Computer Networks Fall 2024 Semester Project

CL-3001

CS Department

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Objective:

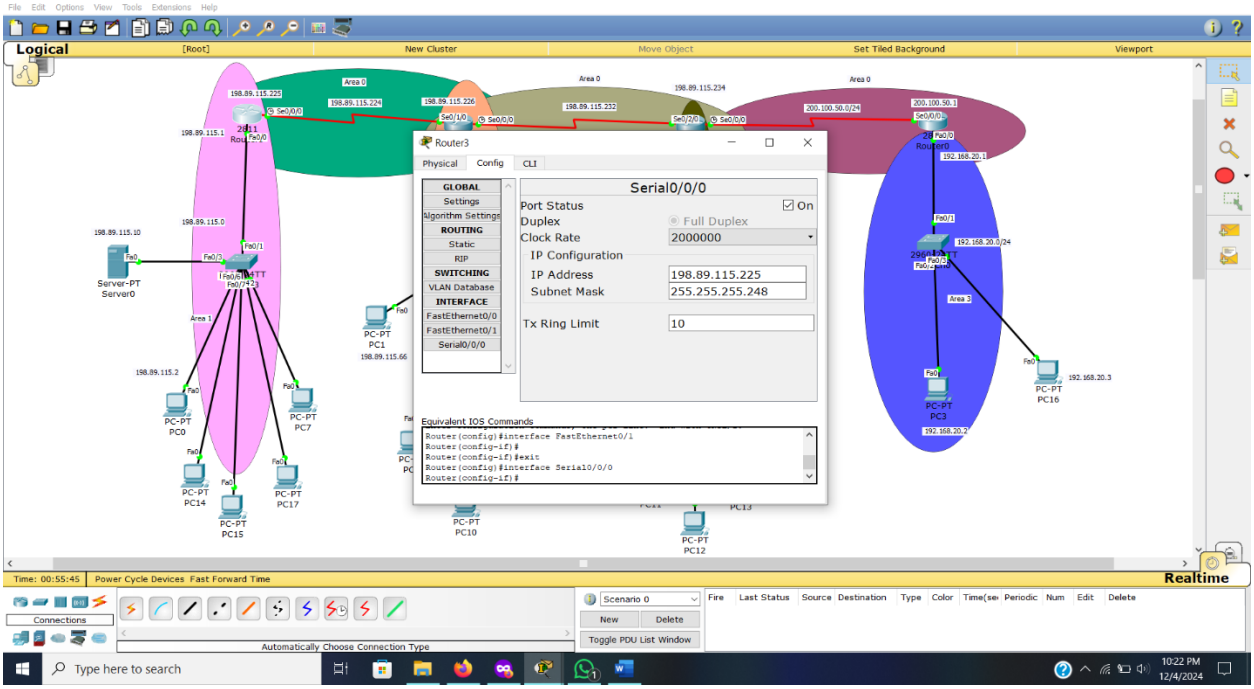
To build a simple Network Topology to understand and implement different technologies i.e., DHCP Server, NAT and OSPF for Routing.

Technologies Used:

