Lab Task: 11

————————————786————————————

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Subject: Computer Networks Lab

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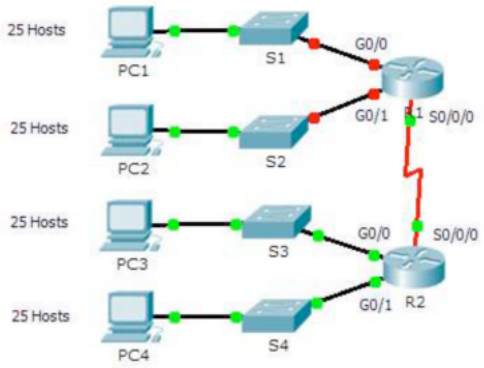
Section: BCS-5B

Lab Tasks:

Topology A:



Main Objectives:

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

Instructions:

- **Design an IP Addressing Scheme**
- **Assign the 192.168.100.0/24 network into the appropriate number of subnets.**

Activity:

In this activity, you are given the network address of 192.168.100.0/24 to subnet and provide the IP addressing for the Packet Tracer network. Each LAN in the network requires at least 25 addresses for end devices, the switch and the router. The connection between R1 to R2 will require an IP address for each end of the link.

Questions:

1. Based on the topology, how many subnets are needed?
   Answer: 5
2. How many bits must be borrowed to support the number of subnets in the topology?
   Answer: 3
3. How many subnets does this create?
   Answer: 8
4. How many usable hosts does this create per subnet?
   Answer: 30
5. Calculate the binary value for the first five subnets!
   Answer: The first two subnets have been done for you.

Subnet	**Network Address**	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2
0	192.168.100.	0	0	0	0	0	0
1	192.168.100.	0	0	0	0	0	0
2	192.168.100.	0	1	0	0	0	0
3	192.168.100.	0	1	1	0	0	0
4	192.168.100.	1	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
First Decimal Octet	Second Decimal Octet	Third Decimal Octet	Fourth Decimal Octet	Fourth Decimal Octet	Fourth Decimal Octet	Fourth Decimal Octet	Fourth Decima Octet
255	255	255					
11111111	11111111	11111111					

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.

Note: You may not need to use all rows.

Subnet Table:

Subnet Number	**Subnet Address**	**F.Usable host add**	**L.Usable host add**	**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:
b) Assign Subnet 1 to the LAN connected to the GigabitEthernet 0/1 interface of R1:
c) Assign Subnet 2 to the LAN connected to the GigabitEthernet 0/0 interface of R2:
d) Assign Subnet 3 to the LAN connected to the GigabitEthernet 0/1 interface of R2:
e) Assign Subnet 4 to the WAN link between R1 to R2:

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	D.Gateway
R1	G0/0	192.168.100.1	255.255.255.244	N/A
	G0/1	192.168.100.33	255.255.255.244	N/A
	S0/0/0	192.168.100.129	255.255.255.244	N/A
R2	G0/0	192.168.100.65	255.255.255.244	N/A
	G0/1	192.168.100.97	255.255.255.244	N/A
	S0/0/0	192.168.100.158	255.255.255.244	N/A
S1	VLAN 1	192.168.100.2	255.255.255.244	192.168.100.1
S2	VLAN 1	192.168.100.34	255.255.255.244	192.168.100.33
S3	VLAN 1	192.168.100.66	255.255.255.244	192.168.100.65
S4	VLAN 1	192.168.100.98	255.255.255.244	192.168.100.97
PC1	NIC	192.168.100.30	255.255.255.244	192.168.100.1
PC2	NIC	192.168.100.62	255.255.255.244	192.168.100.33
PC3	NIC	192.168.100.94	255.255.255.244	192.168.100.65
PC4	NIC	192.168.100.126	255.255.255.244	192.168.100.97

Part 2: Assign IP Addresses to Network Devices and Verify Connectivity

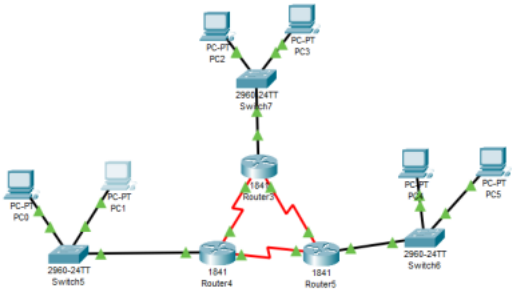
Answer:

Most of the IP addressing is already configured on this network. Implement the following steps to complete the addressing configuration.

Step 1: Configure IP addressing on R1 LAN interfaces.
Step 2: Configure IP addressing on S3, including the default gateway.
Step 3: Configure IP addressing on PC4, including the default gateway.
Step 4: Verify connectivity.
You can only verify connectivity from R1, S3, and PC4. However, you should be able to ping every IP address listed in the Addressing Table.

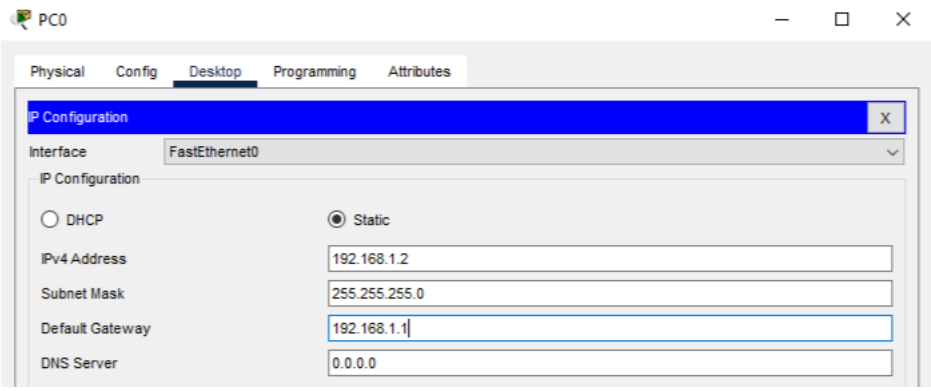
Topology B:
Implement Task 4 (Lab 10) in Packet Tracer and Assign IP Addresses to Network Devices and Verify Connectivity.

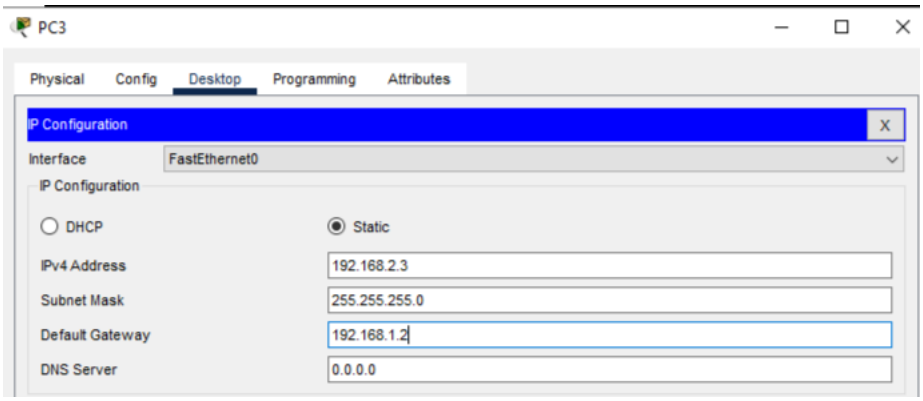
Visuals Of Topology:

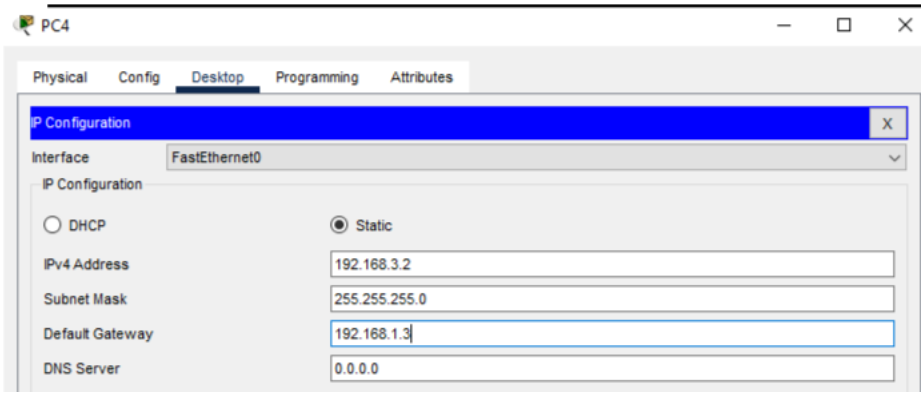


Assiging IP's To The PC's:

After making the topology we assign IP addresses to the 6 pc's:

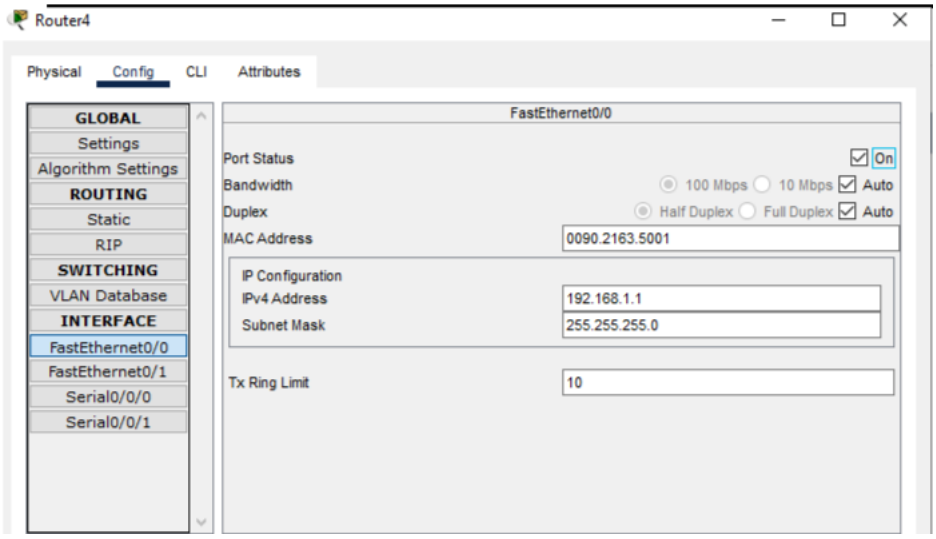






Assiging IP'S To Routers:

We assign ip addresses to our all three routers.



```
Router>enable
Router#
Router#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Router(config)#interface FastEthernet0/0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#ip address 192.168.1.1 255.255.255.0
Router(config-if)#no shutdown
Router(config-if)#
%LINK-5-CHANGED: Interface FastEthernet0/0, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/0, changed
```

```
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Press RETURN to get started!


%LINK-5-CHANGED: Interface FastEthernet0/1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/1, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/2, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/2, changed state to up

%LINK-5-CHANGED: Interface FastEthernet0/3, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface FastEthernet0/3, changed state to up


Switch>en
Switch#conf t
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#ip default-gateway 172.31.1.33
Switch(config)# int vlan1
Switch(config-if)#ip add 172.31.1.34 255.255.255.240
Switch(config-if)#no shut

Switch(config-if)#
%LINK-5-CHANGED: Interface Vlan1, changed state to up

%LINEPROTO-5-UPDOWN: Line protocol on Interface Vlan1, changed state to up
```

Ping Test From PC 4 To PC1

```
Invalid Command.

C:\>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=1ms TTL=126
Reply from 192.168.2.2: bytes=32 time=16ms TTL=126
Reply from 192.168.2.2: bytes=32 time=1ms TTL=126
Reply from 192.168.2.2: bytes=32 time=7ms TTL=126

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 16ms, Average = 6ms

C:\>
```

Pinging From PC5 from PC1: