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= 17.16.0.0 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: $2^{14} - 2 = 16{,}382 - 2 = 16{,}380$

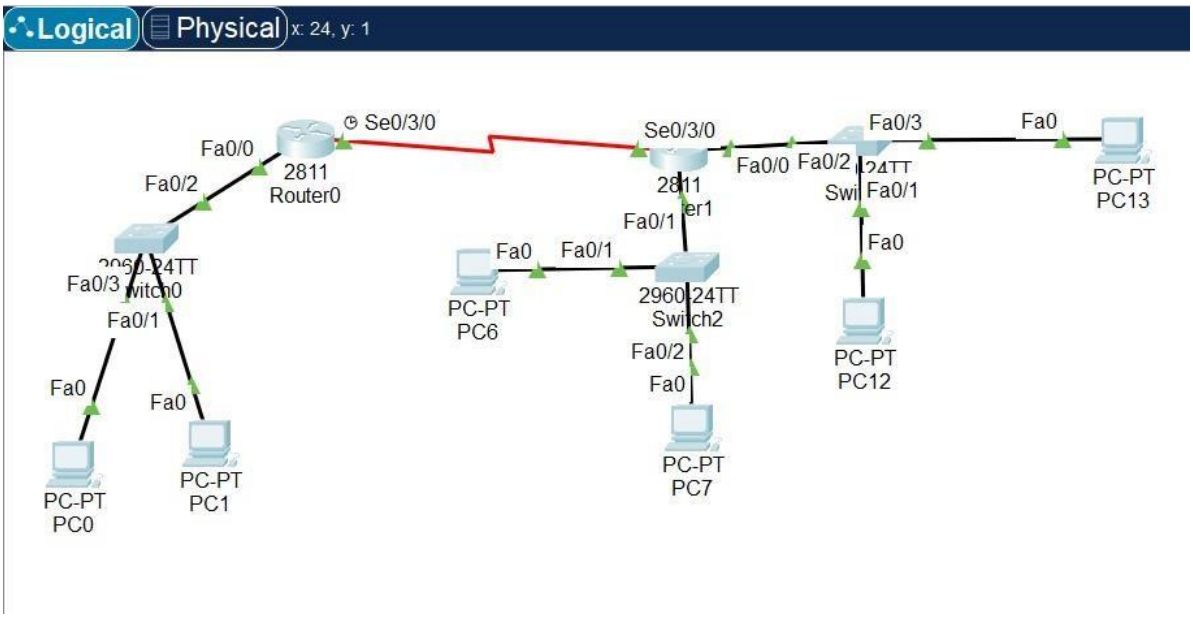
Block Size = 256 – 192= 64

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

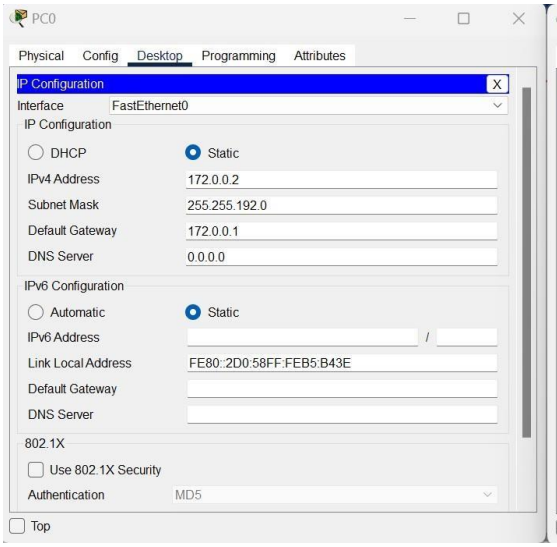
This is Class B IPv4 network address.

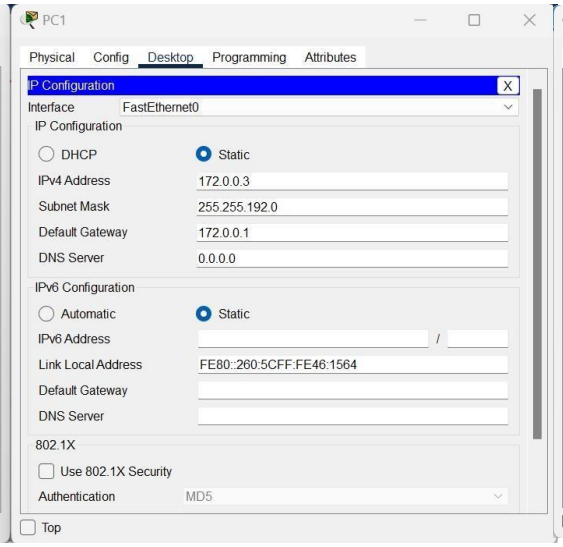
| Subnet Address | First Host | Last Host | Broadcast Address |
|---|---|---|---|
| 172.0.0.0 | 172.0.0.1 | 172.63.255.254 | 172.63.255.255 |
| 172.64.0.0 | 172.64.0.1 | 172.127.255.254 | 172.127.255.255 |
| 172.128.0.0 | 172.128.0.1 | 172.191.255.254 | 172.191.255.255 |
| 172.192.0.0 | 172.192.0.1 |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

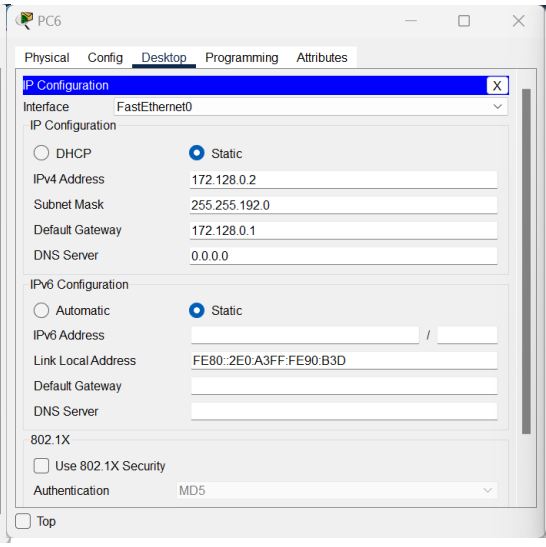
**Designing the Topology:** As there are 4 possible Subnets we attached 3 switches to the router to differentiate the broadcast domains and assigned 2 PCs to each domain. The routers itself are in a separatedomain.

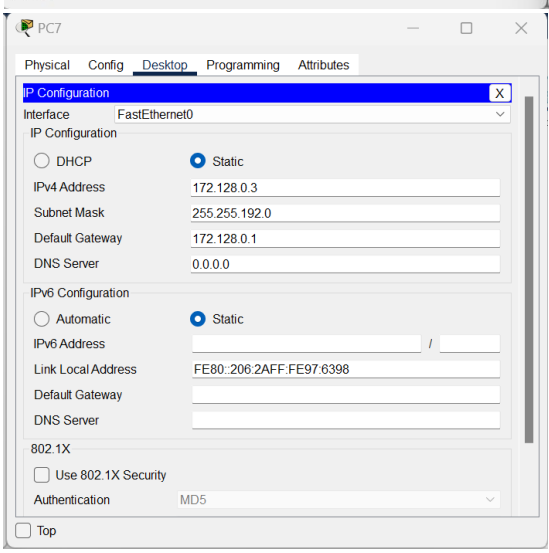


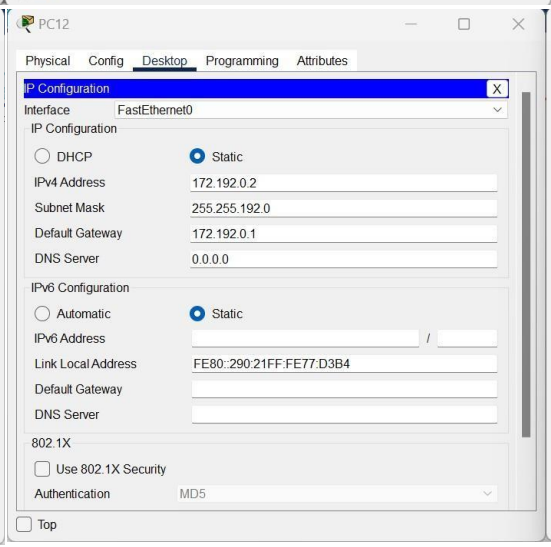
**Setting up PCs:** IPv4 adresses and default gateways are assigned according to the valid hosts adresses takenfrom the table. Subnet Mask is 255.255.192.0

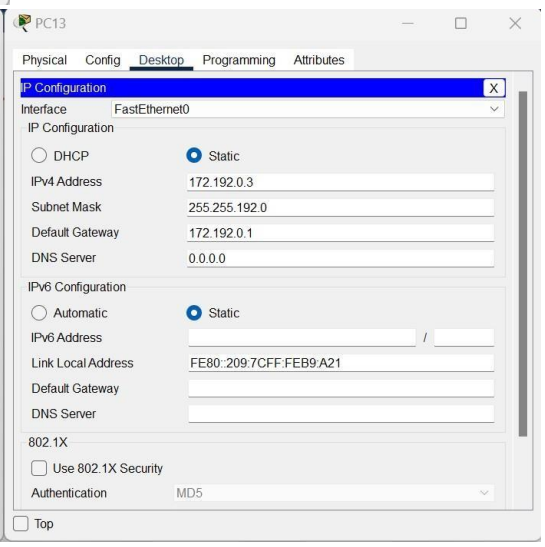


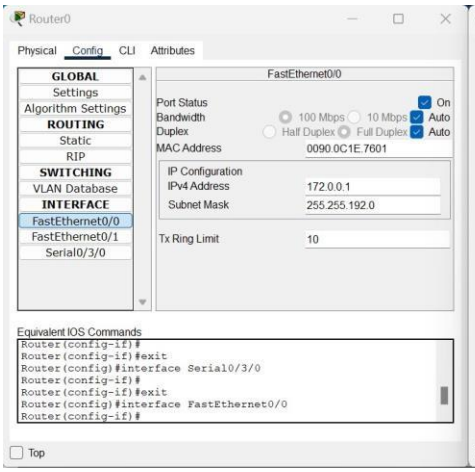



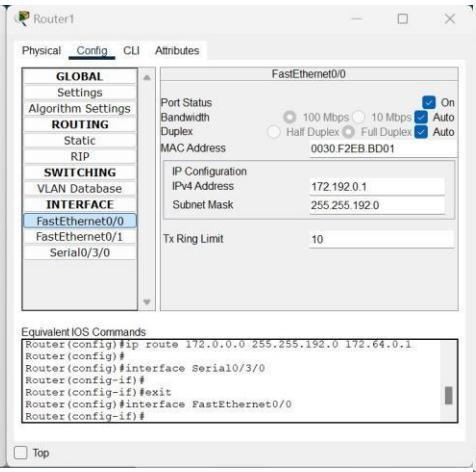



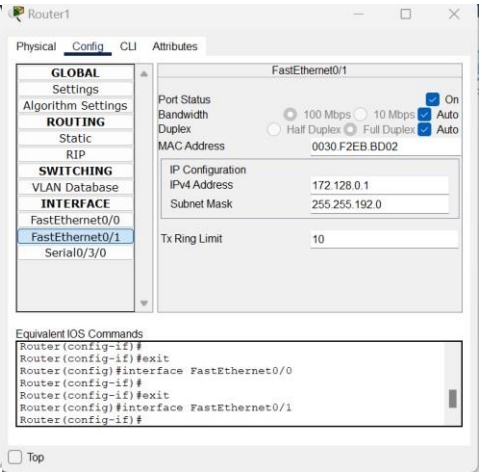



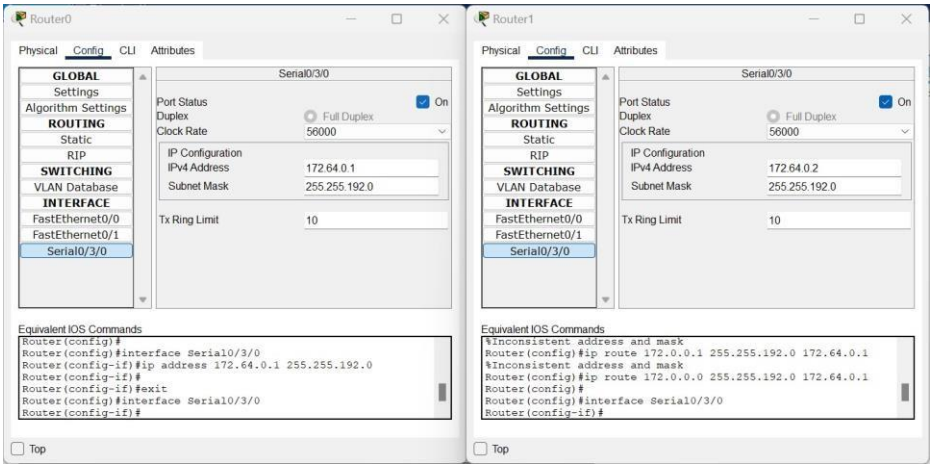




**Setting up Router:** Connecting the switches to router and adding the deault IPv4 of each subnet and alsomaking the routers a separate subnet.






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