

PRACTICAL-5

AIM: To create a Network using Switch and Routers

1) Why subnetting is required?

ANS: **Subnetting** helps to reduce the network traffic and conceals network complexity. **Subnetting** is essential when a single network number has to be allocated over numerous segments of a local area network (LAN). **Subnets** were initially designed for solving the shortage of IP addresses over the Internet.

2) What do you mean by CIDR?

ANS: Classless inter-domain routing (**CIDR**). It will help us to save ip otherwise assigning private ip to all is cost effective and difficult.

3) What information you get from subnet mask?

ANS: Subnet mask provides information about how many number of bits are in or available for network parts

4) If the slash notation is /26. What information do you get from this?

ANS: It gives information that first 26 bits are network part rest are host ip.

5) You need to configure a server that is on the subnet 192.168.19.24/29. the router has the first available host address. What IP you can assign to the server? (Mention the subnet mask as well)

ANS: 192.168.19.26/24 is the ip you can assign to server also between (192.168.19.26 to 192.168.19.30) any server or device will get ip in this range if subnet is 192.168.19.24/29 because 192.168.19.24 is network ip and 192.168.19.31 is broadcast ip for this subnet and first one is required in router so left are 26 to 30 (5 ips)
Subnet mask: 255.255.255.248

6) If you configure a router interface with the IP address 192.168.10.62 255.255.255.192 and received an error. What can be the possible reason for that?

ANS:

- Let us ignore first three octet which is perfect because 255.255.255 is the valid subnet which shows that 3 octet is there in network let's talk about 4th one 192 it means 11000010 is in network means 255.255.255.11000010 is network part
- You cannot assign 00 in between because it is the bits that is positioning continuously in giving network there is no such network where you can have first part in network then host then network (as 0 represents host bits and their possibilities and 1 for network so this is not correct)

- Instead we can give (255.255.255).11000000 means 255.255.255.190 as subnet for given ip (classless domain specifically not in classfull addressing.)

7) What is IP subnet-zero?

ANS: IP subnet 0 means network ip

Example 192.168.1.2 has classfull subnet 255.255.255.0 means this is the network subnet mask and 192.168.1.0 this 0 is showing that its is a network ip means 0 in subnet mask is related to ip of specific network.

DESIGN A NETWORK USING SWITCH AND ROUTER

Steps: 1 start cisco packet

Choosing Devices and Connections

We will begin building our network topology by selecting devices and the media in

Which to connect them. Several types of devices and network connections can be Used. For this lab, we will keep it simple by using End Devices, Switches, Hubs, and connections

step 2 Choose "End Devices"



Select and place it into workspace.

Step 3 Click at the workspace to see the PC. Repeat the above process to place all

PCs.



Step 4: Add switches also by clicking on “Network Devices” and choose Switch.

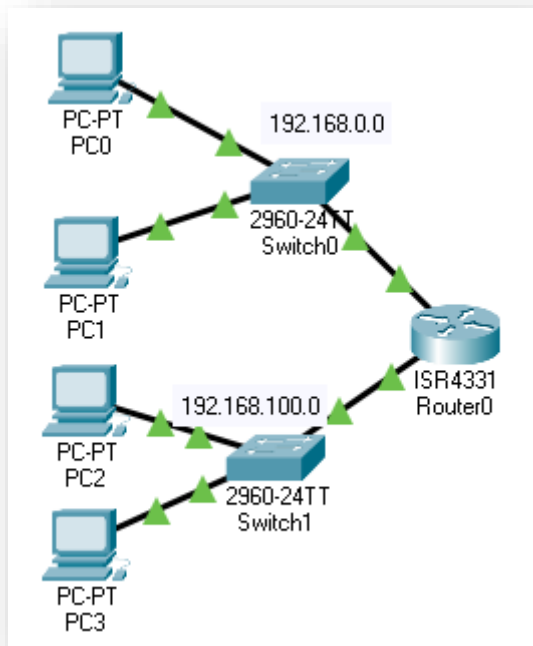


Step5: Add Routers by clicking on “Network Devices” and choose Router.



Step 6: Connect PC-0 & PC 1 with Switch 0, Switch0 with Router0

And pc-2 & pc3 with switch 1 , switch 1 with router 0.



For pc0:

PC0

Physical Config Desktop Programming Attributes

IP Configuration

Interface: FastEthernet0

IP Configuration

☐ DHCP ☒ Static

IPv4 Address: 192.168.0.2

Subnet Mask: 255.255.255.0

Default Gateway: 192.168.0.1

DNS Server: 0.0.0.0

IPv6 Configuration

☐ Automatic ☒ Static

IPv6 Address: /

Link Local Address: FE80::201:63FF:FE26:5560

Default Gateway:

DNS Server:

802.1X

☐ Use 802.1X Security

Authentication: MD5

Username:

Password:

Pc 1:

The screenshot shows the 'PC1' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected under 'IP Configuration'. The 'IPv4 Address' is set to '192.168.0.3', 'Subnet Mask' to '255.255.255.0', 'Default Gateway' to '192.168.0.1', and 'DNS Server' to '0.0.0.0'. The 'IPv6 Configuration' section shows 'Static' selected, with 'Link Local Address' set to 'FE80::230:F2FF:FE15:CEBD'. The '802.1X' section shows 'Use 802.1X Security' unchecked, 'Authentication' set to 'MD5', and 'Username' and 'Password' fields empty.

Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	192.168.0.3
Subnet Mask	255.255.255.0
Default Gateway	192.168.0.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::230:F2FF:FE15:CEBD
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

Pc 2:

The screenshot shows the 'PC2' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected under 'IP Configuration'. The 'IPv4 Address' is set to '192.168.100.2', 'Subnet Mask' to '255.255.255.0', 'Default Gateway' to '192.168.100.1', and 'DNS Server' to '0.0.0.0'. The 'IPv6 Configuration' section shows 'Static' selected, with 'Link Local Address' set to 'FE80::200:CFF:FE20:BB0'. The '802.1X' section shows 'Use 802.1X Security' unchecked, 'Authentication' set to 'MD5', and 'Username' and 'Password' fields empty.

Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	192.168.100.2
Subnet Mask	255.255.255.0
Default Gateway	192.168.100.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::200:CFF:FE20:BB0
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

Pc 3:

The screenshot shows the 'PC3' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected under 'IP Configuration'. The IPv4 Address is set to 192.168.100.3, Subnet Mask to 255.255.255.0, Default Gateway to 192.168.100.1, and DNS Server to 0.0.0.0. The 'IPv6 Configuration' section is also expanded, showing 'Static' selected, with an empty IPv6 Address field, Link Local Address set to FE80::20B:BEFF:FE09:5C16, and empty fields for Default Gateway and DNS Server. The '802.1X' section is expanded, showing 'Use 802.1X Security' unchecked, Authentication set to MD5, and empty fields for Username and Password.

Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	192.168.100.3
Subnet Mask	255.255.255.0
Default Gateway	192.168.100.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::20B:BEFF:FE09:5C16
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

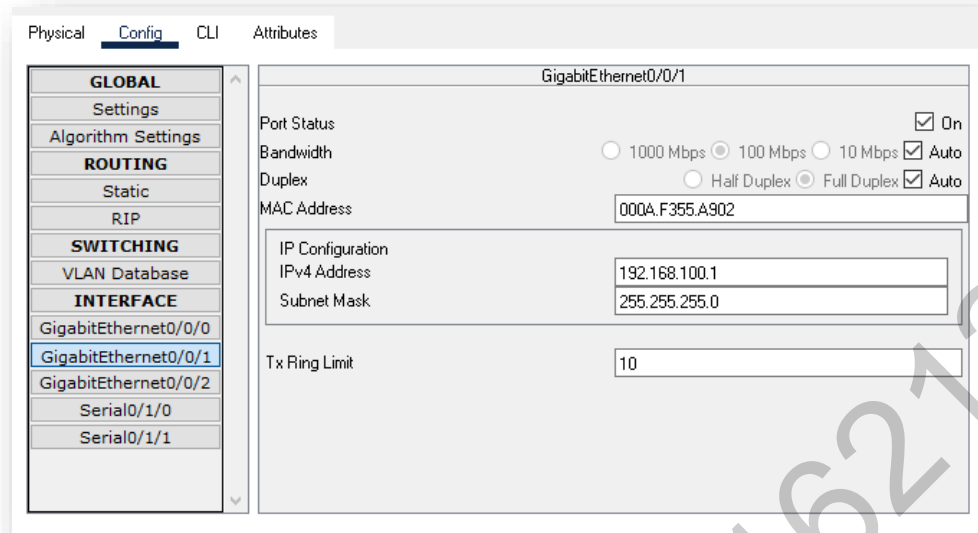
For router 0 and network 1

The screenshot shows the configuration window for 'GigabitEthernet0/0/0'. The left sidebar has a tree view with 'INTERFACE' expanded and 'GigabitEthernet0/0/0' selected. The main area shows the configuration for this interface. 'Port Status' is checked 'On'. 'Bandwidth' is set to 100 Mbps. 'Duplex' is set to Full Duplex. 'MAC Address' is 000A.F355.A901. The 'IP Configuration' section shows IPv4 Address set to 192.168.0.1 and Subnet Mask set to 255.255.255.0. 'Tx Ring Limit' is set to 10.

