

TASK 3

Calculate total number of subnets, total number of hosts per subnet, total number of valid hosts per subnet, subnet mask for each subnet, first valid host for each subnet, last valid host for each subnet, broadcast ip address of each subnet, subnetwork IP address for each subnet, block size for each family of IPs in each subnet. Generate a table as shown in the classroom exercise for enlisting range of IP address in each of subnet families. & finally design the same on packet tracer.

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: $2^{14} - 2 = 16,382 - 2 = 16,380$

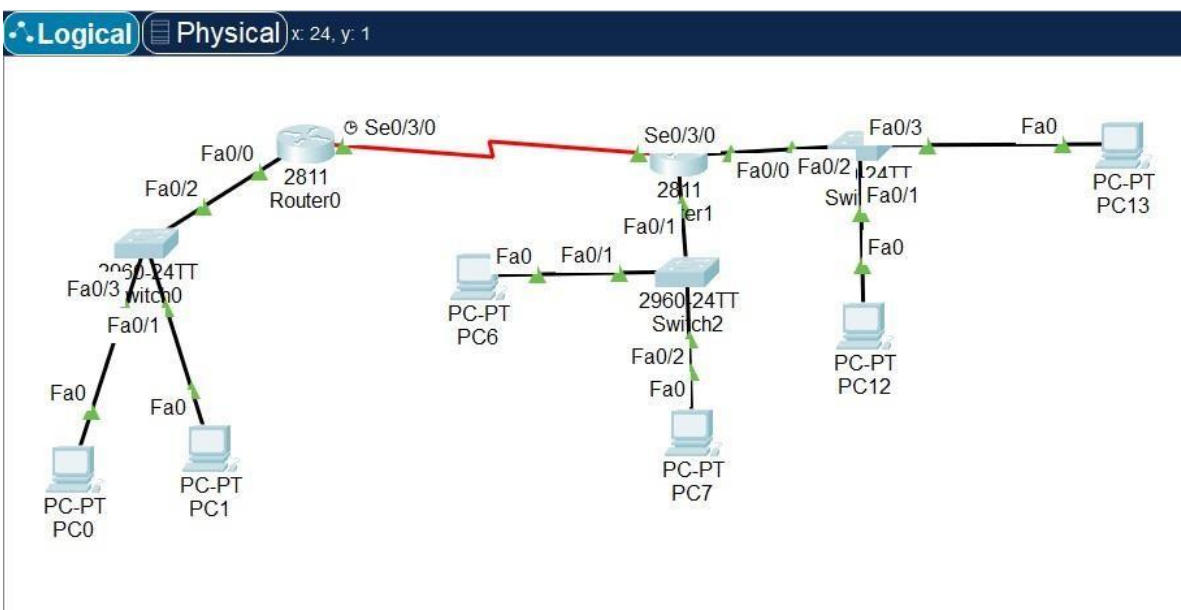
Block Size = $256 - 192 = 64$

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 separated 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

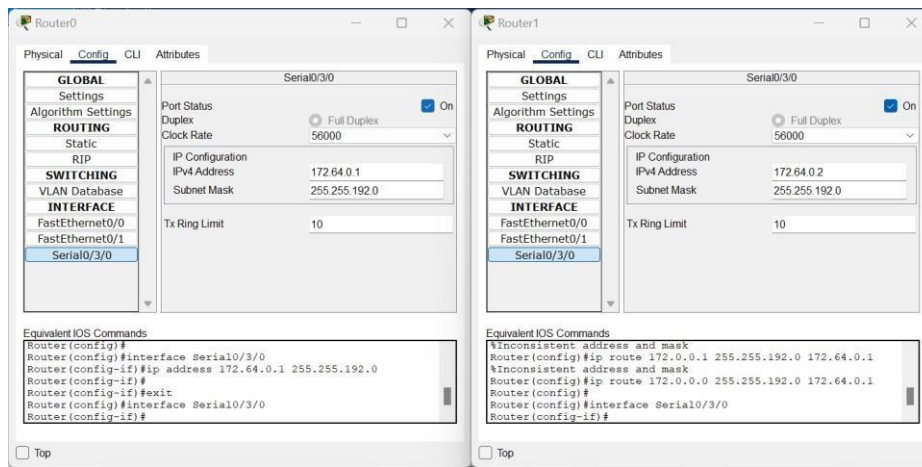
The image displays six screenshots of PC configuration windows, labeled PC0 through PC5. Each window shows the 'Desktop' tab with 'IP Configuration' and 'IPv6 Configuration' sections. The 'Static' option is selected for both. The IPv4 Address, Subnet Mask (255.255.192.0), and Default Gateway (172.0.0.1) are configured for each PC. The IPv6 Address, Link Local Address, and Default Gateway are also configured. The 802.1X Security is disabled, and the Authentication is set to MD5.

PC	IPv4 Address	Link Local Address
PC0	172.0.0.2	FE80::2D0:58FF:FEB5:B43E
PC1	172.0.0.3	FE80::260:5CFF:FE46:1564
PC6	172.128.0.2	FE80::2E0:A3FF:FE90:B3D
PC7	172.128.0.3	FE80::206:2AFF:FE97:6398
PC12	172.192.0.2	FE80::290:21FF:FE77:D3B4
PC13	172.192.0.3	FE80::209:7CFF:FEB9:A21

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 image displays three screenshots of Router configuration windows, labeled Router0, Router1, and Router1. Each window shows the 'Config' tab with 'FastEthernet0/0' and 'FastEthernet0/1' interfaces. The 'Static' option is selected for both. The IPv4 Address, Subnet Mask (255.255.192.0), and Default Gateway (172.0.0.1) are configured for each router. The 802.1X Security is disabled, and the Authentication is set to MD5.

Router	Interface	IPv4 Address	Link Local Address
Router0	FastEthernet0/0	172.0.0.1	FE80::2D0:58FF:FEB5:B43E
Router1	FastEthernet0/0	172.192.0.1	FE80::290:21FF:FE77:D3B4
Router1	FastEthernet0/1	172.128.0.1	FE80::2E0:A3FF:FE90:B3D



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

