Practical - 6

Aim:
Design a Network of an organization using fundamentals of subnetting.

Scenario:
Organization named Zenith enterprise has setup a branch office at Noida and hired you as a Network Engineer. The branch office will be having 5 different departments and each department has its own network. Each department has actually 14 devices (including network devices). The IP address range given to you is 192.XX.10.0/24. Design the network such that wastage of IP address is less. So, for designing purpose you can take 2 devices in each department (as first device and last device in network) for ease of the implementation.

Calculation:

Reserved address:

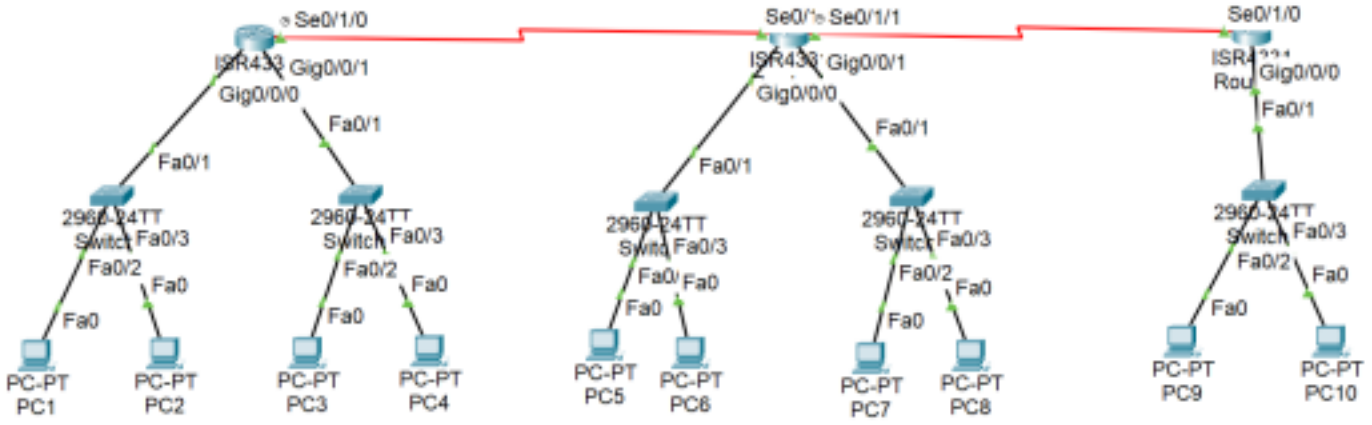
- Network Address
- Broadcast Address

Min host bit requirement:

$$\text{No. of devices} \leq 2^n - 2$$

Procedure:

1) Create network as given below



2) Calculate the number of bits required for host as per the given problem.

3) Get subnet mask for subnetting

Old Subnet mask (Decimal form)	255.255.255.0
Old Subnet mask (Binary form)	11111111. 11111111. 11111111. 00000000
New Subnet mask (Binary form)	255.255.255.240
New Subnet mask (Decimal form)	11111111. 11111111. 11111111. 11110000

4) Calculate IP address and design a network

Dept.	**Device**	**IP Address**	**Subnet Mask**
Dept. 1	Network	192.38.10.0	255.255.255.240
	Default Gateway	192.38.10.1	255.255.255.240
	Host (First)	192.38.10.2	255.255.255.240
	Host (Last)	192.38.10.14	255.255.255.240
	Broadcast	192.38.10.15	255.255.255.240
Dept. 2	Network	192.38.10.16	255.255.255.240
	Default Gateway	192.38.20.17	255.255.255.240
	Host (First)	192.38.10.18	255.255.255.240
	Host (Last)	192.38.10.30	255.255.255.240
	Broadcast	192.38.10.31	255.255.255.240
Dept. 3	Network	192.38.10.32	255.255.255.240
	Default Gateway	192.38.10.33	255.255.255.240

	Host (First)	192.38.10.34	255.255.255.240
	Host (Last)	192.38.10.46	255.255.255.240
	Broadcast	192.38.10.47	255.255.255.240
Dept. 4	Network	192.38.10.48	255.255.255.240
	Default Gateway	192.38.10.49	255.255.255.240
	Host (First)	192.38.10.50	255.255.255.240
	Host (Last)	192.38.10.62	255.255.255.240
	Broadcast	192.38.10.63	255.255.255.240
Dept. 5	Network	192.38.10.64	255.255.255.240
	Default Gateway	192.38.10.65	255.255.255.240
	Host (First)	192.38.10.66	255.255.255.240
	Host (Last)	192.38.10.78	255.255.255.240
	Broadcast	192.38.10.79	255.255.255.240

5) Configure IP address (All Devices, Routers)

6) Configure static routing table (STATIC in routers)

Router	**Dept.**	**Network**	**Subnet Mask**	**Next Hop**
Router0	Dept.3	192.38.10.32	255.255.255.240	10.0.0.2
	Dept.4	192.38.10.48	255.255.255.240	10.0.0.2
	Dept.5	192.38.10.64	255.255.255.240	10.0.0.2
Router1	Dept.1	192.38.10.0	255.255.255.240	10.0.0.1
	Dept.2	192.38.10.16	255.255.255.240	10.0.0.1
	Dept.5	192.38.10.64	255.255.255.240	20.0.0.2
Router2	Dept.1	192.38.10.0	255.255.255.240	20.0.0.2

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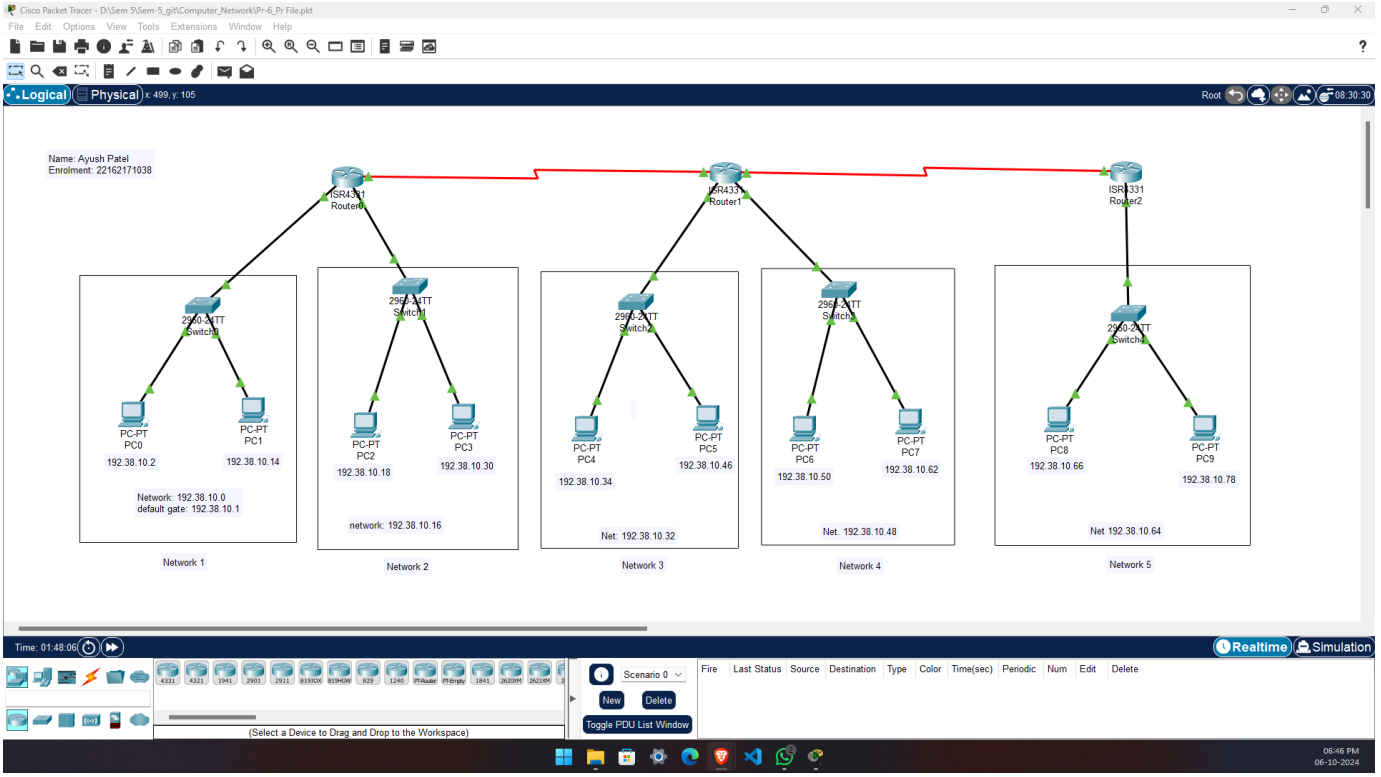
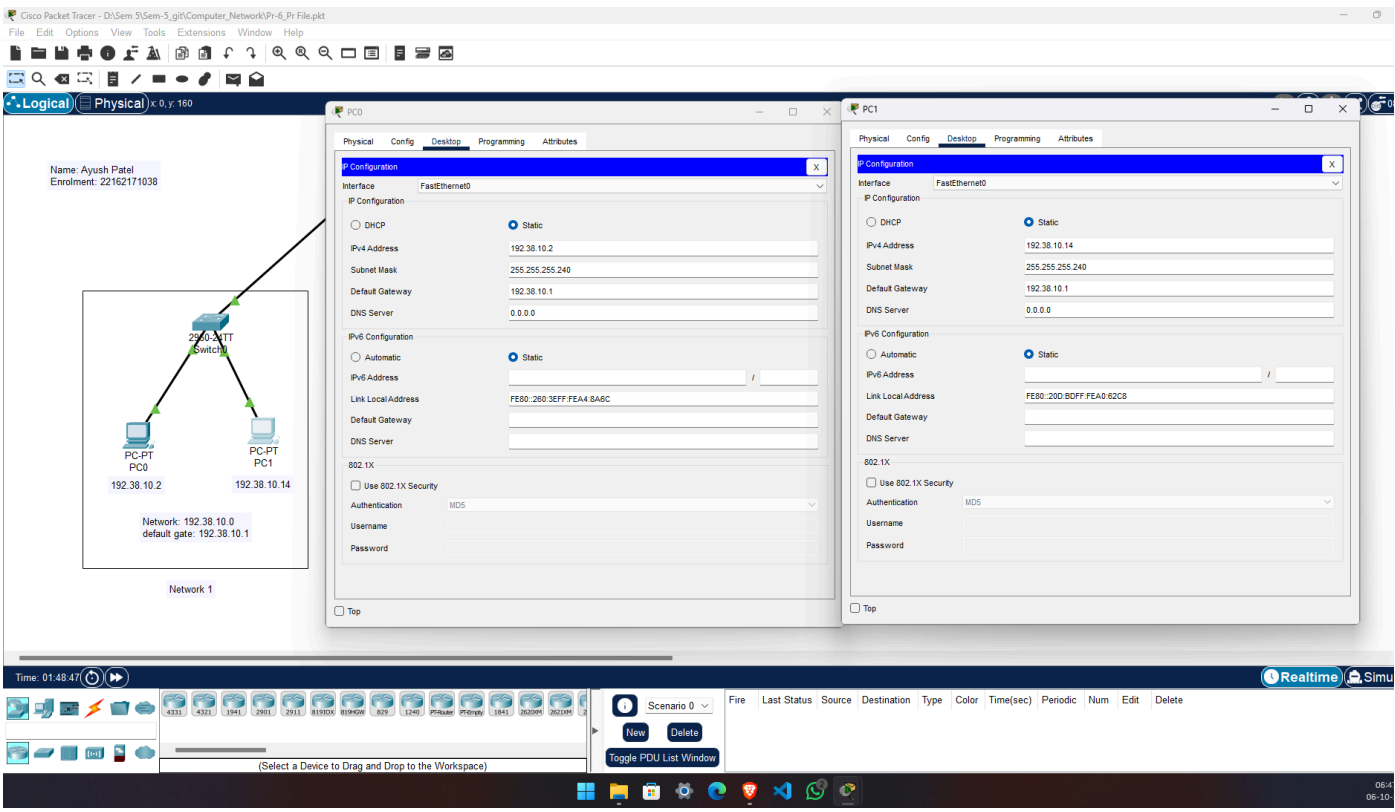
	Dept.2	192.38.10.16	255.255.255.240	20.0.0.2
	Dept.3	192.38.10.32	255.255.255.240	20.0.0.2
	Dept.4	192.38.10.48	255.255.255.240	20.0.0.2

Configuration:





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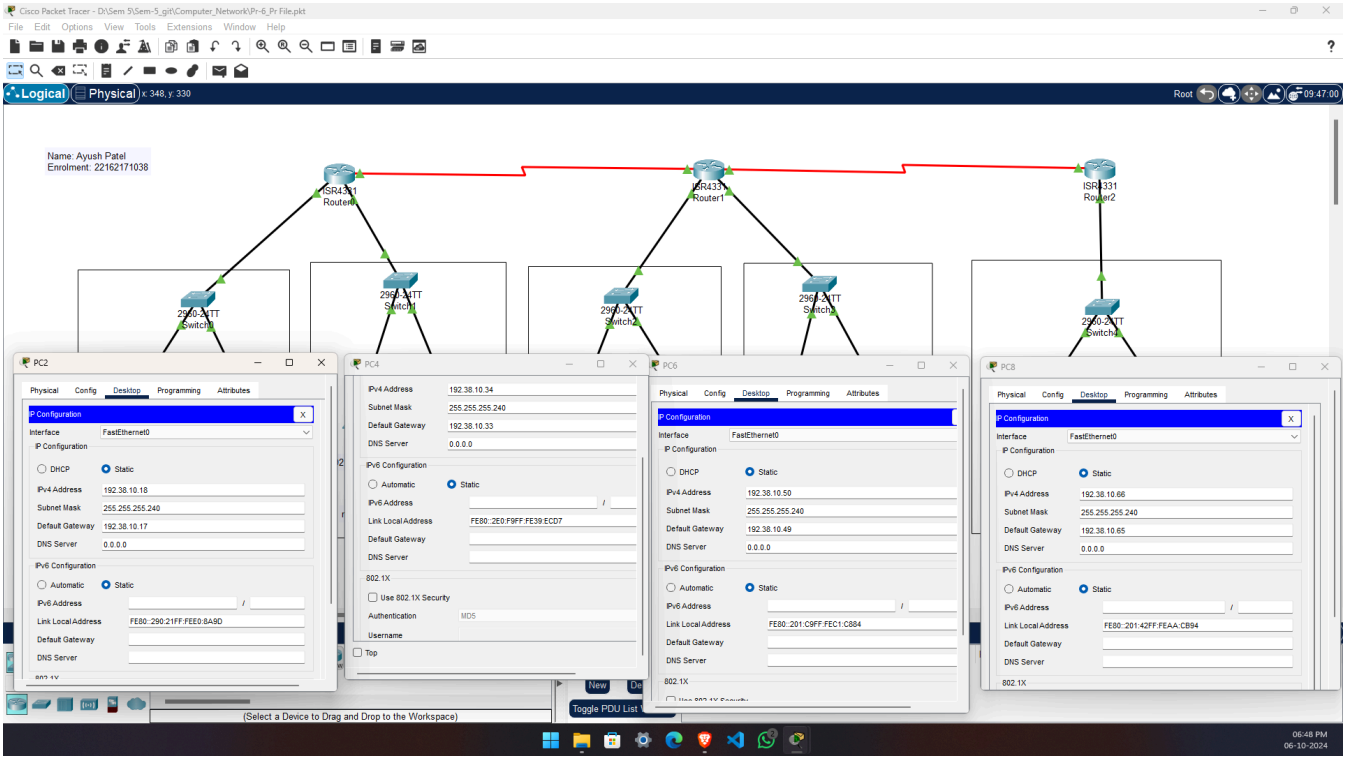

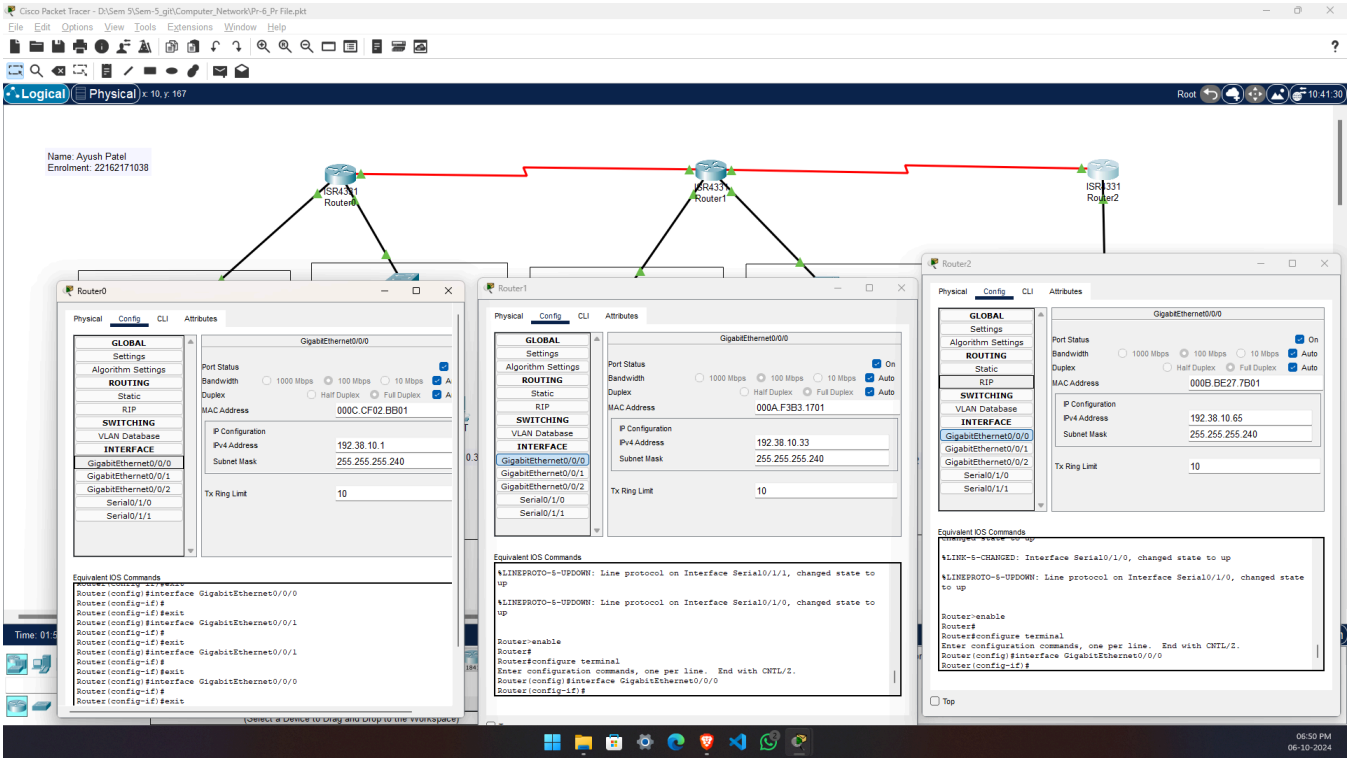

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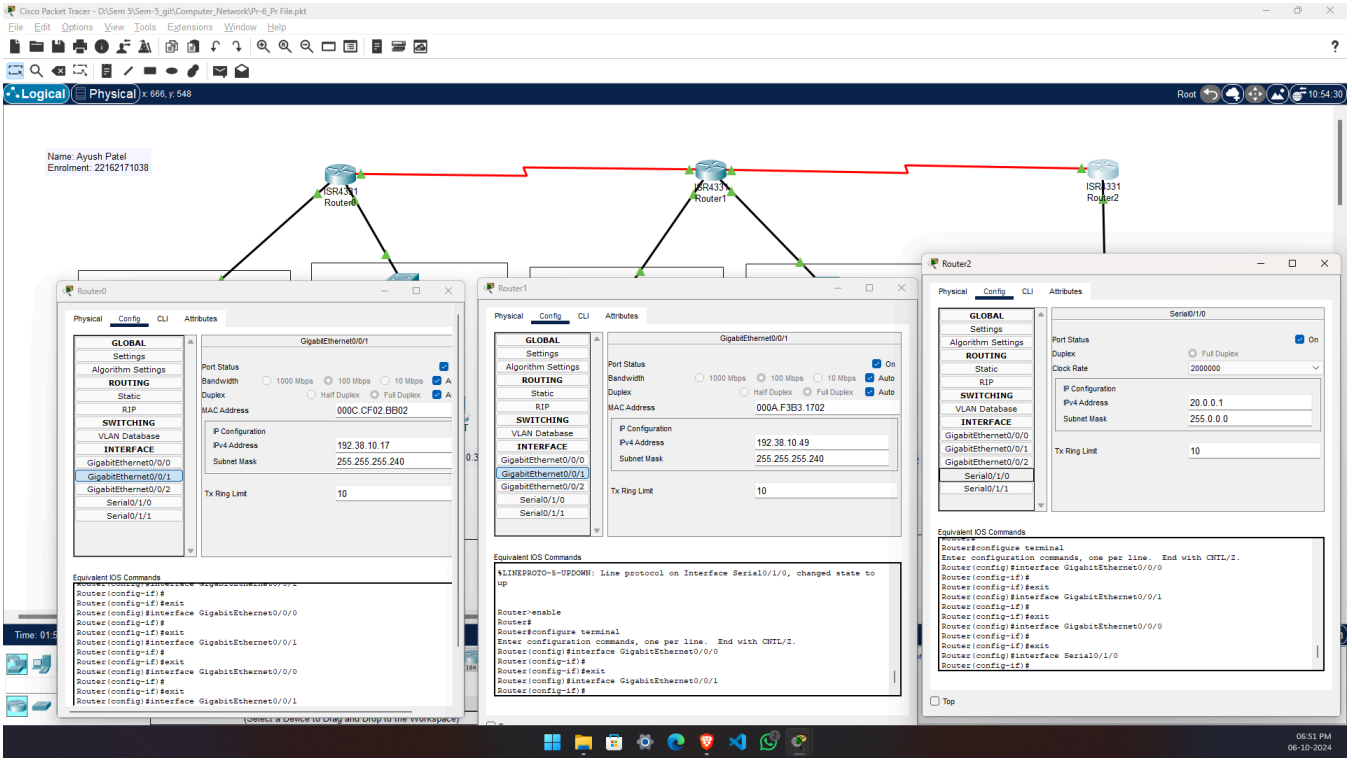

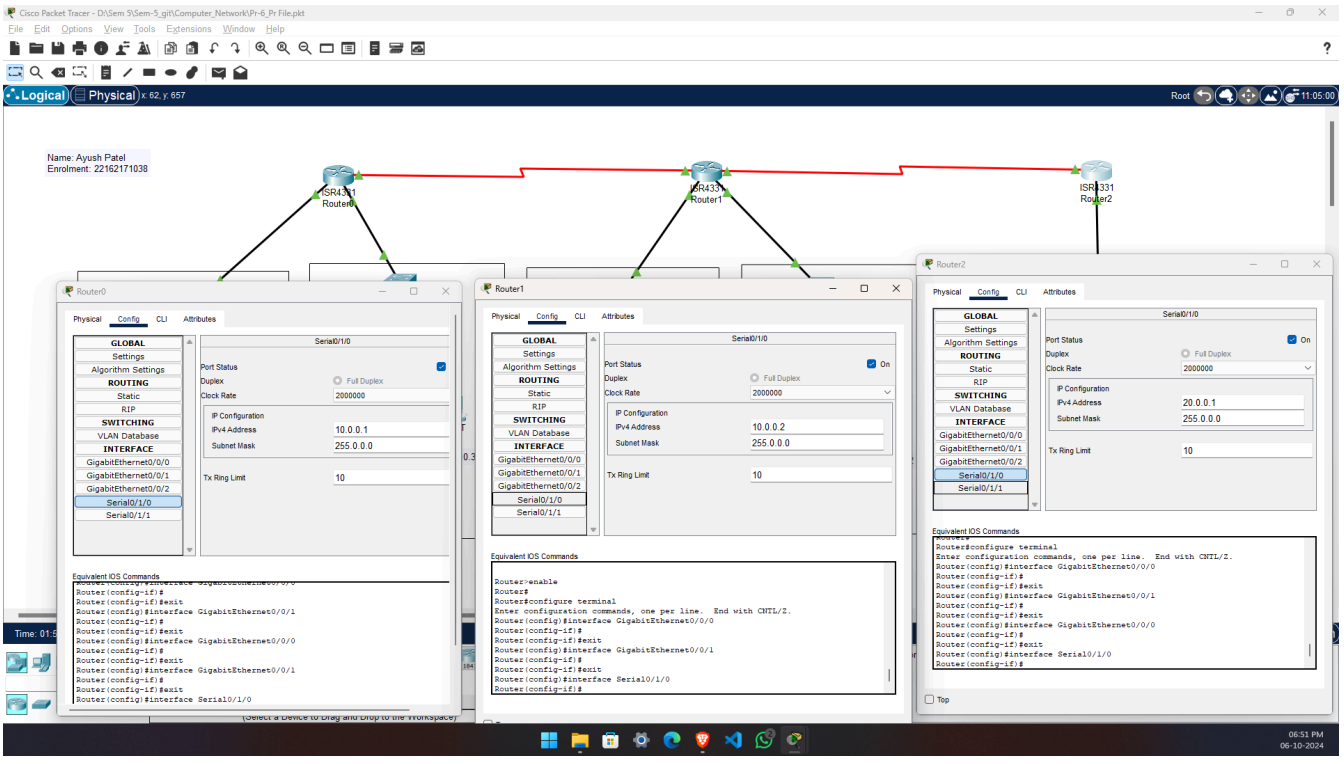

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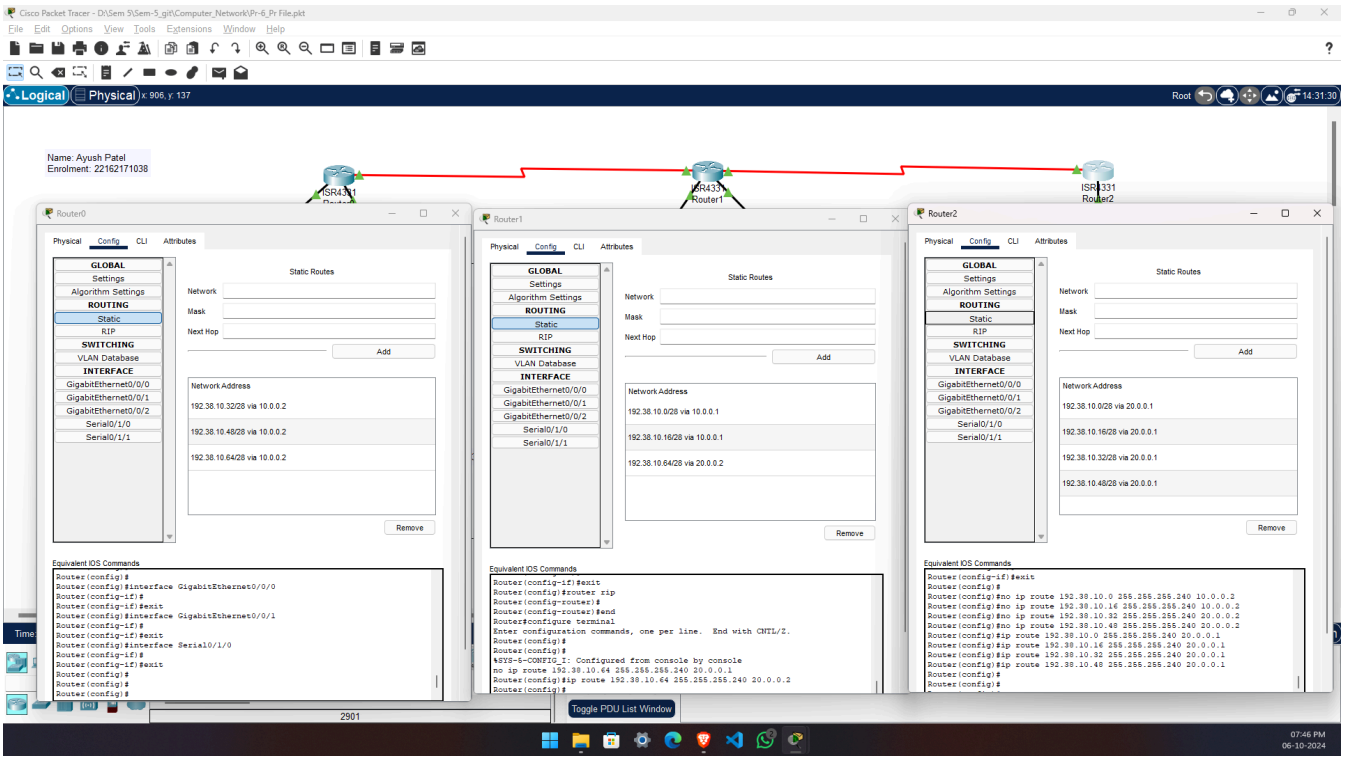
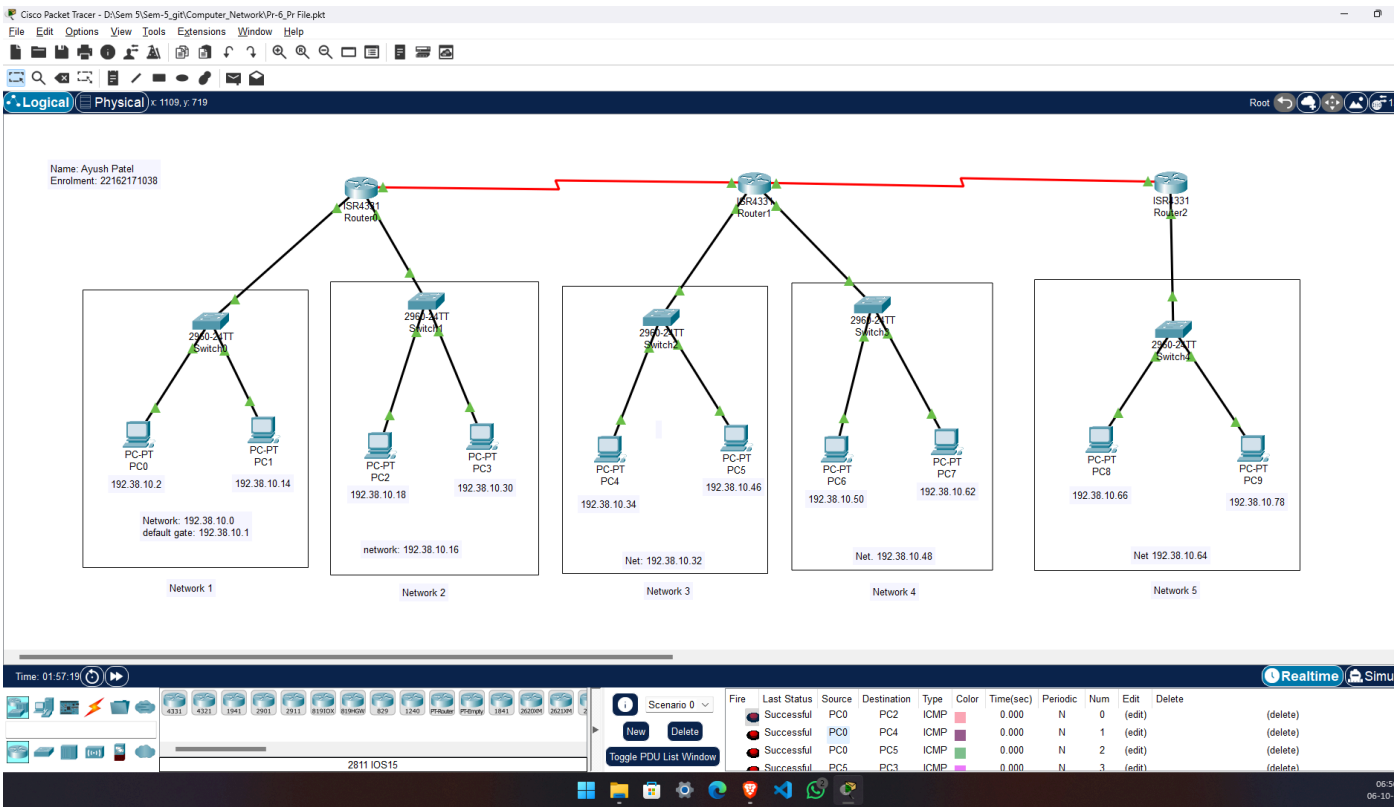


Output:



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Note:
Make sure last two digits of your enrollment numbers appears in network IP address that must be visible in snapshot of the cisco packet tracer. i.e. 192.XX.10.1 (XX indicates last two digits of your enrollment no.)