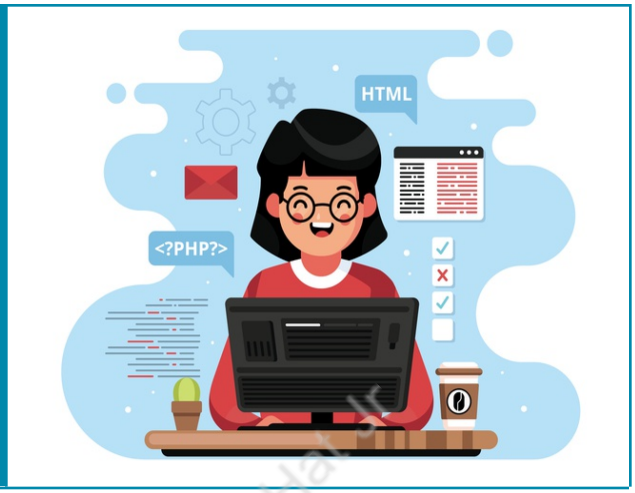
# TOPOLOGIES




## What is our GOAL for this MODULE?

The goal of this module is to  learn about different types of connections between the computers, topologies and  to create the topologies.

## What did we ACHIEVE in the class TODAY?

We learned about topologies and created topologies.

## Which CONCEPTS/CODING BLOCKS did we cover today?

- We learned about the topologies
- We learned to create the topologies.

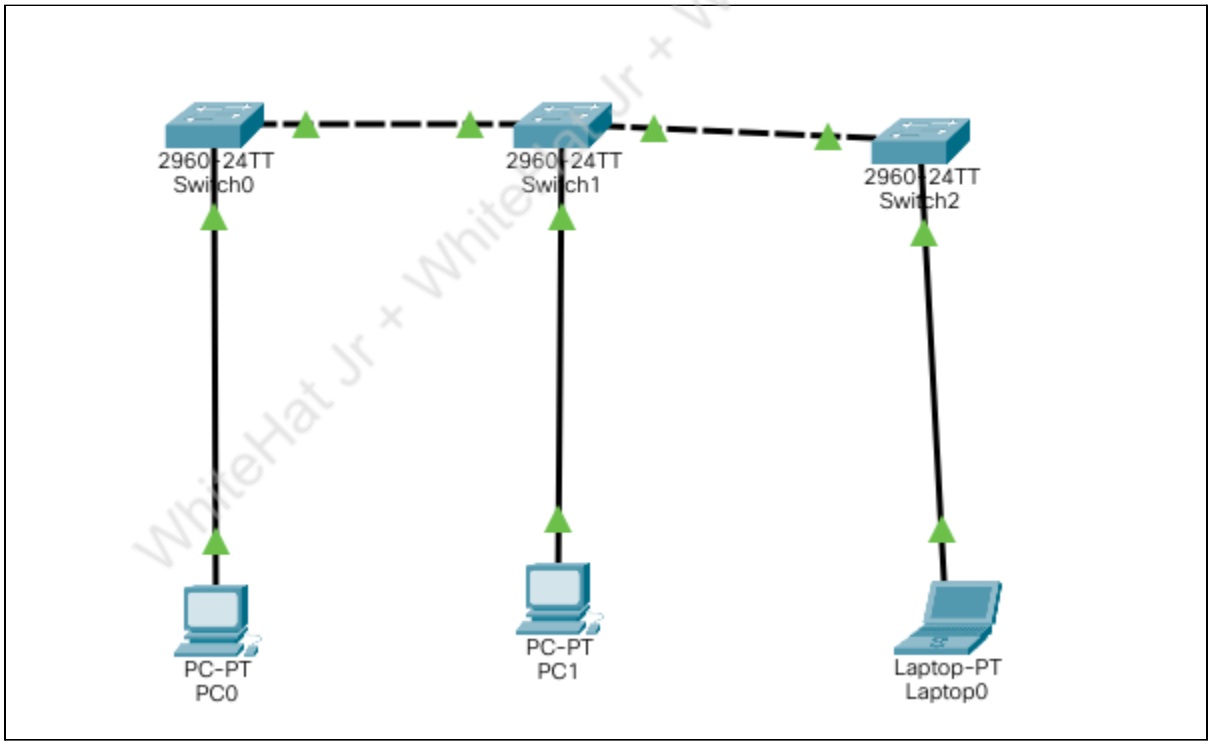
## The KEY CONCEPT

1. What is Network topology?

   Network topology is the arrangement of the elements of a communication network. Network topology can be used to define or describe the arrangement of various types of telecommunication networks, including command and control radio networks, industrial field busses and computer networks.

2. Bus Topology

   The bus topology is designed in such a way that it connects all the stations/switches through a single cable which is also called the backbone cable.



3. CSMA(Carrier Sense Multiple Access)

CSMA is a media access control used to control the data flow so that data integrity is maintained, that is the packets do not get lost. There are two alternative ways of handling the problems that occur when two nodes send the message simultaneously.

- CSMA CD: CSMA CD (Collision detection) is an access method used to detect the collision. Once the collision is detected, the sender will stop transmitting the data. Therefore, it works on "recovery after the collision".

- CSMA CA: CSMA CA (Collision Avoidance) is an access method used to avoid the collision by checking whether the transmission media is busy or not. If busy, then the sender waits until the media becomes idle. This technique effectively reduces the possibility of collision. It does not work on "recovery after the collision".

4. Advantages and disadvantages of BusTopology

The advantages are

- Low-cost cable
- Moderate data speeds
- Familiar technology
- Limited failure

The disadvantages are

- Difficult troubleshooting
- Signal interference
- Reconfiguration is difficult
- Attenuation
- Extensive Cabling

5. Ring topology:

It is like a bus topology, but with connected ends. The node that receives the message from the previous computer will retransmit to the next node. The data flows only in one direction i.e it's unidirectional. The data in the ring topology flows in a clockwise direction.

The most common access method of the ring topology is token passing.

- Token passing: It is a network access method in which a token is passed from one node to another node.
- Token: It is a frame that circulates around the network. It contains the packets/data and the address of the receiver.

6. Advantages and disadvantages of the ring topology

   Advantages:-

   - Network Management
   - Product availability

   Disadvantages:

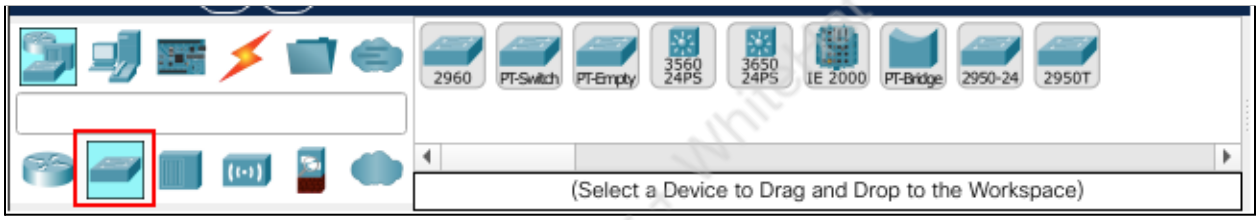
   - Difficult troubleshooting
   - Failure
   - Reconfiguration is difficult

## How did we DO the activities?

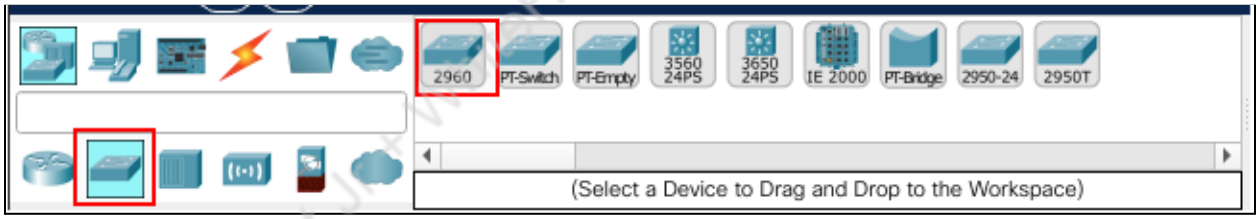
1. Devices needed to create bus topology
    - Switch, which will act as the nodes.
    - Computers or laptops, which will be connected to these nodes.
    - Wires to create the connections.

2. Open Cisco packet tracer software and create the switch

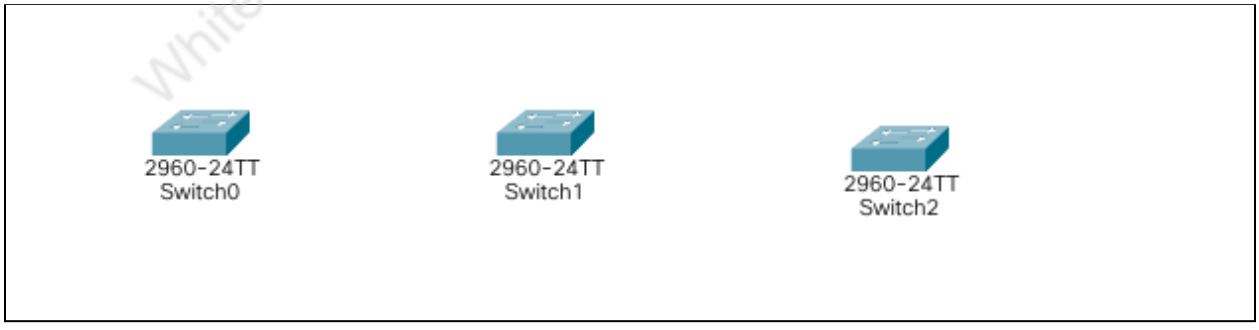
    - Click on switch option




    - Select any of the switches from the panel.

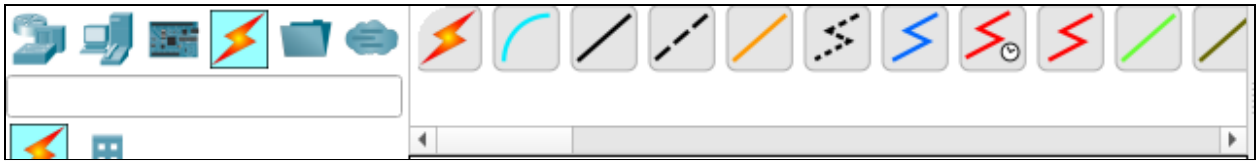



    - Get the switches on the canvas.



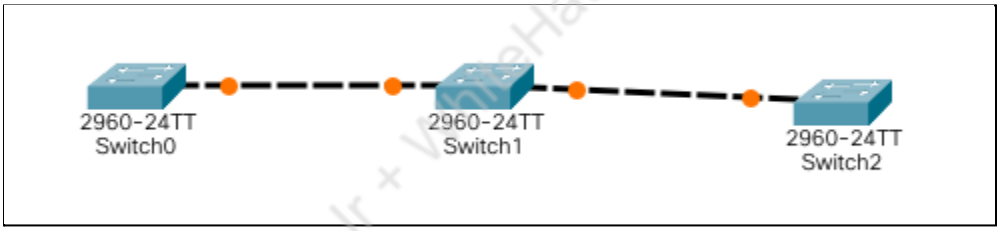
3. Join these switches using the cable

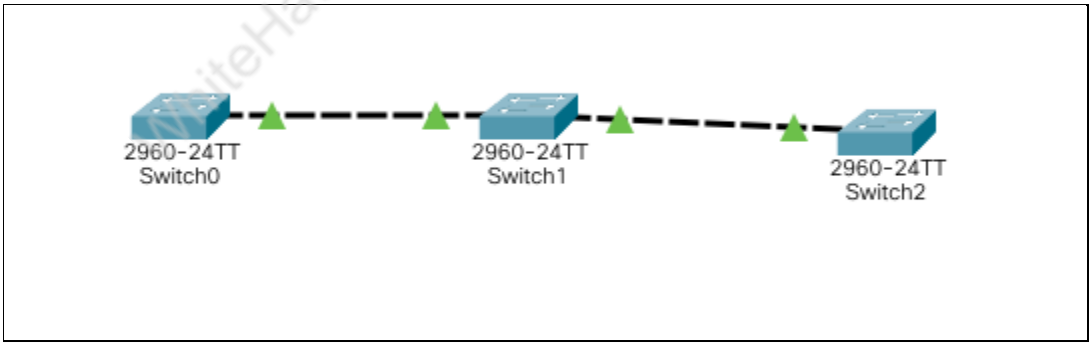
   - Click on the thunderbolt icon on the right panel



   - Click on the two switches it will select the correct cable automatically.

   - Join the switches with the cable and wait till the connection turns green.

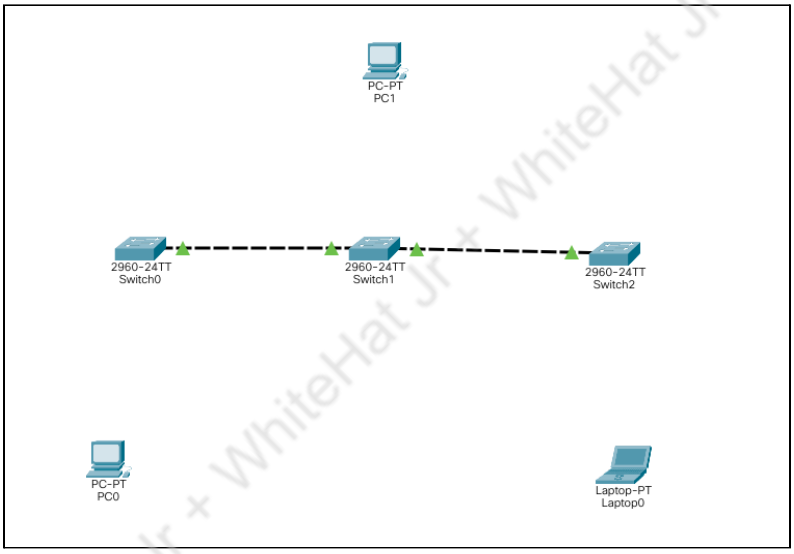


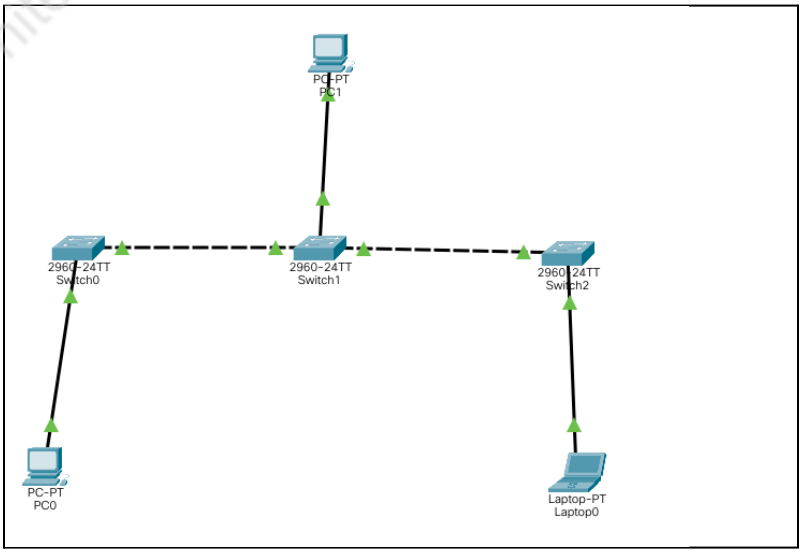
4. Add the devices to the canvas and connect them with the switches.

   - Click on the End devices option.

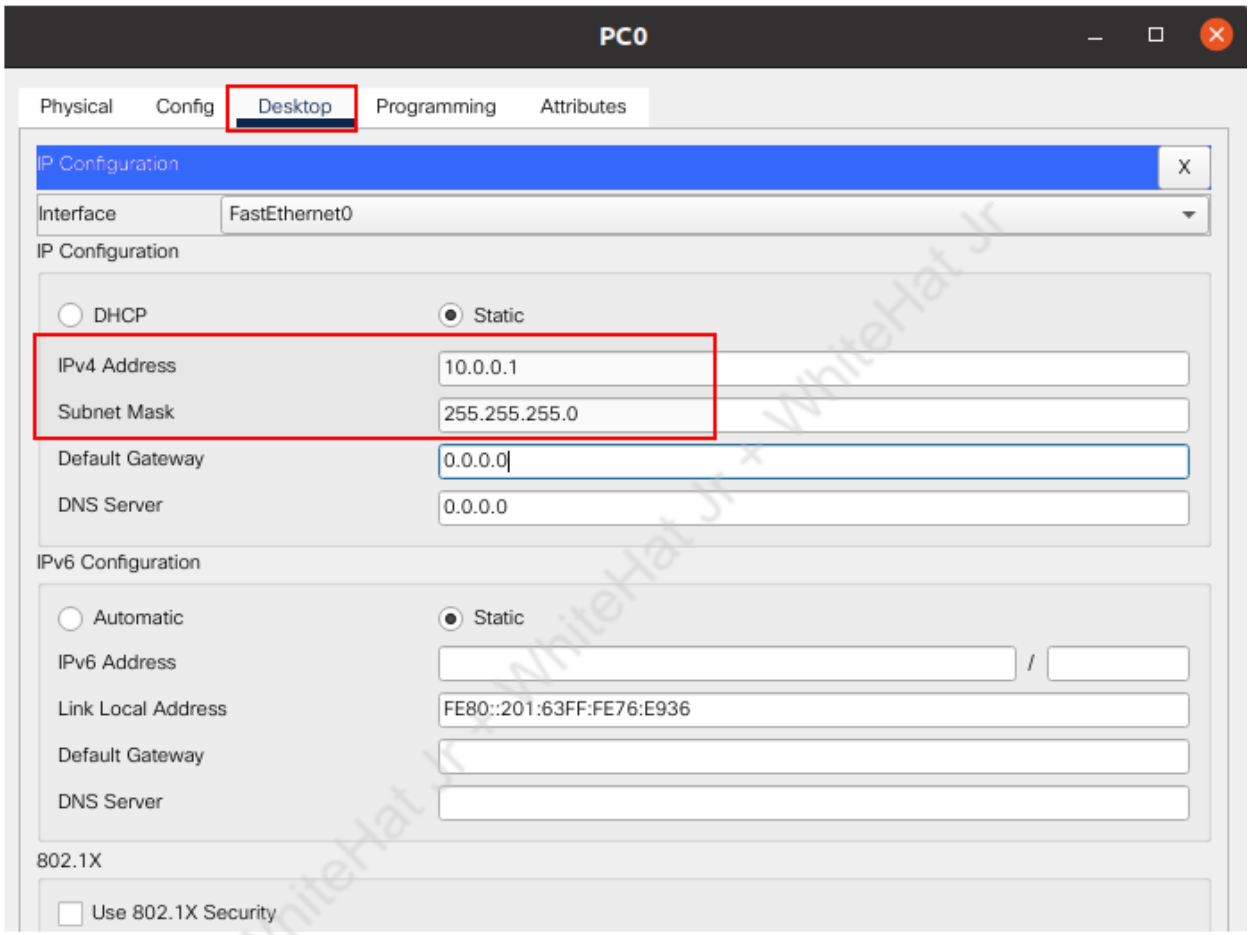

   - A panel of devices opens up. Select PC or laptop and add it to the canvas.




   - Connect on the devices using the wires.



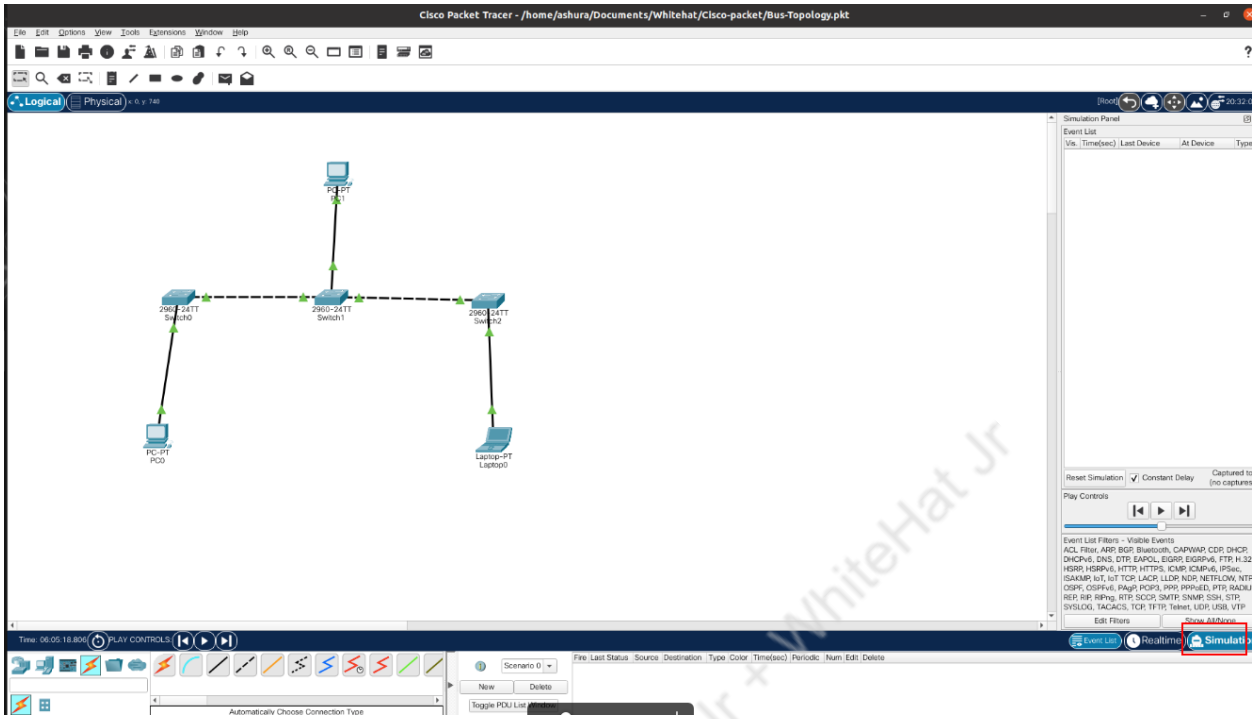
5. Add the IP address for each of the end devices.
    1. Click on one of the devices .
    2. Click on Desktop.
    3. Click on IP configuration.
    4. Set the IP and the subnet mask.



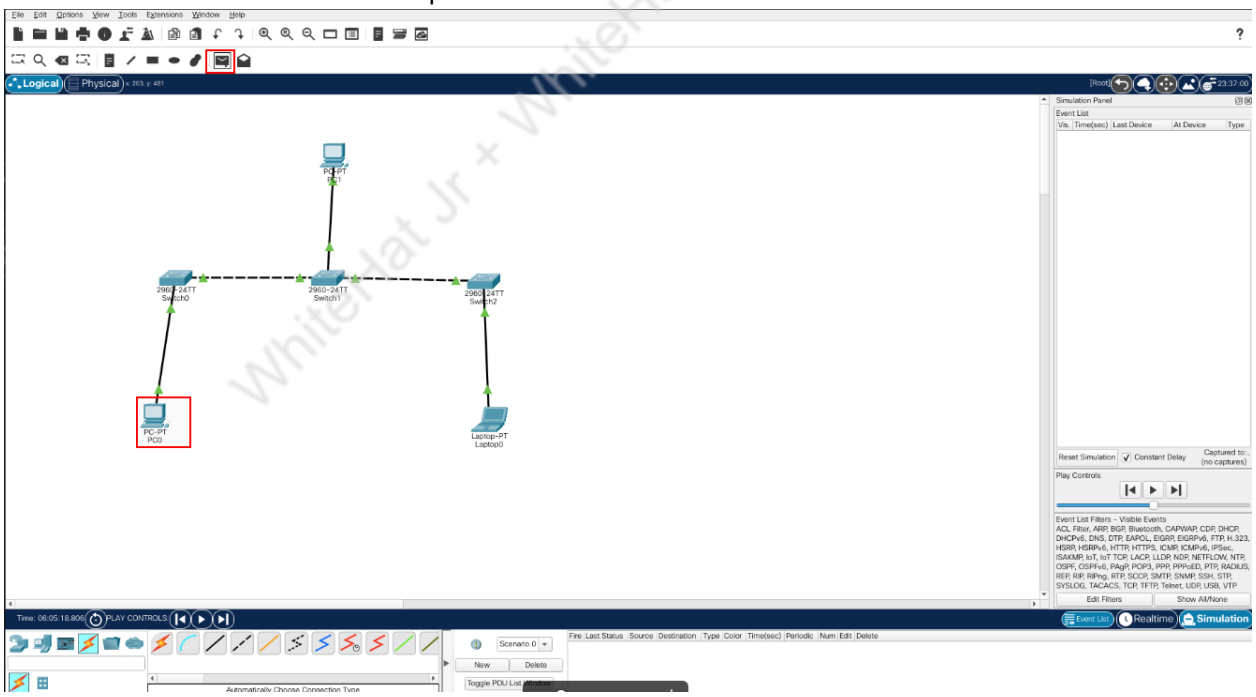

Note: Repeat the process for all devices.

6. Test the topology by sending some packets from PC0 to Laptop0.

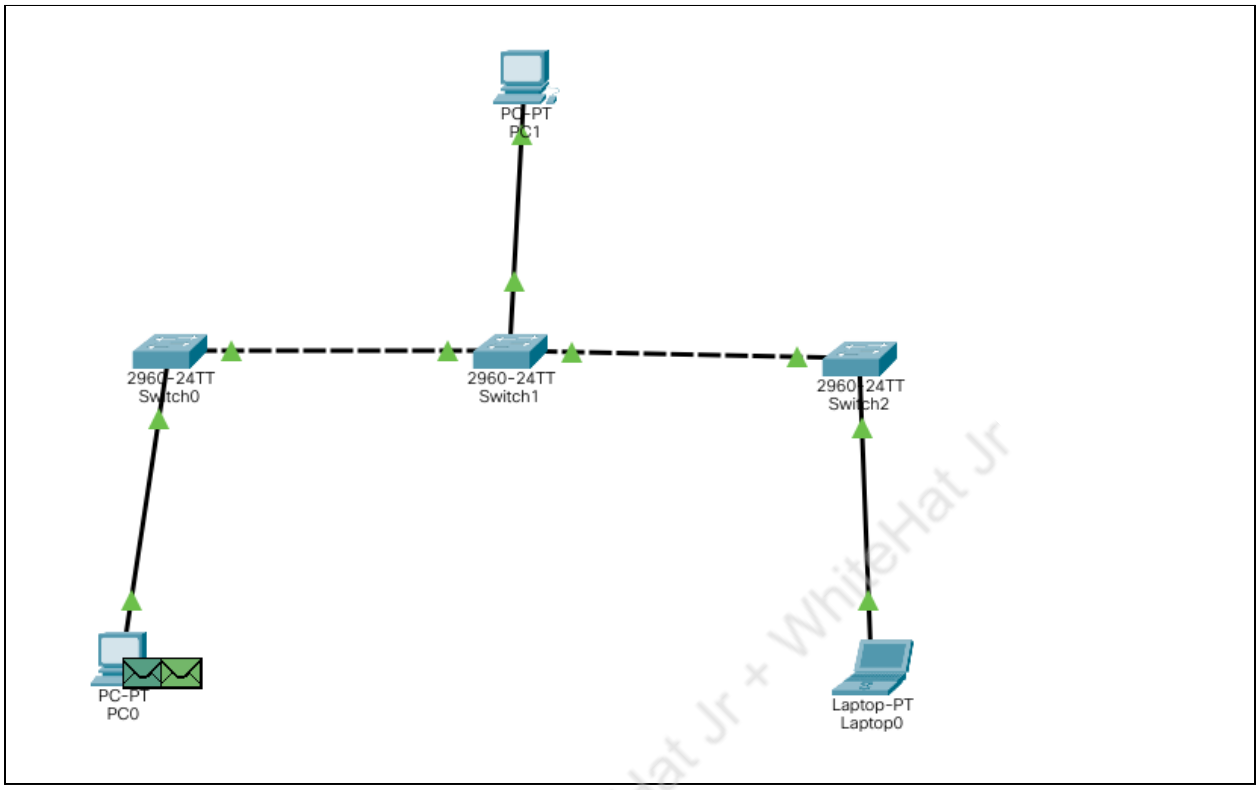
    - Click on the simulation option to see the whole process.



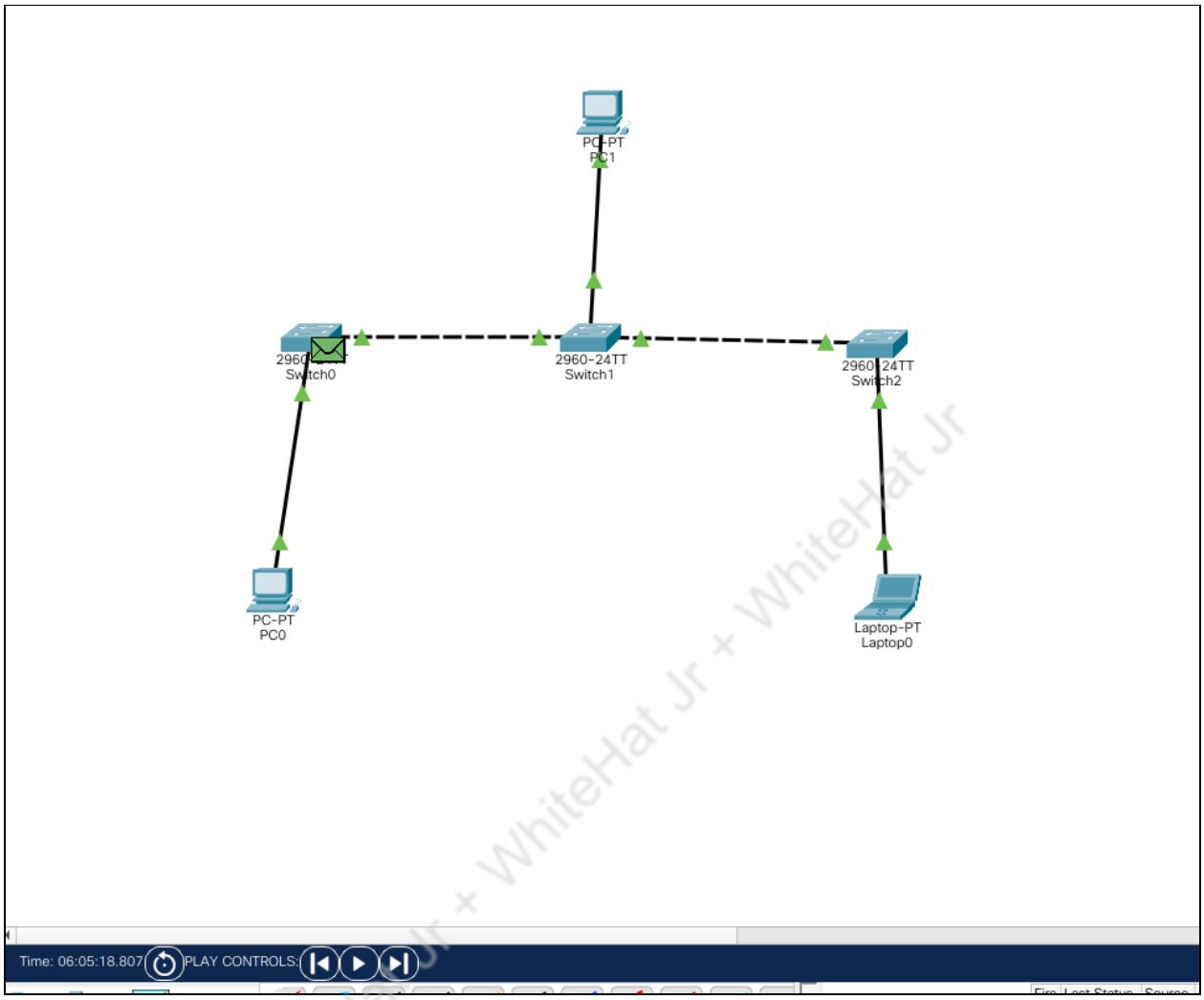

- Click on the envelope icon and then click on one of the pc from where you want to send the packet



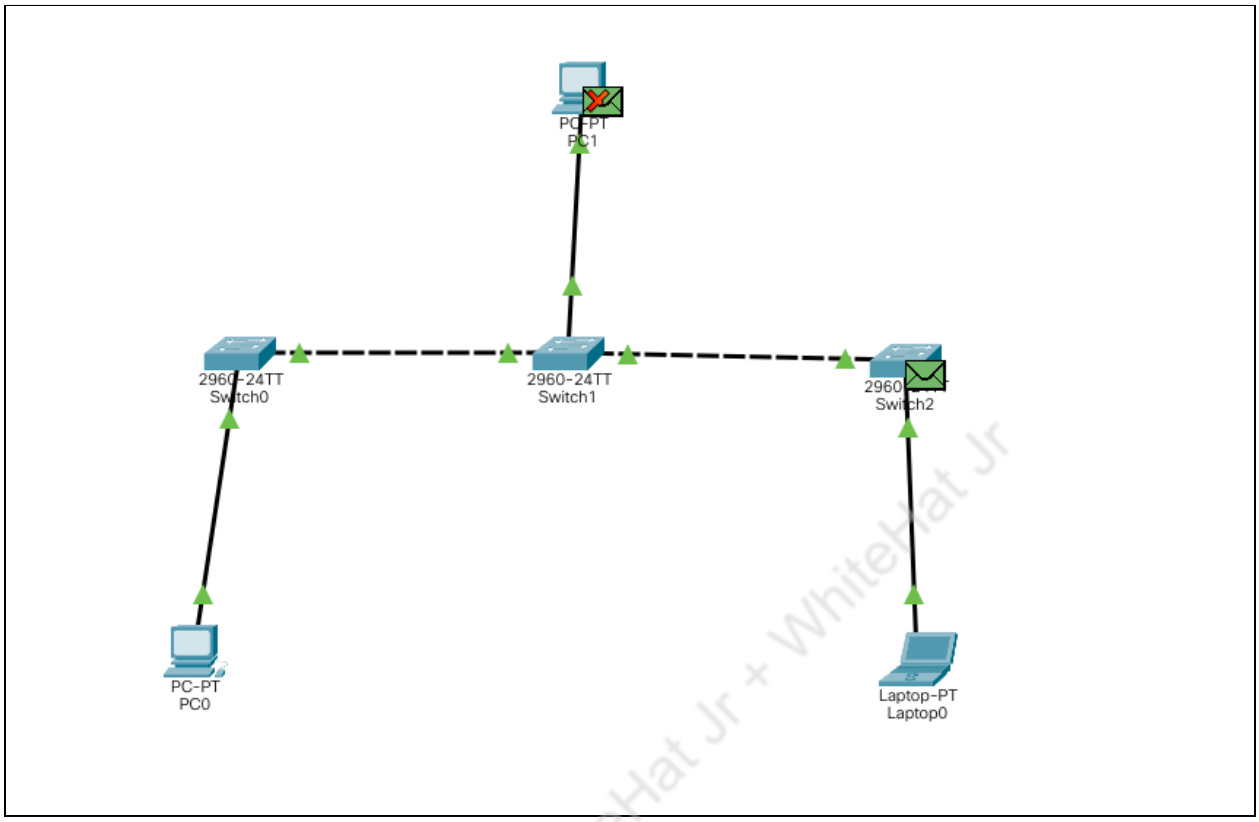

- Then click on the other PC which you want to receive these packets.

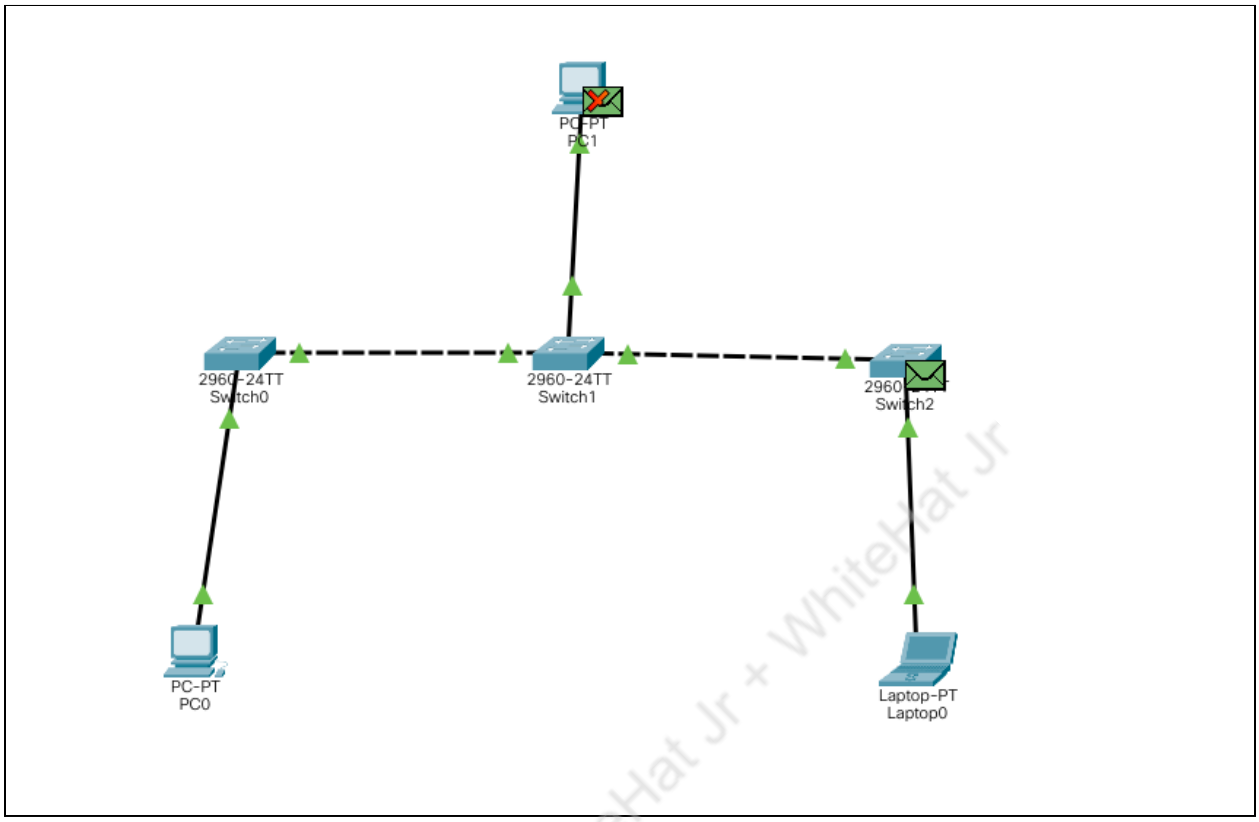



- Click the next button to see the transfer of packets.



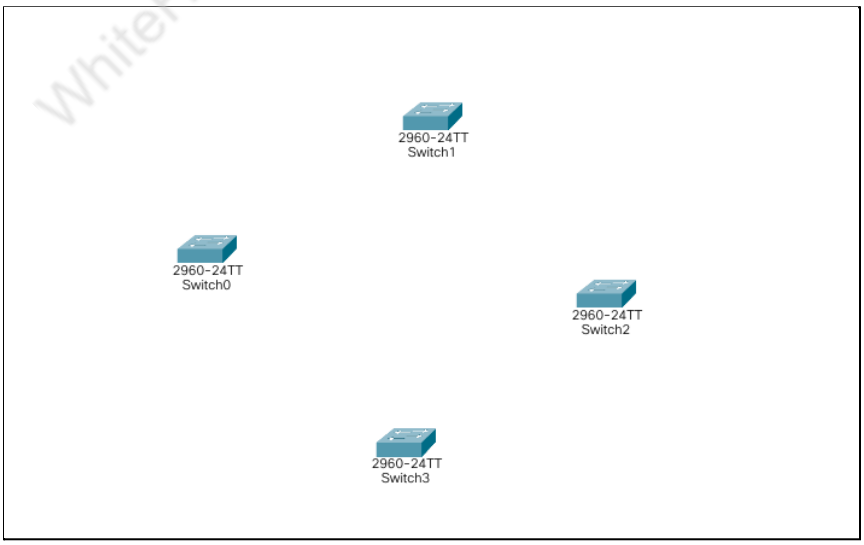

- Packet also got sent to the device which we didn't want.



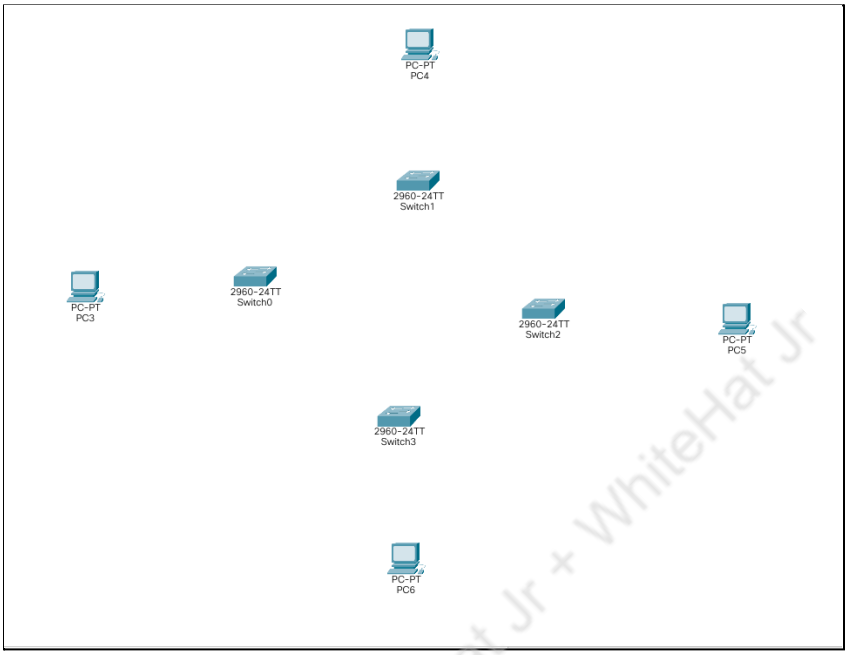



7. Steps to create Ring Topology

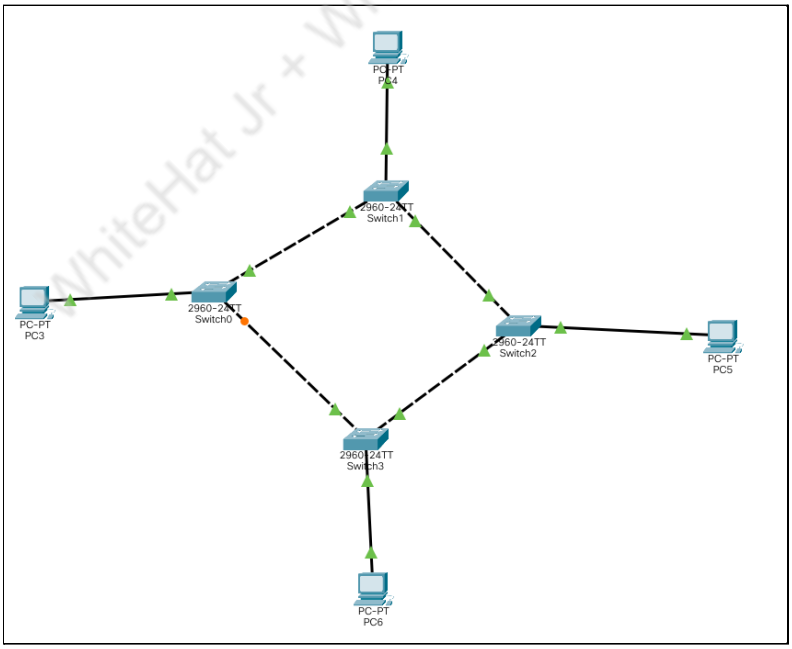
    - Pick the switches from the panel.



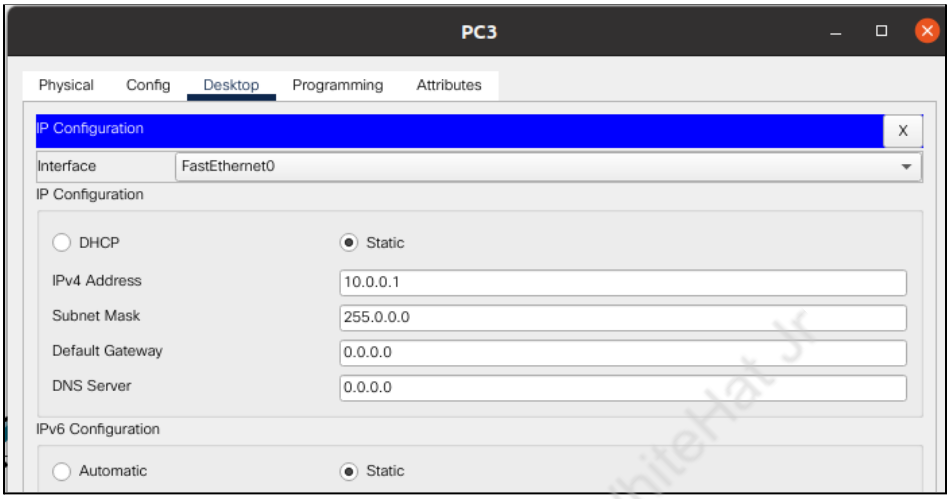
- Pick end devices from the panel .




- Connect the devices with the cables.



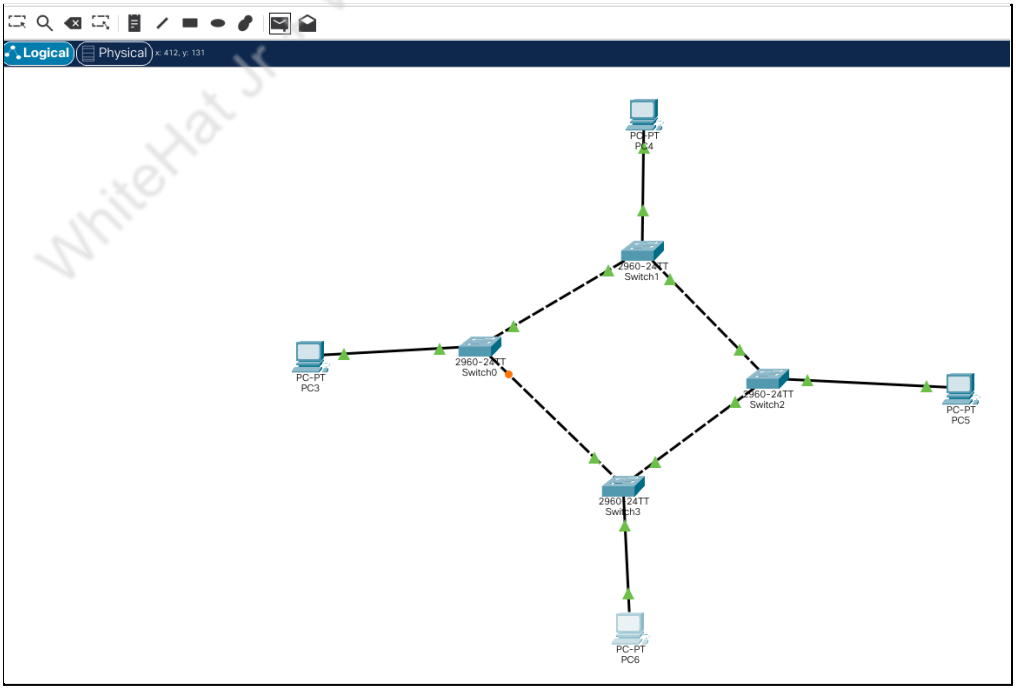
- Set the IP to the end devices.



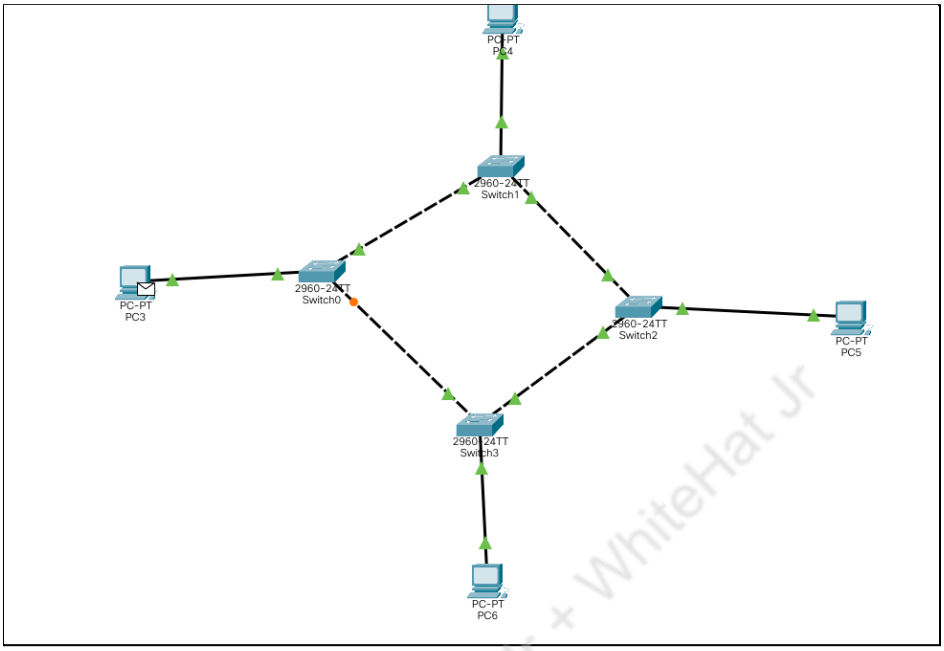

Afterwards we assign the IP address to all the devices.

8. Test it by sending the data from PC3 to PC6.

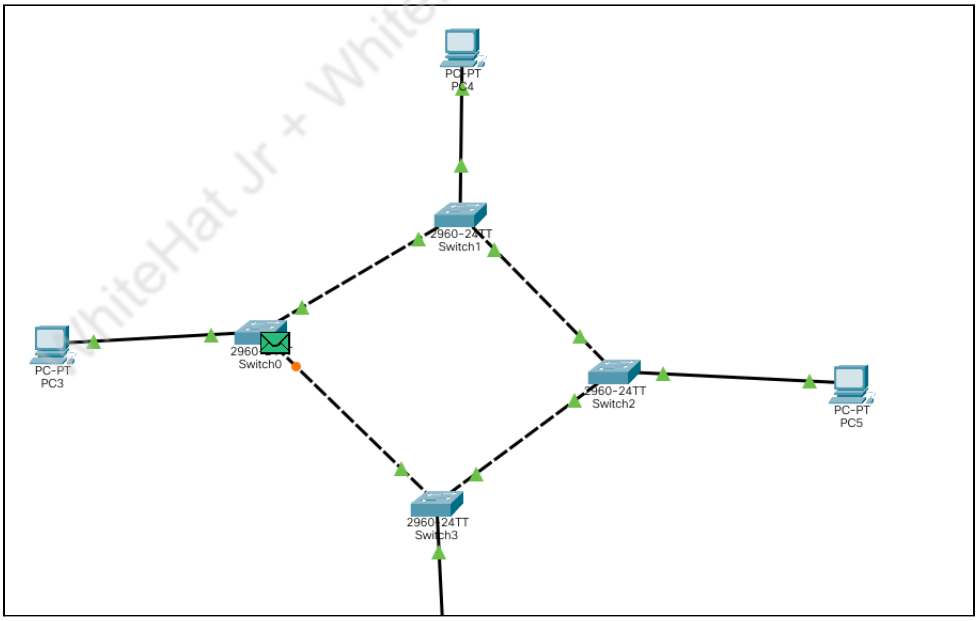
- Select the envelope sign.



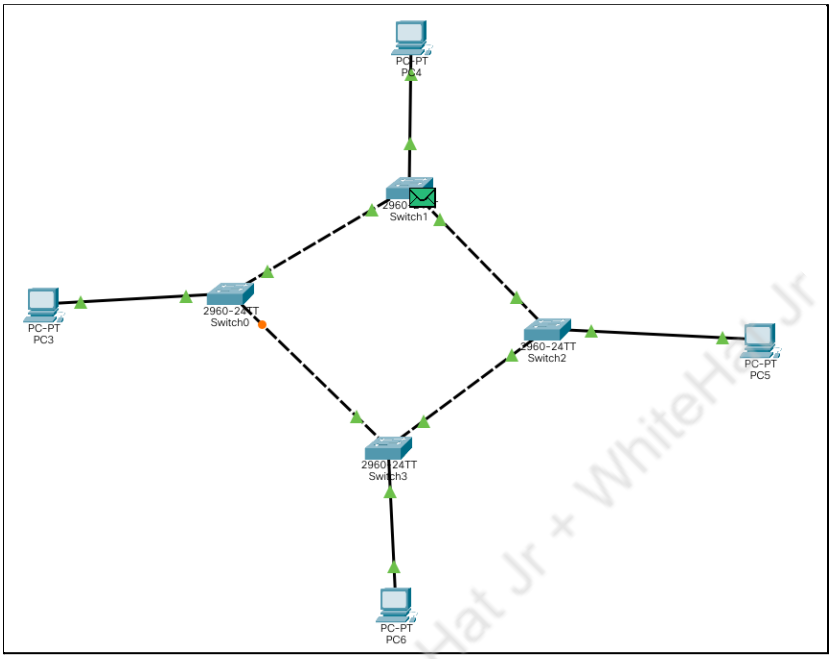
- Click on the PC3 as sender and PC6 as receiver.



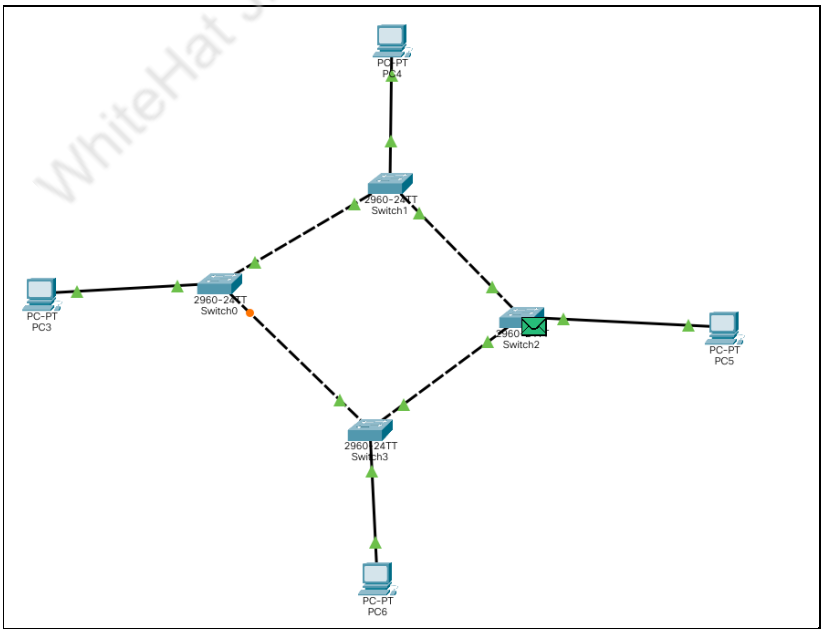

- Click on simulation to see the simulation. And use the forward button to play the simulation.



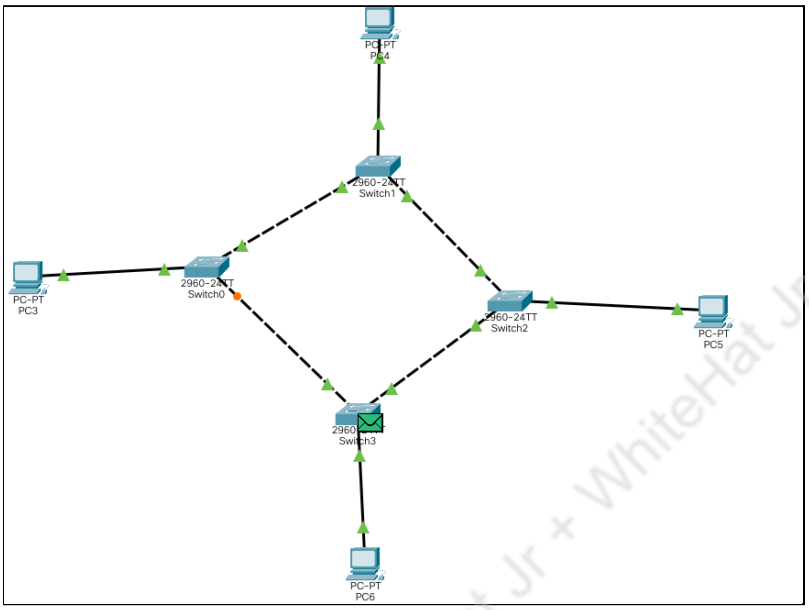
- Data moving from switch 0 to switch 1.



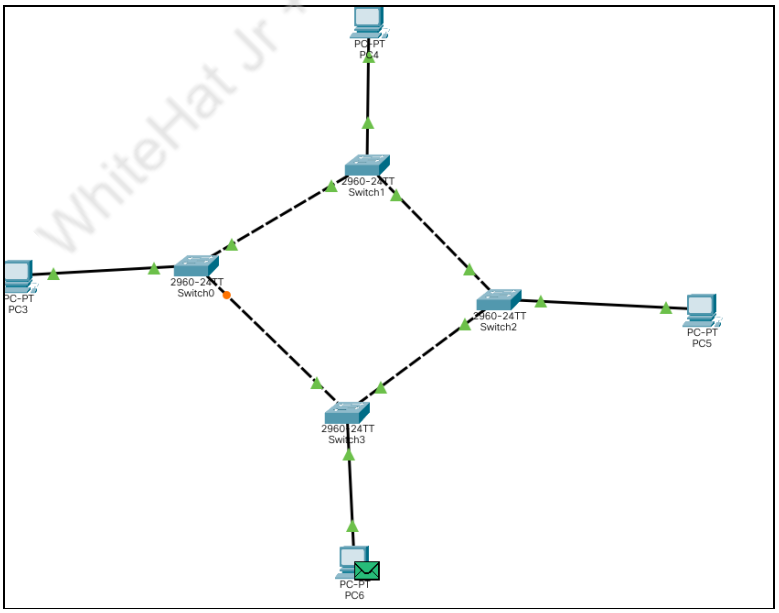

- Data moving from Switch 1 to switch 2.



- Data moving from Switch 2 to switch 3.




- Data moving from switch3 to PC6.




Note:- As you continue the simulation you can see the data being sent back the same path.

# PRO-C196

We have successfully learned about different topologies and built a simulation for bus topology and a ring topology.

## What's NEXT?

In the next class, we will learn more about _____.

## EXTEND YOUR KNOWLEDGE

You can create an account in CPT using this link.