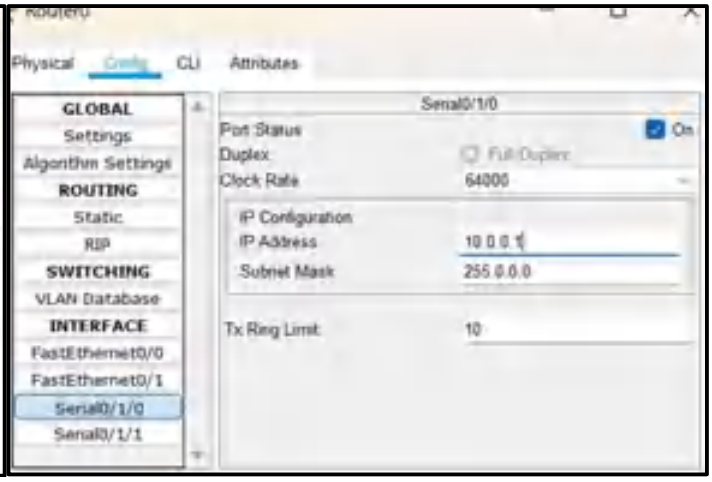


Final Connection must look like this.

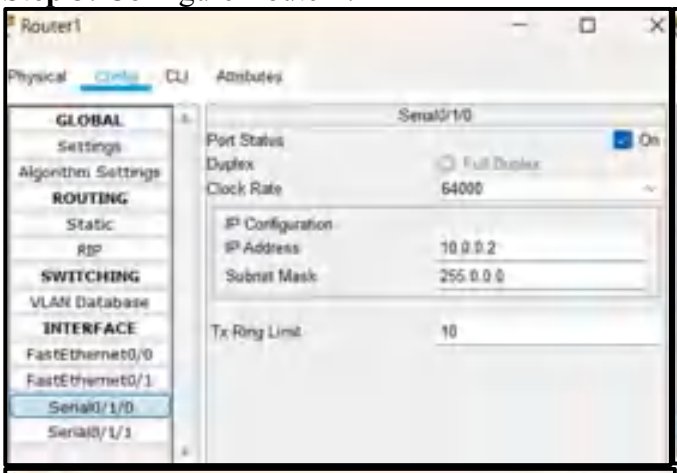


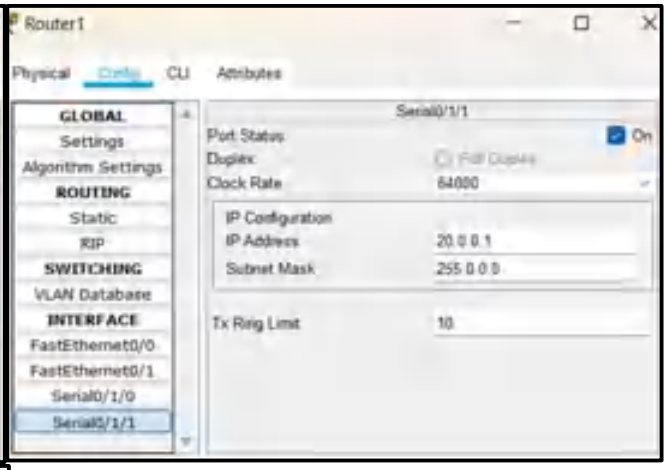
Step 4: Configure Router0.

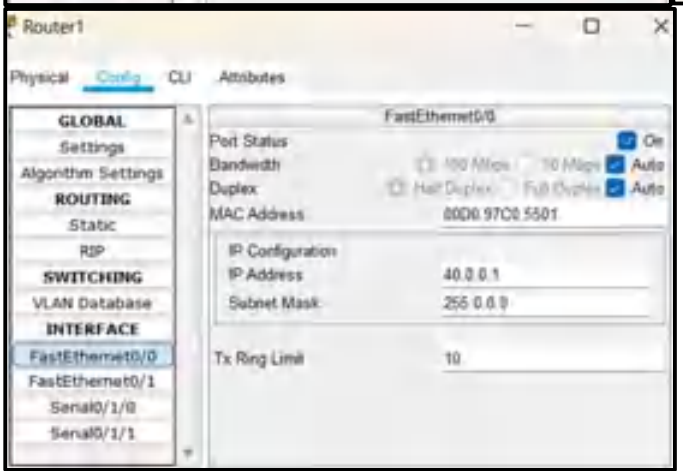




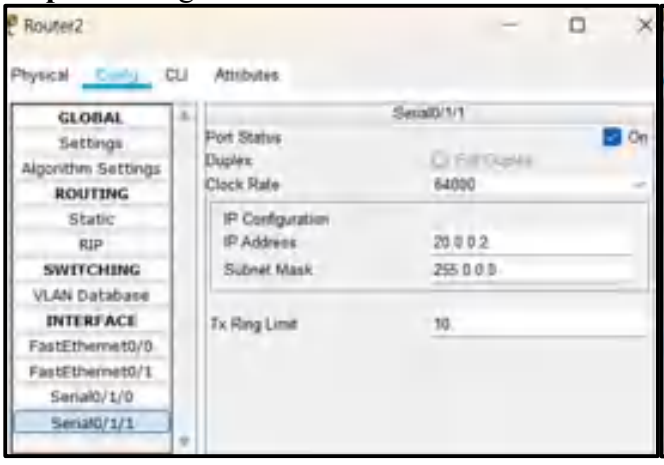
Step 5: Configure Router1.

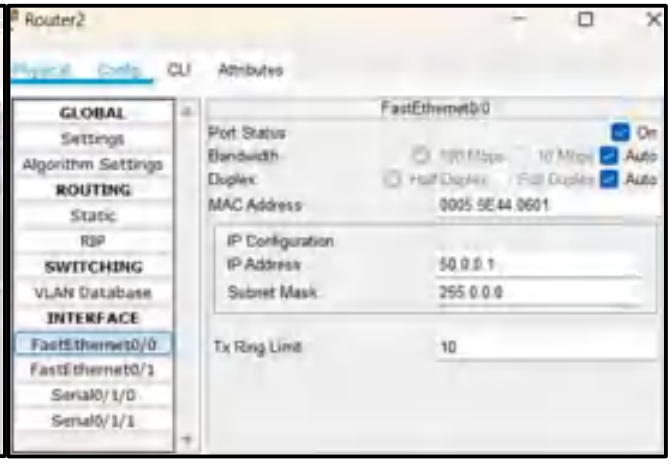




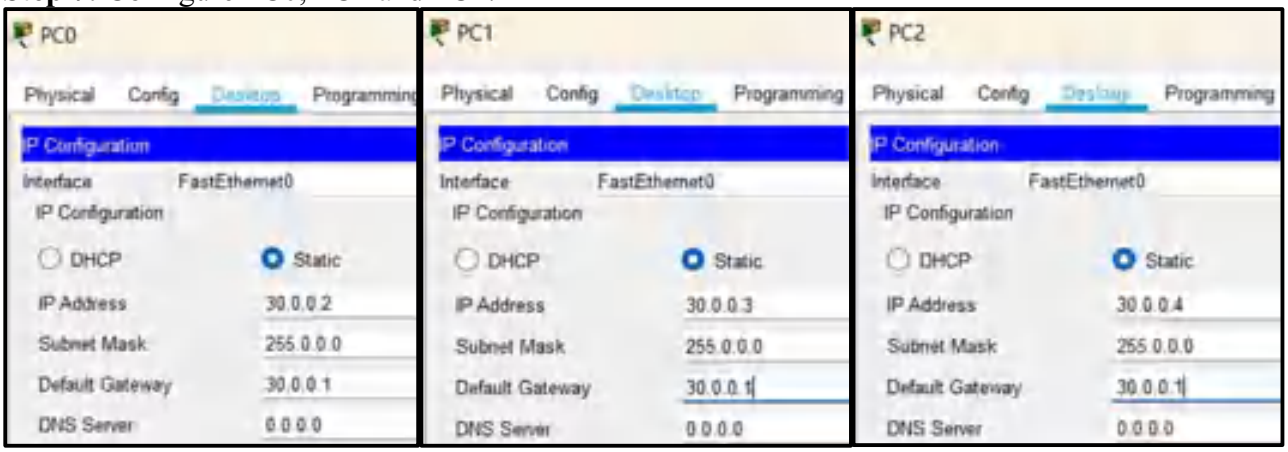


Step 6: Configure Router2.