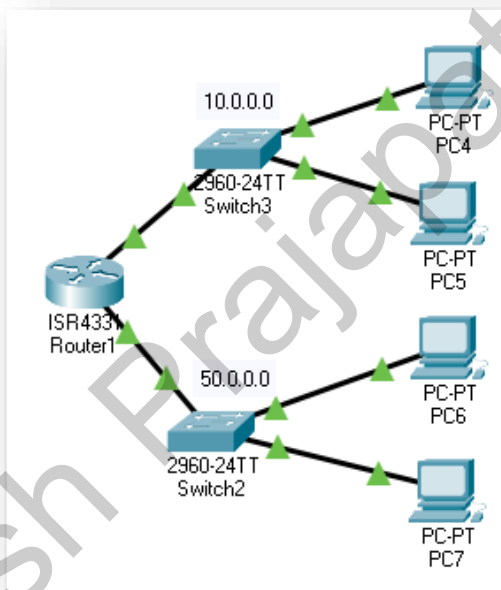
GigabitEthernet0/0/0	
Port Status	<input checked="" type="checkbox"/> On
Bandwidth	<input type="radio"/> 1000 Mbps <input checked="" type="radio"/> 100 Mbps <input type="radio"/> 10 Mbps <input checked="" type="checkbox"/> Auto
Duplex	<input type="radio"/> Half Duplex <input checked="" type="radio"/> Full Duplex <input checked="" type="checkbox"/> Auto
MAC Address	000A.F355.A901
IP Configuration	
IPv4 Address	192.168.0.1
Subnet Mask	255.255.255.0
Tx Ring Limit	10

For router 0: network 2: downside

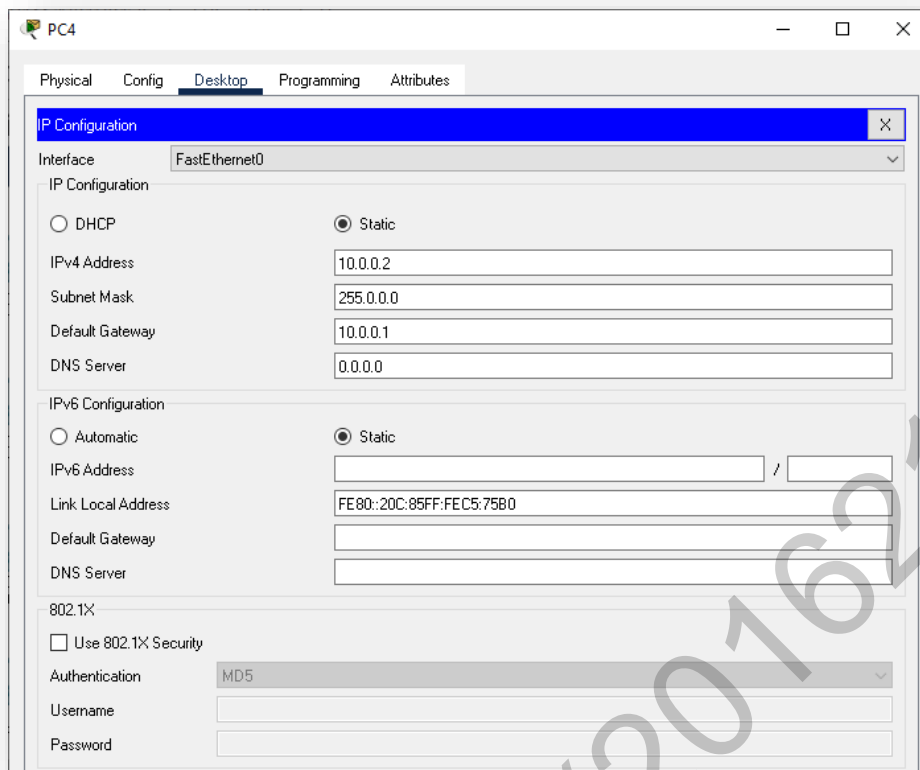
GigabitEthernet0/0/1:



Step 6: Now make similar network on right side one router two switch and respective devices:



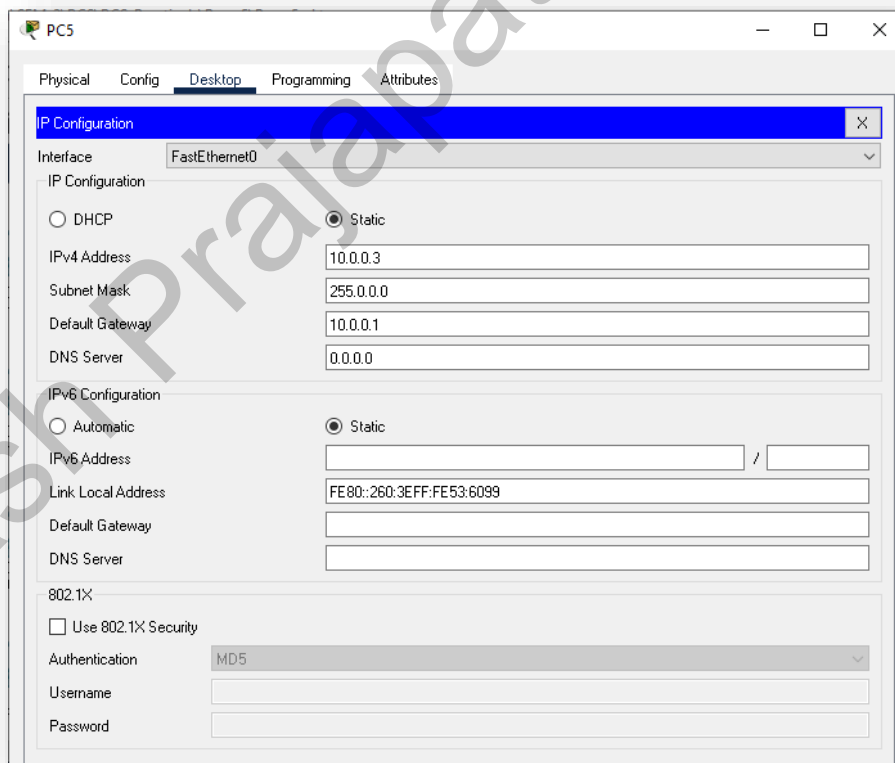
For pc4:



The screenshot shows the 'PC4' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected under 'IP Configuration'. The IPv4 Address is set to 10.0.0.2, Subnet Mask to 255.0.0.0, Default Gateway to 10.0.0.1, and DNS Server to 0.0.0.0. The IPv6 Configuration section shows 'Static' selected, with an empty IPv6 Address field, a Link Local Address of FE80::20C:85FF:FE5:7580, and empty fields for Default Gateway and DNS Server. The 802.1X section shows 'Use 802.1X Security' unchecked, 'Authentication' set to MD5, and empty fields for Username and Password.

Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	10.0.0.2
Subnet Mask	255.0.0.0
Default Gateway	10.0.0.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::20C:85FF:FE5:7580
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

For pc5:



The screenshot shows the 'PC5' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected under 'IP Configuration'. The IPv4 Address is set to 10.0.0.3, Subnet Mask to 255.0.0.0, Default Gateway to 10.0.0.1, and DNS Server to 0.0.0.0. The IPv6 Configuration section shows 'Static' selected, with an empty IPv6 Address field, a Link Local Address of FE80::260:3EFF:FE53:6099, and empty fields for Default Gateway and DNS Server. The 802.1X section shows 'Use 802.1X Security' unchecked, 'Authentication' set to MD5, and empty fields for Username and Password.

Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	10.0.0.3
Subnet Mask	255.0.0.0
Default Gateway	10.0.0.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	
Link Local Address	FE80::260:3EFF:FE53:6099
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

For pc6:

The screenshot shows the 'PC6' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected under both 'IP Configuration' and 'IPv6 Configuration'. The IPv4 settings are: IP Address 50.0.0.2, Subnet Mask 255.0.0.0, Default Gateway 50.0.0.1, and DNS Server 0.0.0.0. The IPv6 settings are: Static selected, IPv6 Address field empty, Link Local Address FE80::204:9AFF:FE50:1666, Default Gateway empty, and DNS Server empty. The '802.1X' section has 'Use 802.1X Security' unchecked, 'Authentication' set to 'MD5', and 'Username' and 'Password' fields empty.

Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	50.0.0.2
Subnet Mask	255.0.0.0
Default Gateway	50.0.0.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	/
Link Local Address	FE80::204:9AFF:FE50:1666
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

For pc7:

The screenshot shows the 'PC7' configuration window with the 'Desktop' tab selected. The 'IP Configuration' section is expanded, showing settings for the 'FastEthernet0' interface. The 'Static' radio button is selected under both 'IP Configuration' and 'IPv6 Configuration'. The IPv4 settings are: IP Address 50.0.0.3, Subnet Mask 255.0.0.0, Default Gateway 50.0.0.1, and DNS Server 0.0.0.0. The IPv6 settings are: Static selected, IPv6 Address field empty, Link Local Address FE80::201:43FF:FE19:E589, Default Gateway empty, and DNS Server empty. The '802.1X' section has 'Use 802.1X Security' unchecked, 'Authentication' set to 'MD5', and 'Username' and 'Password' fields empty. A 'Top' button is visible at the bottom left.

Interface	FastEthernet0
IP Configuration	
<input type="radio"/> DHCP	<input checked="" type="radio"/> Static
IPv4 Address	50.0.0.3
Subnet Mask	255.0.0.0
Default Gateway	50.0.0.1
DNS Server	0.0.0.0
IPv6 Configuration	
<input type="radio"/> Automatic	<input checked="" type="radio"/> Static
IPv6 Address	/
Link Local Address	FE80::201:43FF:FE19:E589
Default Gateway	
DNS Server	
802.1X	
<input type="checkbox"/> Use 802.1X Security	
Authentication	MD5
Username	
Password	

☐ Top

For router 1: network 1:

The screenshot shows the configuration window for the interface GigabitEthernet0/0/0 on Router1. The left sidebar has tabs for Physical, Config, CLI, and Attributes, with 'Config' selected. Under the 'Config' tab, there is a tree view with categories: GLOBAL, Settings, Algorithm Settings, ROUTING (Static, RIP), SWITCHING (VLAN Database), and INTERFACE. Under the INTERFACE category, GigabitEthernet0/0/0 is selected. The main area shows the configuration for this interface:

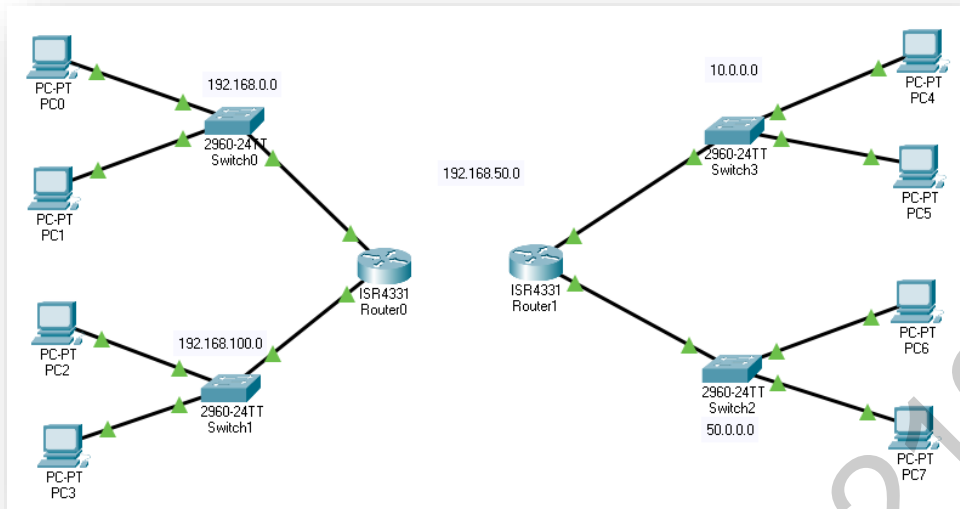
- Port Status: ☒ On
- Bandwidth: ☐ 1000 Mbps ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex: ☐ Half Duplex ☒ Full Duplex ☒ Auto
- MAC Address: 0060.2F7D.0301
- IP Configuration:
 - IPv4 Address: 10.0.0.1
 - Subnet Mask: 255.0.0.0
- Tx Ring Limit: 10

For router 1: network 2:

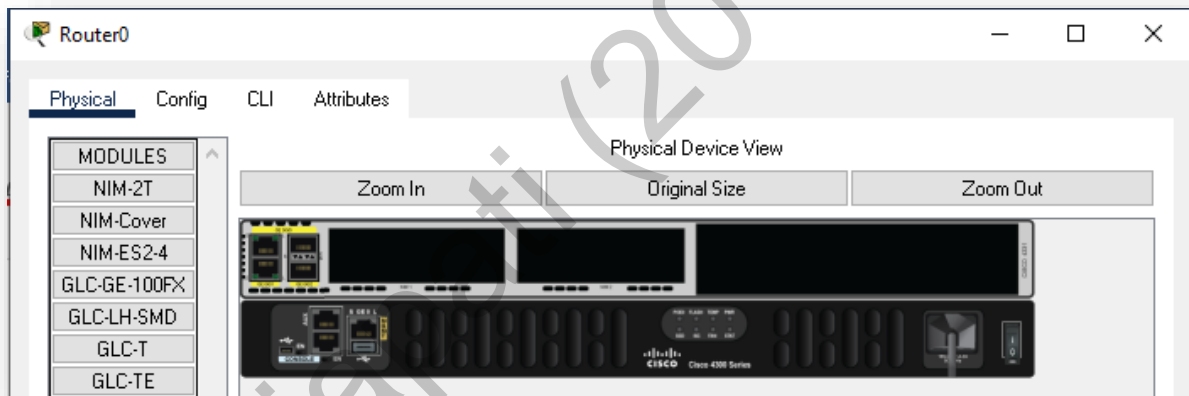
The screenshot shows the configuration window for the interface GigabitEthernet0/0/1 on Router1. The left sidebar has tabs for Physical, Config, CLI, and Attributes, with 'Config' selected. Under the 'Config' tab, there is a tree view with categories: GLOBAL, Settings, Algorithm Settings, ROUTING (Static, RIP), SWITCHING (VLAN Database), and INTERFACE. Under the INTERFACE category, GigabitEthernet0/0/1 is selected. The main area shows the configuration for this interface:

- Port Status: ☒ On
- Bandwidth: ☐ 1000 Mbps ☒ 100 Mbps ☐ 10 Mbps ☒ Auto
- Duplex: ☐ Half Duplex ☒ Full Duplex ☒ Auto
- MAC Address: 0060.2F7D.0302
- IP Configuration:
 - IPv4 Address: 50.0.0.1
 - Subnet Mask: 255.0.0.0
- Tx Ring Limit: 10

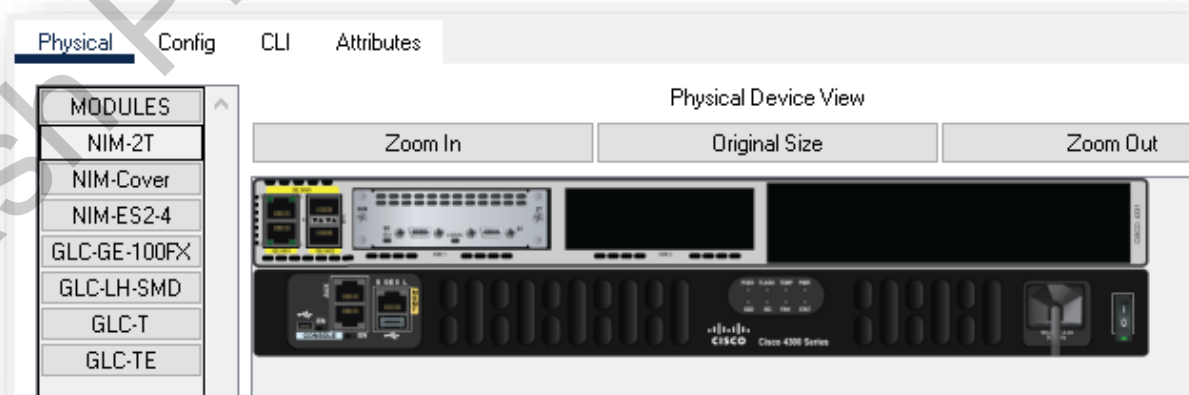
Step 7: Now it is time to connect two routers it will require serial port that needs to be added into network



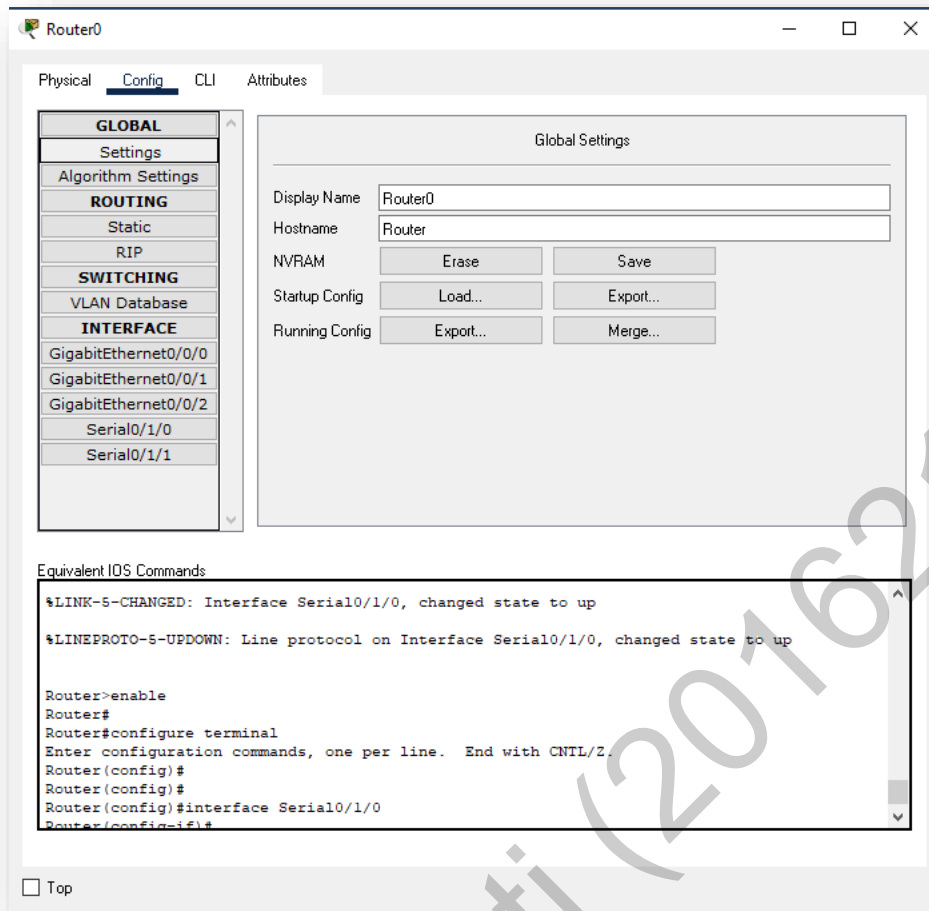
Step 8: Now to add serial port click on router go to router



Select NM-Cover and drag one serial port by like this power off the module:



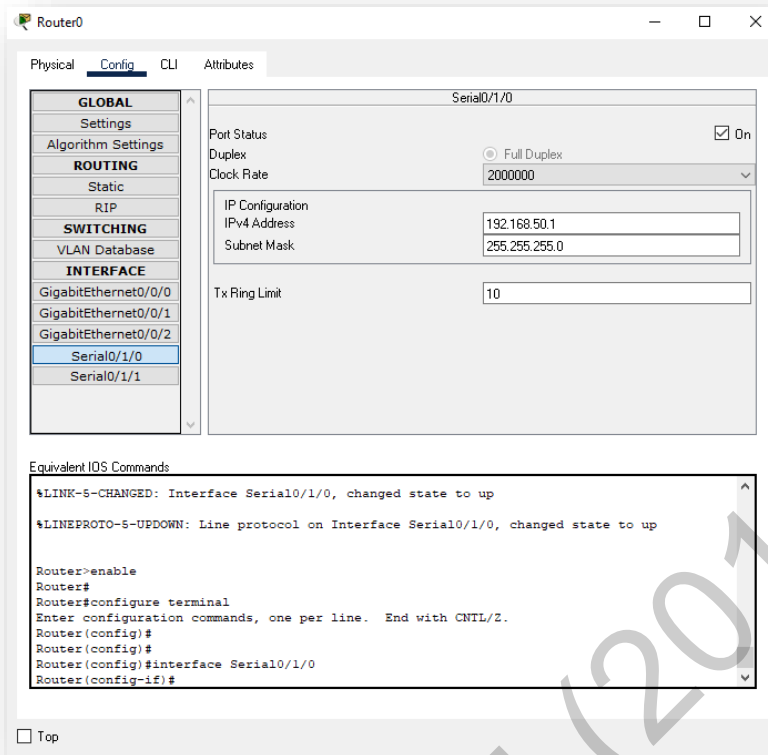
Then it will open a new window for that will provide serial option:



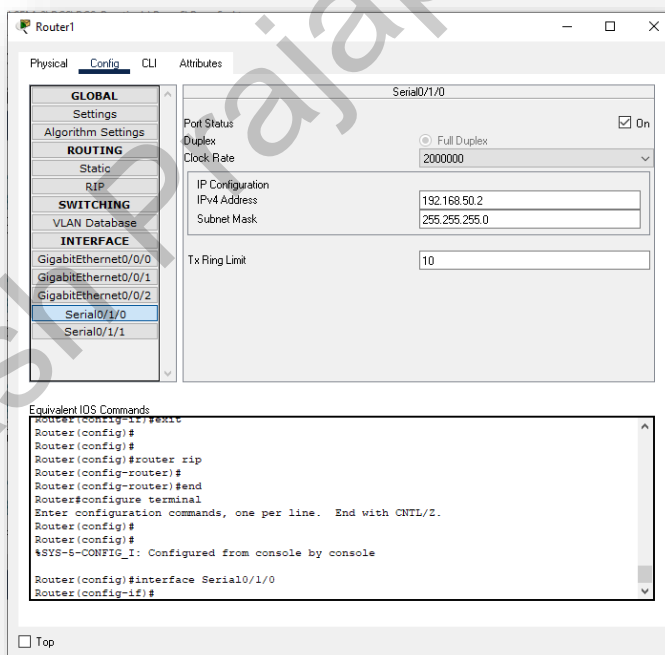
Serial port 0/1/0 configuration is applied for router0

Assign IP address to serial 0/1/0 by clicking on Router0, then click on

“Config”, click on “Serial o/1/0” and configure IP address, set clock and then turn the port “On”.



Now same for router 4:



And use serial port

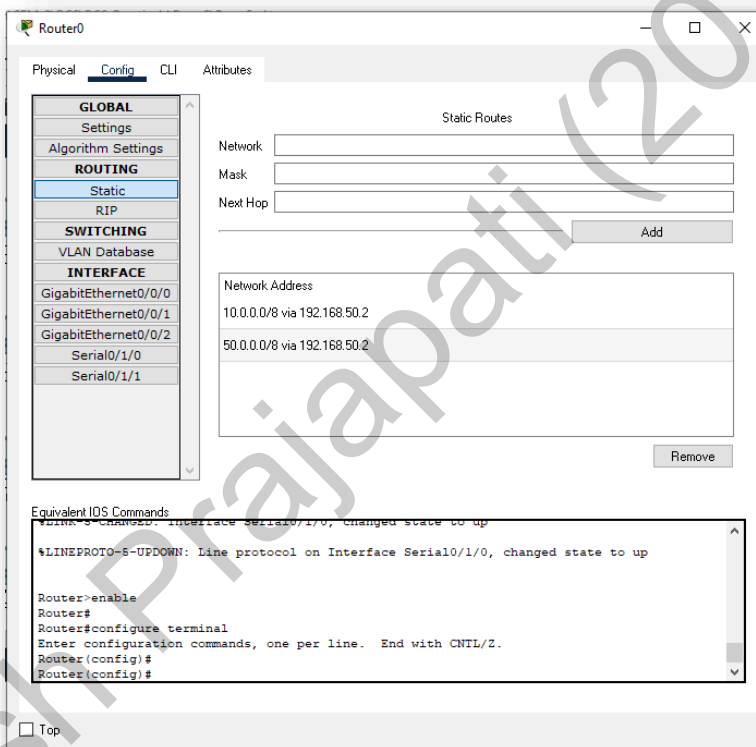


Step 9: Try to pass message from PC0 to PC1. It would still fail .because connection is not completed

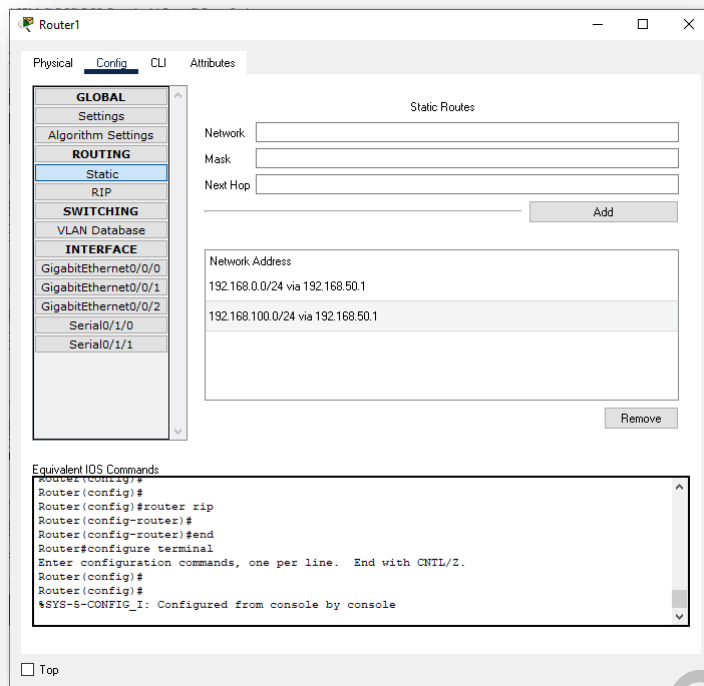
Step 10: To connect it on serial0/1/0 with router0 and router1

Use Static routing configure Router0 and Router4 by adding number of networks that they know.

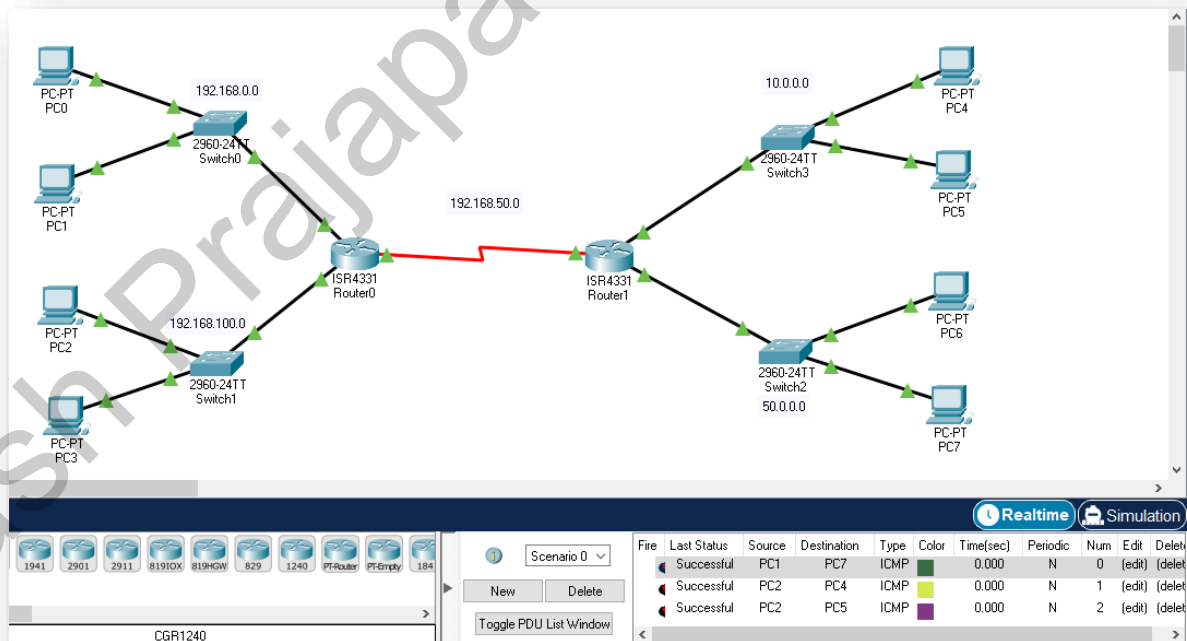
It will be done by clicking on Router0, then click on “Config”, click on “static” and finally add networks. Add the route in router 1 also









FOR ROUTER1



Step 11: Try to send packet from PC0 to PC1. Initially it will fail. Then wait for 10 seconds and then the packet will be delivered successfully.



Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC1	PC7	ICMP		0.000	N	0	(edit)	(delete)
	Successful	PC2	PC4	ICMP		0.000	N	1	(edit)	(delete)
	Successful	PC2	PC5	ICMP		0.000	N	2	(edit)	(delete)