

## Assignment 4

### **Aim: To implement the concept of OSPF Routing Protocol in Packet tracer simulator**

## OSPF Protocol

Open Shortest Path First (OSPF) is a routing protocol for Internet Protocol (IP) networks. It uses a link state routing (LSR) algorithm and falls into the group of interior gateway protocols (IGPs), operating within a single autonomous system (AS).

OSPF gathers link state information from available routers and constructs a topology map of the network. The topology is presented as a routing table to the internet layer for routing packets by their destination IP address. OSPF supports Internet Protocol version 4 (IPv4) and Internet Protocol version 6 (IPv6) networks and is widely used in large enterprise networks. IS-IS, another LSR-based protocol, is more common in large service provider networks.

## How does OSPF work?

The basic functioning of OSPF is carried out through LSA Flooding. As we know by now, the OSPF chooses the shortest path for the routers. The main process involves the sharing of LSAs and determining the best route to each destination.

### **This is how OSPF works in three main steps:**

- The first step is to become neighbors with other routers connected to the same segment.
- Then the routers exchange the Link State Advertisements (LSAs) with neighbor routers.
- After that, each router independently calculates the best routes to each destination. Then it inserts all of these into the routing table.

## ADVANTAGES:

. The following are the major advantages of the OSPF protocol:

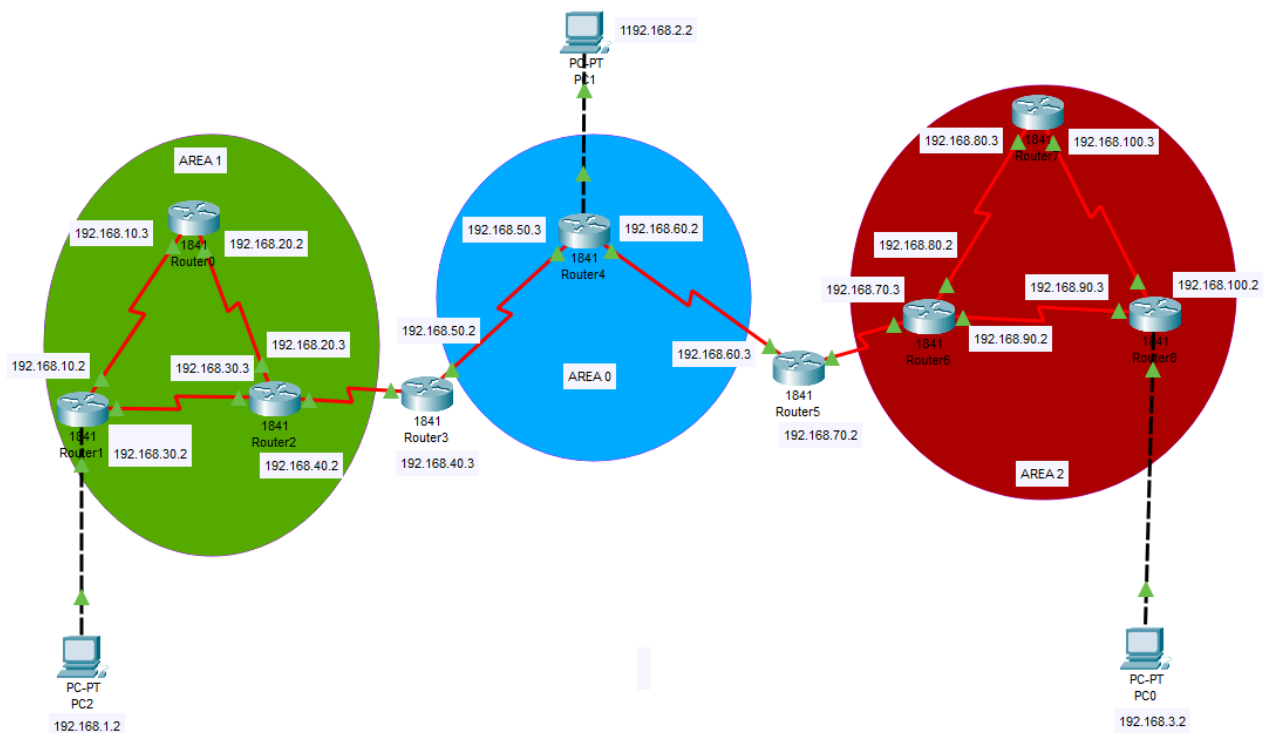
- OSPF can be configured on both IPv4 and IPv6 versions of IPs.
- It can carry out load balancing.
- It uses the SPF algorithm to present a loop-free technology.
- It is not Cisco proprietary. It can run on many routers.
- It is a classless protocol.
- It has unlimited hop counts.
- It works very fast.

## Disadvantages

The following are the disadvantages of the OSPF protocol:

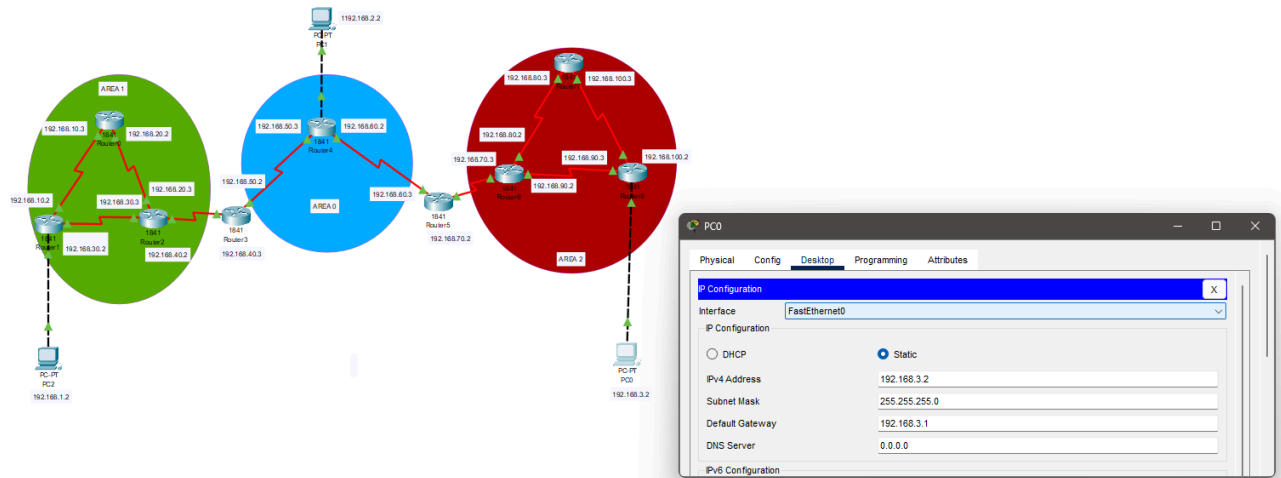
- It needs extra storage. Therefore, it means that it needs an extra CPU process to run the SPF algorithm.
- It needs more RAM to save adjacency topology.
- It is very complex. Therefore, it's very difficult to troubles