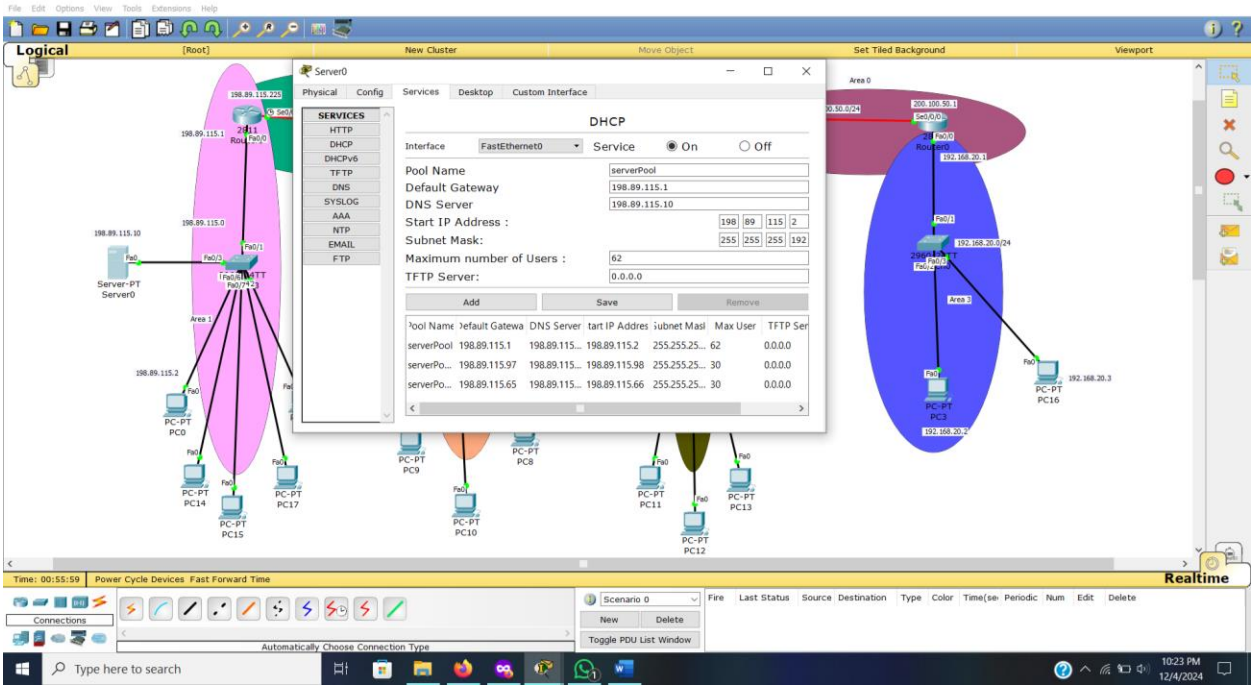
1. Cisco Packet Tracer
2. OSPF for Routing
3. DHCP Server for automatically assigning IP address to edge devices.
4. NAT for private IP Addresses

Implementation Details:

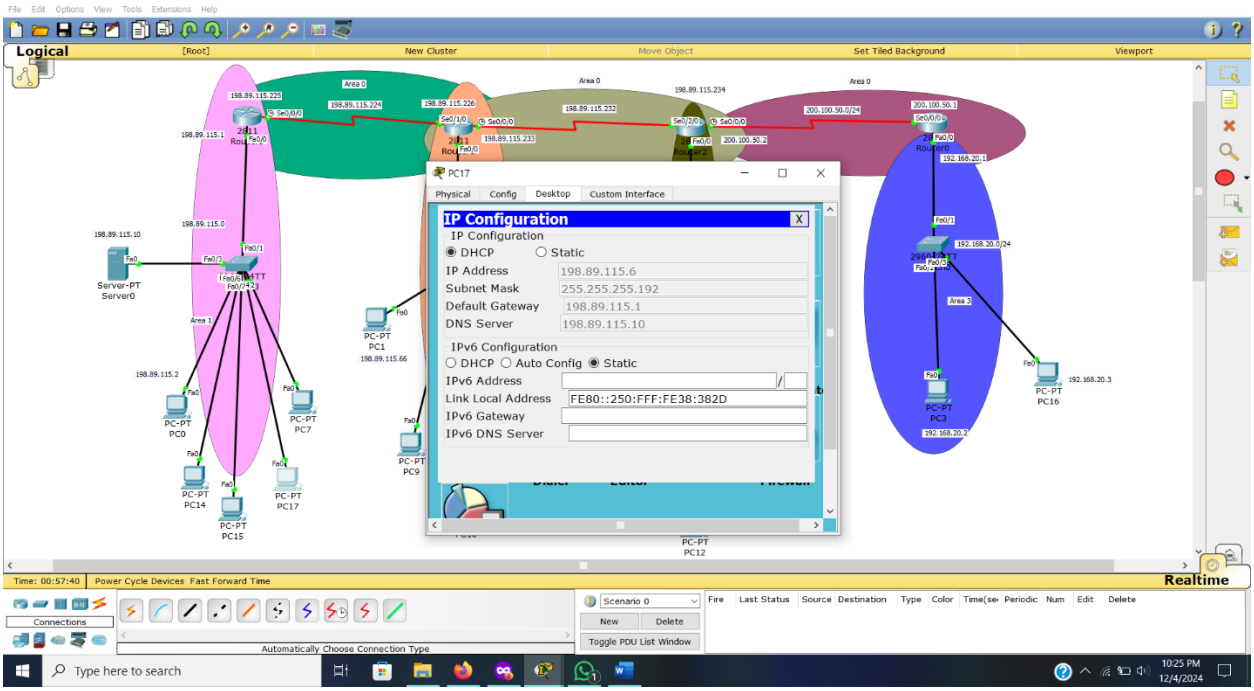
1. Used Cisco Packet Tracer to implement the entire project upon.
2. Firstly, design and construct a basic network topology.
3. Connect the devices through relevant ports.
4. Assign IP addresses to the interfaces of the Router



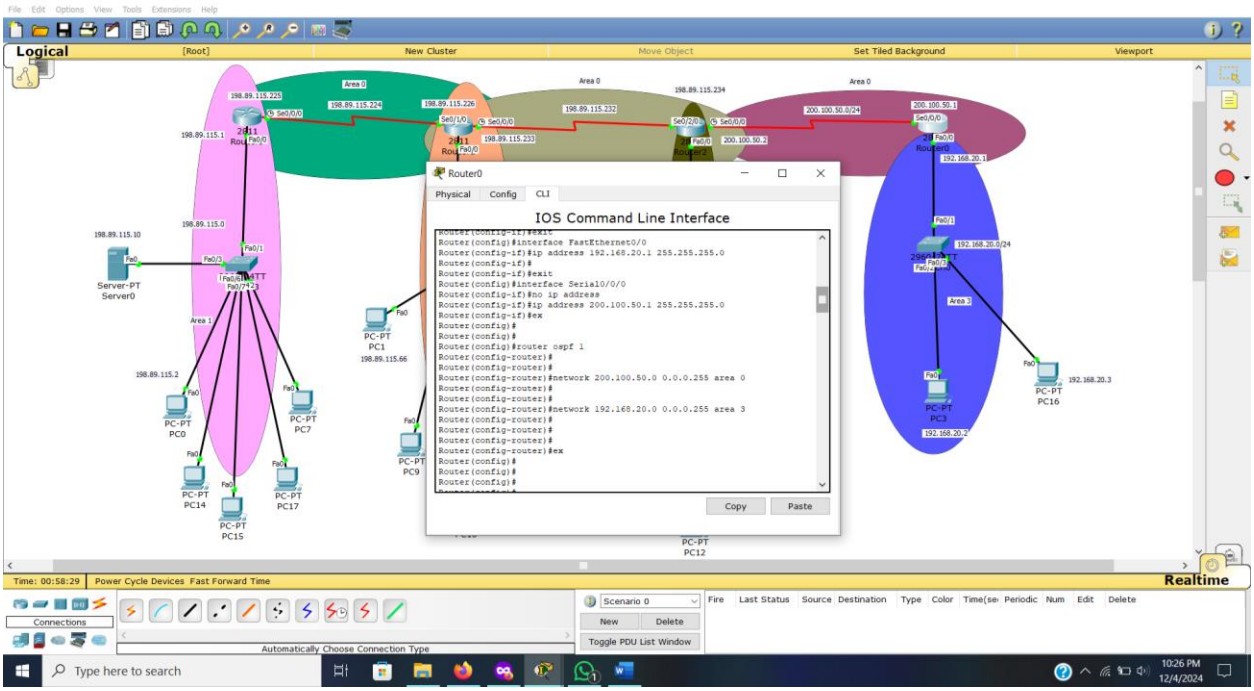
5. Then create IP Pools in the DHCP Server



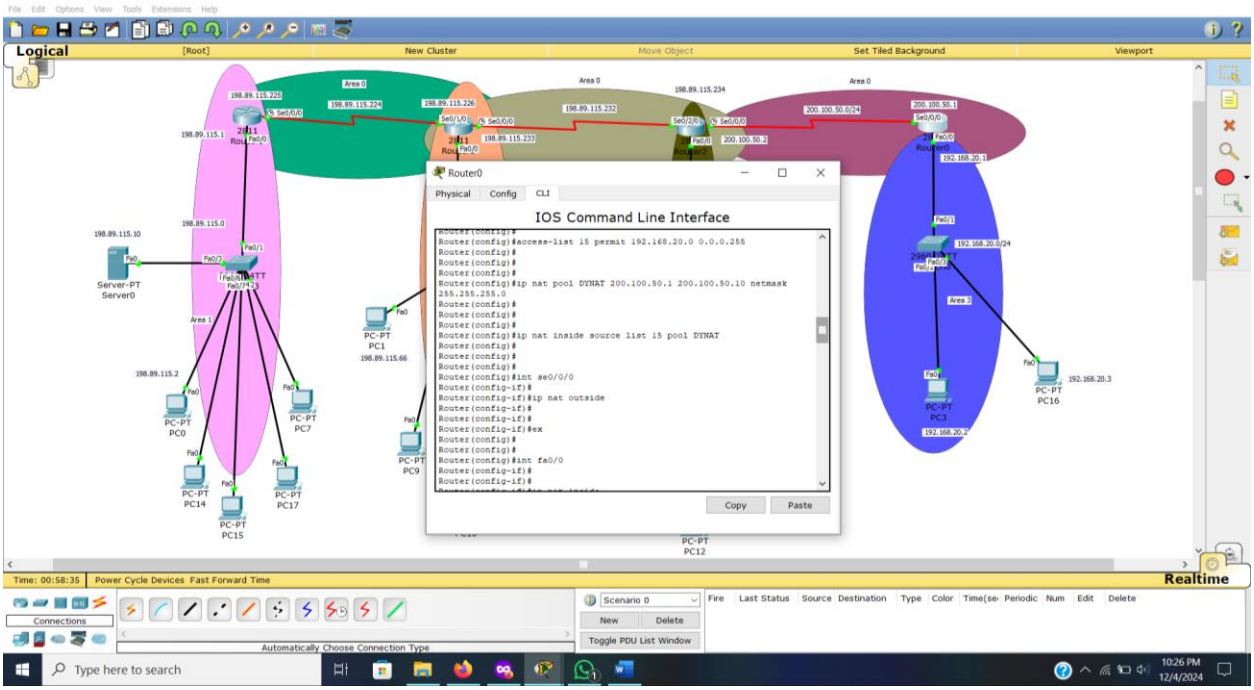
6. Relate the DHCP Server with the Router
7. Connect the edge devices and utilize DHCP IP Configuration



8. For OSPF Routing, define areas at the Routers

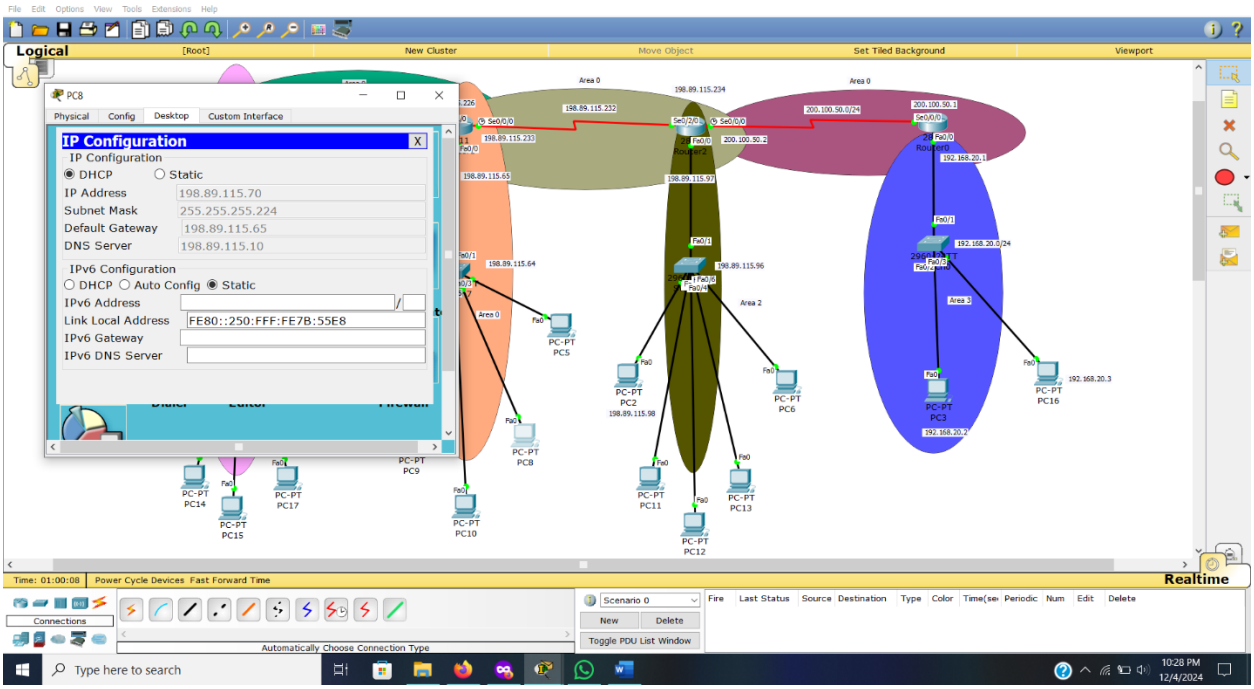


9. For NAT, use the relevant commands Router 0. 200.100.50.0/24 is the Public Address and 192.168.20.0/24 is the private.

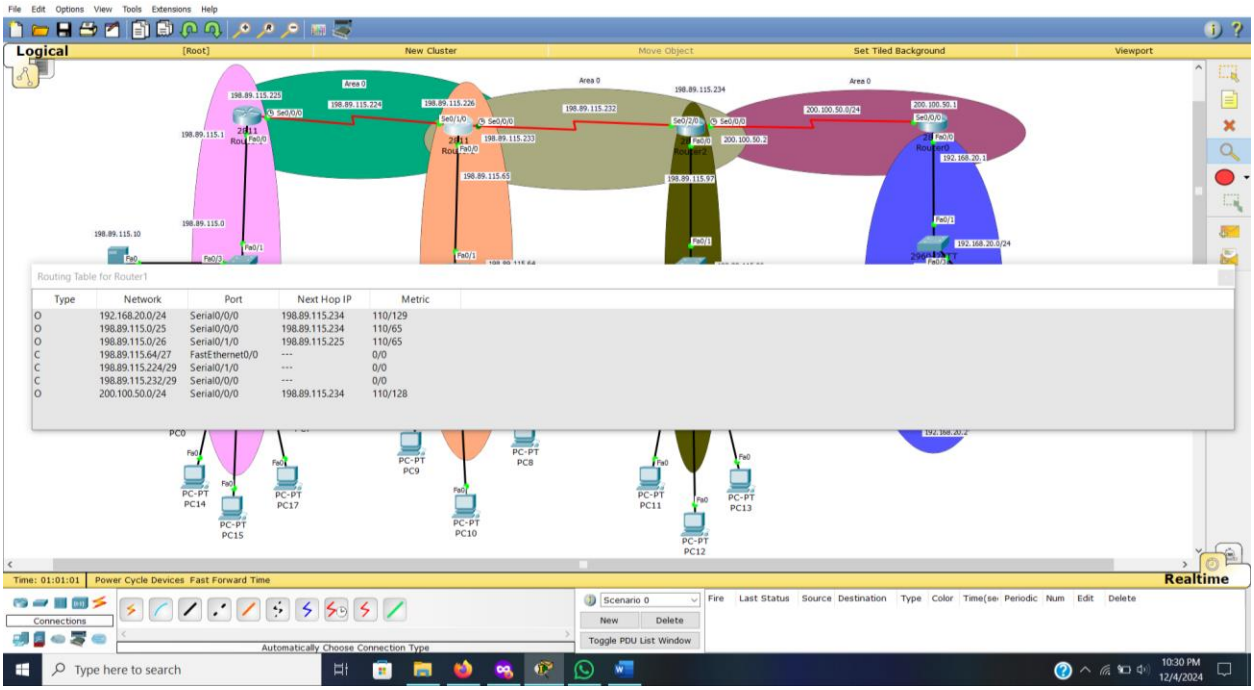


Results and Testing

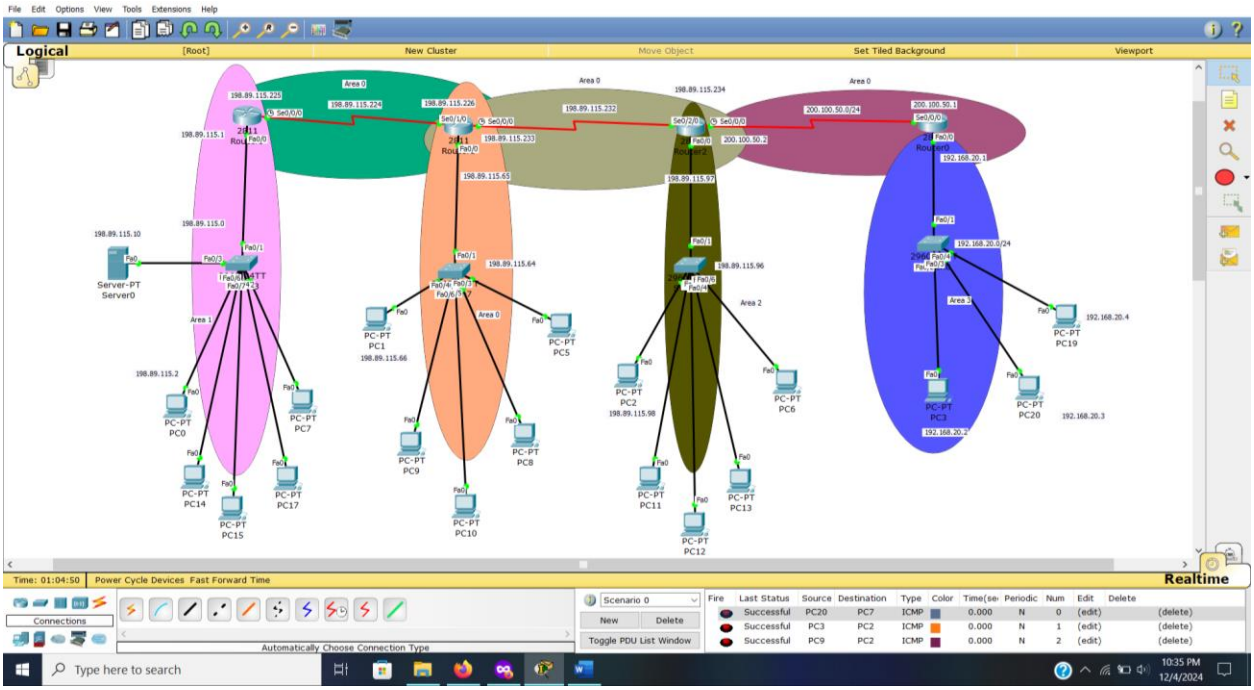
1. DHCP IP Configuration Check



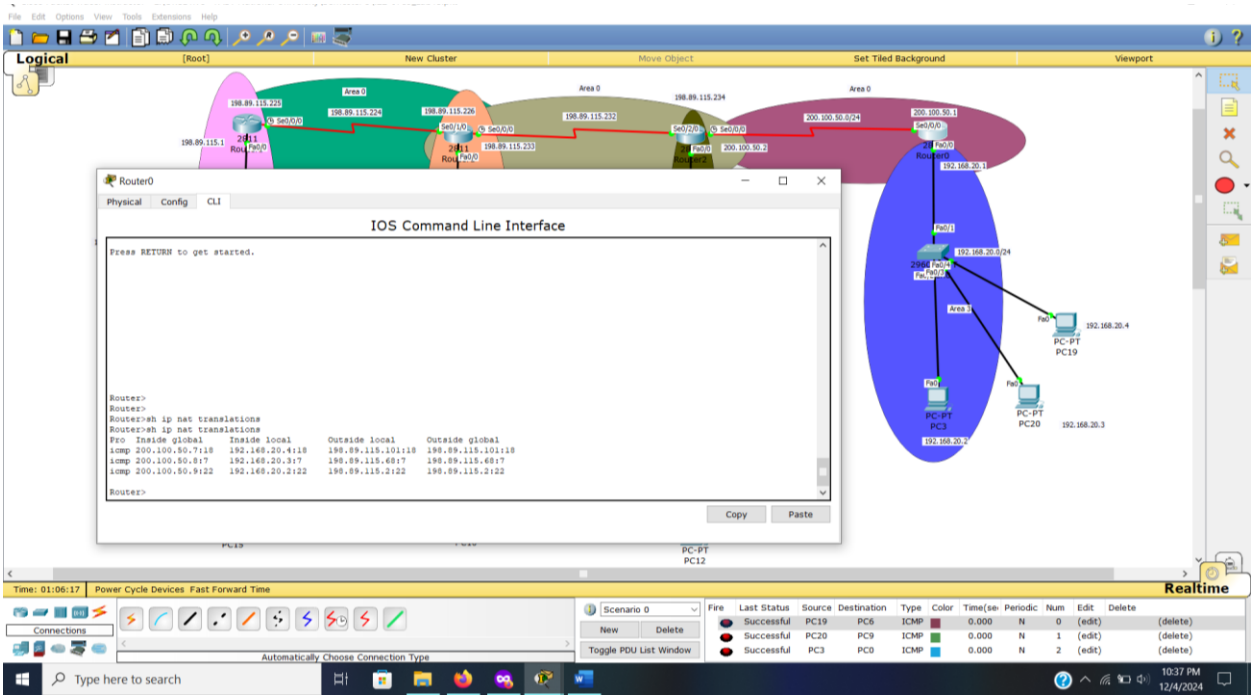
2. OSPF Routing Check
   a. Routing Table of one of the routers



b. Message Send Success



3. NAT Translation Check



Challenges Faced:

1. Confusion when implementing NAT
2. OSPF Routing broke down. Had to implement it again.
3. DHCP IP Configuration would sometimes give APIPA error, but after sometime it would resolve itself automatically.
4. Correct Mapping of DHCP Pools at the relevant routers.

Conclusion:

This is a very naïve implementation of the technologies. I hope to delve more into it and play around with the rest of the routing protocols as well.

The Resulting Network Topology: