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Sec : 5A

Computer Networks

Lab Task 11

Part 1: Design an IP Addressing Scheme
Part 2: Assign IP Addresses to Network Devices and Verify Connectivity

Topology A:

Part 1: Design an IP Addressing Scheme

Questions:

1. Based on the topology, how many subnets are needed?

Ans : 5 Four for the LANs, and one for the link between the routers

2. How many bits must be borrowed to support the number of subnets in the topology?
Ans: 3

3. How many subnets does this create?
Ans: *8*

4. How many usable hosts does this create per subnet?
Ans: 30

5. Calculate the binary value for the first five subnets. The first two subnets have been done for you.

Subnet	Network Address	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	192.168.100.	0	0	0	0	0	0	0	0
1	192.168.100.	0	0	1	0	0	0	0	0
2	192.168.100.	0	1	0	0	0	0	0	0
3	192.168.100.	0	1	1	0	0	0	0	0
4	192.168.100.	1	0	0	0	0	0	0	0

6. Calculate the binary and decimal value of the new subnet mask

First Octet	Second Octet	Third Octet	Mask Bit 7	Mask Bit 6	Mask Bit 5	Mask Bit 4	Mask Bit 3	Mask Bit 2	Mask Bit 1	Mask Bit 0
11111111	11111111	11111111	1	1	1	0	0	0	0	0
First Decimal Octet	Second Decimal Octet	Third Decimal Octet	Fourth Decimal Octet							
255.	255.	255.	224							

7. Fill in the Subnet Table, listing the decimal value of all available subnets, the first and last usable host address, and the broadcast address. Repeat until all addresses are listed.

Subnet Number	Subnet Address	First Usable Host Address	Last Usable Host Address	Broadcast Address
0	192.168.100.0	192.168.100.1	192.168.100.30	192.168.100.31
1	192.168.100.32	192.168.100.33	192.168.100.62	192.168.100.63
2	192.168.100.64	192.168.100.65	192.168.100.94	192.168.100.95
3	192.168.100.96	192.168.100.97	192.168.100.126	192.168.100.127
4	192.168.100.128	192.168.100.129	192.168.100.158	192.168.100.159
5	192.168.100.160	192.168.100.161	192.168.100.190	192.168.100.191
6	192.168.100.192	192.168.100.193	192.168.100.222	192.168.100.223
7	192.168.100.224	192.168.100.225	192.168.100.254	192.168.100.255

Step 2: Assign the subnets to the network shown in the topology.

a) Assign Subnet 0 to the LAN connected to the GigabitEthernet 0/0 interface of R1:

192.168.100.0 /27

b) Assign Subnet 1 to the LAN connected to the GigabitEthernet 0/1 interface of R1:

192.168.100.32 /27

c) Assign Subnet 2 to the LAN connected to the GigabitEthernet 0/0 interface of R2:

192.168.100.64 /27

d) Assign Subnet 3 to the LAN connected to the GigabitEthernet 0/1 interface of R2:

192.168.100.96 /27

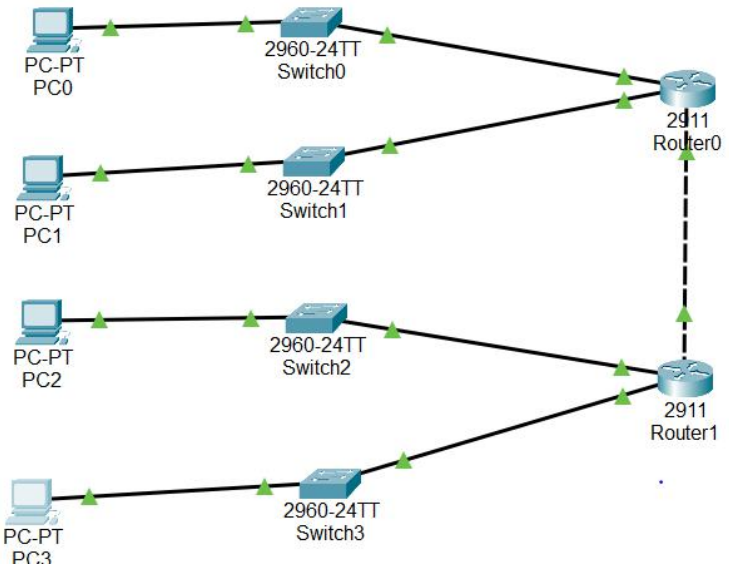
e) Assign Subnet 4 to the WAN link between R1 to R2:

192.168.100.128 /27

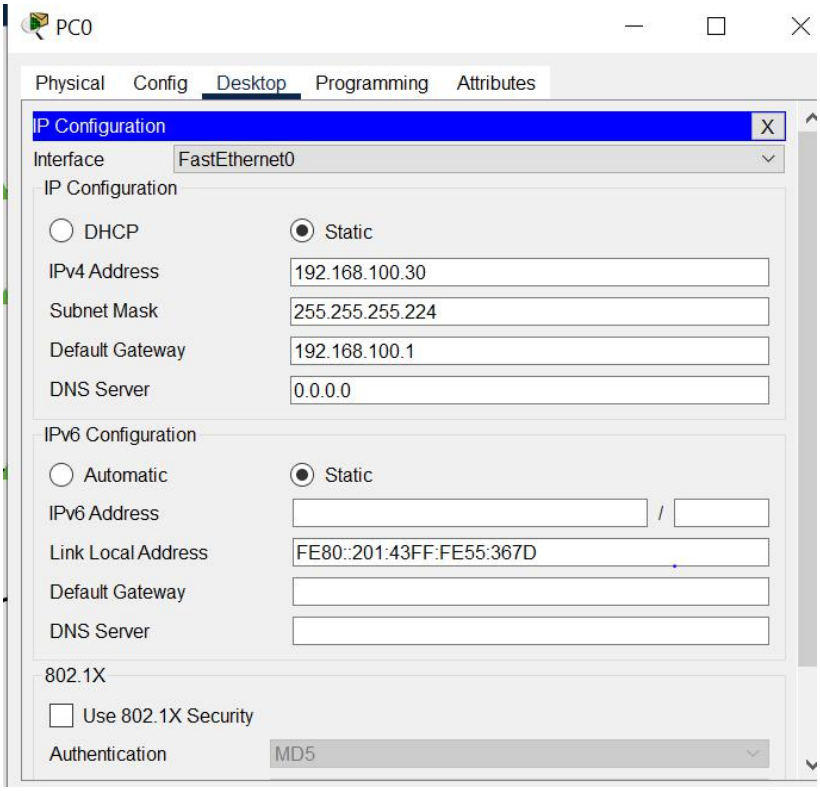
Step 3: Document the addressing scheme.
Fill in the Addressing Table using the following guidelines:
• Assign the first usable IP addresses in each subnet to R1 for the two LAN links and the WAN link.
• Assign the first usable IP addresses in each subnet to R2 for the LAN links. Assign the last usable IP address for the WAN link.
• Assign the second usable IP address in the attached subnets to the switches.
• Assign the last usable IP addresses to the PCs in each subnet.

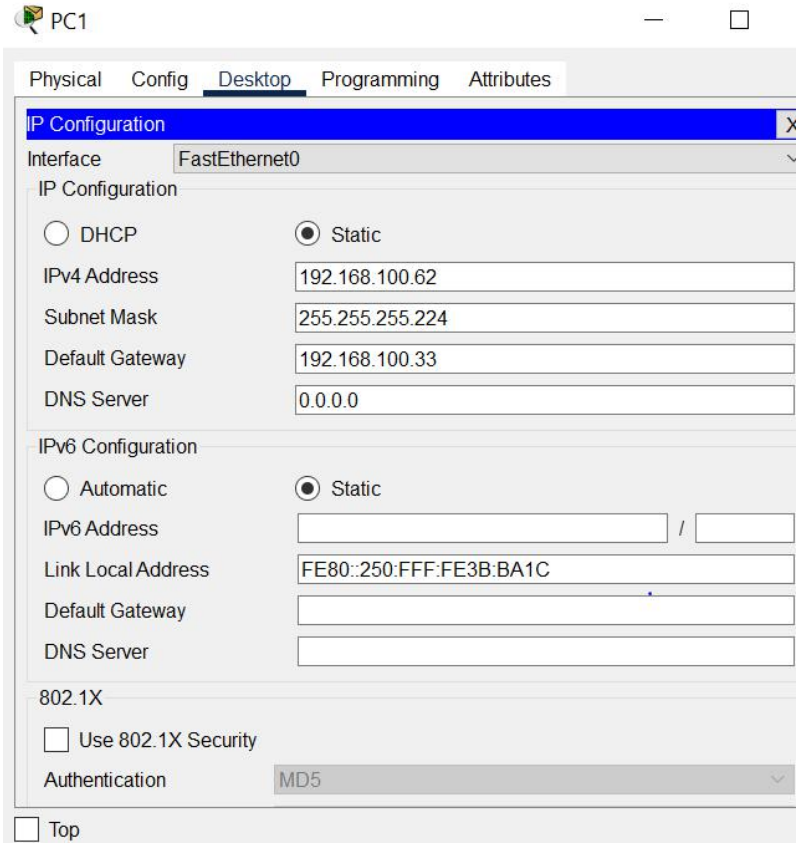
Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0	192.168.100.1	255.255.255.224	N/A
	G0/1	192.168.100.33	255.255.255.224	N/A
	S0/0/0	192.168.100.129	255.255.255.224	N/A
R2	G0/0	192.168.100.65	255.255.255.224	N/A
	G0/1	192.168.100.97	255.255.255.224	N/A
	S0/0/0	192.168.100.158	255.255.255.224	N/A
S1	VLAN 1	192.168.100.2	255.255.255.224	192.168.100.1
S2	VLAN 1	192.168.100.34	255.255.255.224	192.168.100.33
S3	VLAN 1	192.168.100.66	255.255.255.224	192.168.100.65
S4	VLAN 1	192.168.100.98	255.255.255.224	192.168.100.97
PC1	NIC	192.168.100.30	255.255.255.224	192.168.100.1
PC2	NIC	192.168.100.62	255.255.255.224	192.168.100.33
PC3	NIC	192.168.100.94	255.255.255.224	192.168.100.65
PC4	NIC	192.168.100.126	255.255.255.224	192.168.100.97

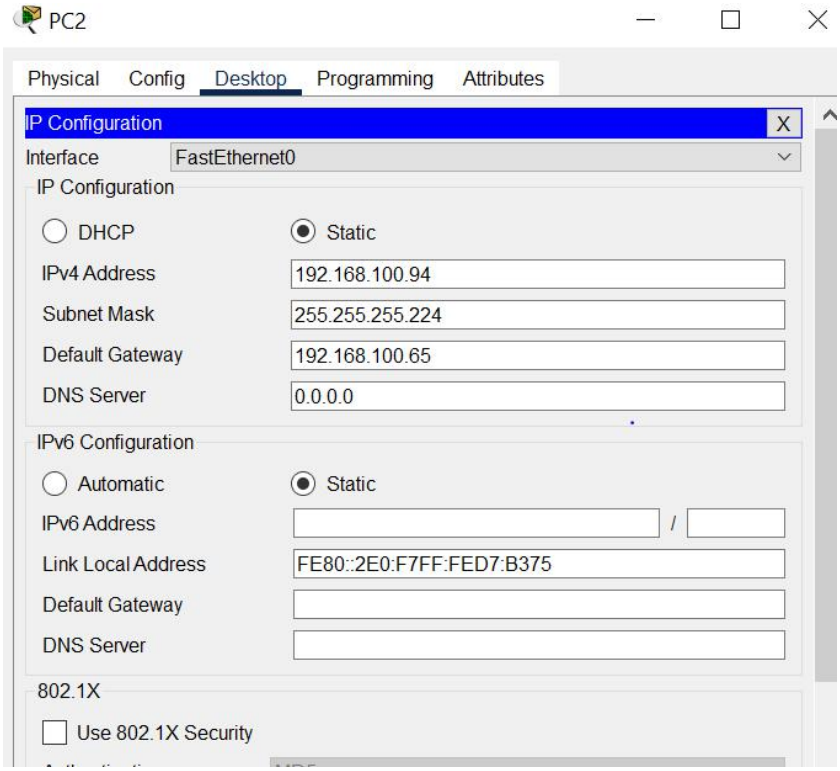
Part 2: Implement given topology in Packet Tracer and Assign IP Addresses to Network Devices and Verify Connectivity.

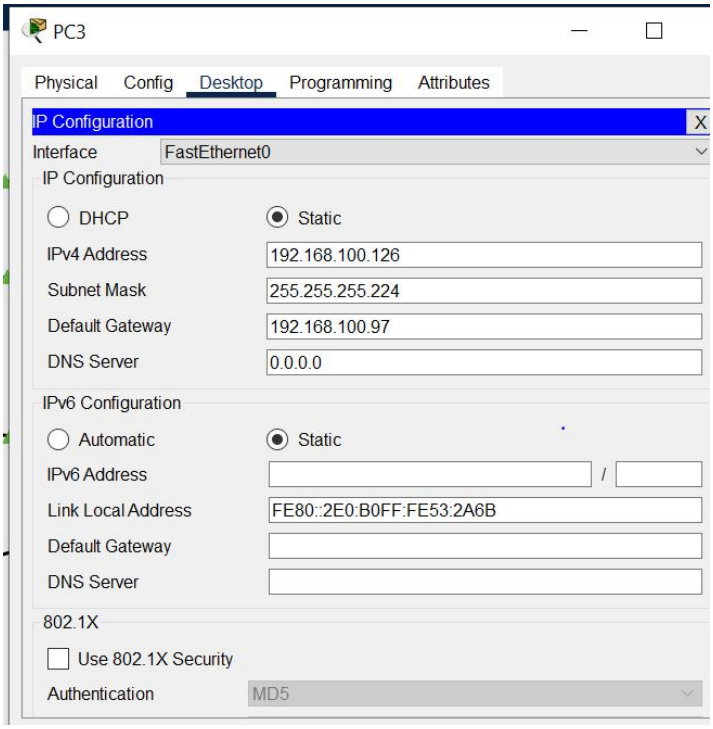


Then we will onfigure the ip addresses of pc

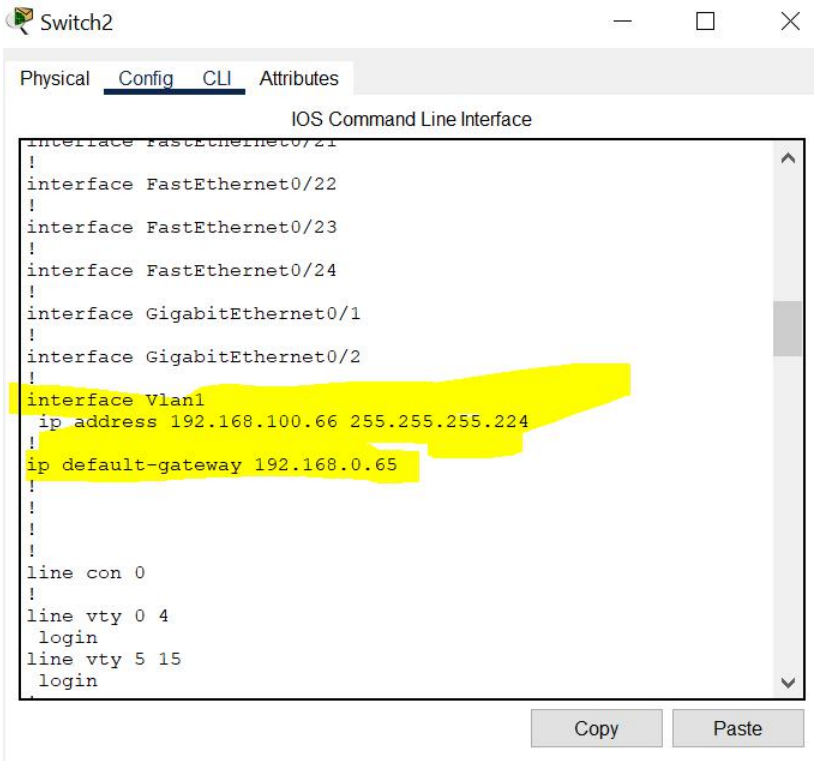


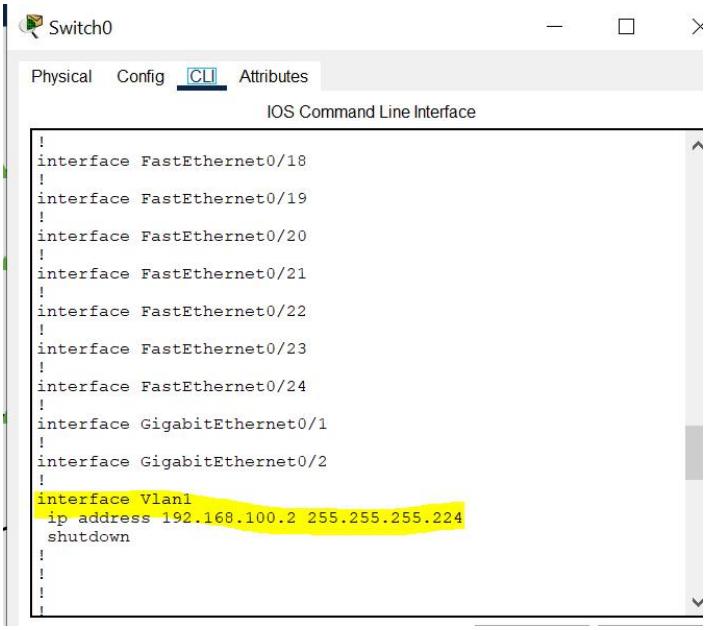

PC1
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
192.168.100.62
Subnet Mask
255.255.255.224
Default Gateway
192.168.100.33
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::250:FFF:FE3B:BA1C
Default Gateway
DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Top


PC2
Physical
Config
Desktop
Programming
Attributes
IP Configuration
Interface
FastEthernet0
IP Configuration
DHCP
Static
IPv4 Address
192.168.100.94
Subnet Mask
255.255.255.224
Default Gateway
192.168.100.65
DNS Server
0.0.0.0
IPv6 Configuration
Automatic
Static
IPv6 Address
Link Local Address
FE80::2E0:F7FF:FED7:B375
Default Gateway
DNS Server
802.1X
Use 802.1X Security



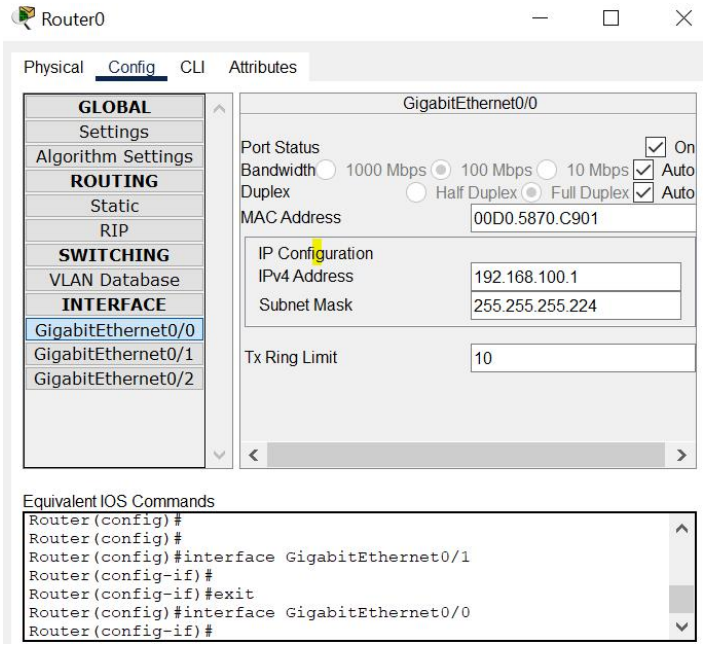
And then we will configure the ip address in vlan 1 in switches

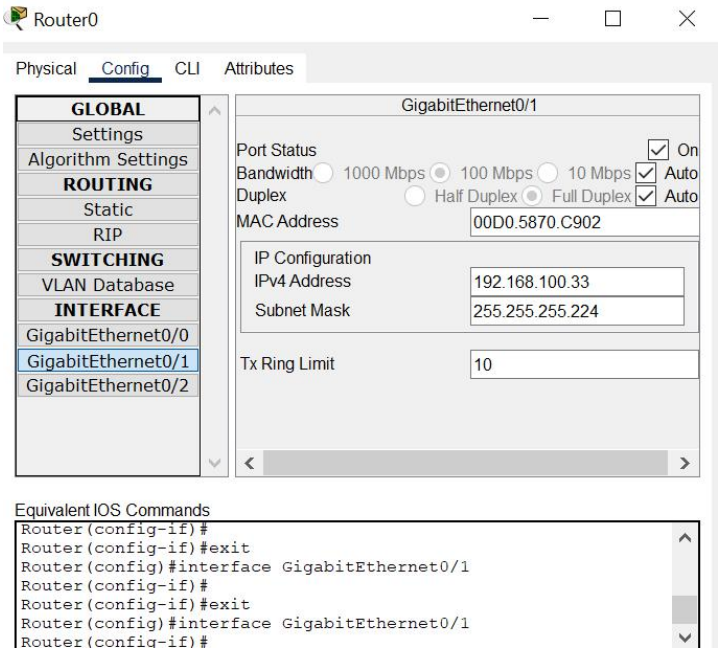


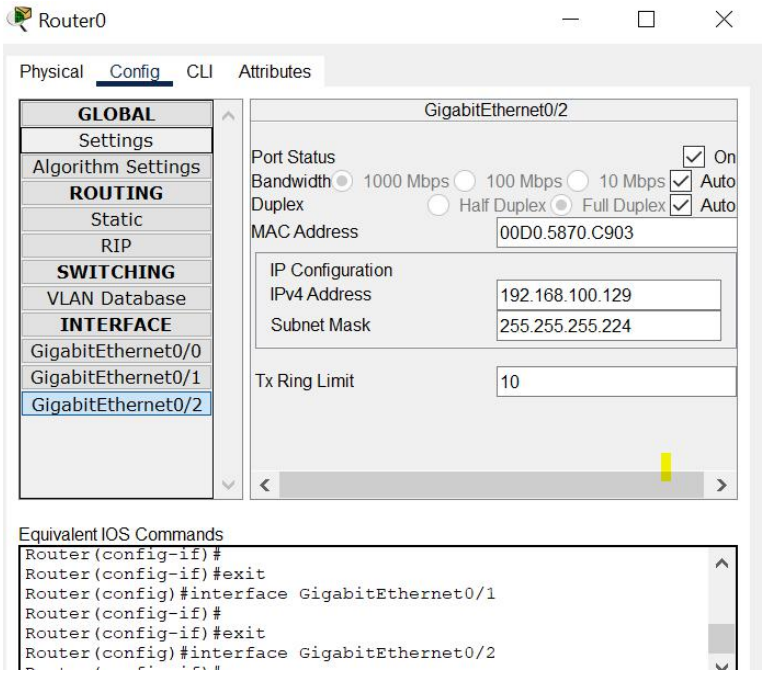


And simmilarly we will give vlan 1 ip address to another 2 switches.

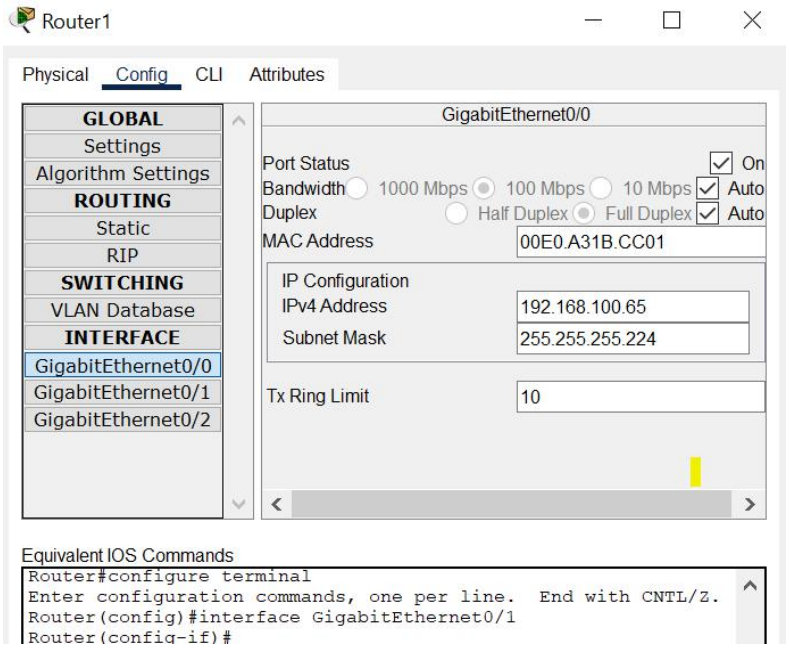
Now we will Configure both LAN interfaces with the addresses from the Addressing Table.Configure the interfaces so that the hosts on the LANs have connectivity to the default gateway

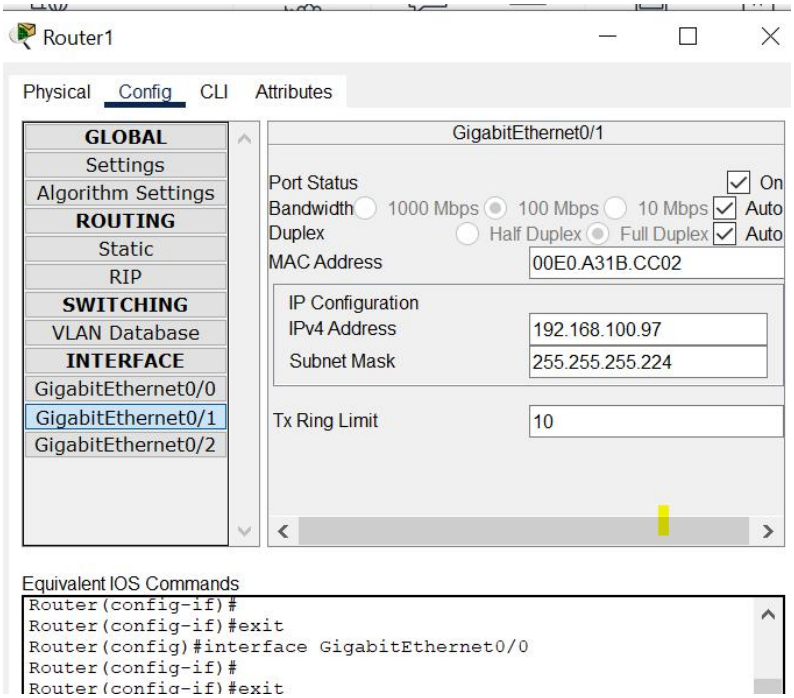


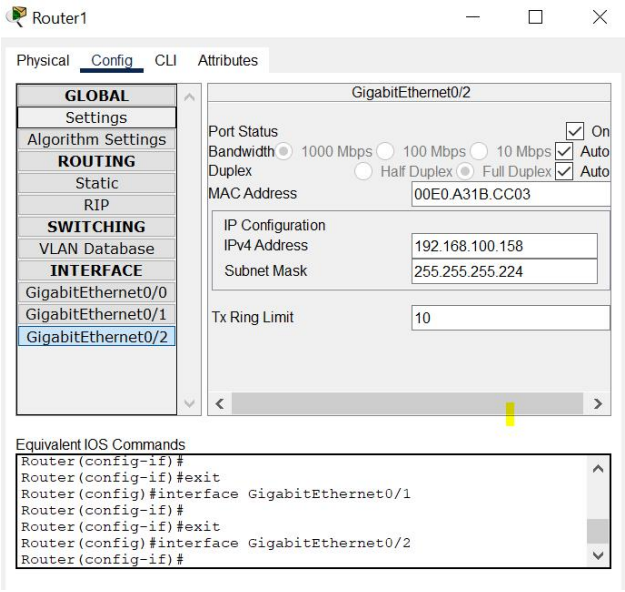

Router0
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
GigabitEthernet0/1
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00D0.5870.C902
IP Configuration
IPv4 Address
192.168.100.33
Subnet Mask
255.255.255.224
Tx Ring Limit
10
Equivalent IOS Commands
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#


Router0
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
GigabitEthernet0/2
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00D0.5870.C903
IP Configuration
IPv4 Address
192.168.100.129
Subnet Mask
255.255.255.224
Tx Ring Limit
10
Equivalent IOS Commands
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/1
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/2

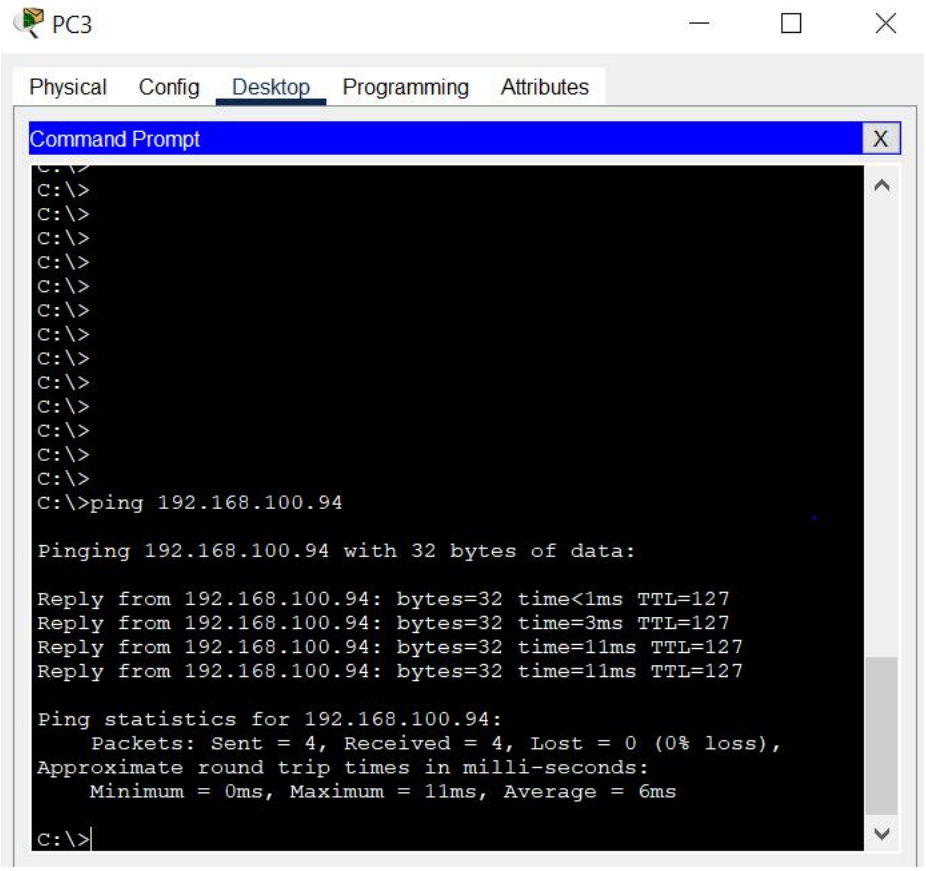
For router 2:


Router1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
GigabitEthernet0/0
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00E0.A31B.CC01
IP Configuration
IPv4 Address
192.168.100.65
Subnet Mask
255.255.255.224
Tx Ring Limit
10
Equivalent IOS Commands
Router#configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)#interface GigabitEthernet0/1
Router(config-if)#


Router1
Physical
Config
CLI
Attributes
GLOBAL
Settings
Algorithm Settings
ROUTING
Static
RIP
SWITCHING
VLAN Database
INTERFACE
GigabitEthernet0/0
GigabitEthernet0/1
GigabitEthernet0/2
GigabitEthernet0/1
Port Status
On
Bandwidth
1000 Mbps
100 Mbps
10 Mbps
Auto
Duplex
Half Duplex
Full Duplex
Auto
MAC Address
00E0.A31B.CC02
IP Configuration
IPv4 Address
192.168.100.97
Subnet Mask
255.255.255.224
Tx Ring Limit
10
Equivalent IOS Commands
Router(config-if)#
Router(config-if)#exit
Router(config)#interface GigabitEthernet0/0
Router(config-if)#
Router(config-if)#exit

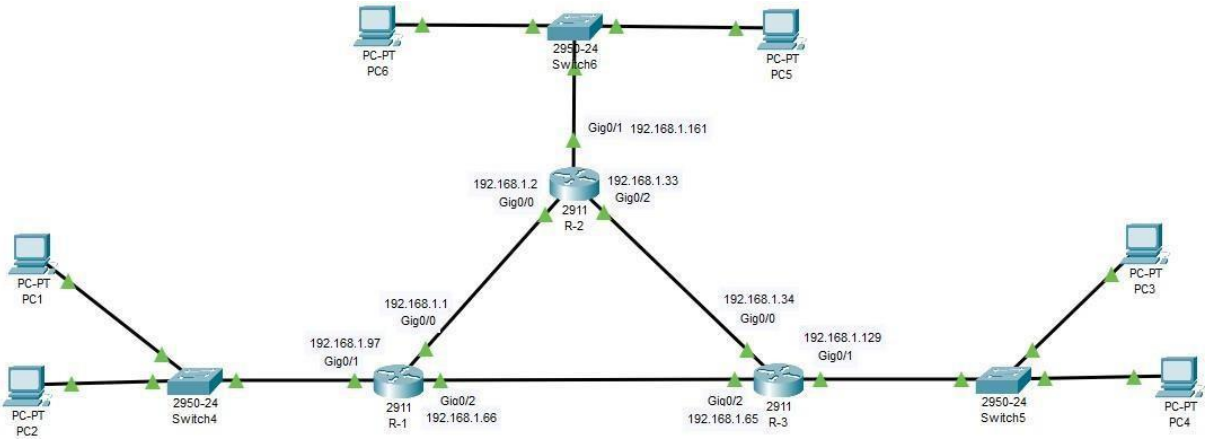


Now You can only verify connectivity from Router1, Switch3, and PC4. However, you should be able to ping every IP address listed in the Addressing Table.



Topology B:

