

## TASK 3

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Given

Network Address= 172.16.0.0 and Subnet Mask = 255.255.192.0.

Now we find

Subnet Mask Binary= 11111111.11111111.11000000.00000000

Total number of Subnets:  $2^2 = 4$

Total number of Hosts per Subnet:  $2^{14} = 16,382$

Total number of valid Hosts per Subnet:  $2^{14} - 2 = 16,382 - 2 = 16,380$

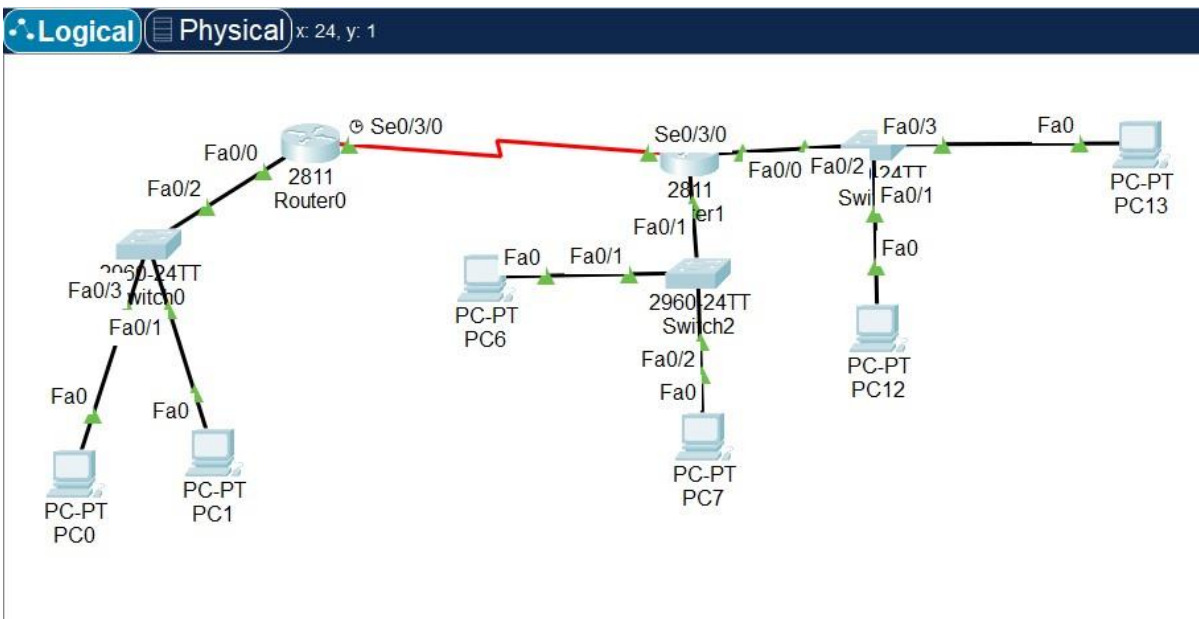
Block Size =  $256 - 192 = 64$

So Blocks would be 172.16.0.0, 172.16.64.0, 172.16.128.0, 172.16.192.0.

This is Class B IPv4 network address.

Subnet Address	First Host	Last Host	Broadcast Address
172.0.0.0	172.0.0.1	172.63.255.254	172.63.255.255
172.64.0.0	172.64.0.1	172.127.255.254	172.127.255.255
172.128.0.0	172.128.0.1	172.191.255.254	172.191.255.255
172.192.0.0	172.192.0.1	172.255.255.254	172.255.255.255

**Designing the Topology:** As there are 4 possible Subnets we attached 3 switches to the router to differentiate the broadcast domains and assigned 2 PCs to each domain. The routers itself are in a separate domain.



**Setting up PCs:** IPv4 addresses and default gateways are assigned according to the valid hosts addresses taken from the table. Subnet Mask is 255.255.192.0

The following table summarizes the IP and IPv6 configurations for the six PCs shown in the screenshots:

PC	Interface	IP Configuration	IPv6 Configuration
PC0	FastEthernet0	Static IPv4 Address: 172.0.0.2 Subnet Mask: 255.255.192.0 Default Gateway: 172.0.0.1 DNS Server: 0.0.0.0	Static IPv6 Address: / Link Local Address: FE80::2D0:58FF:FEB5:B43E Default Gateway: / DNS Server: /
PC1	FastEthernet0	Static IPv4 Address: 172.0.0.3 Subnet Mask: 255.255.192.0 Default Gateway: 172.0.0.1 DNS Server: 0.0.0.0	Static IPv6 Address: / Link Local Address: FE80::260:5CFF:FE46:1564 Default Gateway: / DNS Server: /
PC6	FastEthernet0	Static IPv4 Address: 172.128.0.2 Subnet Mask: 255.255.192.0 Default Gateway: 172.128.0.1 DNS Server: 0.0.0.0	Static IPv6 Address: / Link Local Address: FE80::2E0:A3FF:FE90:B3D Default Gateway: / DNS Server: /
PC7	FastEthernet0	Static IPv4 Address: 172.128.0.3 Subnet Mask: 255.255.192.0 Default Gateway: 172.128.0.1 DNS Server: 0.0.0.0	Static IPv6 Address: / Link Local Address: FE80::206:2AFF:FE97:6398 Default Gateway: / DNS Server: /
PC12	FastEthernet0	Static IPv4 Address: 172.192.0.2 Subnet Mask: 255.255.192.0 Default Gateway: 172.192.0.1 DNS Server: 0.0.0.0	Static IPv6 Address: / Link Local Address: FE80::290:21FF:FE77:D3B4 Default Gateway: / DNS Server: /
PC13	FastEthernet0	Static IPv4 Address: 172.192.0.3 Subnet Mask: 255.255.192.0 Default Gateway: 172.192.0.1 DNS Server: 0.0.0.0	Static IPv6 Address: / Link Local Address: FE80::209:7CFF:FE99:A21 Default Gateway: / DNS Server: /

**Setting up Router:** Connecting the switches to router and adding the default IPv4 of each subnet and also making the routers a separate subnet.

The following table summarizes the router configurations for Router0, Router1, and Router1:

Router	Interface	Port Status	Bandwidth	Duplex	MAC Address	IP Configuration	Subnet Mask
Router0	FastEthernet0/0	On	100 Mbps	Full Duplex	0090.0C1E.7601	172.0.0.1	255.255.192.0
Router1	FastEthernet0/0	On	100 Mbps	Full Duplex	0030.F2EB.BD01	172.192.0.1	255.255.192.0
Router1	FastEthernet0/1	On	100 Mbps	Full Duplex	0030.F2EB.BD02	172.128.0.1	255.255.192.0

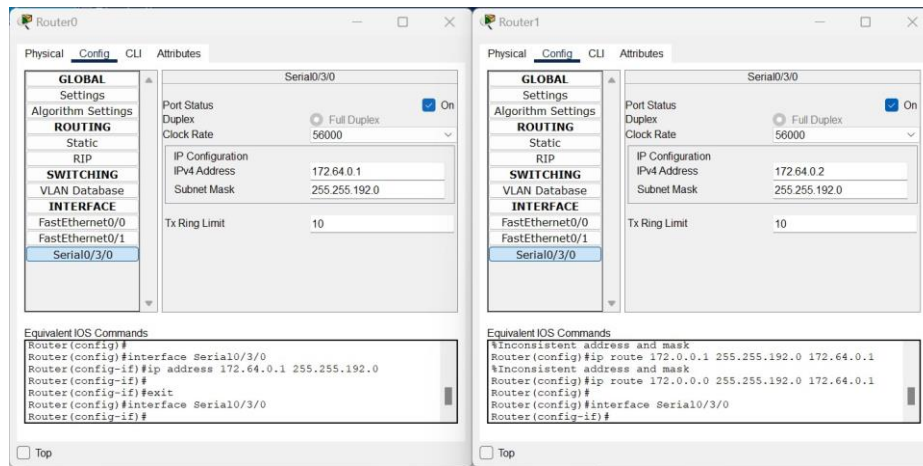
The Equivalent IOS Commands for each router are as follows:

```

Router0:
Router(config-if)#
Router(config-if)#exit
Router(config)#interface Serial0/3/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#

Router1:
Router(config)#ip route 172.0.0.0 255.255.192.0 172.64.0.1
Router(config)#
Router(config)#interface Serial0/3/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#

Router1:
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/0
Router(config-if)#
Router(config-if)#exit
Router(config)#interface FastEthernet0/1
Router(config-if)#
  
```



**Pinging:** Verifying connections by pinging PC1 (IPv4= 172.0.0.2) to PC13 (IPv4=172.192.0.3) which is successful.