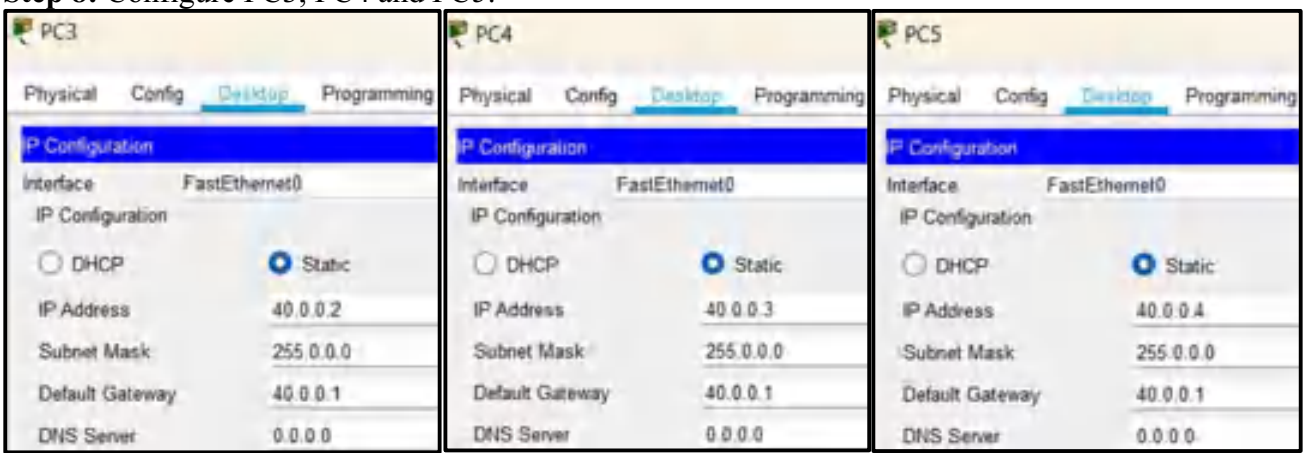




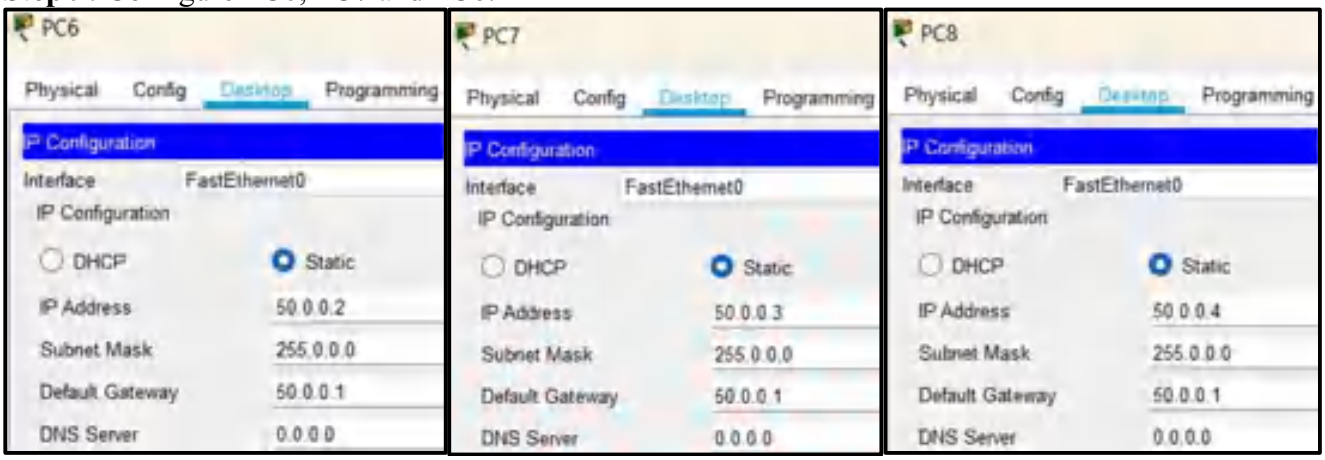
Step 7: Configure PC0, PC1 and PC2.



Step 8: Configure PC3, PC4 and PC5.



Step 9: Configure PC6, PC7 and PC8.



Step 10:- Configure Router0 using CLI mode.

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 10.0.0.0
Router(config-router)#network 30.0.0.0
Router(config-router)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Step 11:- Configure Router1 using CLI mode.

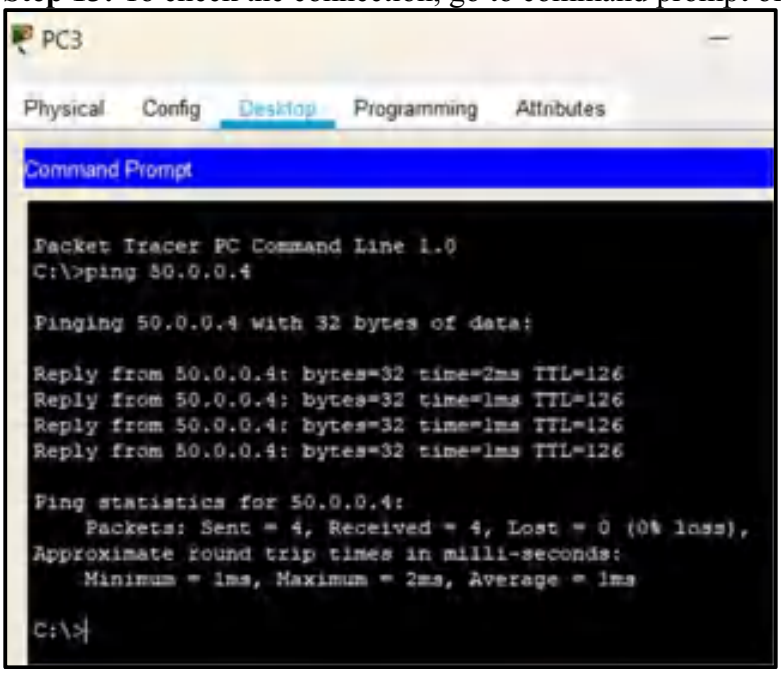
```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 10.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#network 40.0.0.0
Router(config-router)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Step 12:- Configure Router2 using CLI mode.

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router rip
Router(config-router)#version 2
Router(config-router)#network 30.0.0.0
Router(config-router)#network 50.0.0.0
Router(config-router)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

We have successfully connected with every device.

Step 13: To check the connection, go to command prompt of any device and ping the other device.



PRACTICAL NO. 07

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

INTRODUCTION:-

Open Shortest Path First (OSPF) is a link-state routing protocol that was developed for IP networks and is based on the Shortest Path First (SPF) algorithm. OSPF is an Interior Gateway Protocol (IGP).

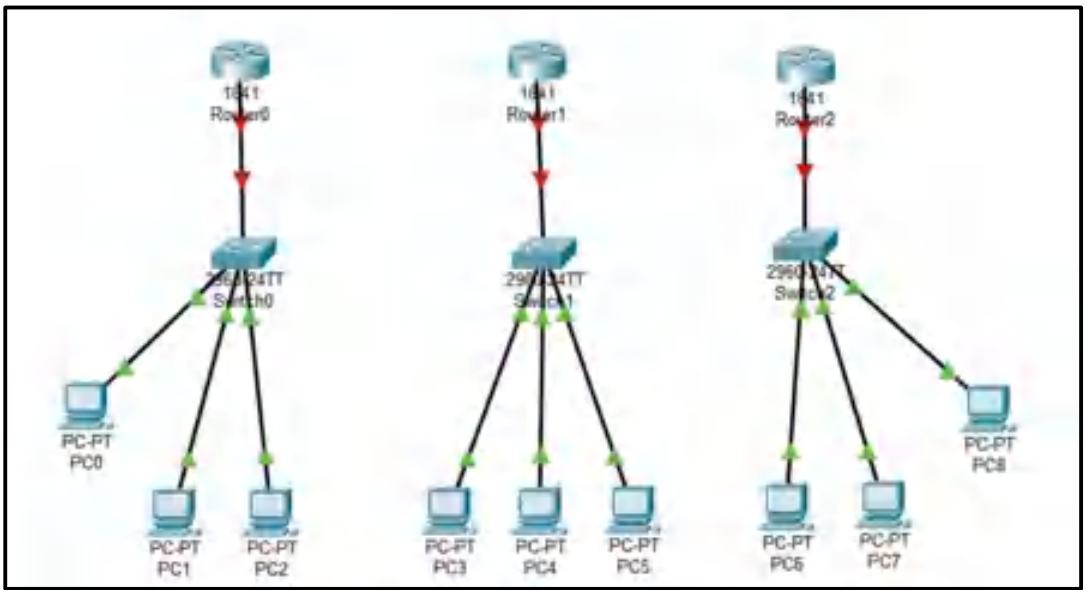
In an OSPF network, routers or systems within the same area maintain an identical link-state database that describes the topology of the area. Each router or system in the area generates its link-state database from the link-state advertisements (LSAs) that it receives from all the other routers or systems in the same area and the LSAs that itself generates. An LSA is a packet that contains information about neighbors and path costs. Based on the link-state database, each router or system calculates a shortest-path spanning tree, with itself as the root, using the SPF algorithm.

OSPF has the following key advantages:

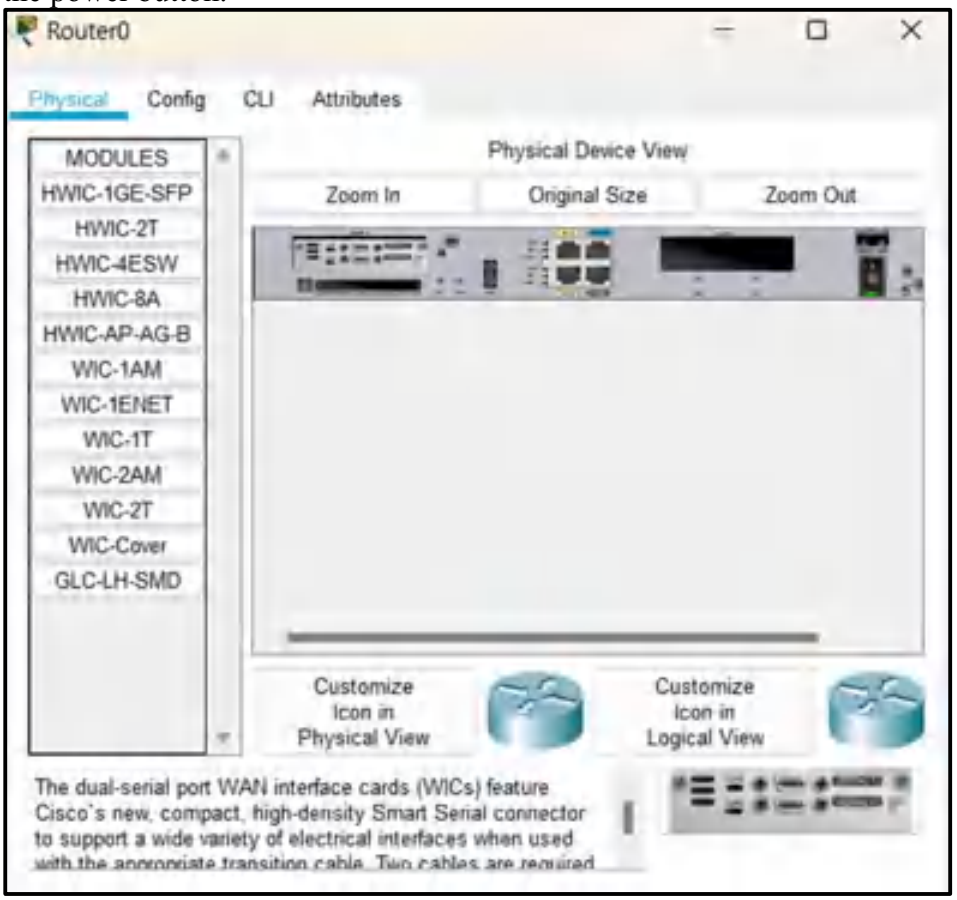
- Compared with distance-vector routing protocols such as the Routing Information Protocol (RIP), OSPF is more suitable for serving large, heterogeneous internetworks. OSPF can recalculate the routes in a short amount of time when the network topology changes.
- With OSPF, you can divide an Autonomous System (AS) into areas and keep area topologies separate to decrease the OSPF routing traffic and the size of the link-state database of each area.
- OSPF provides equal-cost multipath routing. You can add duplicate routes to the TCP stack using different next hops.

OUTPUT:-

Step 1: From the Toolbar, select 3 Routers **'1841'**, 3 switches **'2960-24TT'** and 9 PC's.
Connect Routers to Switches and Switches to PC's by using **'Automatically Choose Connection Type for each Connection'.**

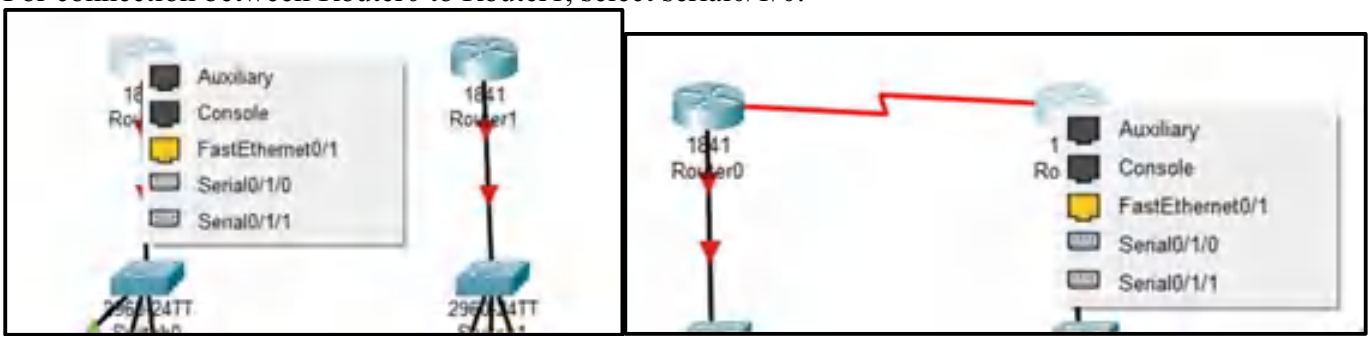


Step 2: Add Serial Interface in Each Router.
Click on Router0, dialog box will appear.
In dialog box, in Physical section, first turn off the power button then assign the **'WIC-2T'** port, then turn on the power button.

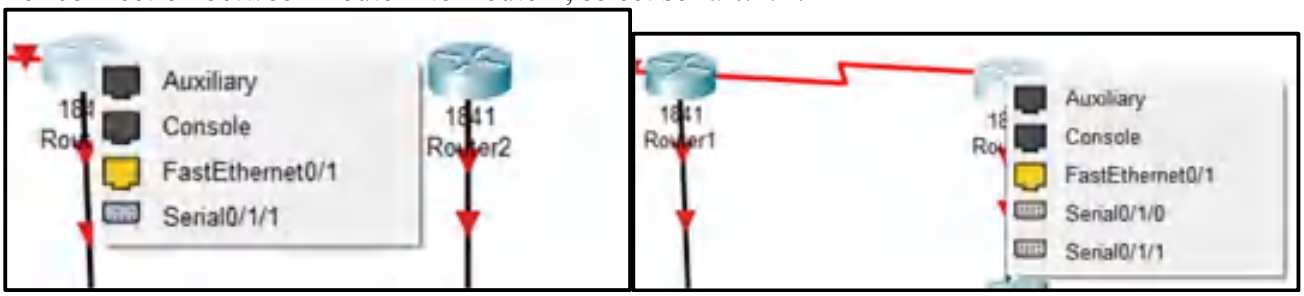


Similarly, do this with Router1 and Router2.

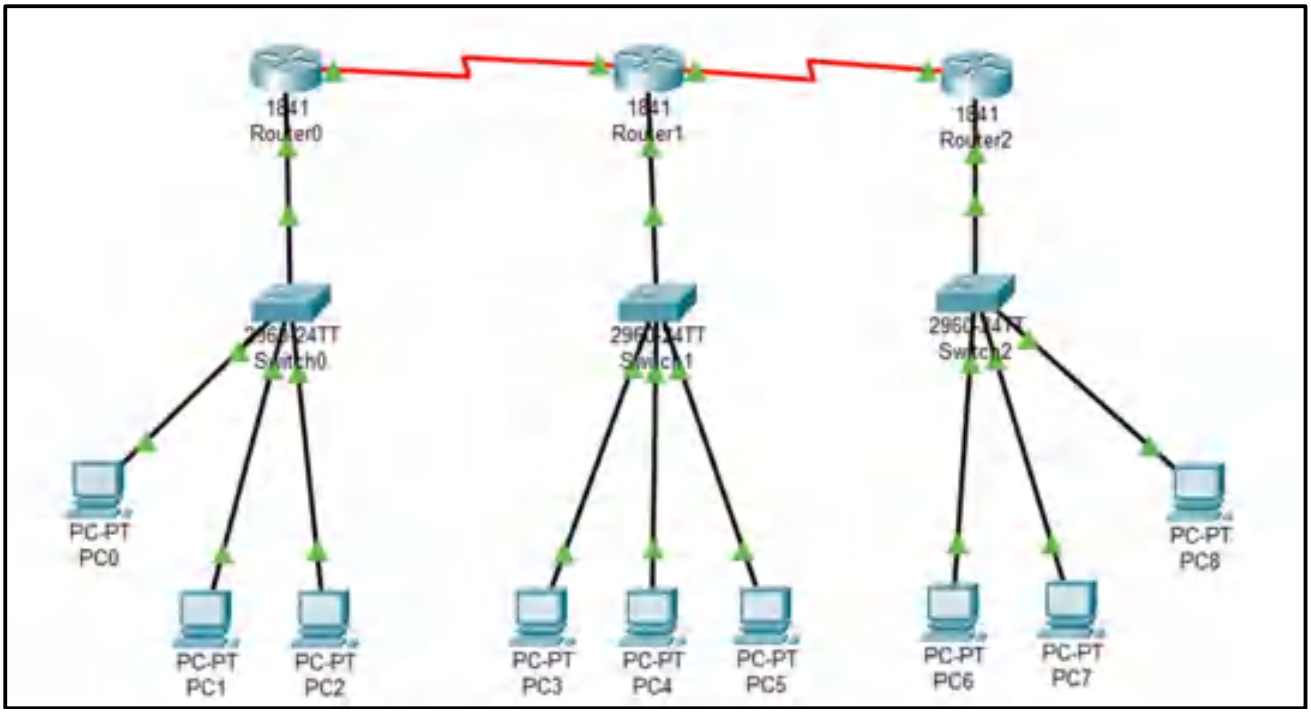
Step 3: Now, Connect the Routers with **'Serial DCE'** wire.
For connection between Router0 to Router1, select serial0/1/0.



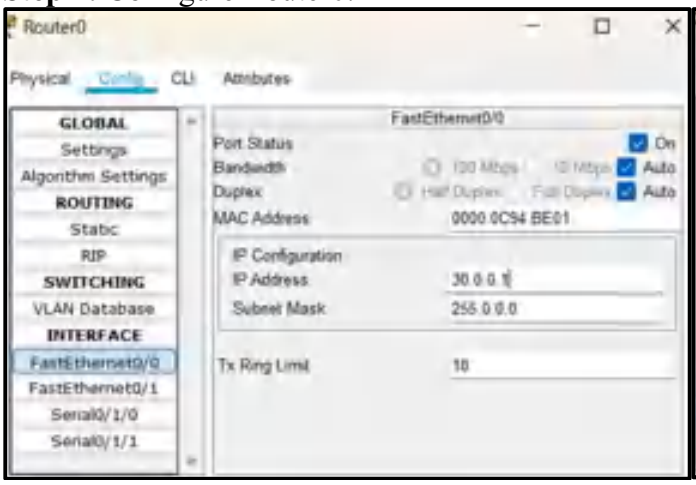
For connection between Router1 to Router2, select serial0/1/1.

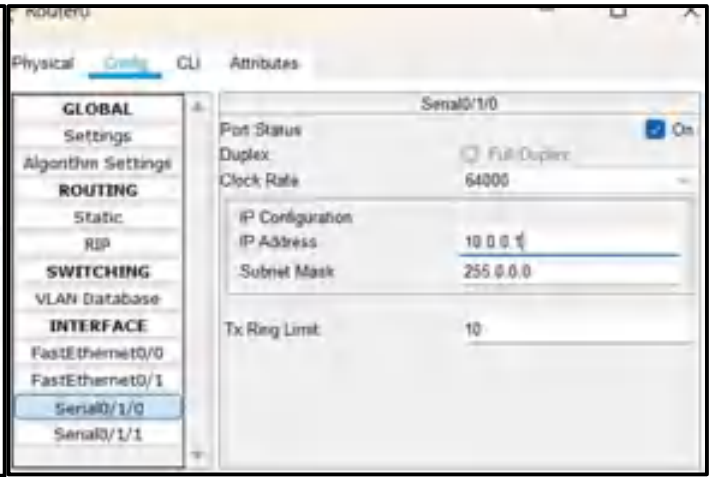


Final Connection must look like this.

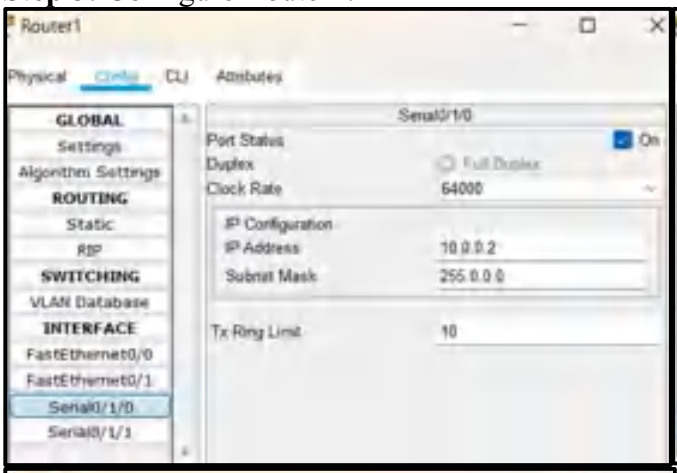


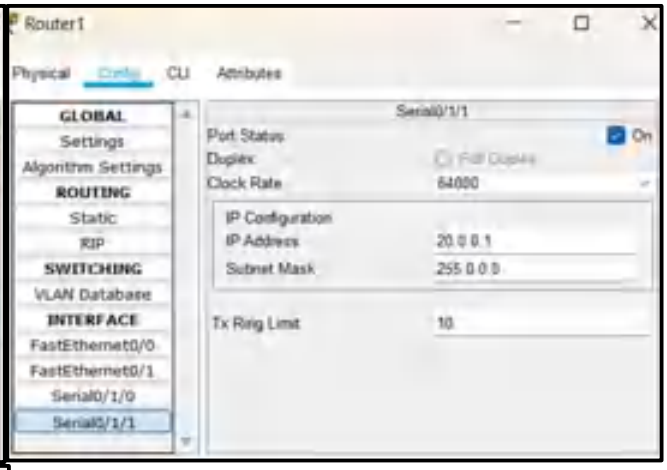
Step 4: Configure Router0.

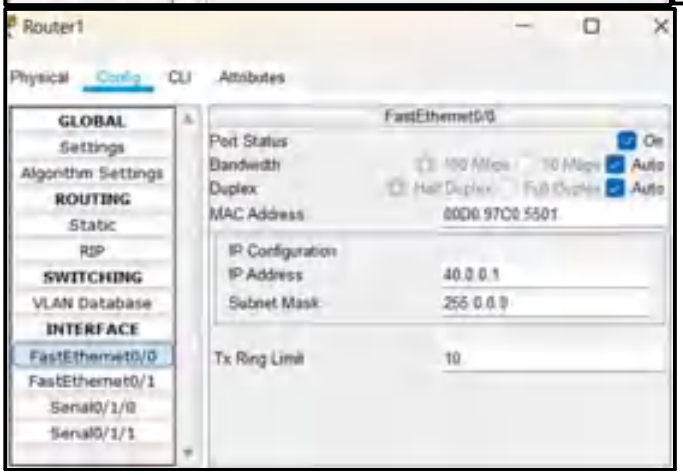




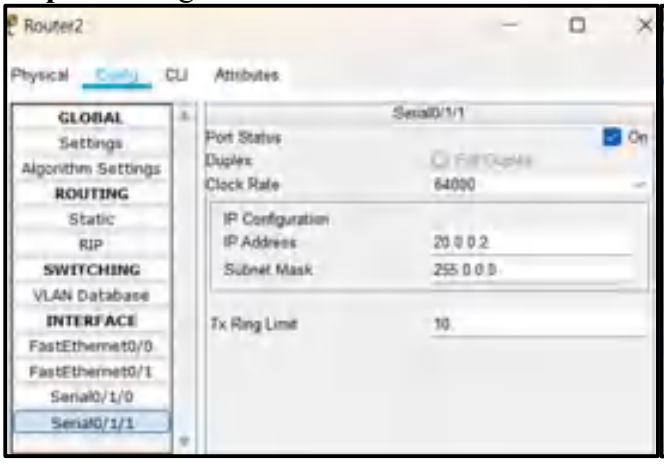
Step 5: Configure Router1.

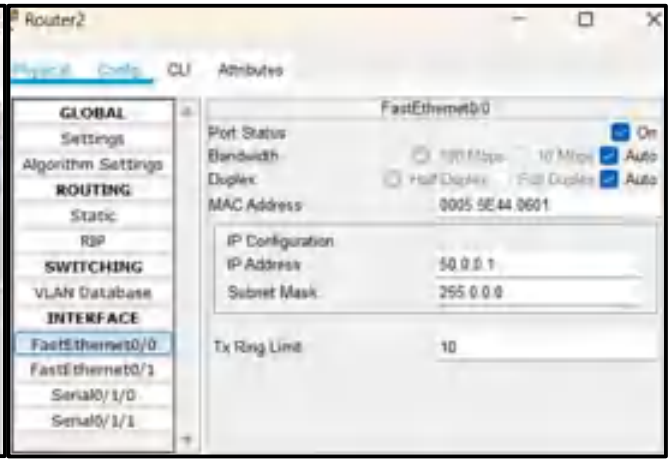




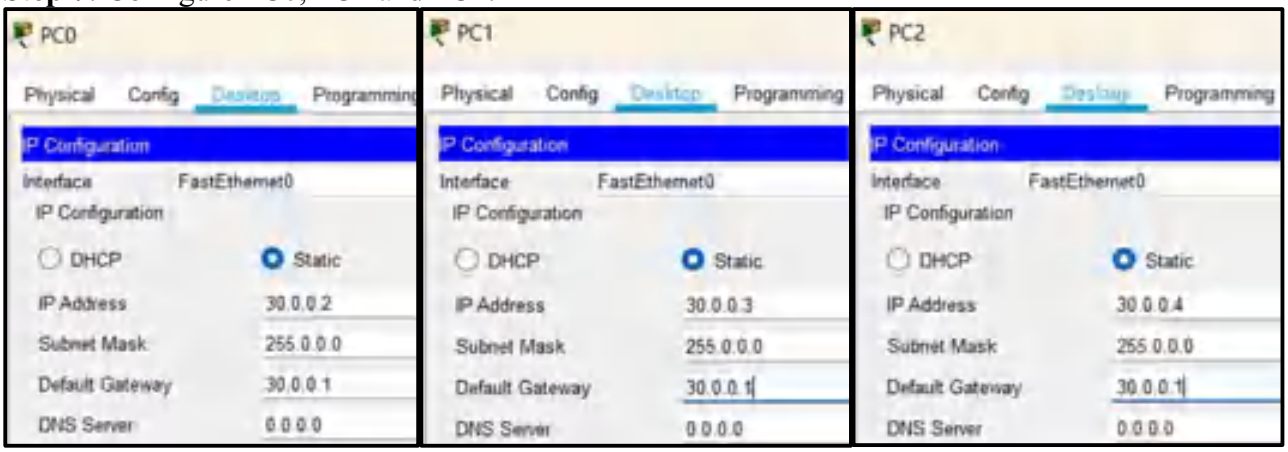


Step 6: Configure Router2.

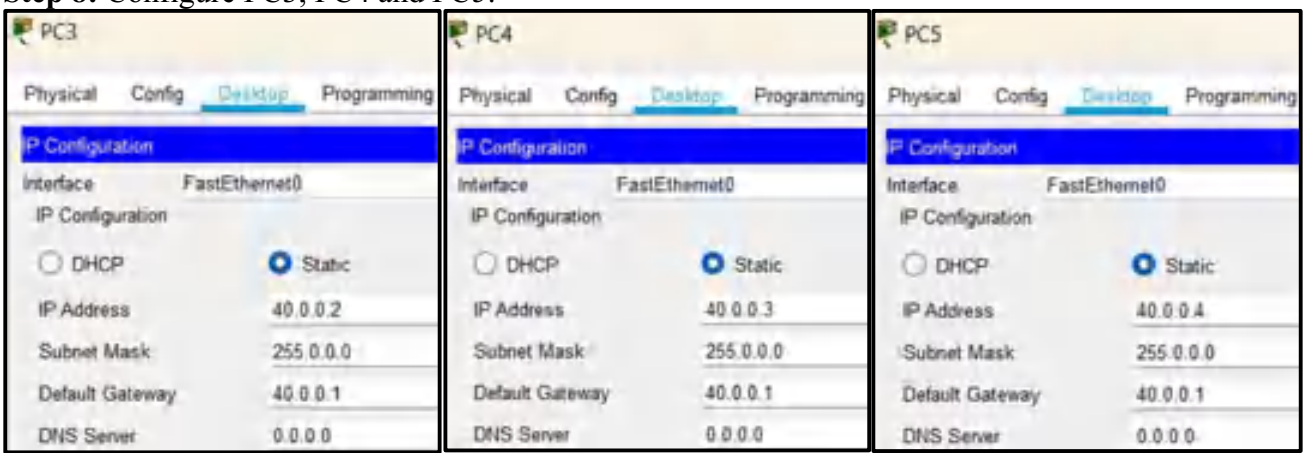




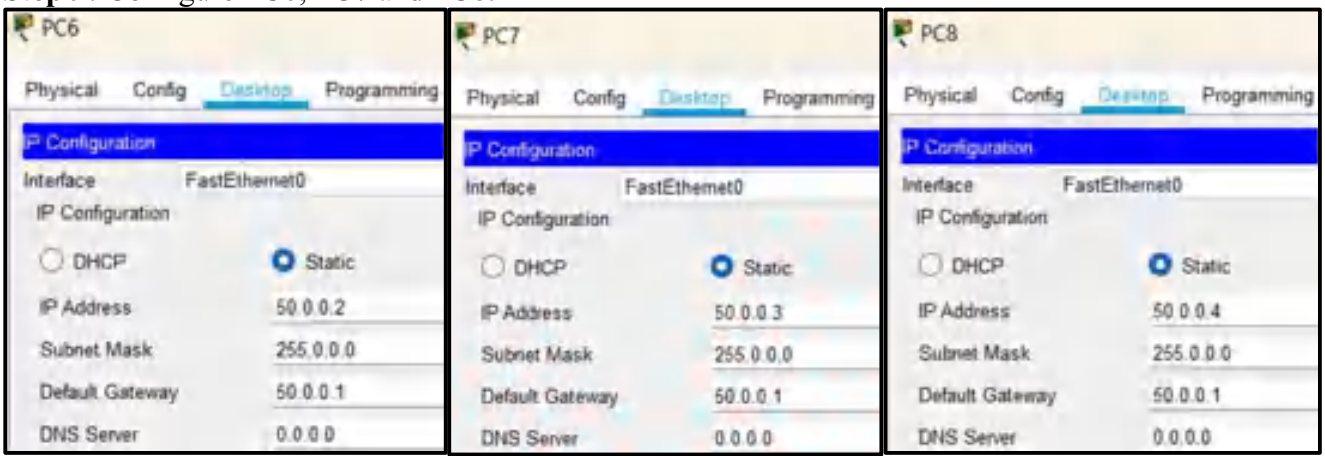
Step 7: Configure PC0, PC1 and PC2.



Step 8: Configure PC3, PC4 and PC5.



Step 9: Configure PC6, PC7 and PC8.



Step 10:- Configure Router0 using CLI mode.

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#network 10.0.0.0 0.0.0.255 area 1
Router(config-router)#network 30.0.0.0 0.0.0.255 area 1
Router(config-router)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Step 11:- Configure Router1 using CLI mode.

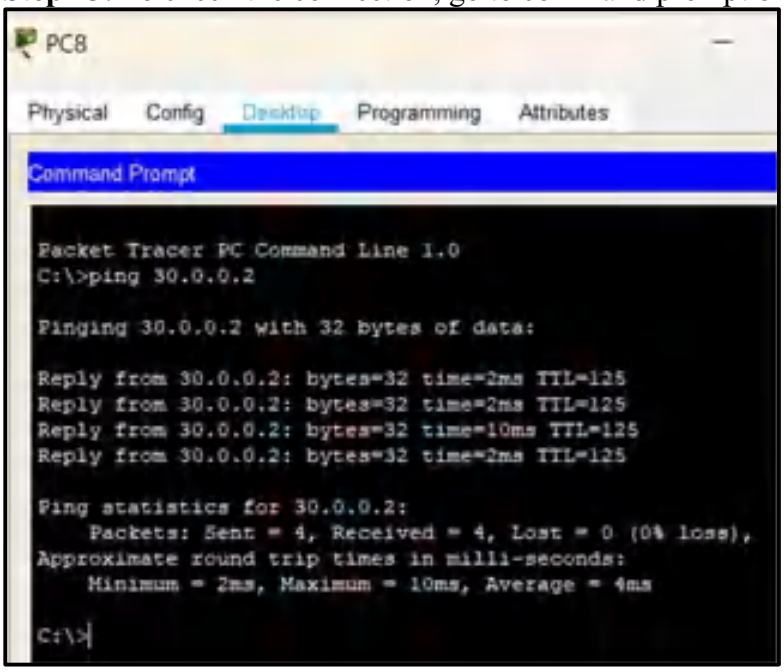
```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#network 10.0.0.0 0.0.0.255 area 1
Router(config-router)#network 20.0.0.0 0.0.0.255 area 1
Router(config-router)#network 20.0.0.0 0.0.0.255 area 1
01:11:05: %OSPF-5-ADJCHG: Process 1, Nbr 30.0.0.1 on Serial0/1/0
frnetwork 40.0.0.0 0.0.0.255 area 1
Router(config-router)#
```

Step 12:- Configure Router2 using CLI mode.

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router ospf 1
Router(config-router)#network 20.0.0.0 0.0.0.255 area 1
Router(config-router)#network 20.0.0.0 0.0.0.255 area 1
01:12:39: %OSPF-5-ADJCHG: Process 1, Nbr 40.0.0.1 on Serial0/1/1
frnetwork 50.0.0.0 0.0.0.255 area 1
Router(config-router)#
```

We have successfully connected with every device.

Step 13: To check the connection, go to command prompt of any device and ping the other device.



PRACTICAL NO. 08

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

INTRODUCTION:-

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

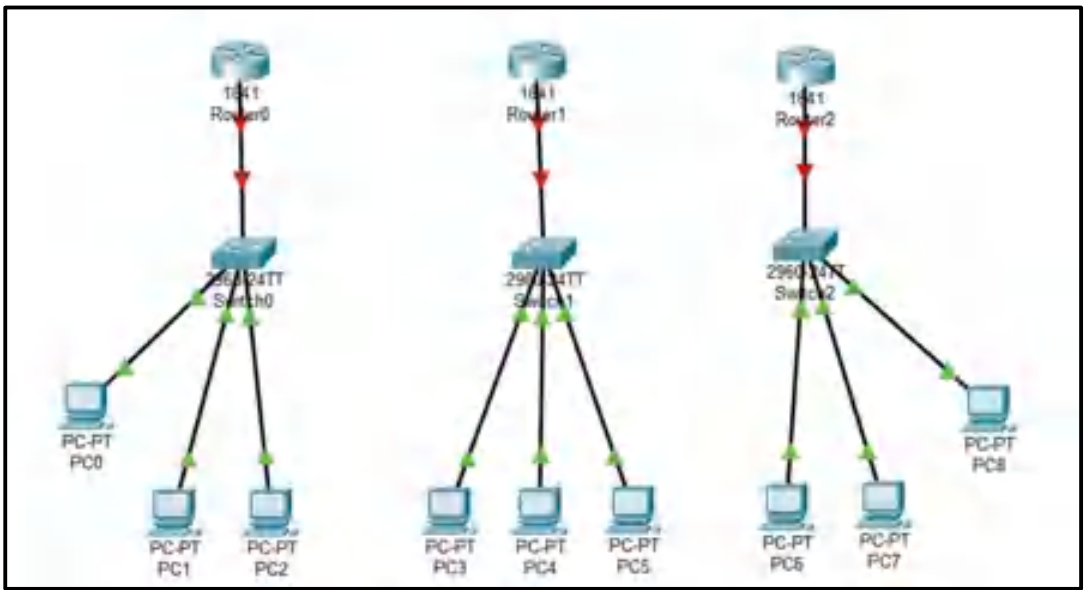
The protocol can connect together any internetwork of autonomous system using an arbitrary topology. The only requirement is that each AS have at least one router that is able to run BGP and that is router connect to at least one other AS's BGP router. BGP's main function is to exchange network reach-ability information with other BGP systems. Border Gateway Protocol constructs an autonomous systems' graph based on the information exchanged between BGP routers.

Characteristics of Border Gateway Protocol (BGP):

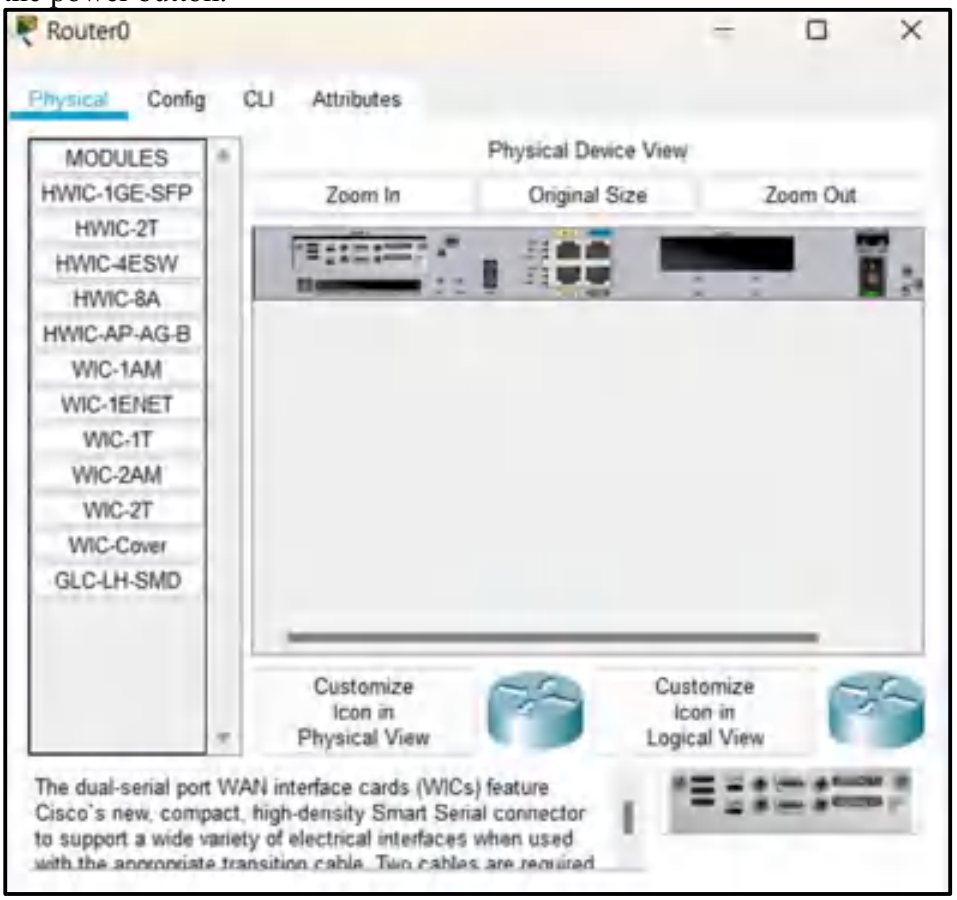
- **Inter-Autonomous System Configuration:** The main role of BGP is to provide communication between two autonomous systems.
- BGP supports Next-Hop Paradigm.
- Coordination among multiple BGP speakers within the AS (Autonomous System).
- **Path Information:** BGP advertisement also include path information, along with the reachable destination and next destination pair.
- **Policy Support:** BGP can implement policies that can be configured by the administrator. For ex:- a router running BGP can be configured to distinguish between the routes that are known within the AS and that which are known from outside the AS.
- Runs Over TCP.
- BGP conserve network Bandwidth.
- BGP supports CIDR.
- BGP also supports Security.