## Implementation

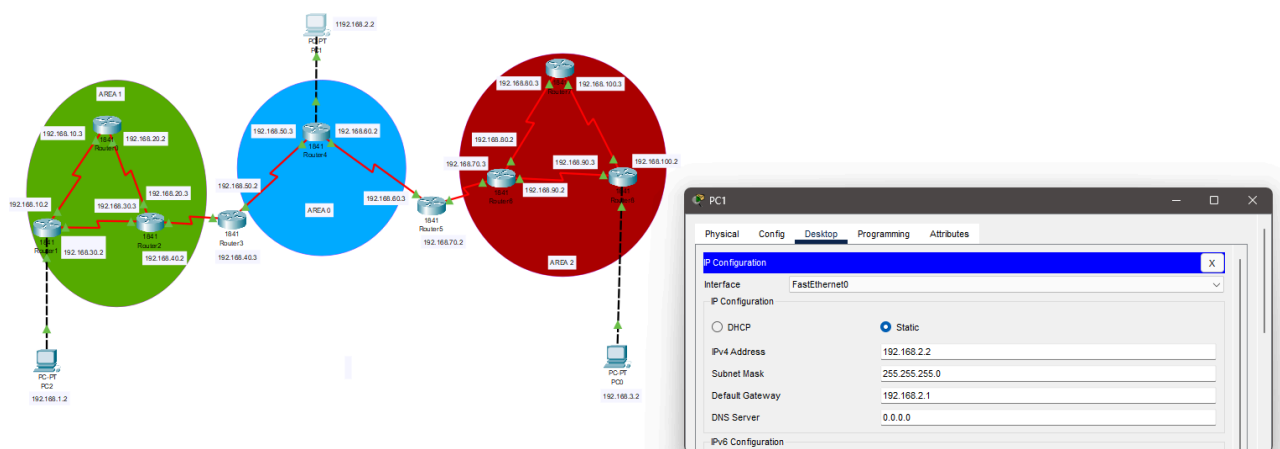


## Provide IP address to PC's

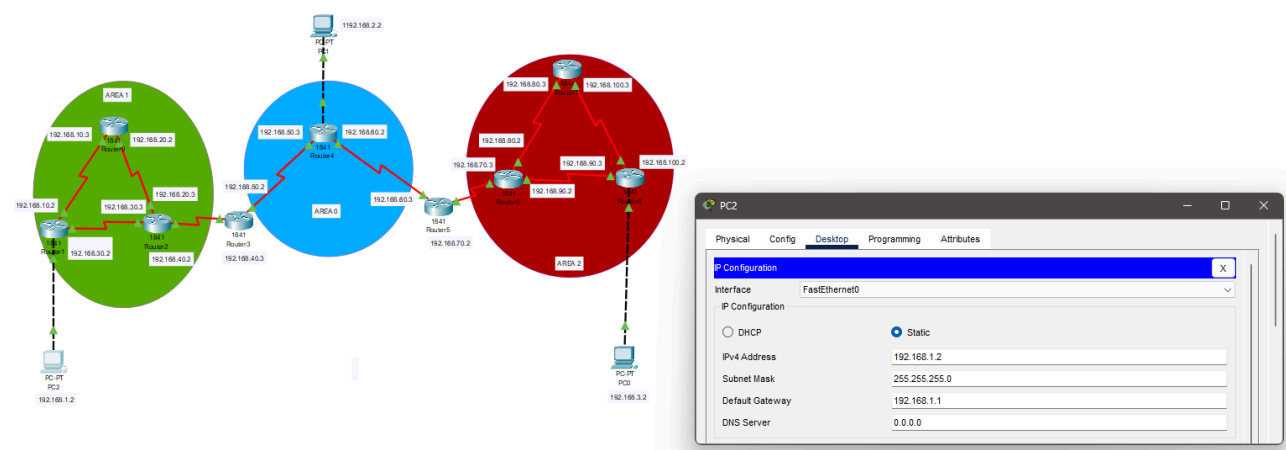
Pc 0:-



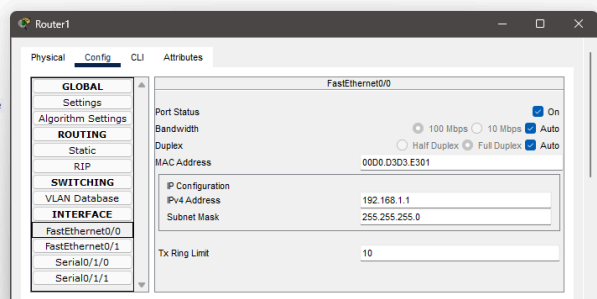
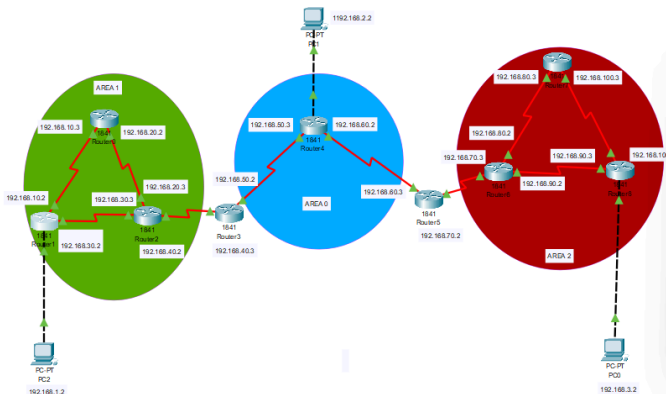
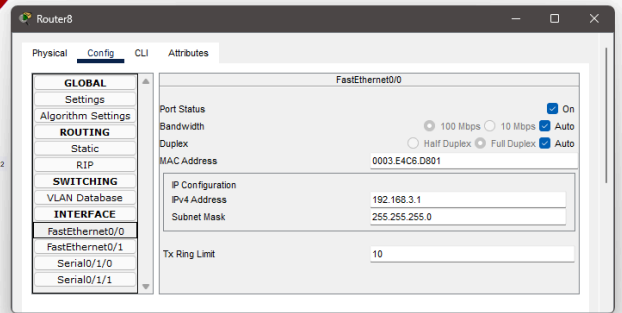
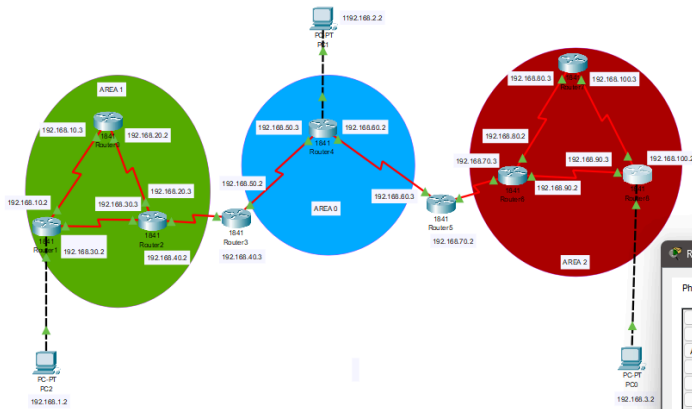
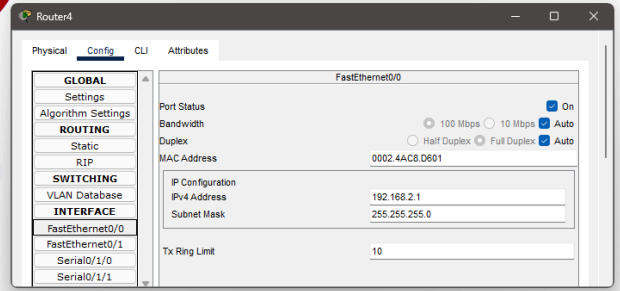
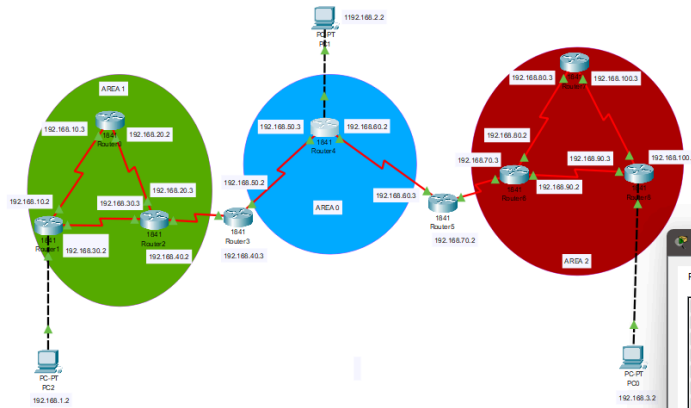
Pc 1:-



Pc 3:-

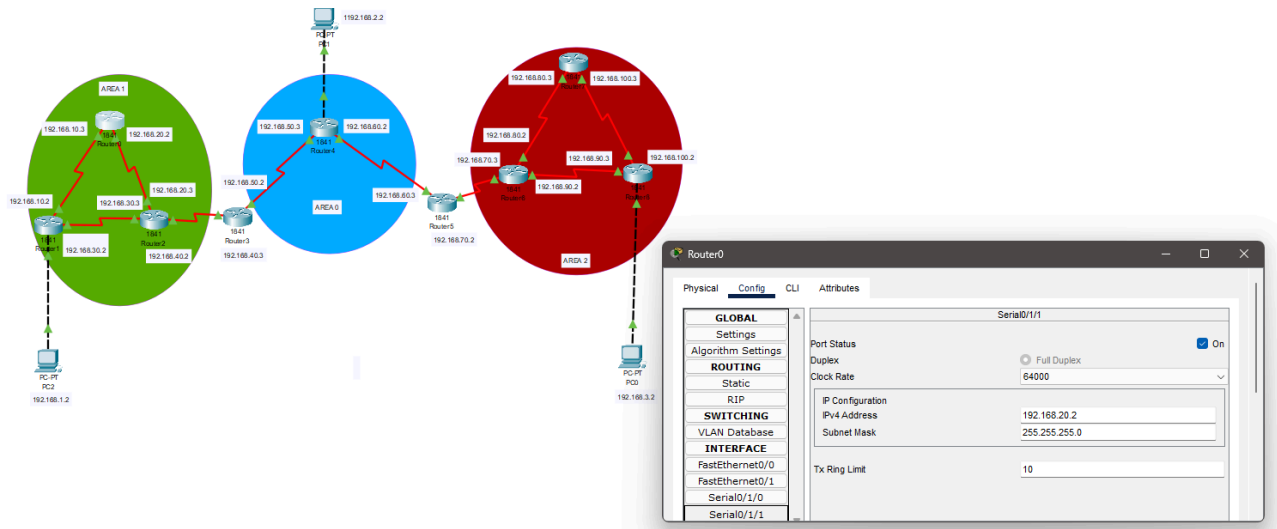
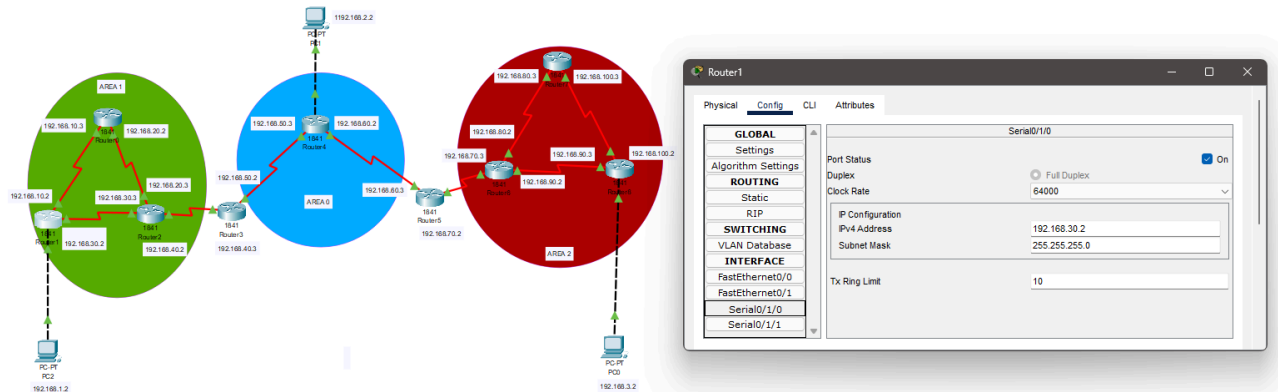


## Provide FastEthernet to all pc connected network

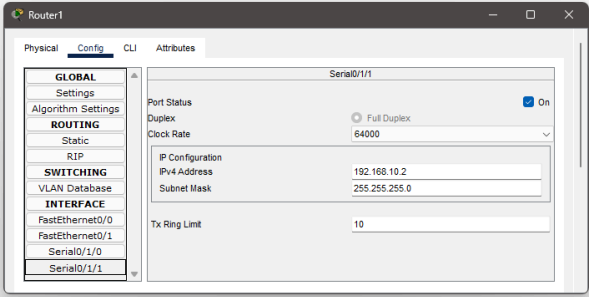
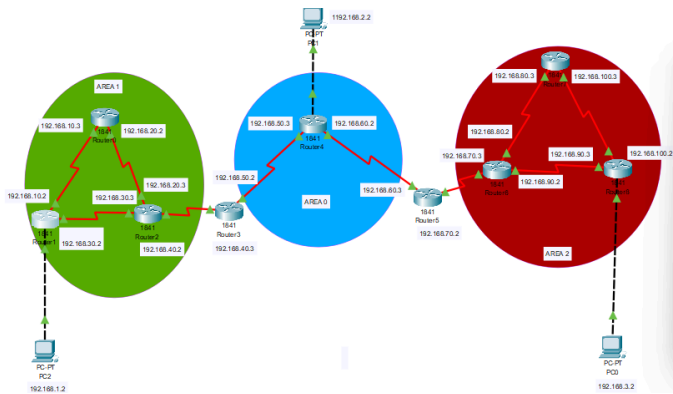
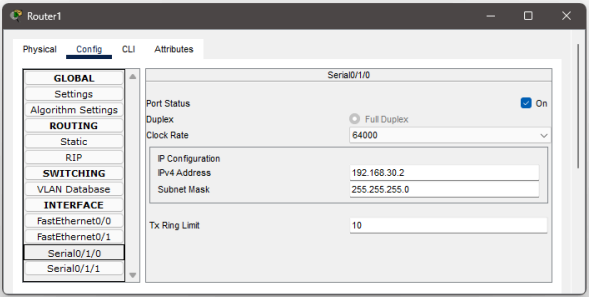
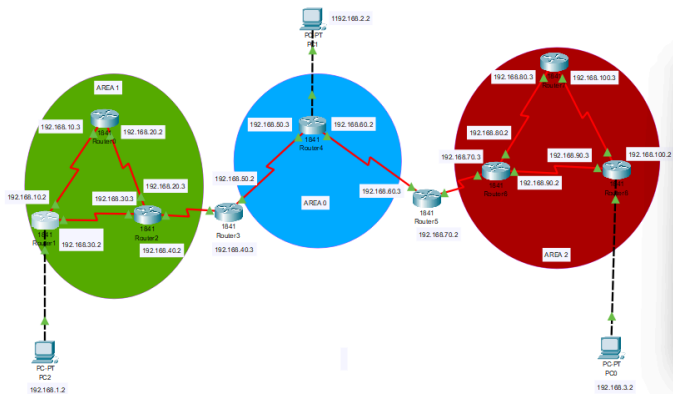


# Provide Serial Port Address To the all serial Ports

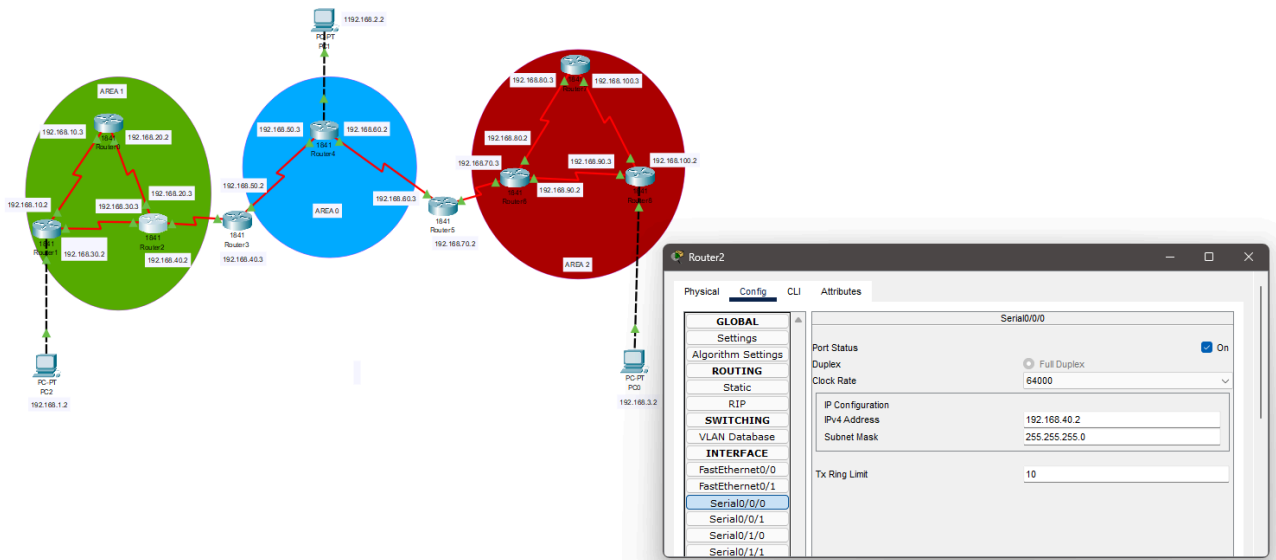
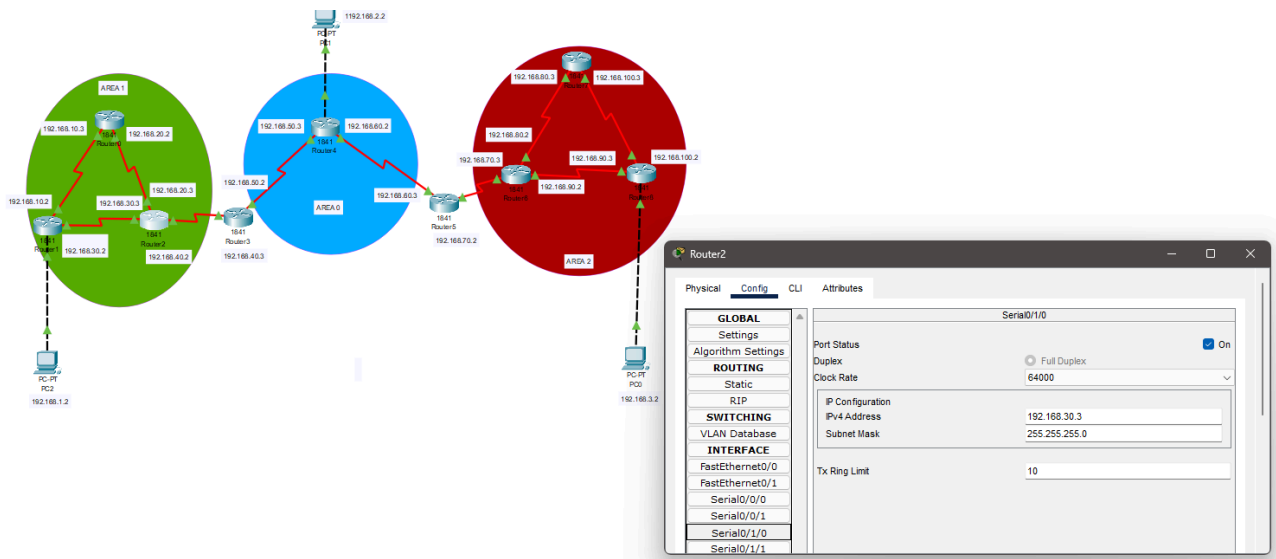
For Router 0



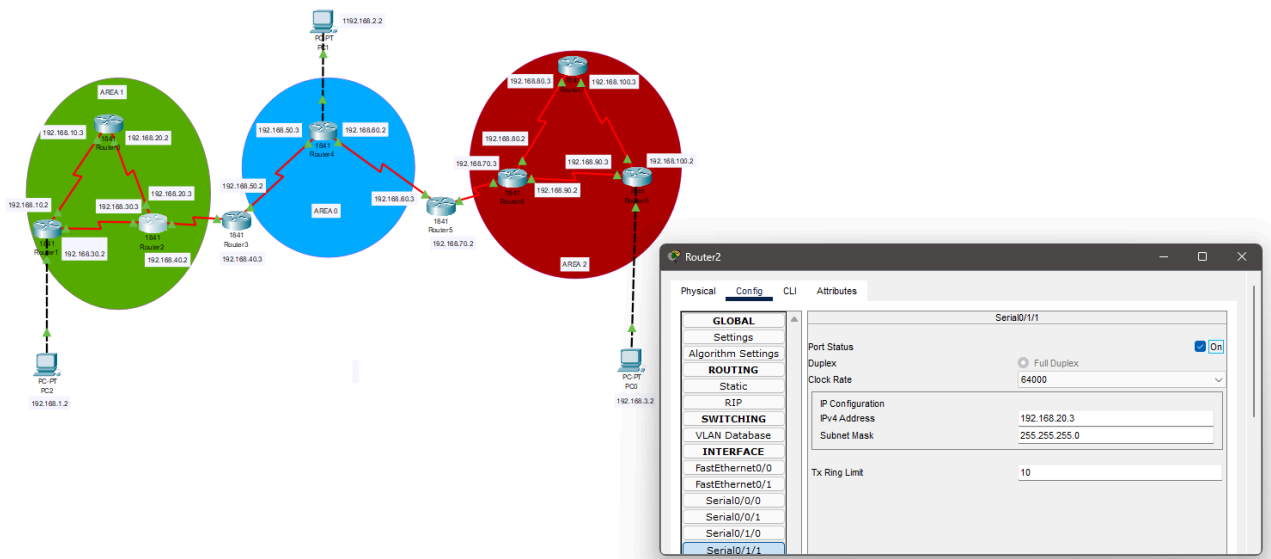
For Router 1



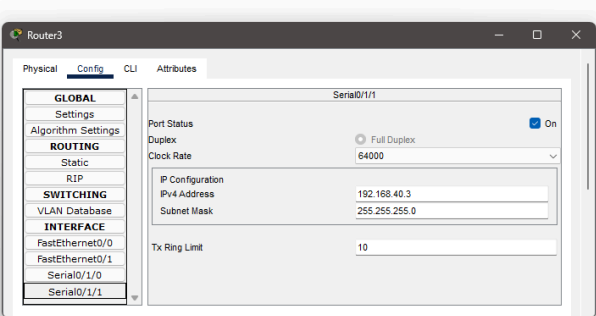
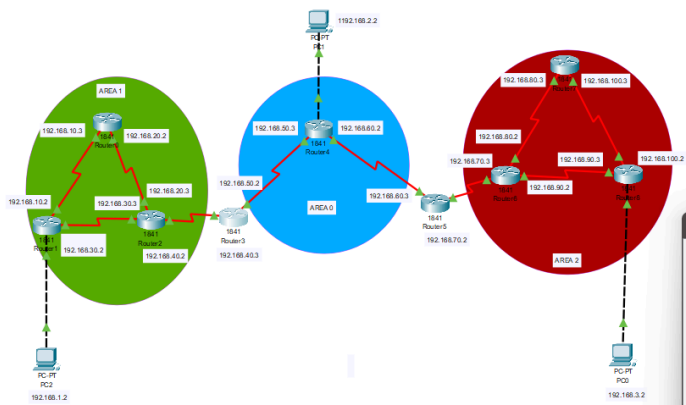
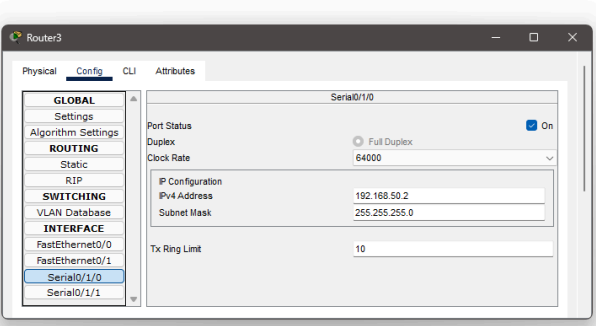
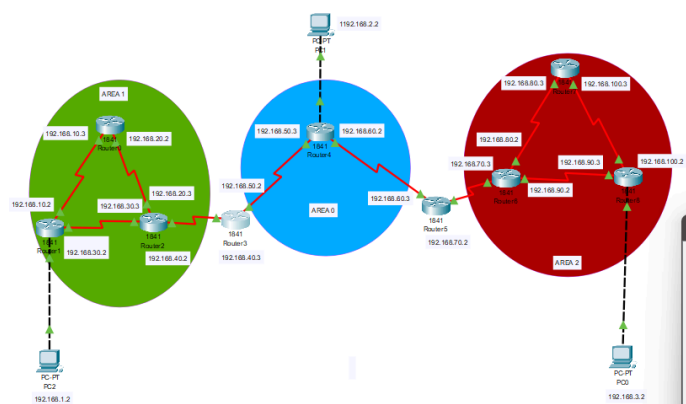
For Router 2



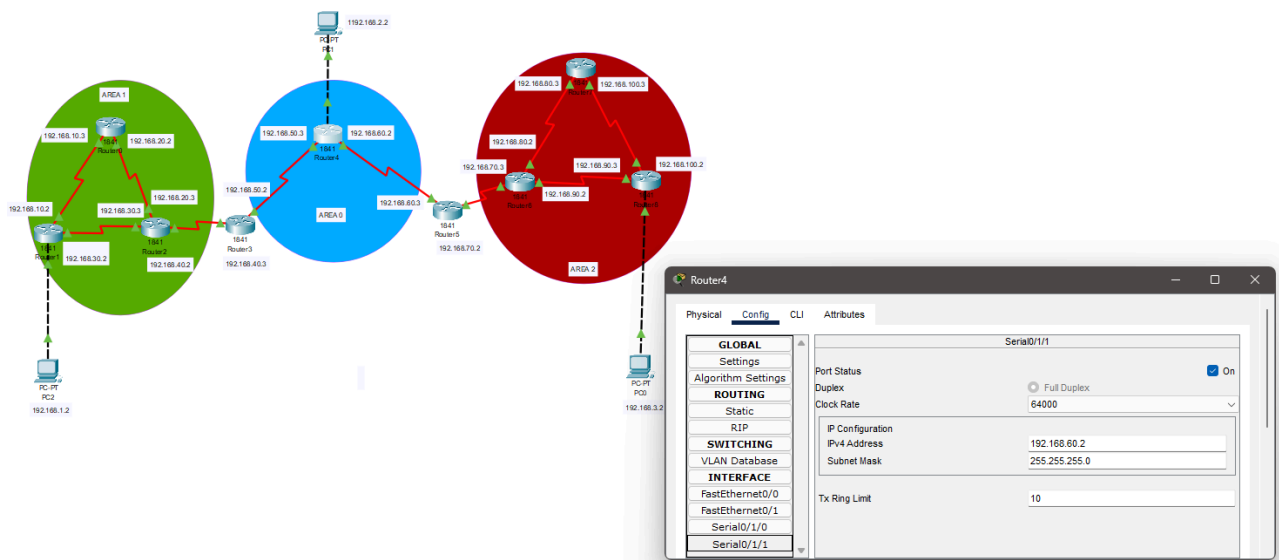
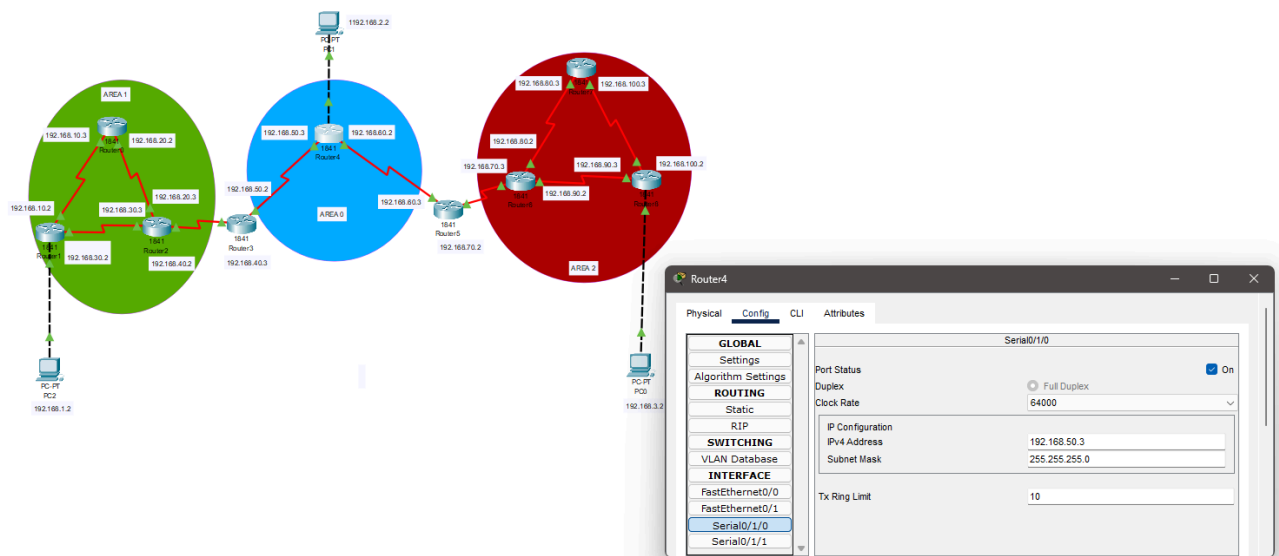




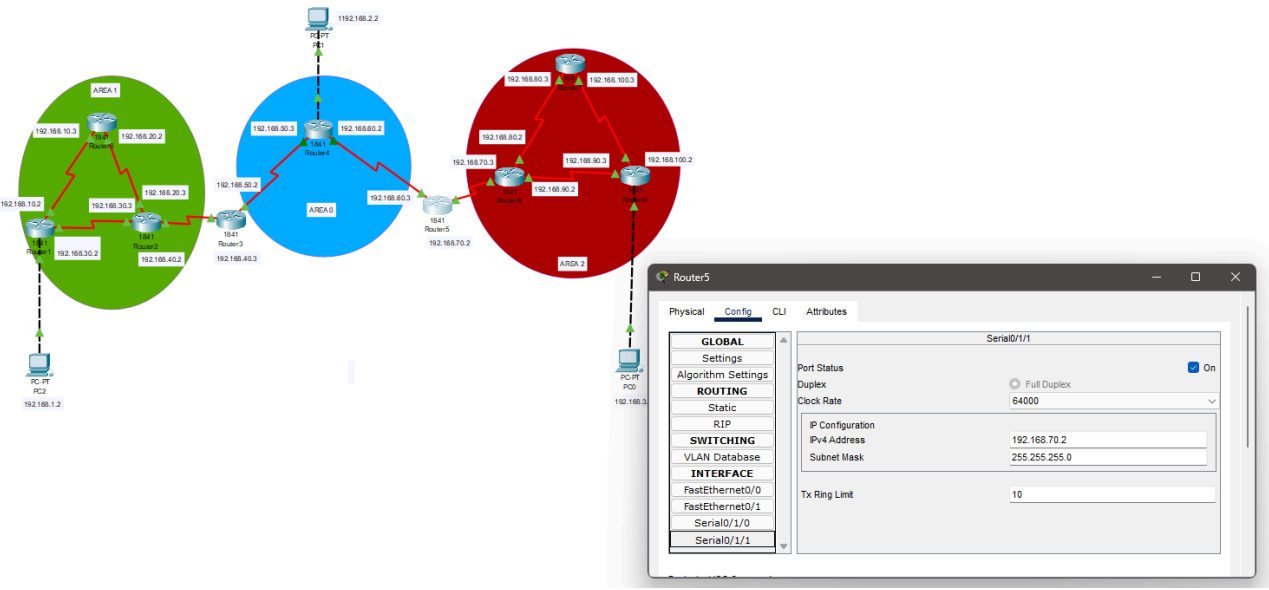
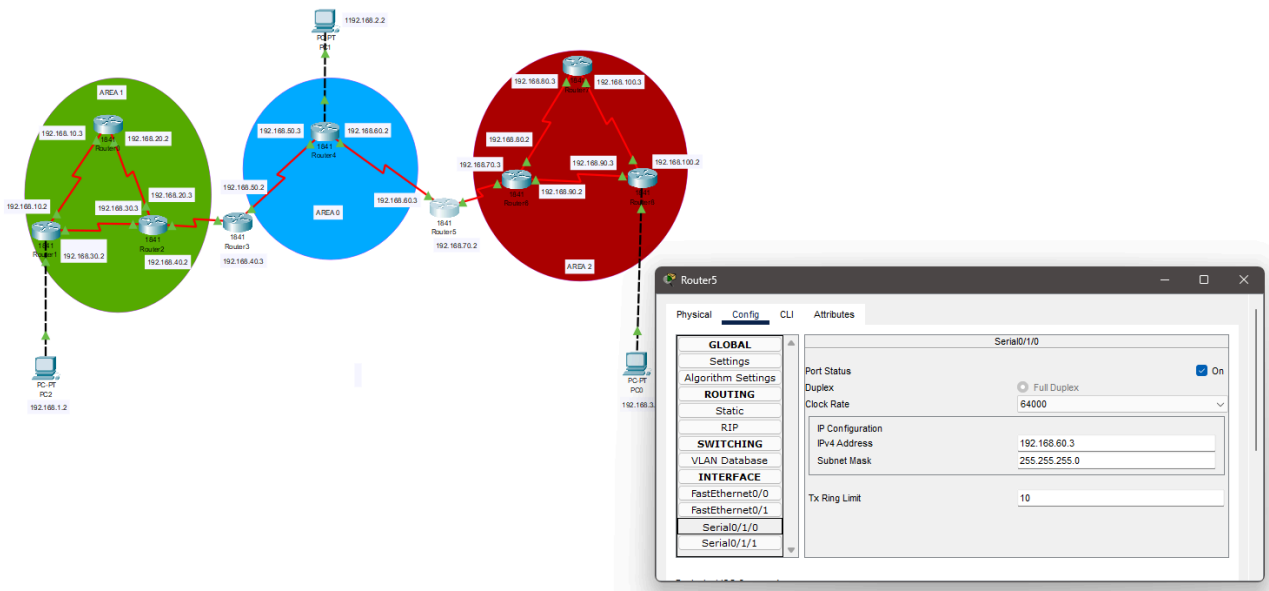
For Router 3



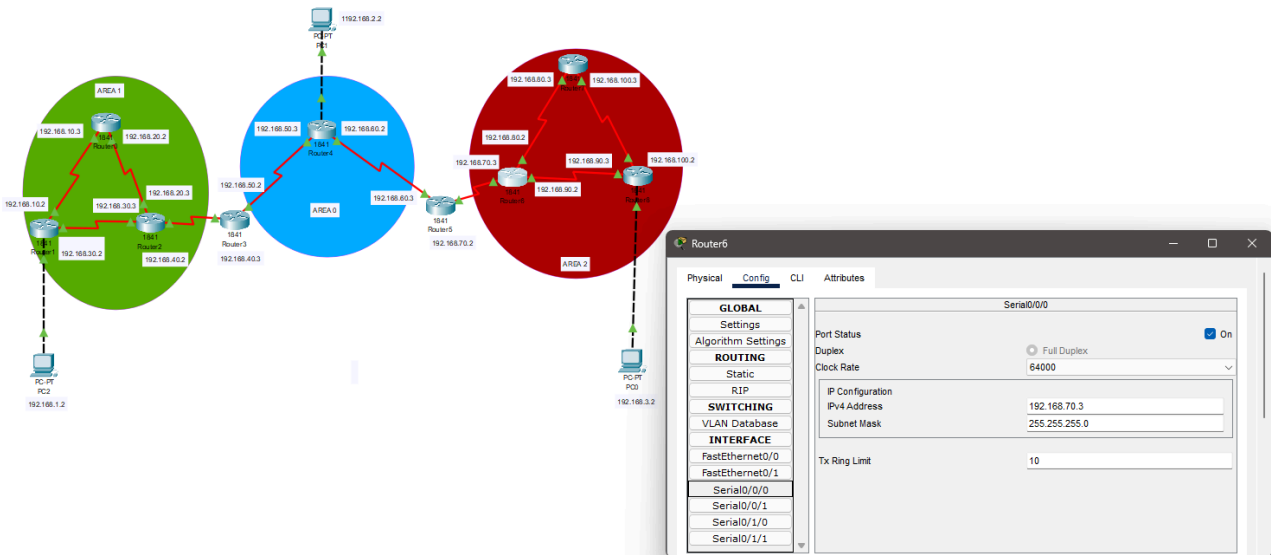
For Router 4

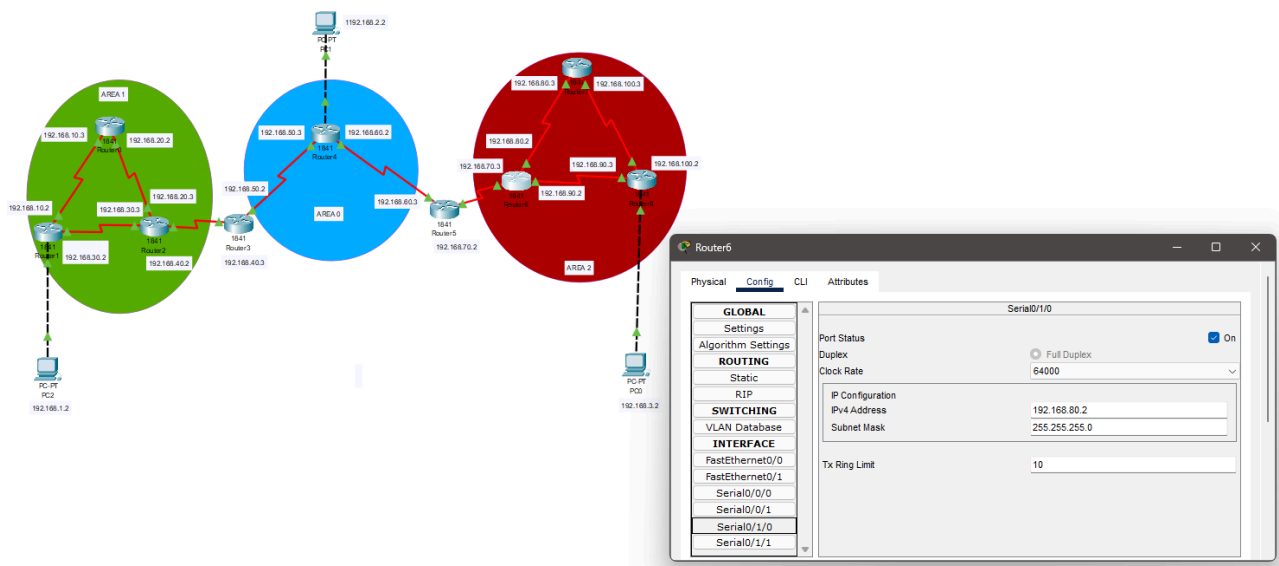


For Router 5

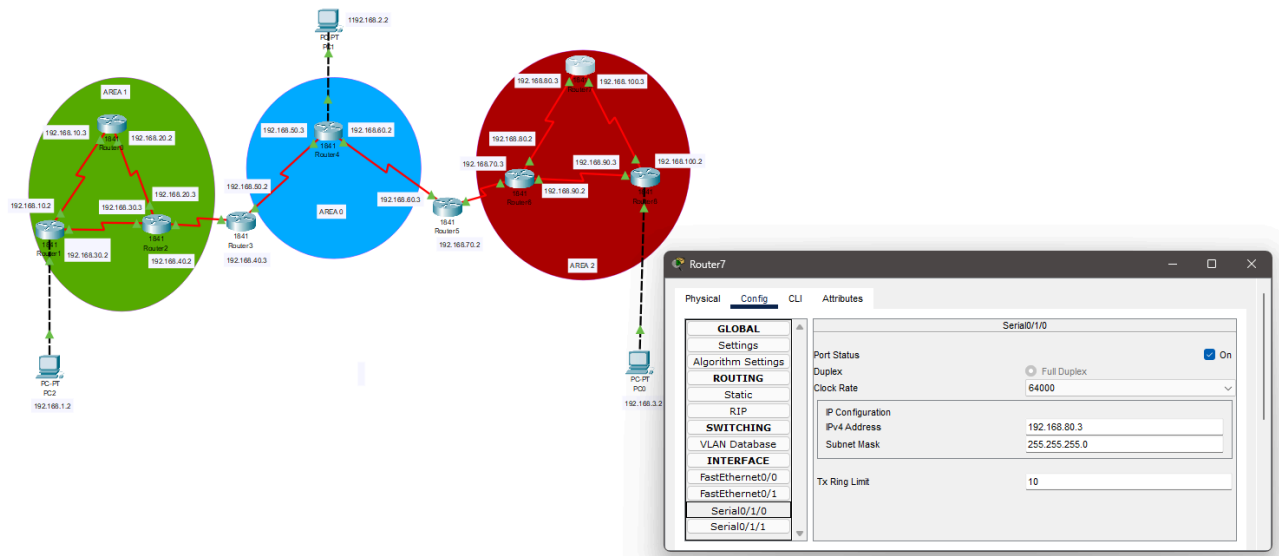


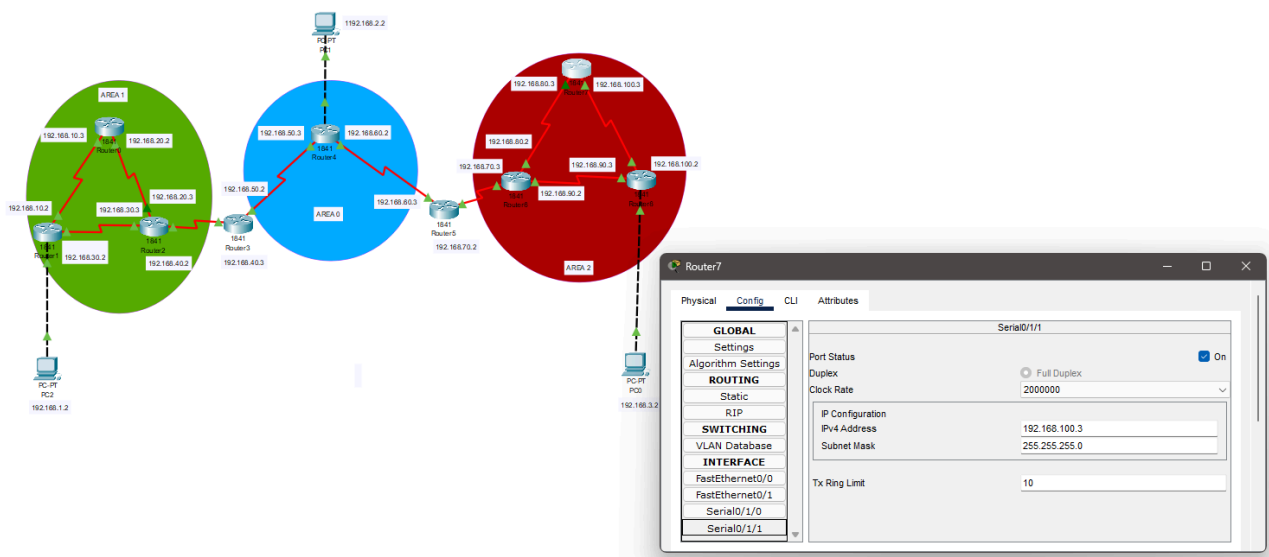
For Router 6



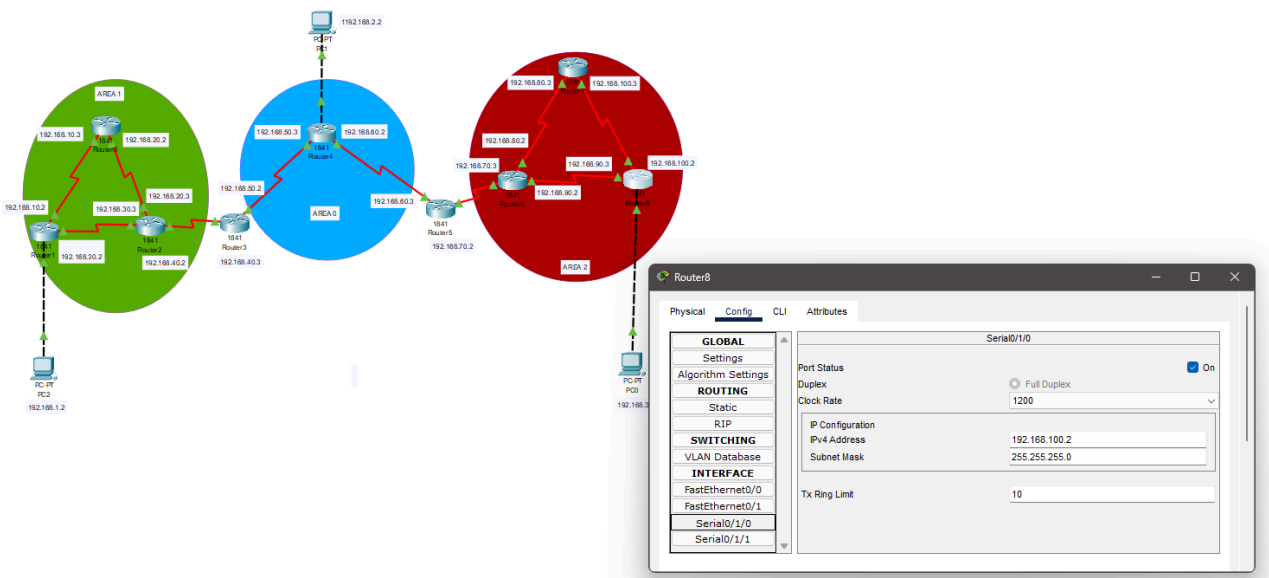


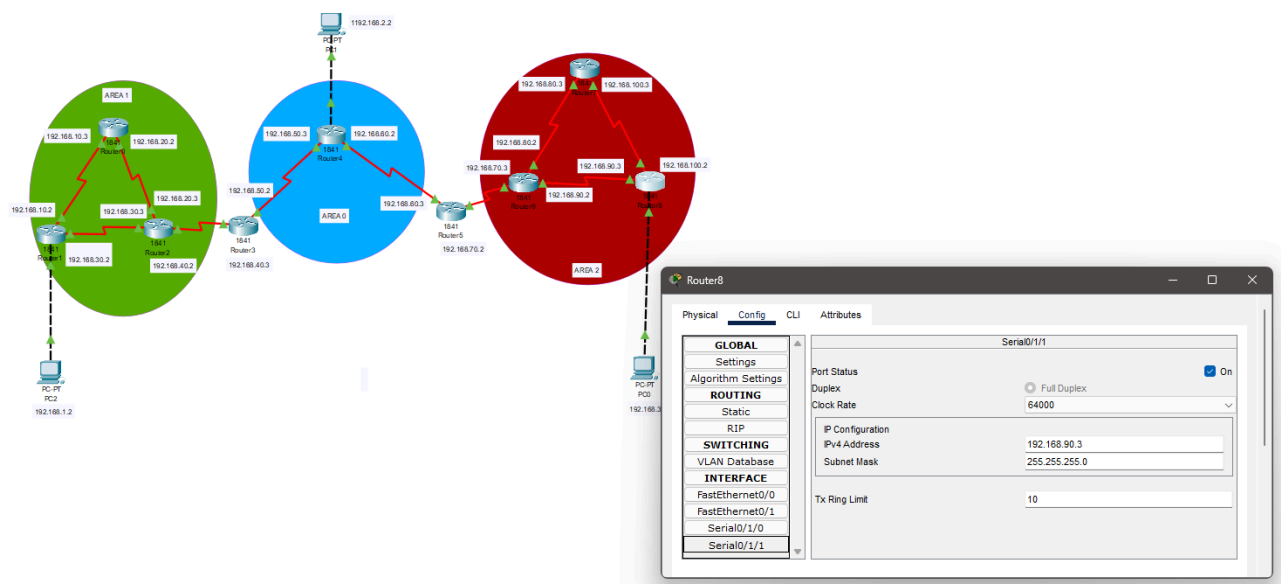
For Router 7





For Router 8



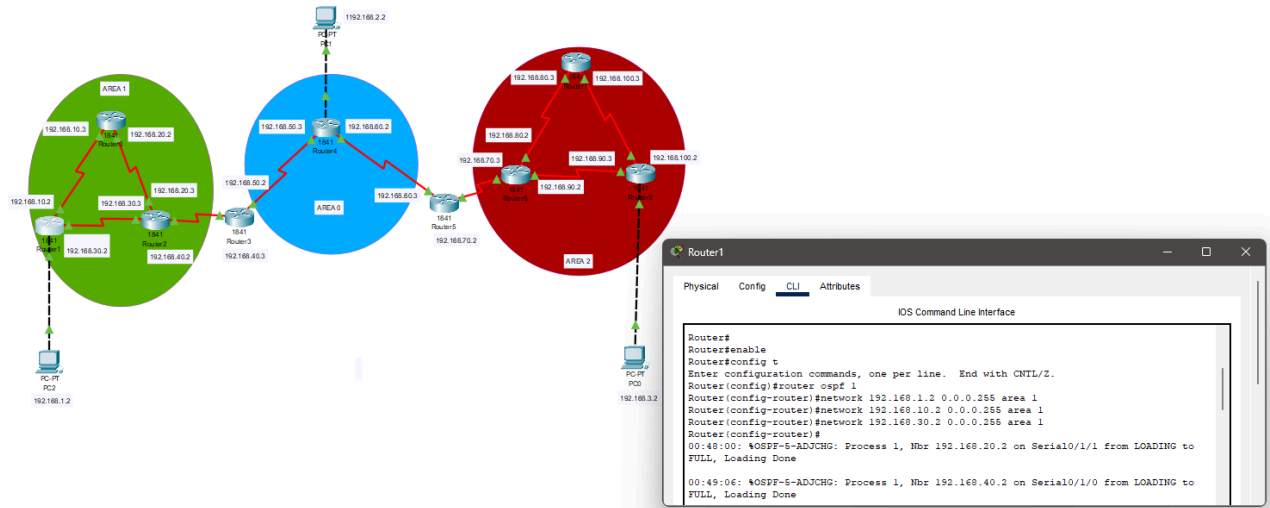




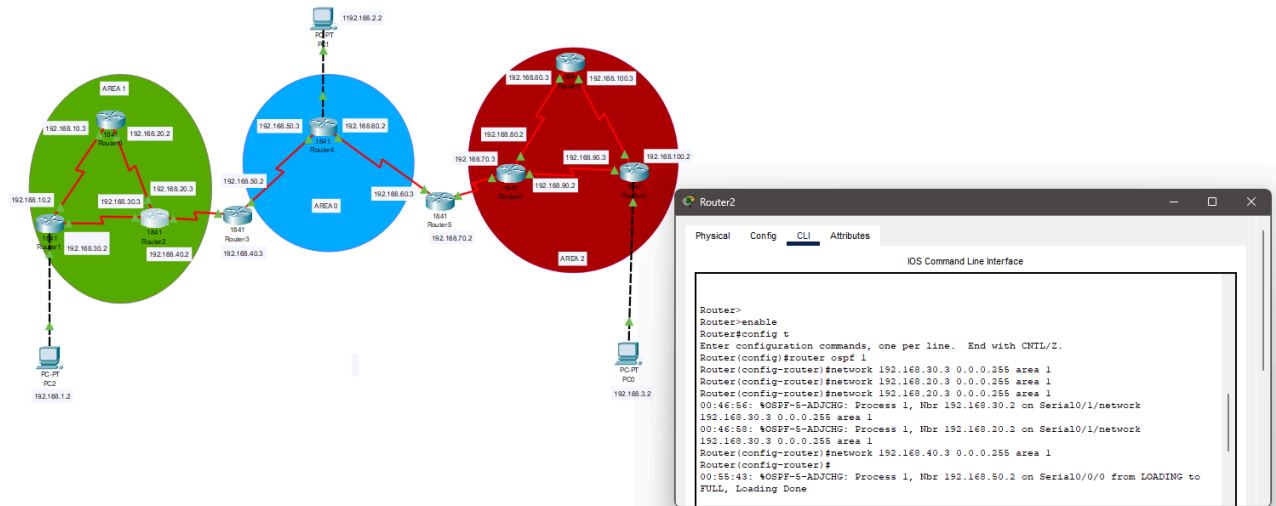


## Now Establishing OSPF PROTOCOL for all the routers

### For Router 1

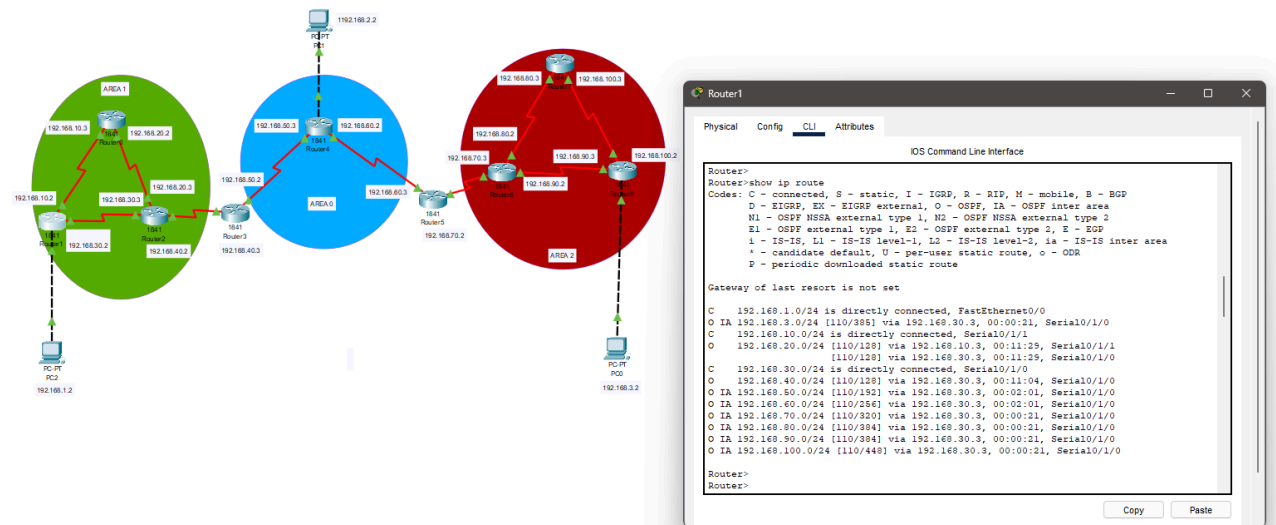


### For ROUTER 2

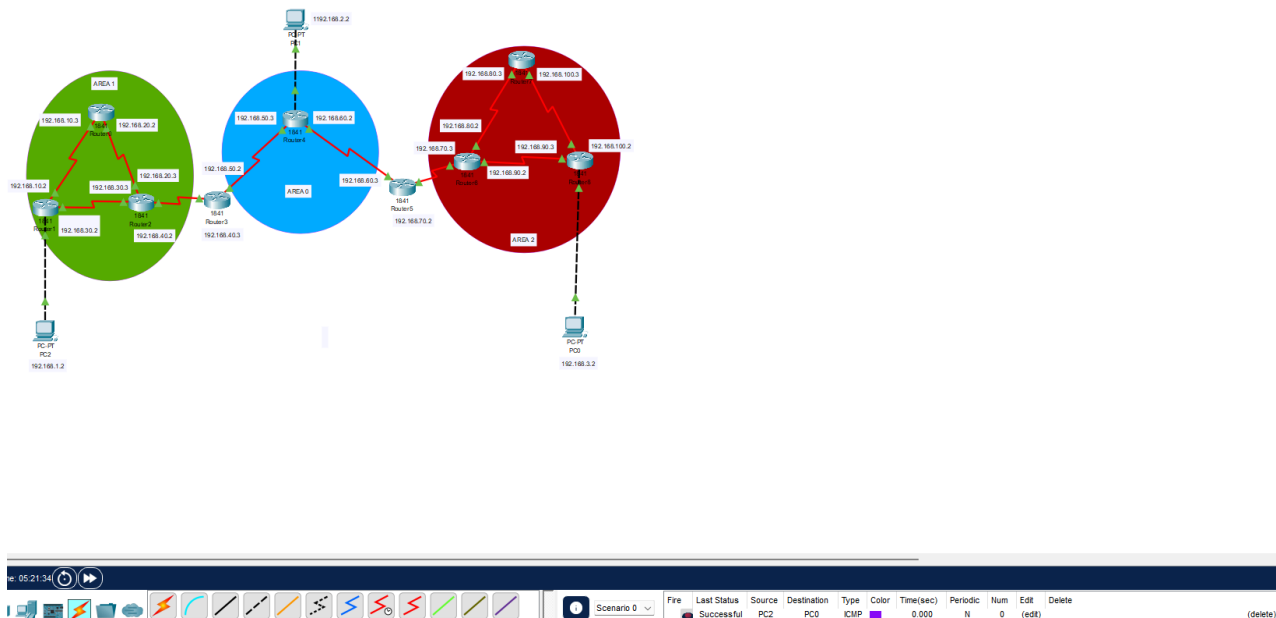




## SAME FOR ALL OTHER ROUTERS

Now , Checking wheather the OSPF protocol is established or not



## NOW Packet transfer



Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC2	PC0	ICMP		0.000	N	0	(edit)	

**The Protocol is well established ....**