ASSIGNMENT 2

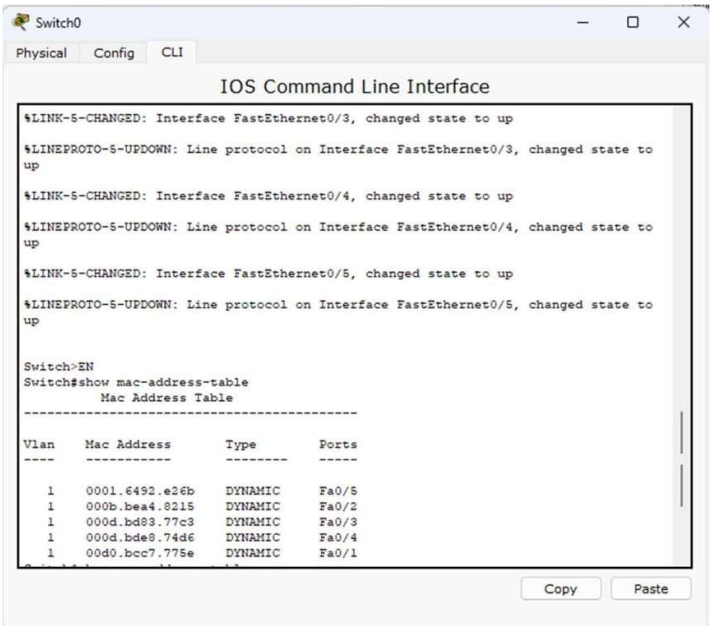
1)Create a LAN using switch on cisco packet tracer.

1) Switch is a layer 2 device which connects devices in a network to each other to establish Local Area Network.

2) The difference of switch from hub is switch has memory. It stores MAC address table in memory. Switch can do unicast, multicast and broadcast depending on the requirement.

3) Take one 2960 switch and 5 end devices.Connect these 5 end devices to switch using Ethernet straight through cable.Set IP address for each device.

4) I want to send data from PC0 to PC2.Now PC0 sends data to port 1 of switch. Switch stores MAC address of end device and port number to which interface that end device is connectedin the MAC address table.



5) So,the data is sent to port based on destination MAC address present in MAC address table.In our case port 3.Then data is sent directly to PC2.

6) Acknowledgement also follows same path.

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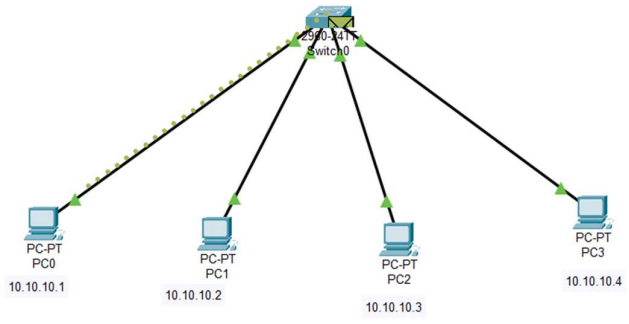

