

# Computer Networks (CL3001)



## CN LAB 02

**Submitted by:**  
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*BS-AI (6A)*

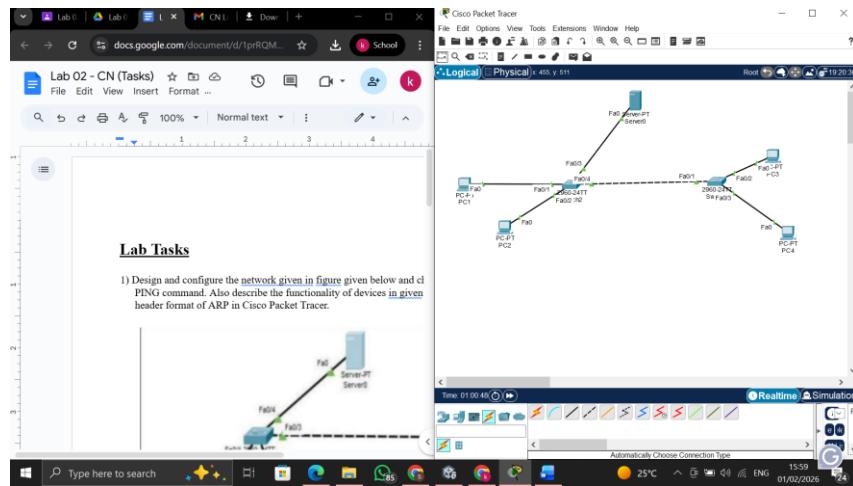
**Submitted to:**  
*Sir Sameer Faisal*

# Lab Tasks

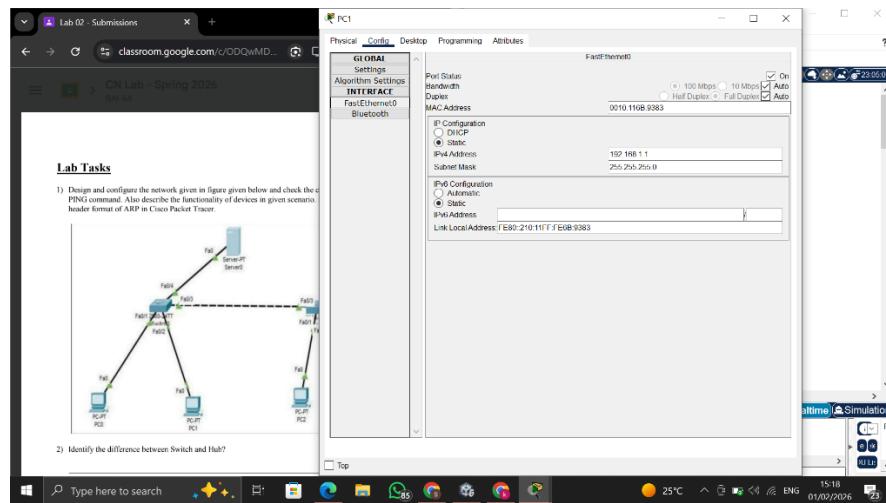
- 1) Design and configure the network given in figure given below and check the connectivity by PING command. Also describe the functionality of devices in given scenario. Show the packet header format of ARP in Cisco Packet Tracer.

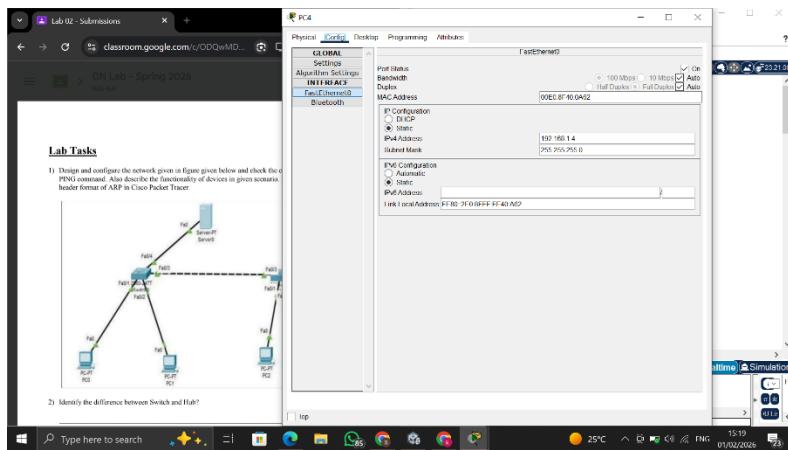
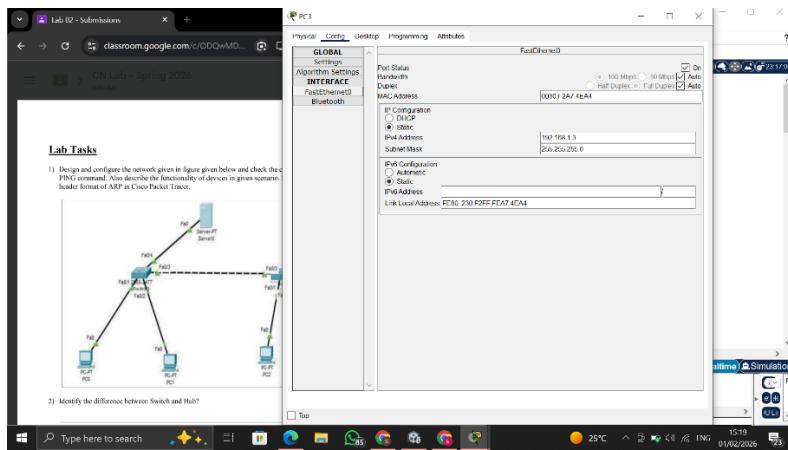
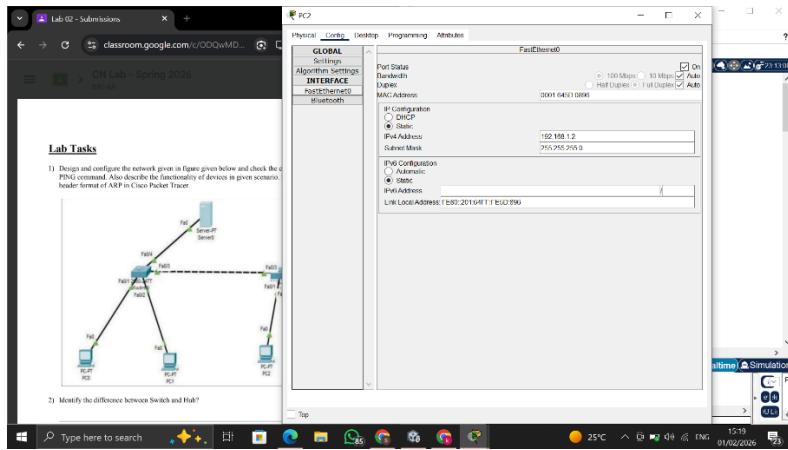
## Design and configuration of the network:

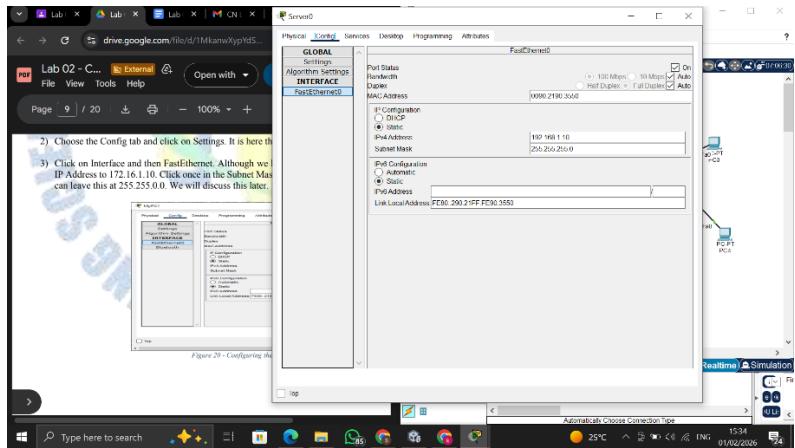
Design:



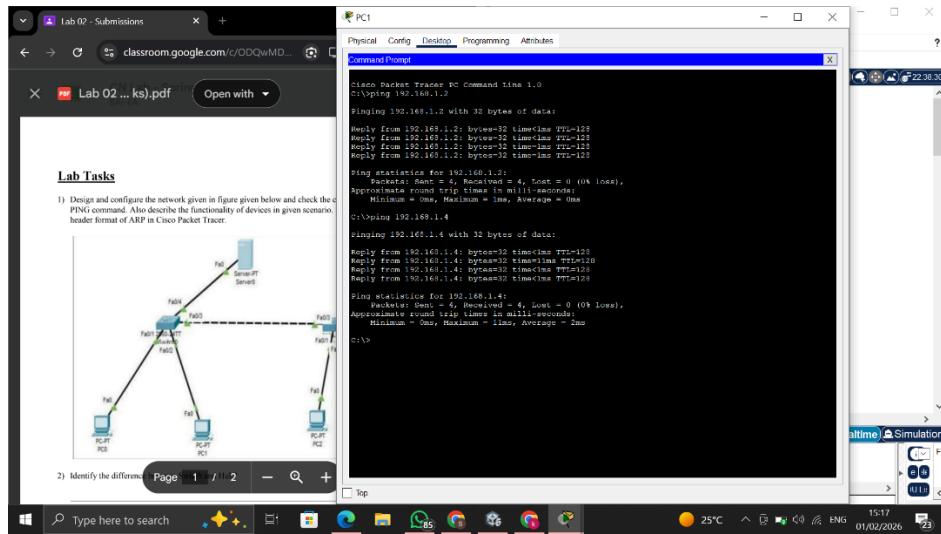
Configuration:







## Check the connectivity using ping command:



## Functionality of devices used:

### 1) PC:

An end device in a network used to send and receive data, acts as a source or destination of communication, generates network traffic (ping), and requires an IP address to communicate.

### 2) Switch:

A networking device that connects multiple devices, operates at the Data Link Layer (layer 2

of the OSI model), use MAC address of each device to forward data, sends data only to the destination device only, and maintains a MAC address table of the connected devices.

### 3) Server:

An end device that provides services to the other devices in the network, stores and manages data, provides network services like file sharing, web services, and email services, and requires an IP address.

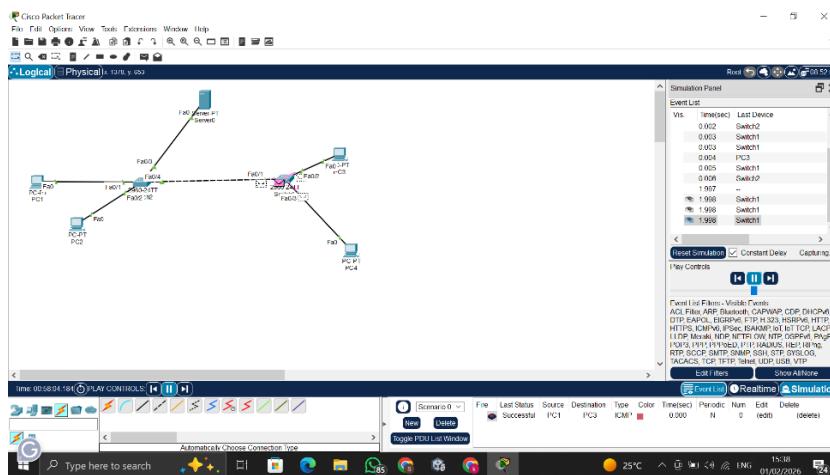
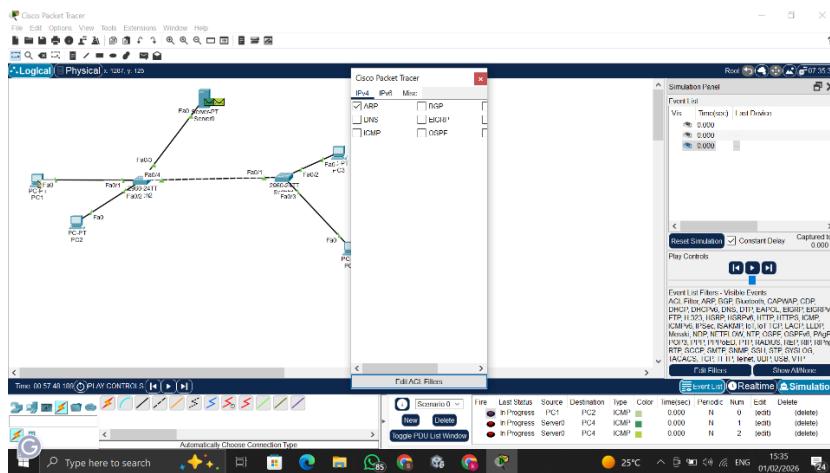
### 4) Cables:

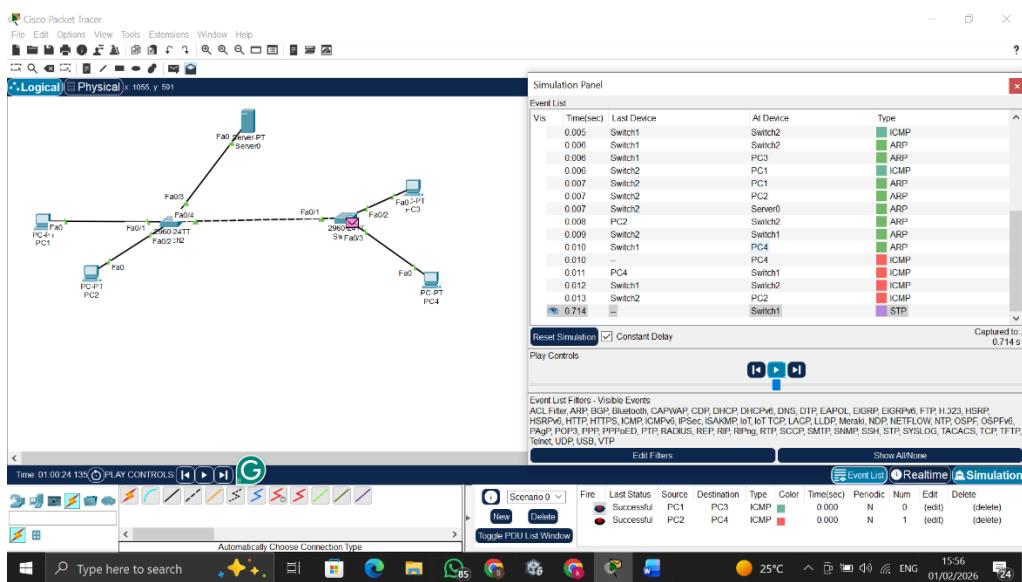
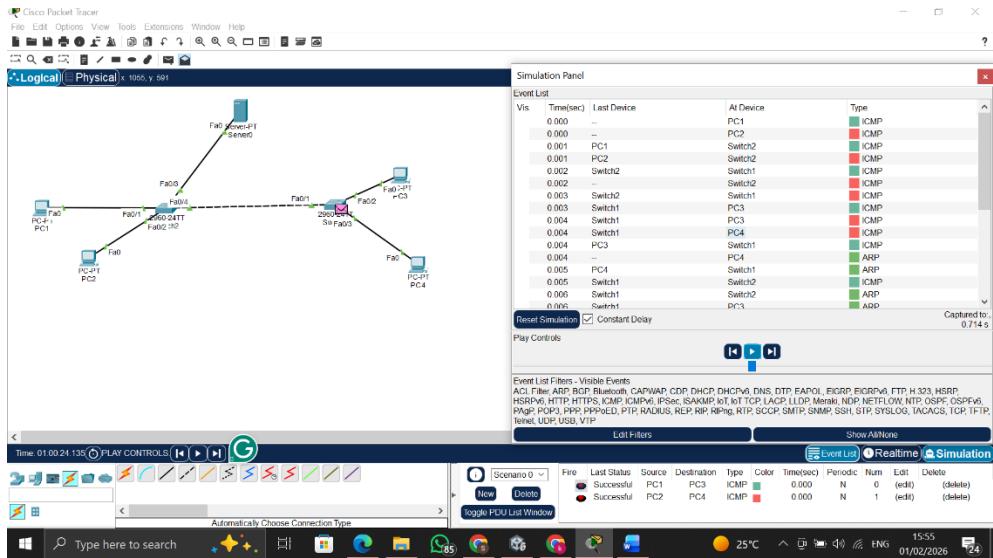
A physical medium used to connect network devices, carries data signals between devices, and enables communication among the networks.

Straight-through cable: Connects different devices.

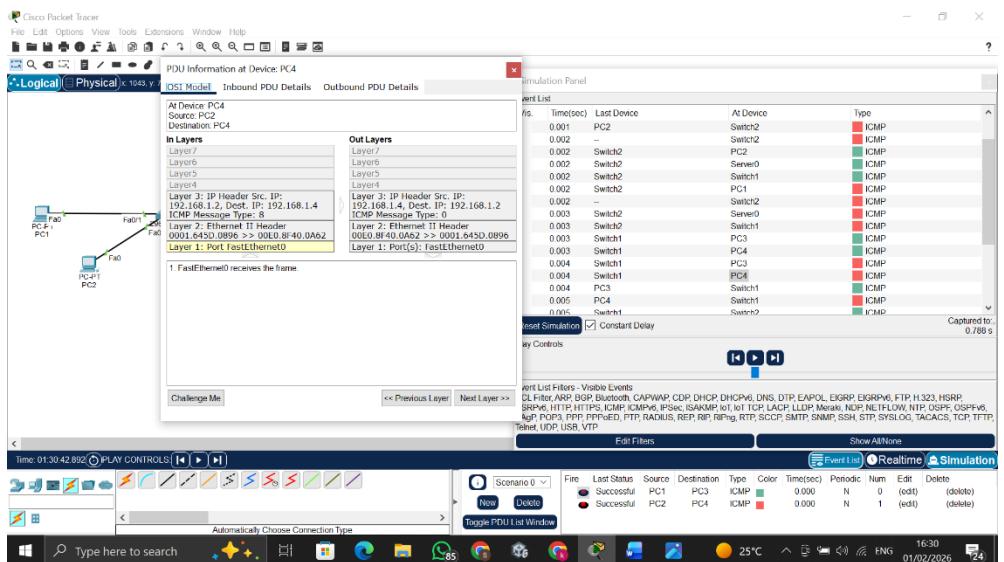
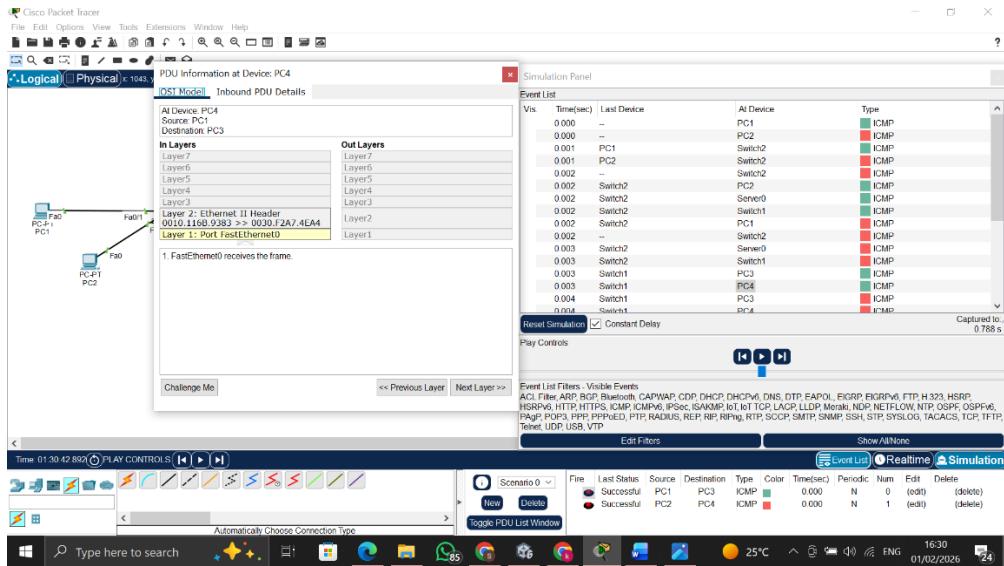
Crossover cable: Connects similar devices.

## Packet header format of ARP:





*ARP finds the MAC address of a device using its IP by sending a broadcast request and receiving a reply from the target device.*



- 2) Identify the difference between Switch and Hub?

**HUB:**

A hub is a basic networking device that connects different devices in a network and operates at the physical layer of the OSI model. It forwards the data to all the connected devices and does not understand the MAC address. This reduces efficiency and privacy in the network.

**Switch:**

A switch is an intelligent networking device that connects different devices in a network and operates at the Data Link layer of the OSI model. It maintains a MAC address table of the connected devices and sends data only to the destination device. This improves the network performance.

- 3) Consider the following figure. The PC is connected to the console port of the switch. All the other connections are made through Fast Ethernet links. Which types of UTP cables can be used with segments 1, 2 and 3?

**Segment 1:**

Straight-through cables are used for connecting different device types, but are primarily used for Ethernet connections. The console port on the switch is not an Ethernet port, so straight-through cables won't be used.

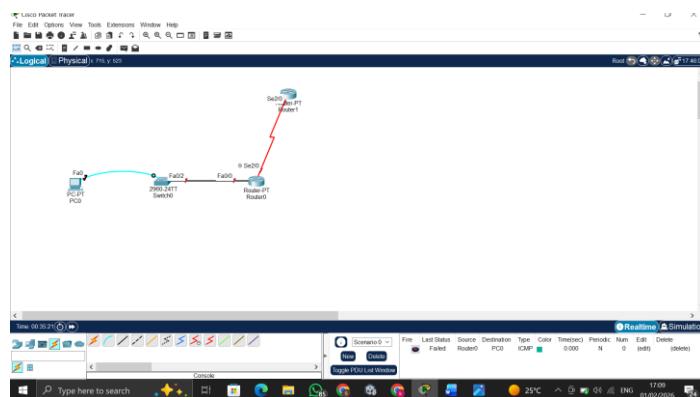
Instead of straight through cables, a Rollover cable will be used for console connection, as the connection here is serial, not Ethernet.

**Segment 2:**

Straight-through cables are used for connecting different device types (Switch and Router).

**Segment 3:**

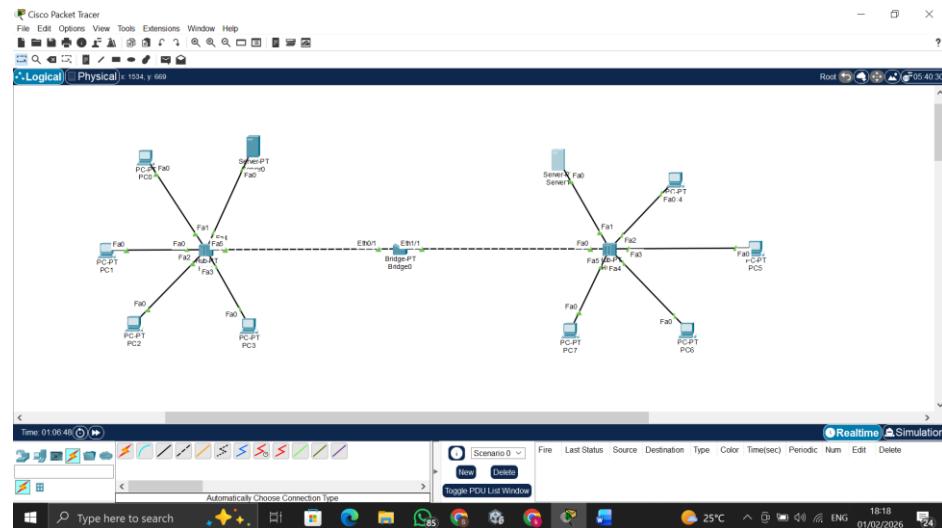
Serial wires are used for connecting one router to another router, so a Serial DTE cable will be used in this segment.



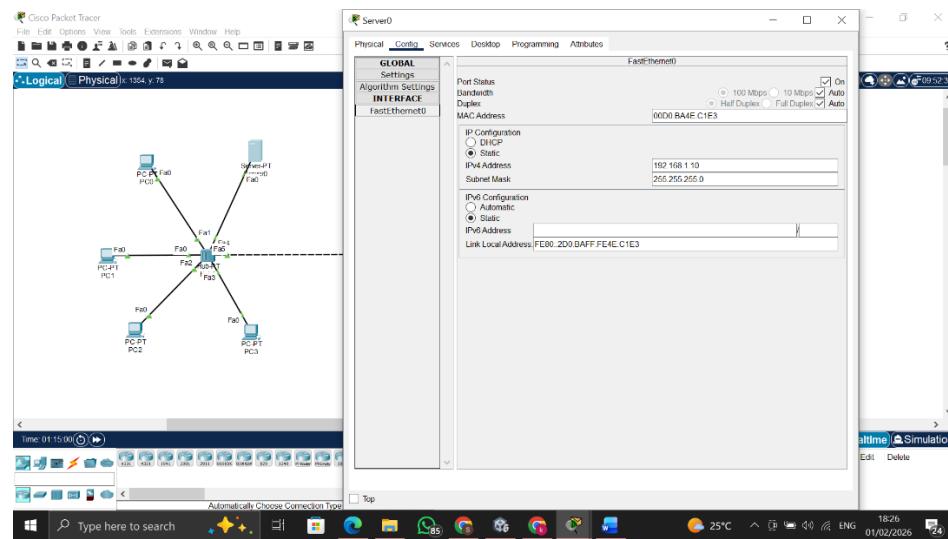
- 4) Create a network using Packet Tracer having eight PC with 4 of them in one broadcast domain and remaining 4 in other broadcast domain achieve this by using HUB and Bridge. Show steps in form of screen shots also explain the working of bridge.

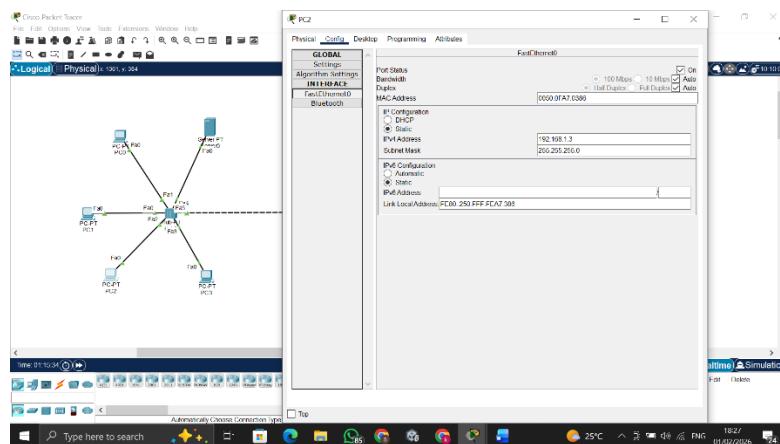
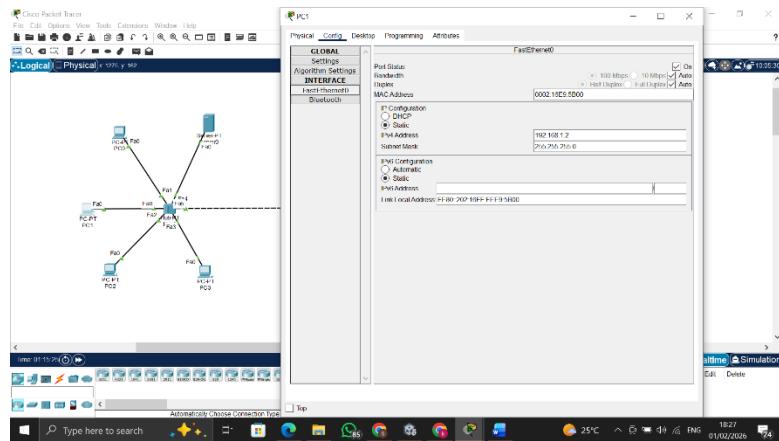
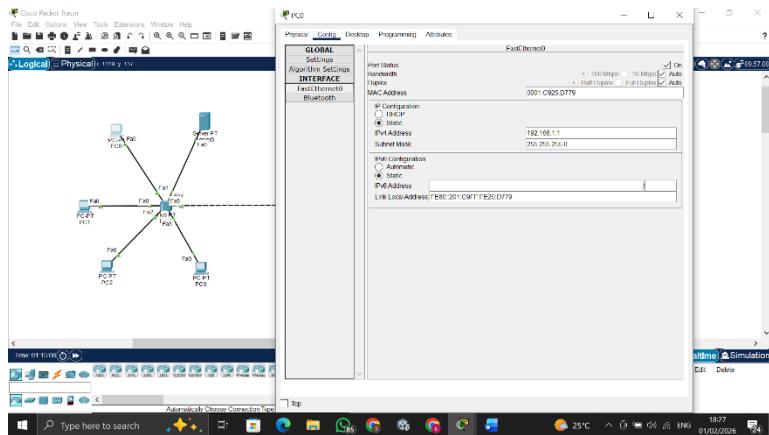
[HINT: HUB has single Broadcast and collision domain; broadcast domain mean all devices connected will receive data of every transaction, USE 2 HUB and 1 Bridge having 8 PCs in Network].

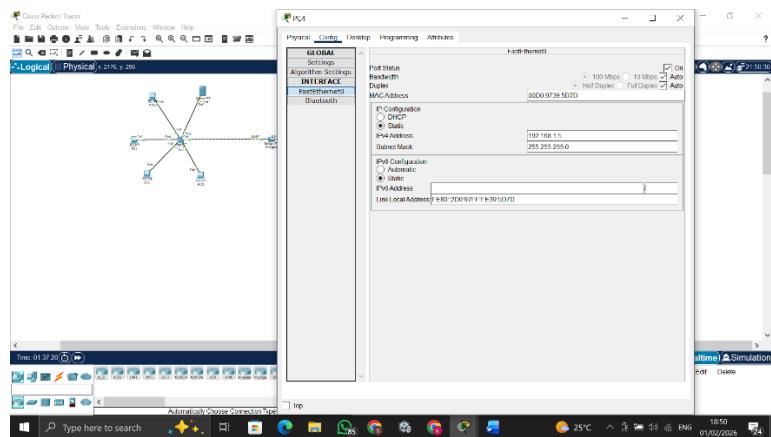
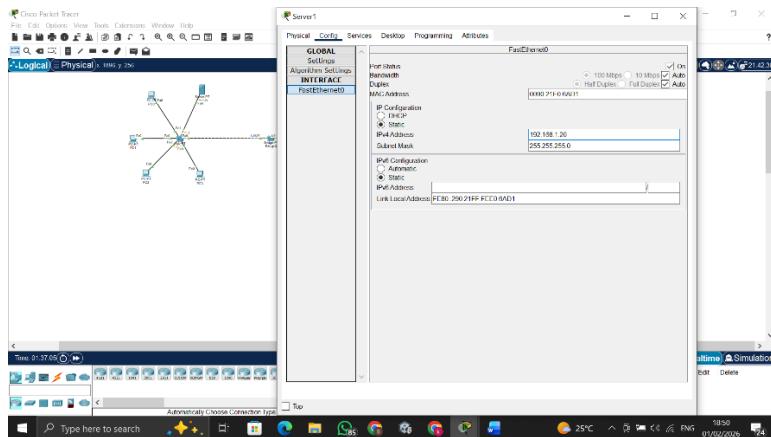
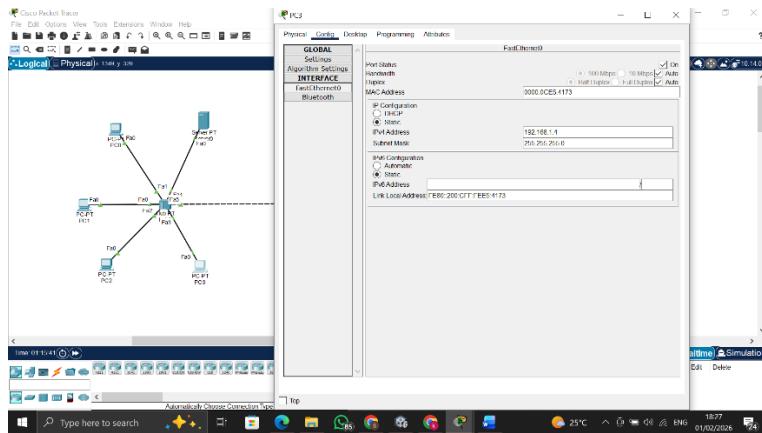
## Topology:

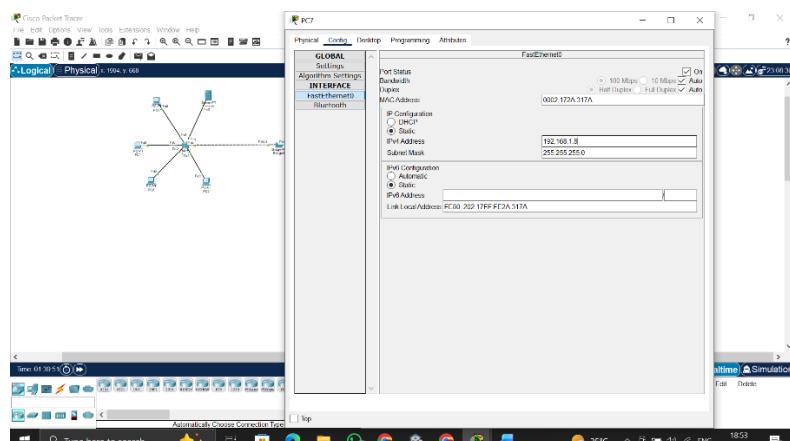
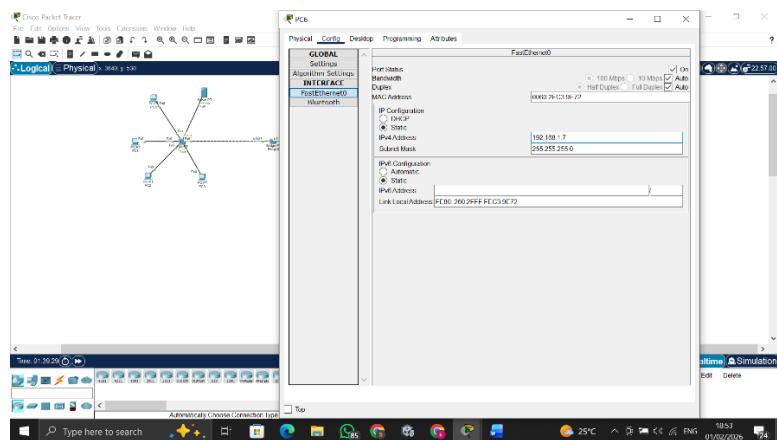
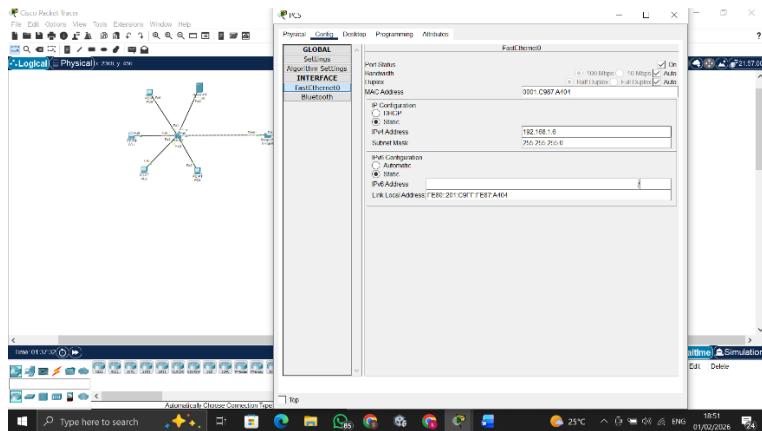


## IP configuration:

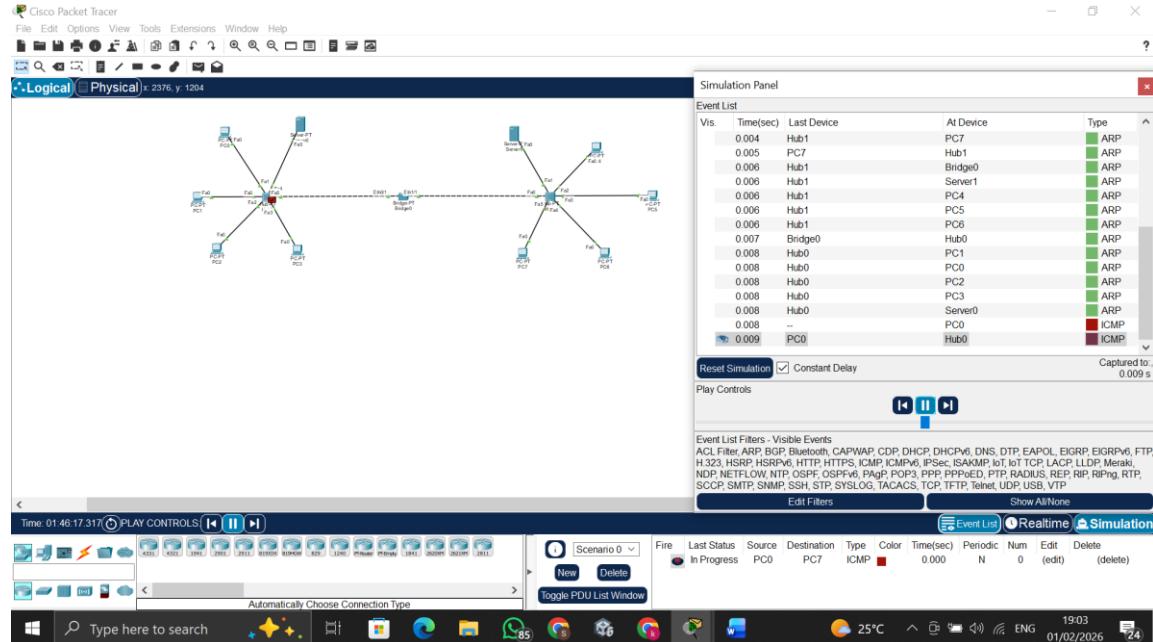
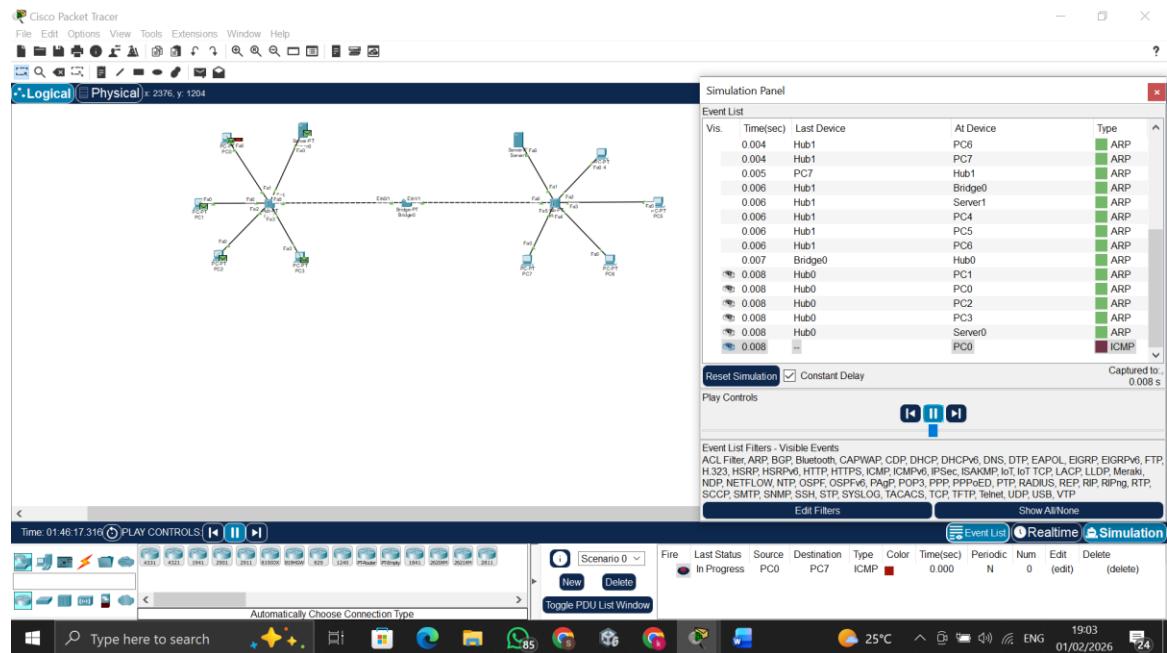


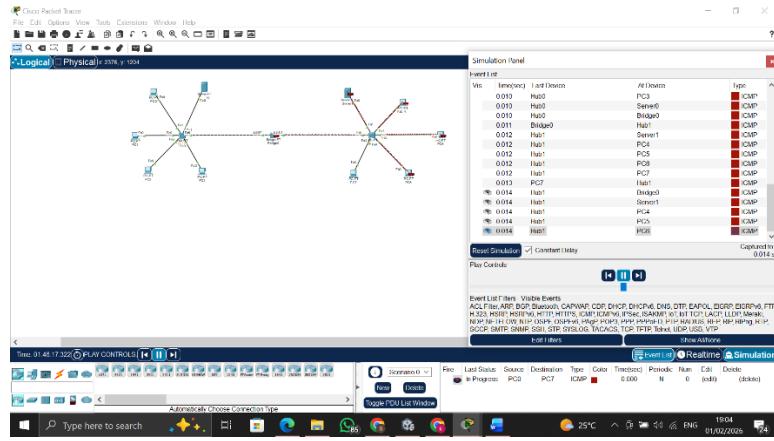
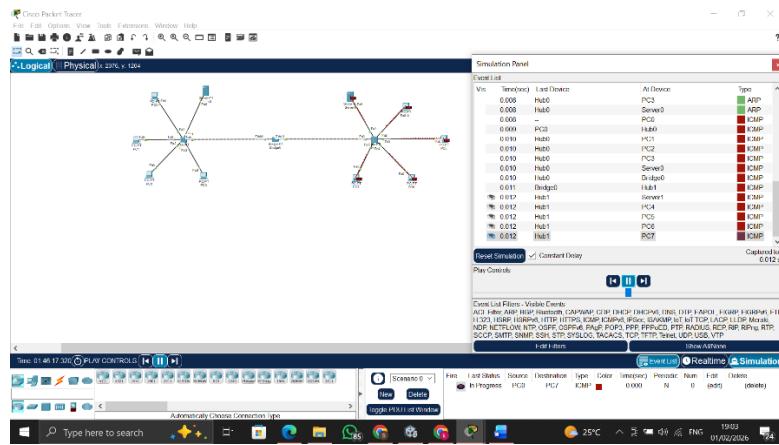
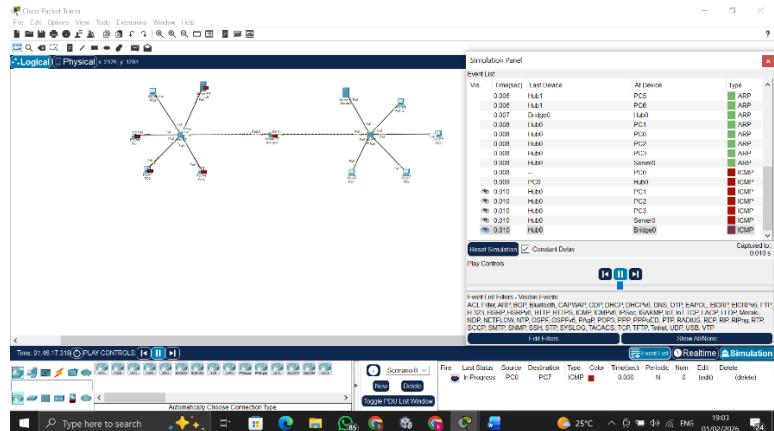


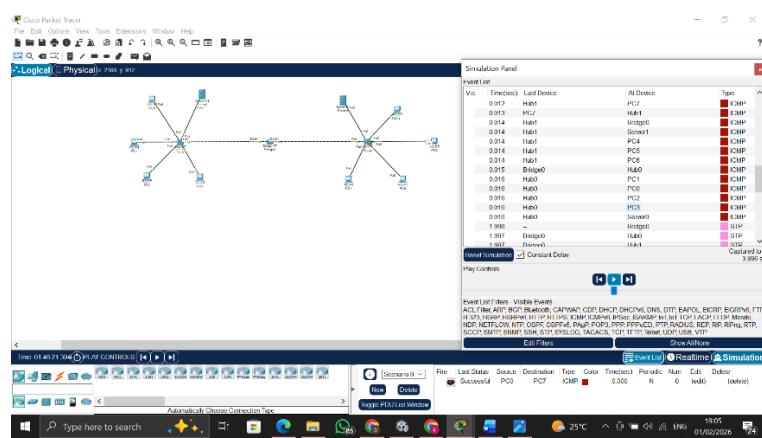
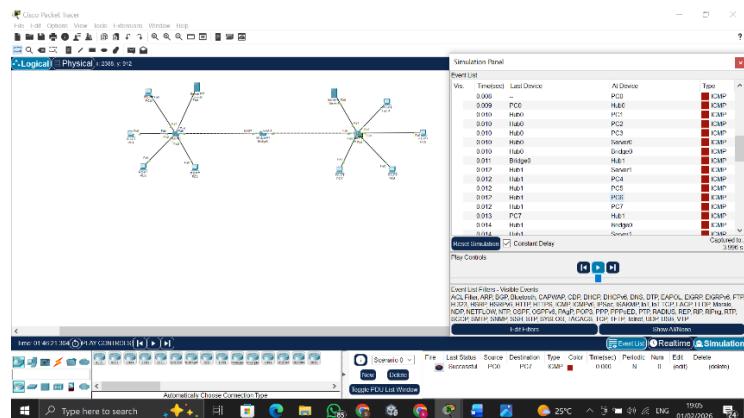
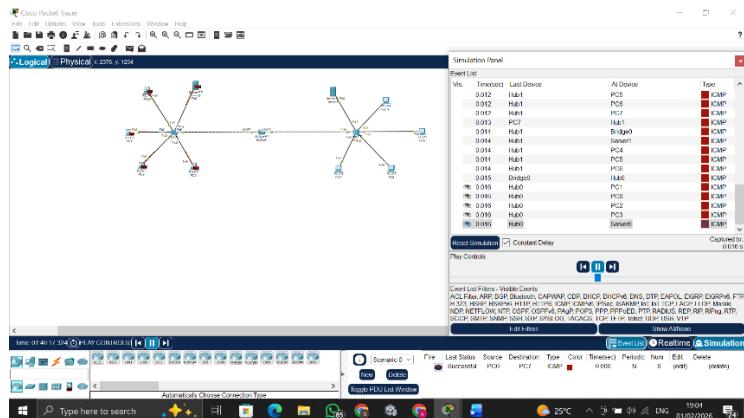