OUTPUT:-

Step 1: From the Toolbar, select 3 Routers **'1841'**, 3 switches **'2960-24TT'** and 9 PC's.
Connect Routers to Switches and Switches to PC's by using **'Automatically Choose Connection Type for each Connection'.**

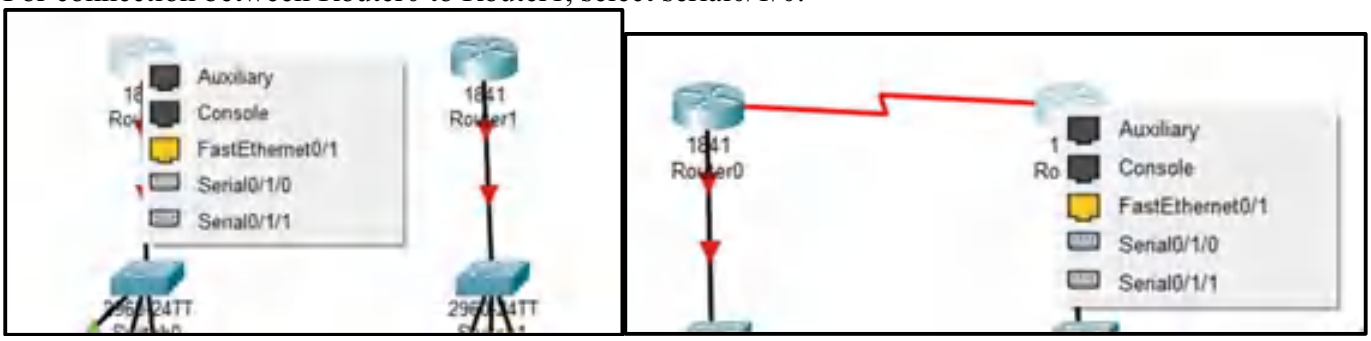


Step 2: Add Serial Interface in Each Router.
Click on Router0, dialog box will appear.
In dialog box, in Physical section, first turn off the power button then assign the **'WIC-2T'** port, then turn on the power button.

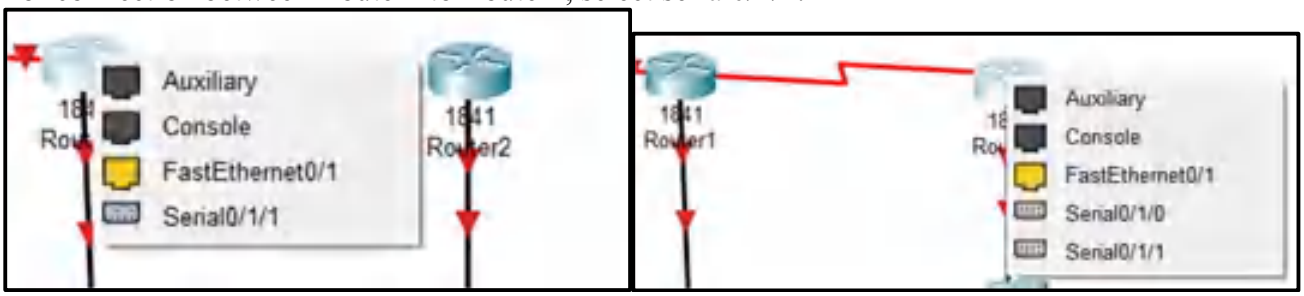


Similarly, do this with Router1 and Router2.

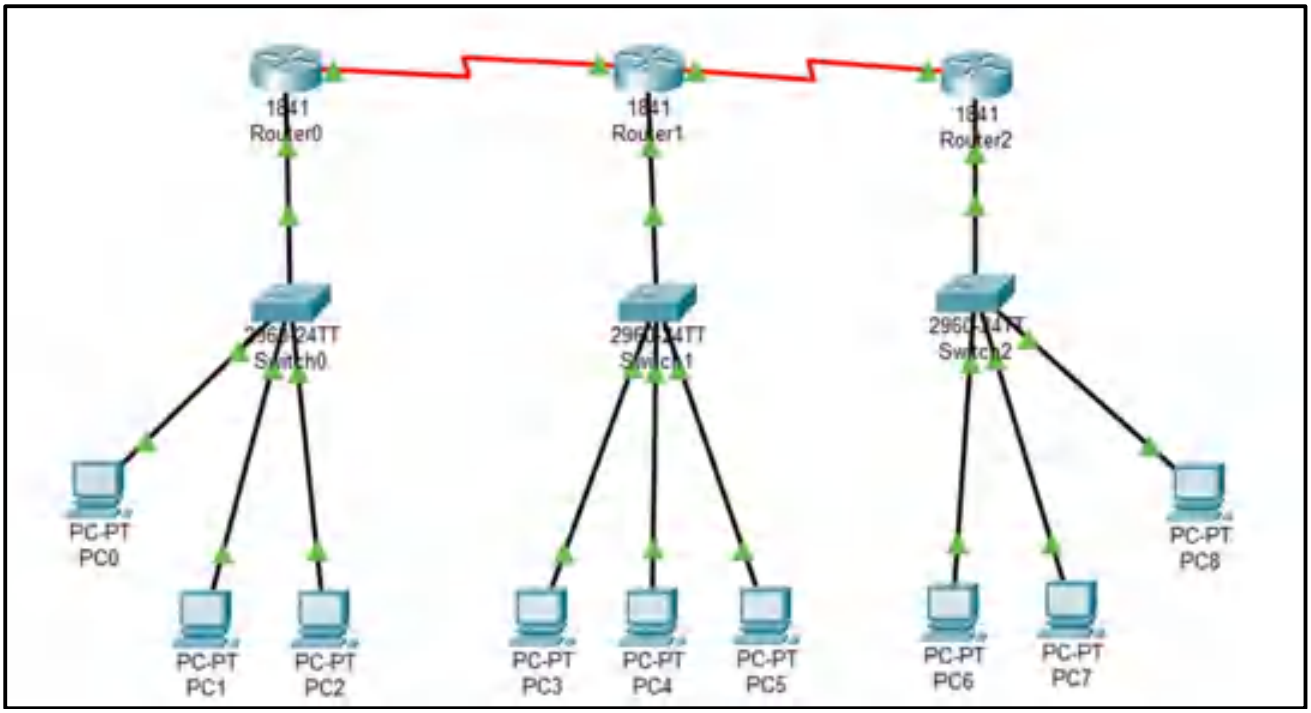
Step 3: Now, Connect the Routers with **'Serial DCE'** wire.
For connection between Router0 to Router1, select serial0/1/0.



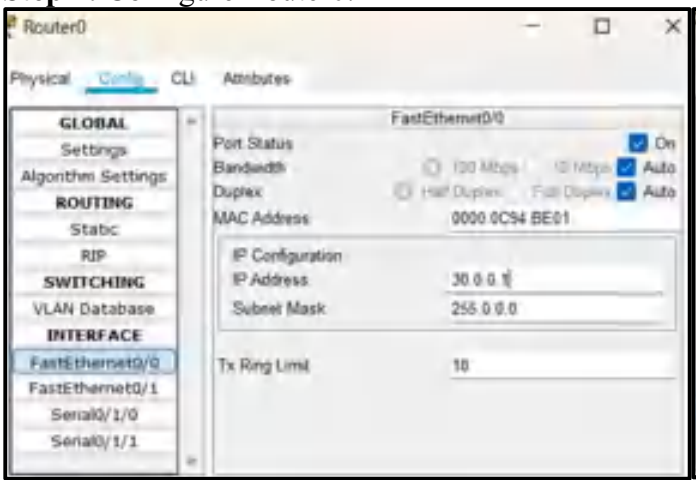
For connection between Router1 to Router2, select serial0/1/1.

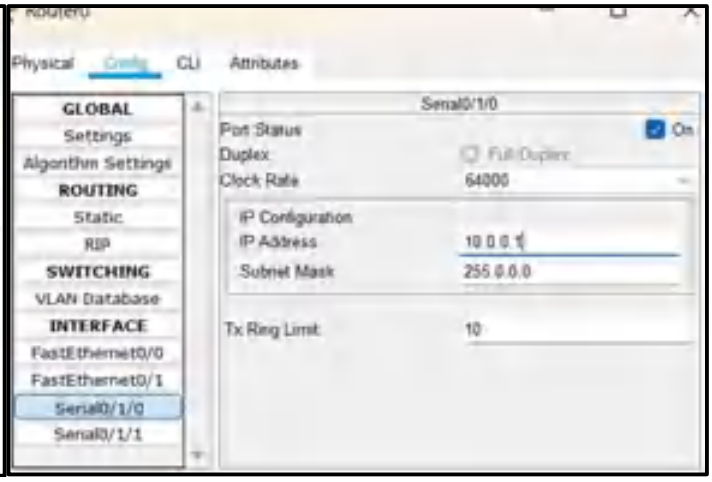


Final Connection must look like this.

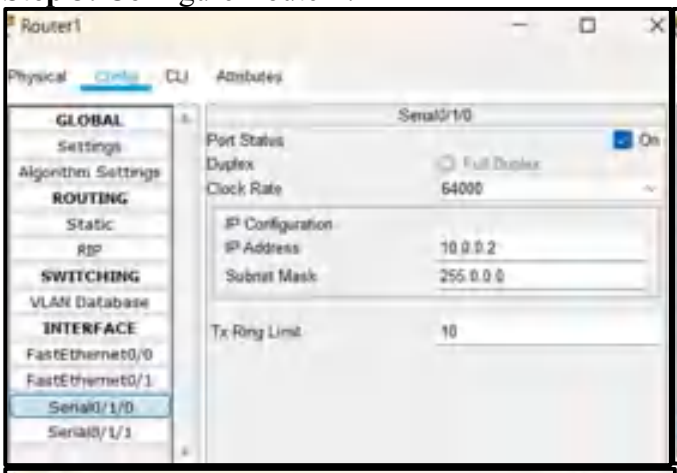


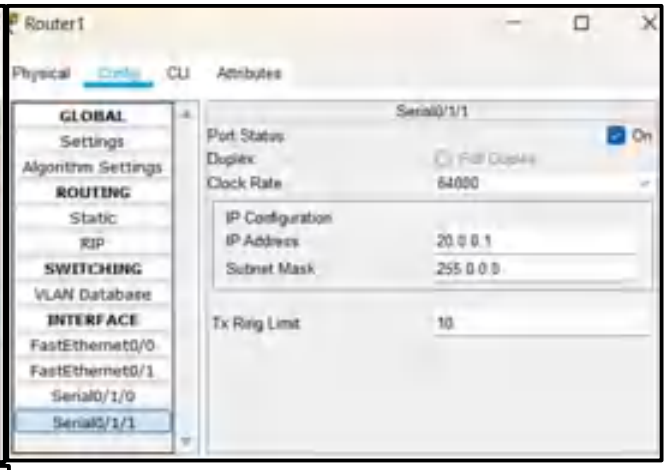
Step 4: Configure Router0.

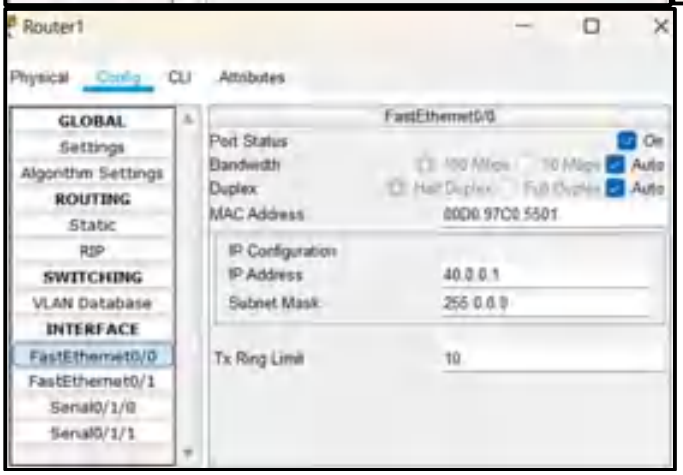




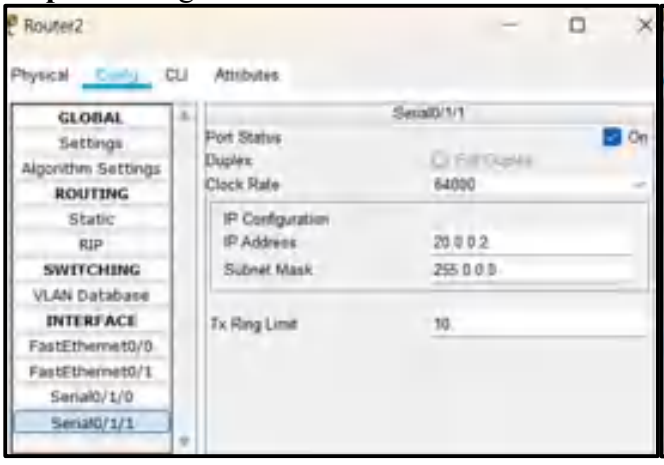
Step 5: Configure Router1.

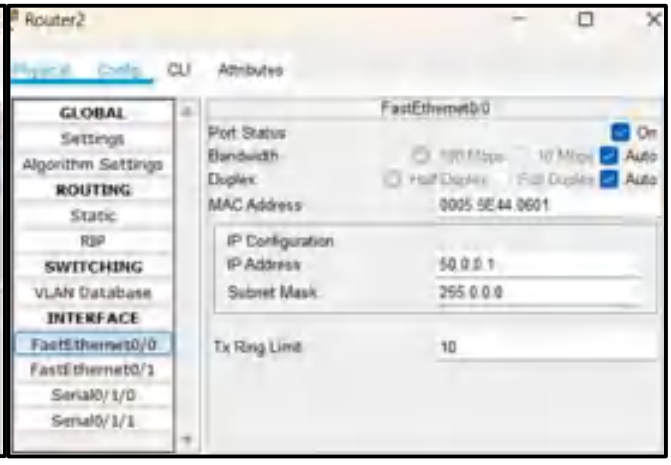




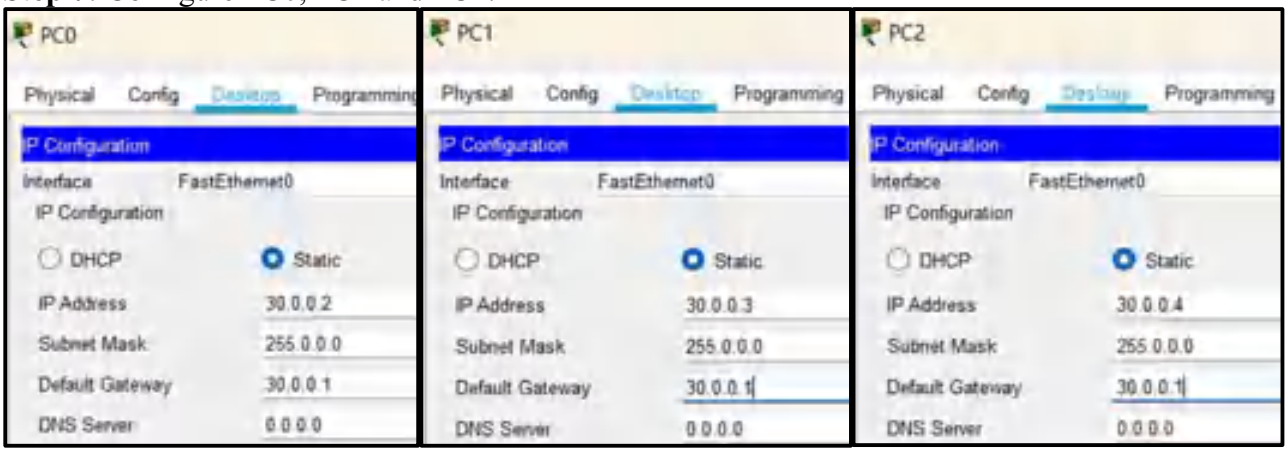


Step 6: Configure Router2.

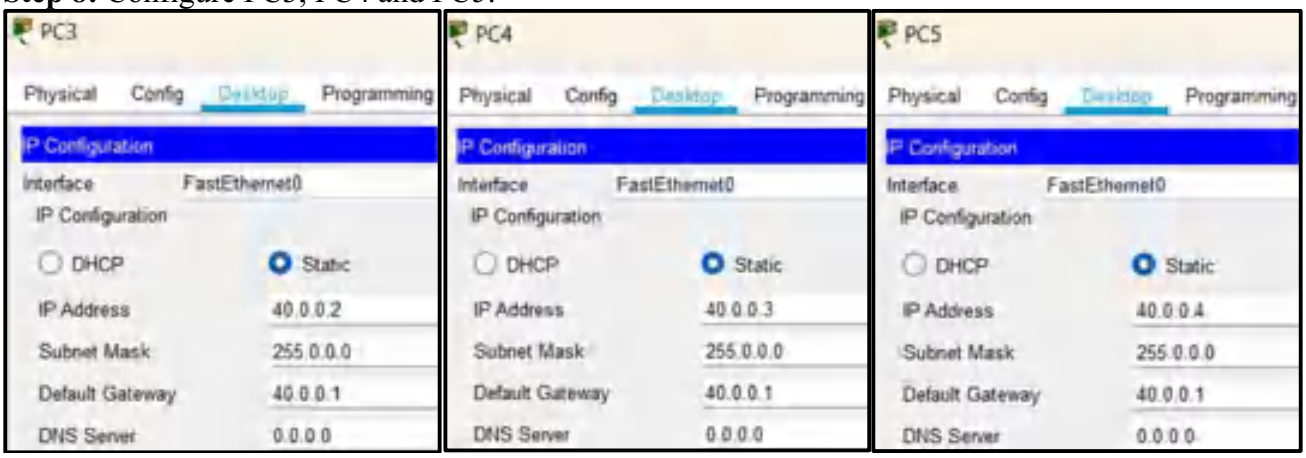




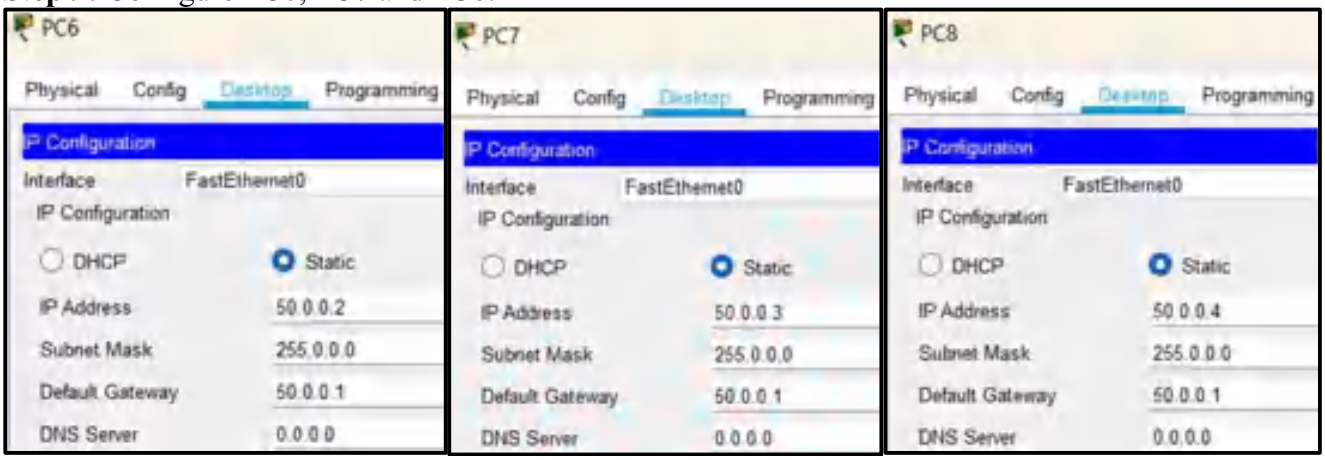
Step 7: Configure PC0, PC1 and PC2.



Step 8: Configure PC3, PC4 and PC5.



Step 9: Configure PC6, PC7 and PC8.