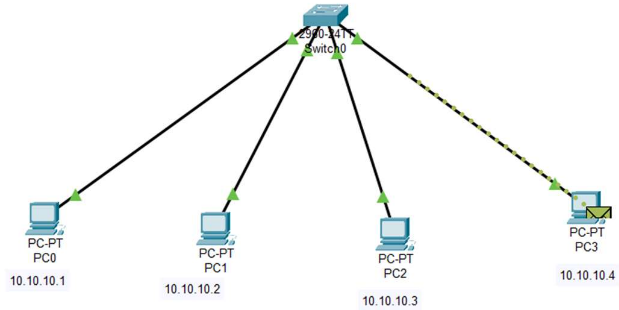

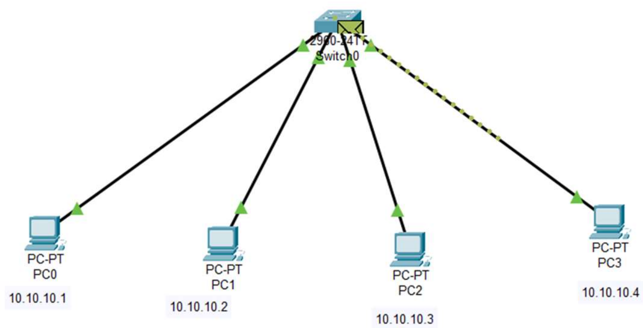

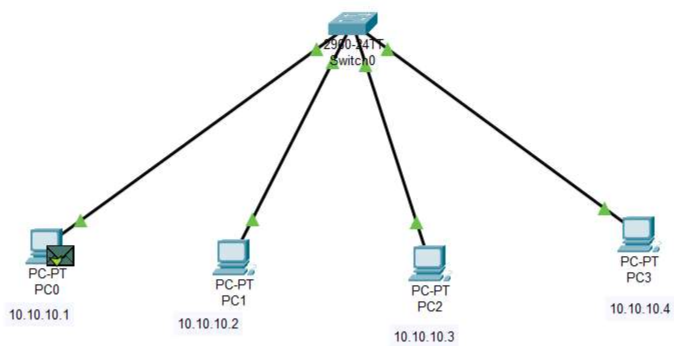

2) Implement LAN topologies:

A) STAR

1) In star topology,all the devices are connected to a single hub through a cable.This hub is the central node and all other devices are connected to the central node.The central node can be switch or hub.
2) Whenever a node tries to connect with another node then the transmission of the message must be happening with the help of the central node.
3) Each device requires only one port to connect to central node hub,therefore total number of ports required is n(n is number of end devices).

Advantages:

1) If n devices are connected to each other in a star topology,number of cables required to connect them is n.So,it is easy to set up.
2) It is robust.If one link fails only that link will affect that end device only not other than that.
3) Easy to fault identification and fault isolation.
4) It is cost-effective as it uses inexpensive coaxial cable.

Disadvantages:

1) If the concentrator(hub) on which the whole topology relies fails,the whole system will crash down.

2) The cost of installation is high.

3)Performance is based on central node hub.

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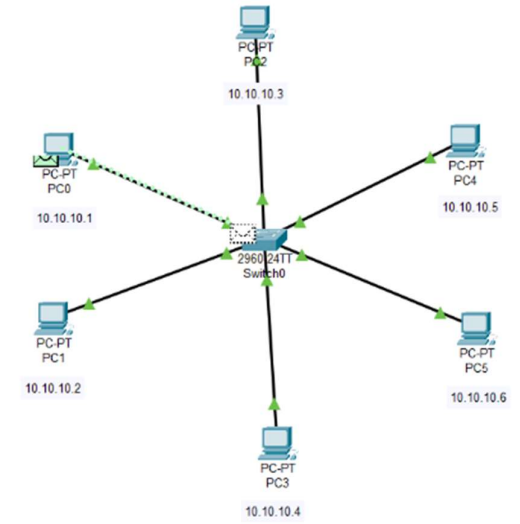

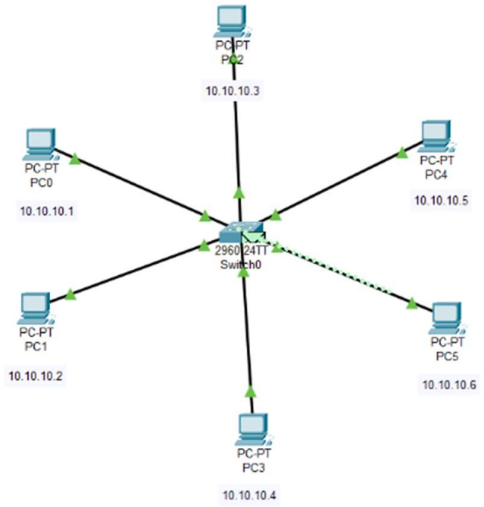

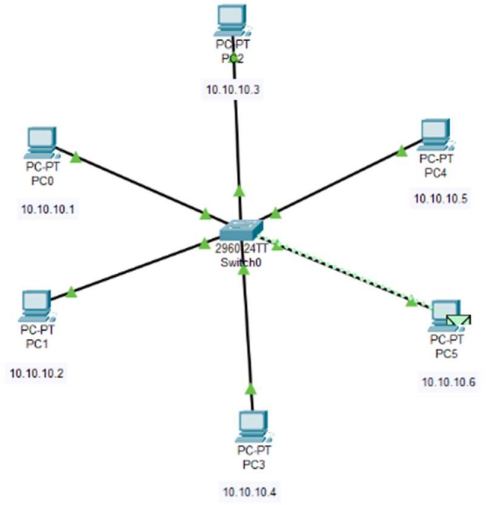

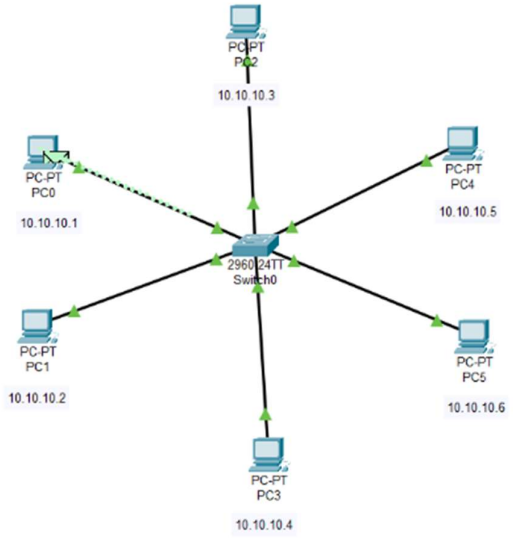

B) MESH

1)In a mesh topology,every device is connected to another device via a particular channel.

2)Suppose,N number of devices are connected with each other in a mesh topology,then the total number of dedicated links required to connect them are ${}^{N}C_{2} = N(N-1)/2$.

3)In the mesh topology,each and every device sends its own signal to the other devices that are present in the arrangement of the network.

Advantages:

1)Communication is fast between the nodes.
2)It is robust.
3) The fault is diagnosed easily.
4) Data is reliable because data is transferred among the devices through dedicated channels or links.
5) Provides security and privacy.

Disadvantages:

1) Installation and configuration are difficult.
2) The cost of cables is high as bulk wiring is required,hence suitable for less number of devices.
3)The cost of maintainance is high.

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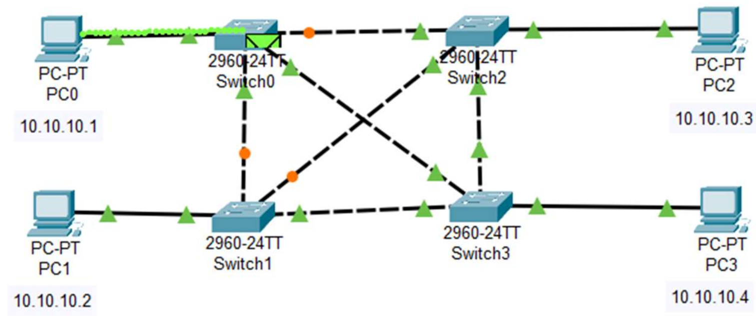
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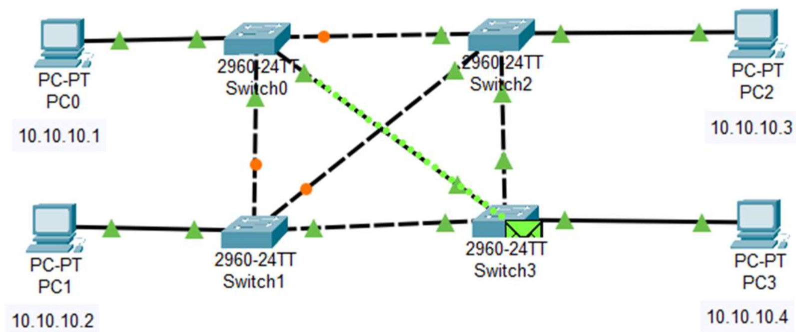
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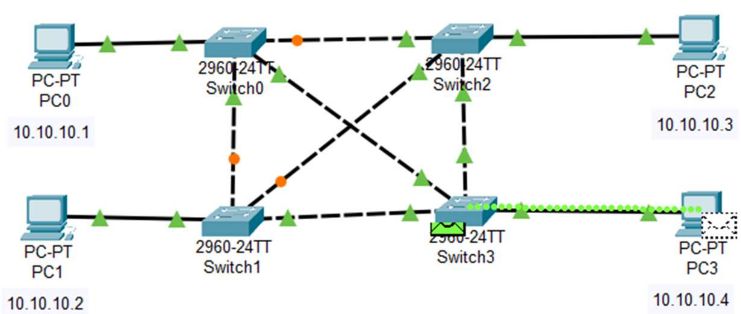
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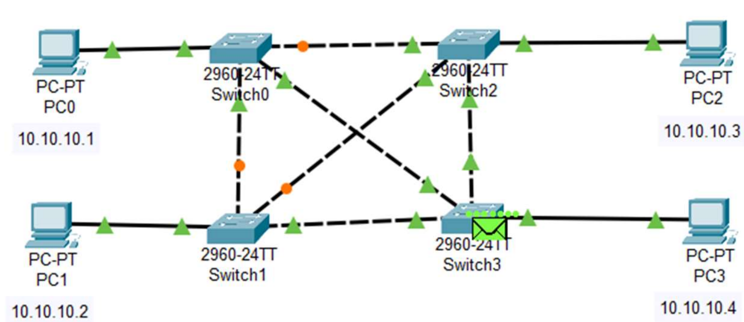
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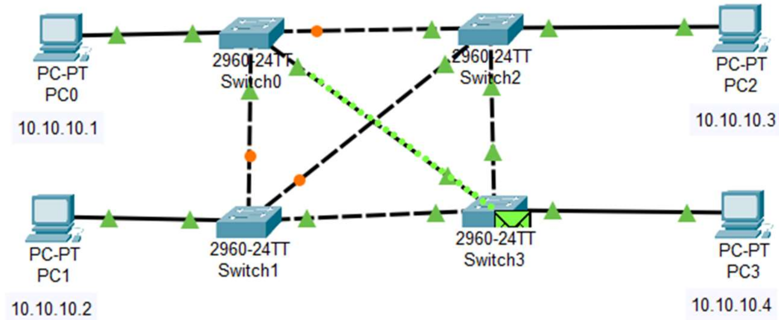
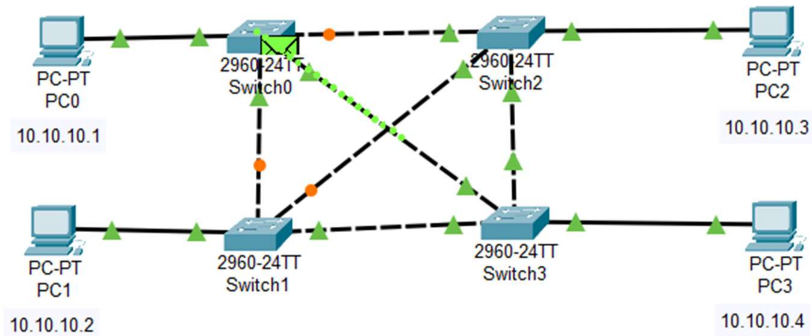
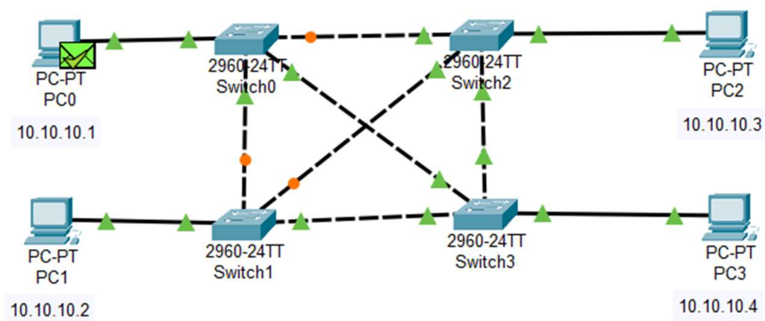






C)BUS

1)Bus topology is a network type in which every computer and network device is connected toa single cable.
2)It is bidirectional.
3)It is a multi-point connection and a non-robust topology because if the backbone fails the topology crashes.
4)In bus topology,the nodes are connected to the channel via droplines.

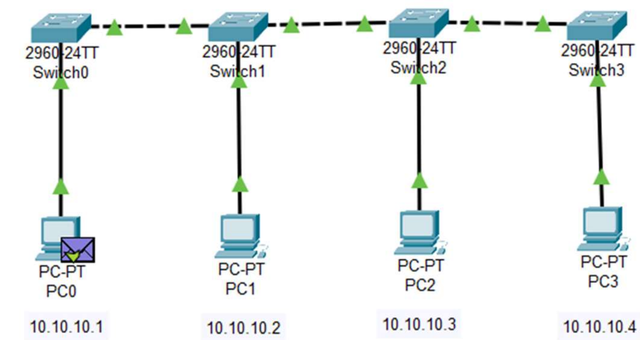
Advantages:

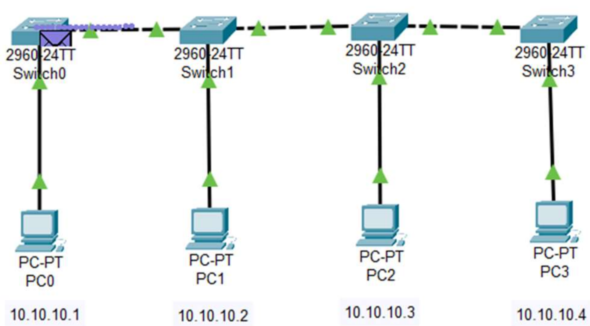
1)If N devices are connected to each other in a bus topology,then the number of cables requiredto connect them is 1,known as backbone cable,and N droplines are required.
2)Coaxial or twisted pair cables are mainly used in bus-based networks that support upto10 MBPS.
3)The cost of cable is less compared to other topologies,but it is used to build small networks.
4)Bus topology is familiar technology as installation and trouble shooting techniques are well known.

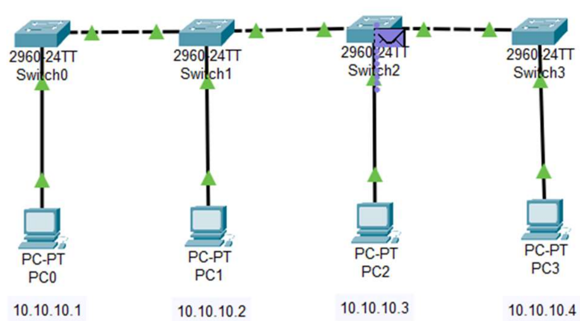
Disadvantages:

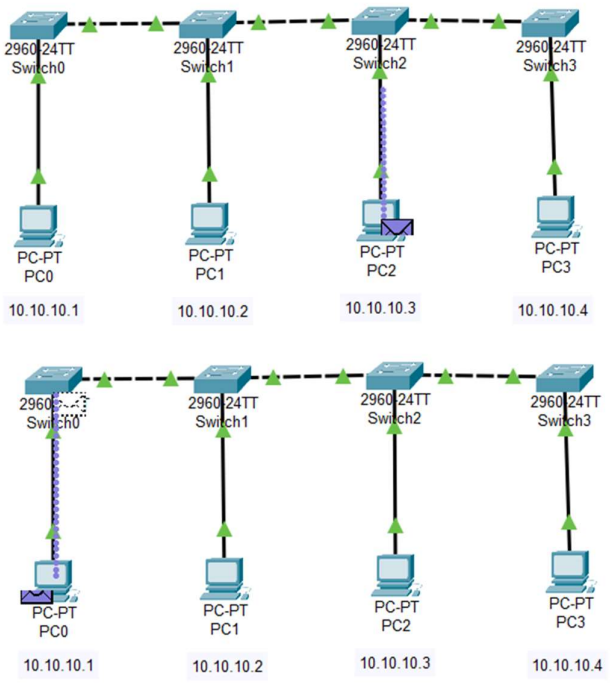
1)A bus topology is quite simpler,but still,it requires a lot of cabling.
2)If the common cable fails,then the whole system will crash down.
3)If the network traffic is heavy,it increases collisions in the network.To avoid this various protocols are used in the MAC layer known as pure Aloha,Slotted Aloha,CSMA/CD etc.
4)Adding new devices to the network would slow down networks.
5)Security is very low.

OUTPUT SS:









D)RING

1) In ring topology,it forms a ring connecting devices with exactly two neighbouring devices.
2) A number of repeaters are used for ring topology with a large number of nodes,because if someone wants to send some data to the last node in the ring topology with 100 nodes,then the data will have to pass through 99 nodes to reach the 100^{th} node.Hence to prevent data loss repeaters are used in the network.
3) The data flows in one direction i.e, it is unidirectional,but it can be made bidirectional by having 2 connections between each network node,it is called Dual Ring Topology.In Ring Topology,the token ring passing protocol is used by the workstations to transmit the data.

Advantages:

1) The data transmission is high-speed.
2) The possibility of collision is minimum in this type of topology.
3) Cheap to install and expand.
4) It is less costly than a star topology.

Disadvantages:

1) The failure of a single node in the network can cause the entire network can cause the entire network to fail.
2) Troubleshooting is difficult in this topology.
3) The addition of stations in between or the removal of stations can disturb the whole topology.
4) Less secure.

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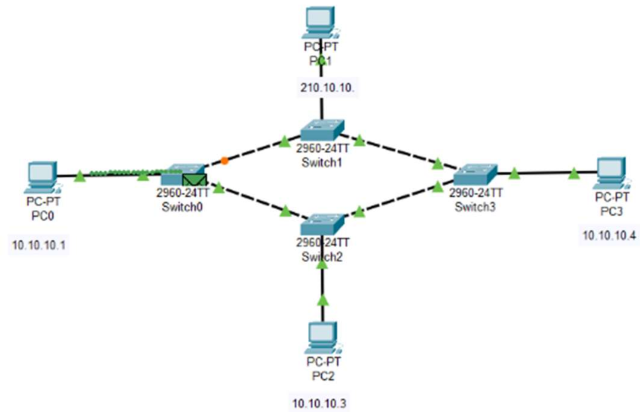
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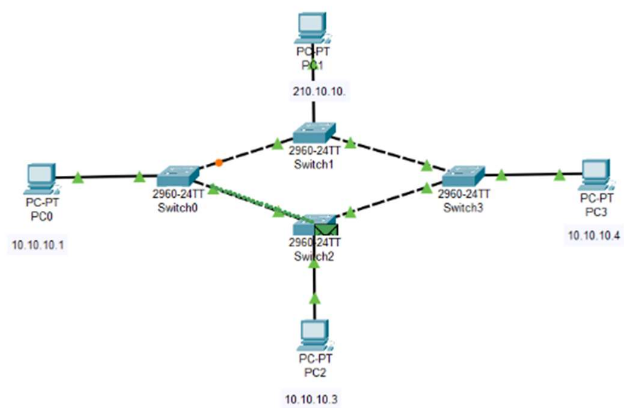
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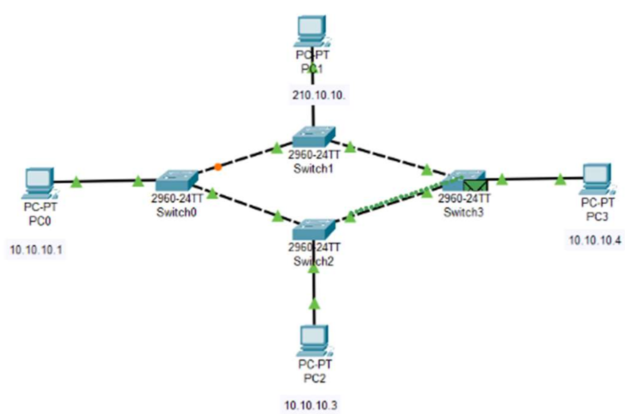
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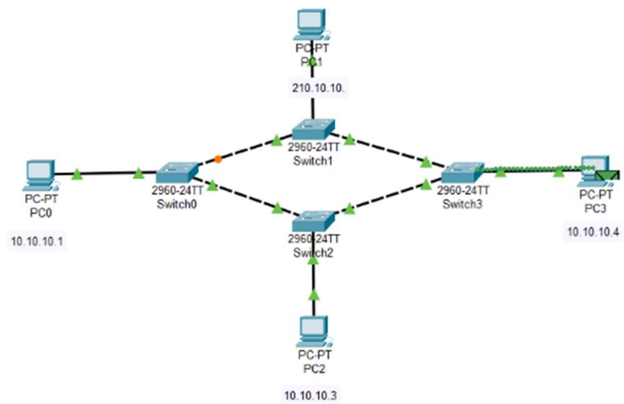
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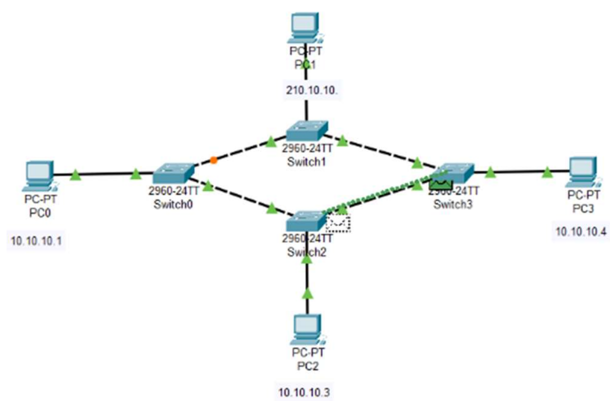
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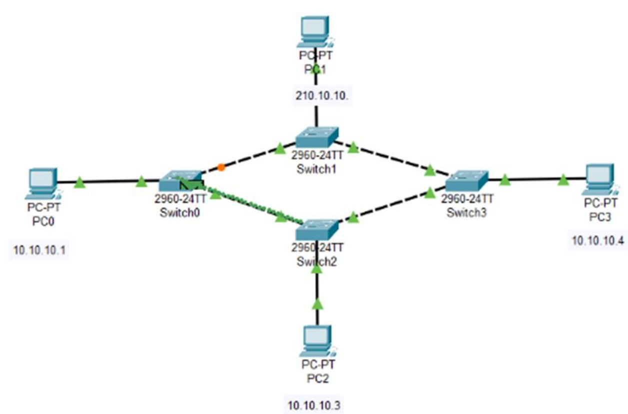
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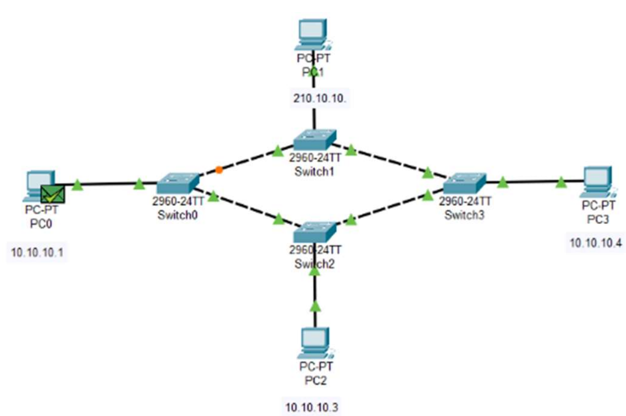
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