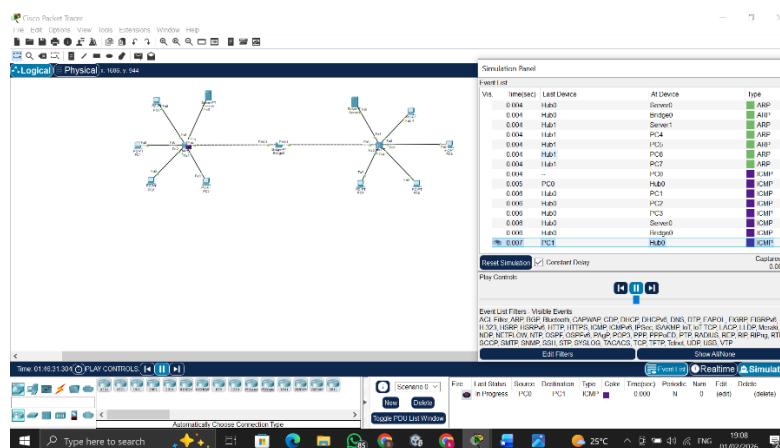
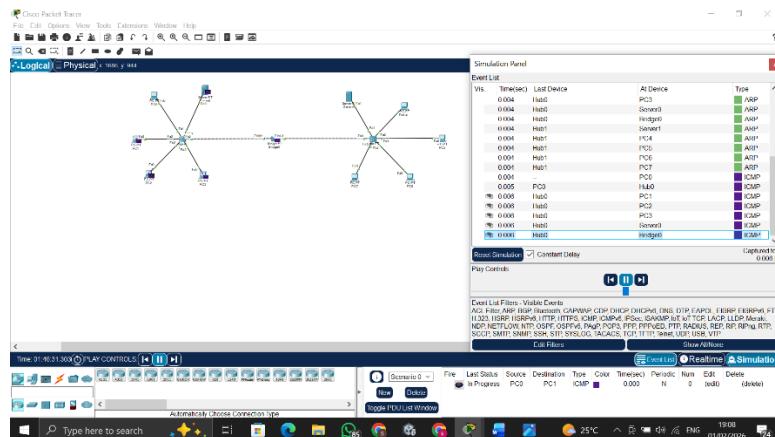
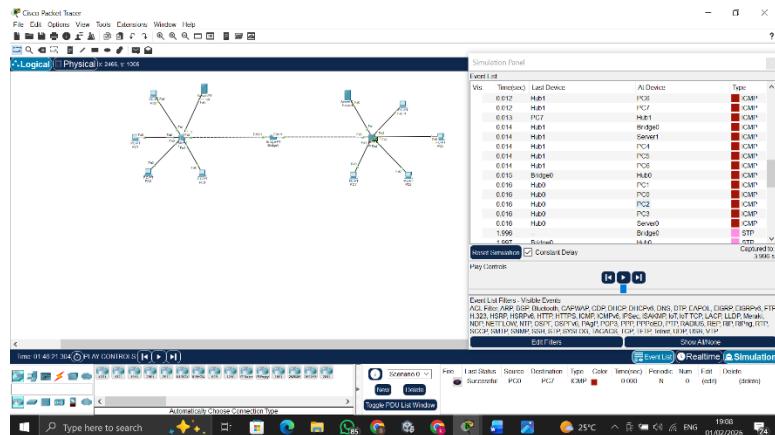


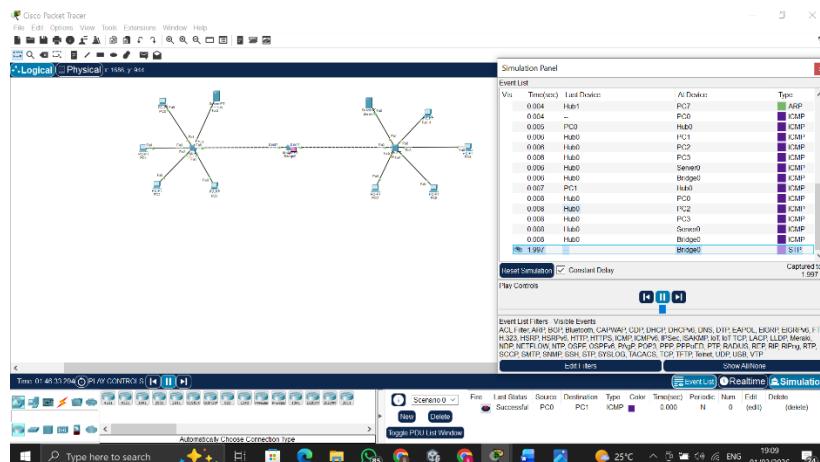
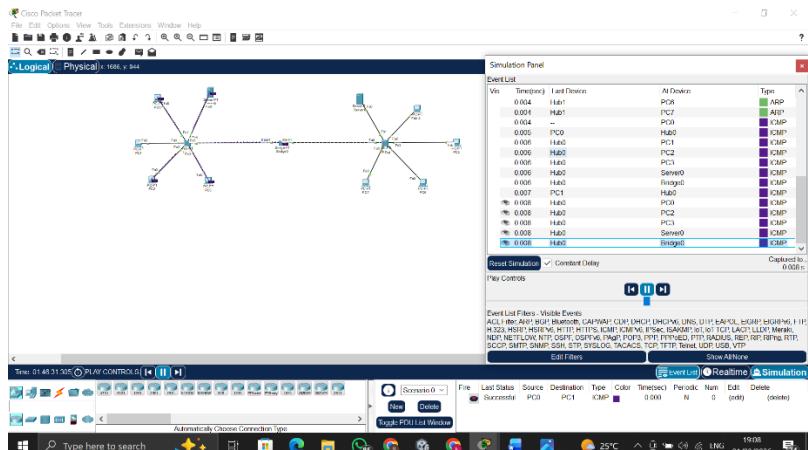
## Simulation Mode showing Packet Flow:











## Working of Bridge:

A bridge is a type of switch and follows the same working criteria. It works by learning the MAC addresses of the devices by maintaining a table that records which device is connected to which hub. When a packet is received, the bridge checks the MAC address of the destination device. If the destination device is located on the same hub as the source device, the bridge does not forward the packet to the other hub. However, if the destination device is located on the other hub, the bridge forwards the packet to the other hub.

In this way, it filters out the traffic by forwarding the required packets only between the hubs and blocking unnecessary traffic, resulting in network efficiency and a decrease in the number of collisions.