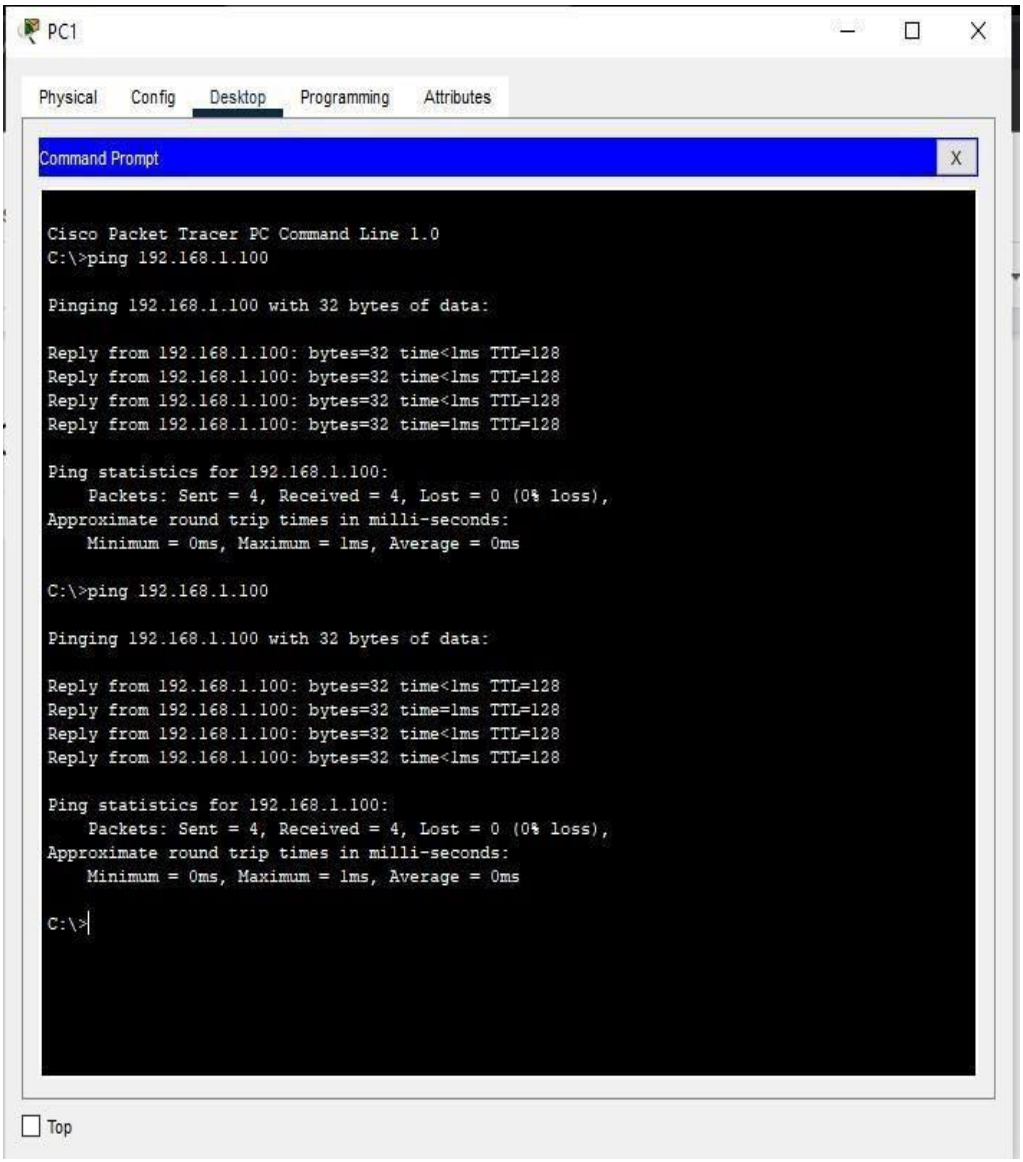
Implement Task 4 (Lab 10) in Packet Tracer and Assign IP Addresses to Network Devices and Verify Connectivity.



➔ Addressing Scheme

Device	Interface	IP Address	Subnet Mask	Default Gateway
R-1	G0/0	192.168.1.1	255.255.255.224	Not Applicable
	G0/1	192.168.1.97	255.255.255.224	192.168.1.98
	G0/2	192.168.1.66	255.255.255.224	Not Applicable
R-2	G0/0	192.168.1.2	255.255.255.224	Not Applicable
	G0/1	192.168.1.161	255.255.255.224	192.168.1.162

	G0/2	192.168.1.33	255.255.255.224	Not Applicable
R-3	**G0/0**	192.168.1.34	255.255.255.224	Not Applicable
	G0/1	192.168.1.129	255.255.255.224	192.168.1.130
	G0/2	192.168.1.65	255.255.255.224	Not Applicable
PC1	**NIC**	192.168.1.99	255.255.255.224	192.168.1.98
PC2	**NIC**	192.168.1.100	255.255.255.224	192.168.1.98
PC3	**NIC**	192.168.1.131	255.255.255.224	192.168.1.130
PC4	**NIC**	192.168.1.132	255.255.255.224	192.168.1.130
PC5	**NIC**	192.168.1.163	255.255.255.224	192.168.1.162
PC6	**NIC**	192.168.1.164	255.255.255.224	192.168.1.162


PC1
Physical
Config
Desktop
Programming
Attributes
Command Prompt
X
Cisco Packet Tracer PC Command Line 1.0
C:\>ping 192.168.1.100
Pinging 192.168.1.100 with 32 bytes of data:
Reply from 192.168.1.100: bytes=32 time<1ms TTL=128
Reply from 192.168.1.100: bytes=32 time<1ms TTL=128
Reply from 192.168.1.100: bytes=32 time<1ms TTL=128
Reply from 192.168.1.100: bytes=32 time=1ms TTL=128
Ping statistics for 192.168.1.100:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>ping 192.168.1.100
Pinging 192.168.1.100 with 32 bytes of data:
Reply from 192.168.1.100: bytes=32 time<1ms TTL=128
Reply from 192.168.1.100: bytes=32 time=1ms TTL=128
Reply from 192.168.1.100: bytes=32 time<1ms TTL=128
Reply from 192.168.1.100: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.1.100:
Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
Minimum = 0ms, Maximum = 1ms, Average = 0ms
C:\>
Top