Step 10:- Configure Router0 using CLI mode.

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router bgp 1000
Router(config-router)#network 10.0.0.0
Router(config-router)#network 30.0.0.0
Router(config-router)#neighbor 10.0.0.2 remote-as 2000
Router(config-router)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Step 11:- Configure Router1 using CLI mode.

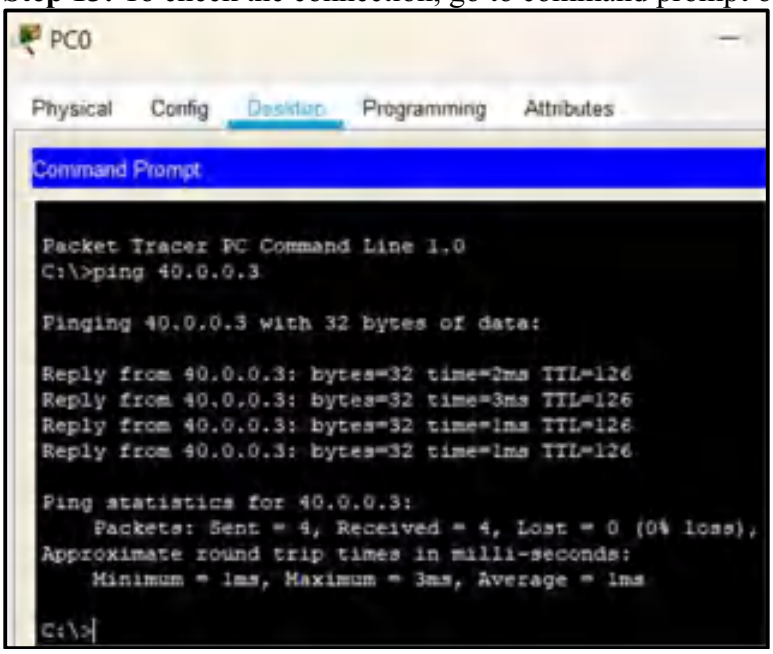
```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router bgp 2000
Router(config-router)#network 10.0.0.0
Router(config-router)#network 20.0.0.0
Router(config-router)#network 40.0.0.0
Router(config-router)#neighbor 10.0.0.1 remote-as 1000
Router(config-router)#neighbor 20.0.0.2 remote-as 3000
Router(config-router)#^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

Step 12:- Configure Router2 using CLI mode.

```
Router>en
Router#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#router bgp 3000
Router(config-router)#network 20.0.0.0
Router(config-router)#network 50.0.0.0
Router(config-router)#neighbor 20.0.0.1 remote-as 2000
Router(config-router)#%BGP-5-ADJCHANGE: neighbor 20.0.0.1 Up
^Z
Router#
%SYS-5-CONFIG_I: Configured from console by console
```

We have successfully connected with every device.

Step 13: To check the connection, go to command prompt of any device and ping the other device.



PRACTICAL NO. 09

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

INTRODUCTION:-

A Wireless Access Point (WAP) is a networking device that allows wireless-capable devices to connect to a wired network. Instead of using wires and cables to connect every computer or device in the network, installing WAPs is a more convenient, more secure, and cost-efficient alternative.

Setting up a wireless network provides a lot of advantages and benefits for you and your small business.

It is easier to set up compared to setting up a wired network.

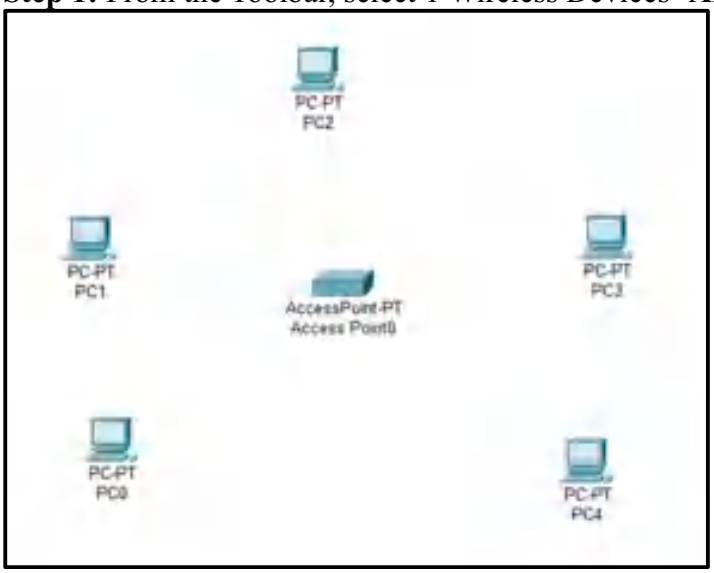
- It is more convenient to access.
- It is less complicated to add new users in the network.
- It gives users more flexibility to stay online even when moving from one area in the office to another.
- Guest users can have Internet access by just using a password.
- Wireless network protection can be set up even if the network is visible to the public by configuring maximum wireless security.
- Segmentation of users, such as guests and employees, is possible by creating Virtual Local Area Networks (VLANs) to protect your network resources and assets.

There are different purposes of setting up a wireless network using a WAP. With a WAP, you can do the following:

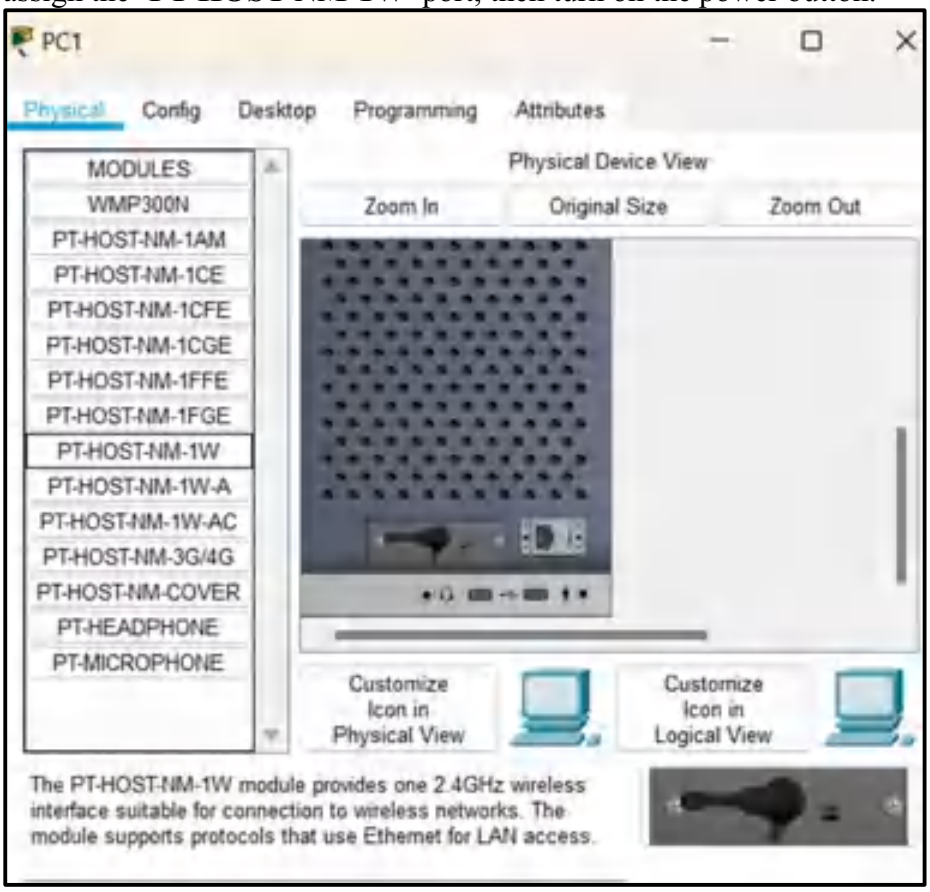
- Create a wireless network within your existing wired network.
- Extend the signal range and strength of your wireless network to provide complete wireless coverage and get rid of dead spots especially in larger office spaces or buildings.
- Accommodate wireless devices within a wired network.
- Configure the settings of your wireless access points in one device.

OUTPUT:-

Step 1: From the Toolbar, select 1 Wireless Devices **'AP-PT'**, and 5 PC's.



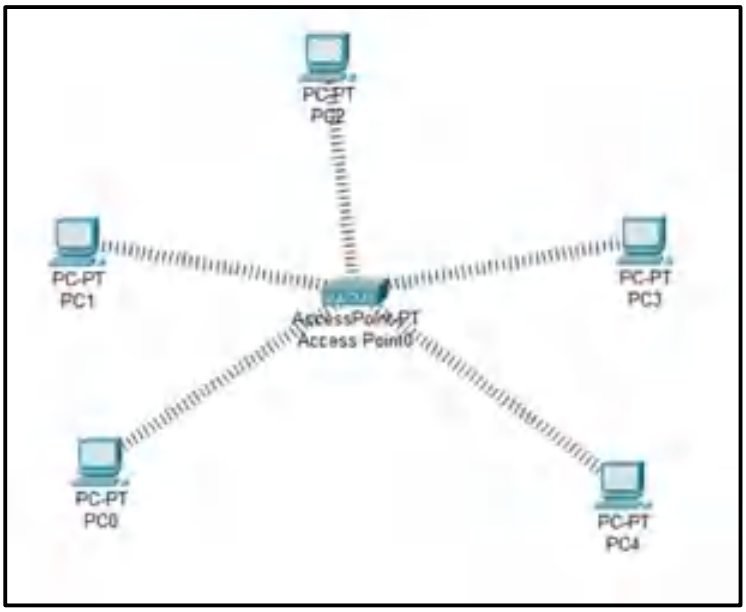
Step 2: Now, we will make the PC wireless, for that Click on PC, dialog box will appear.
In dialog box, in Physical section, first turn off the power button then remove the ethernet port from PC and assign the **'PT-HOST-NM-1W'** port, then turn on the power button.



Similarly, Do this with Every PC.

We have successfully connected with every device.

After the Connection it must be look like this.



Step 3: To check the connection, go to ip configuration of any device and ping this device by using command prompt of any any device.