

### Practical – 3

**Aim** : To study behavior of generic devices used for networking: (CISCO PACKET TRACER)

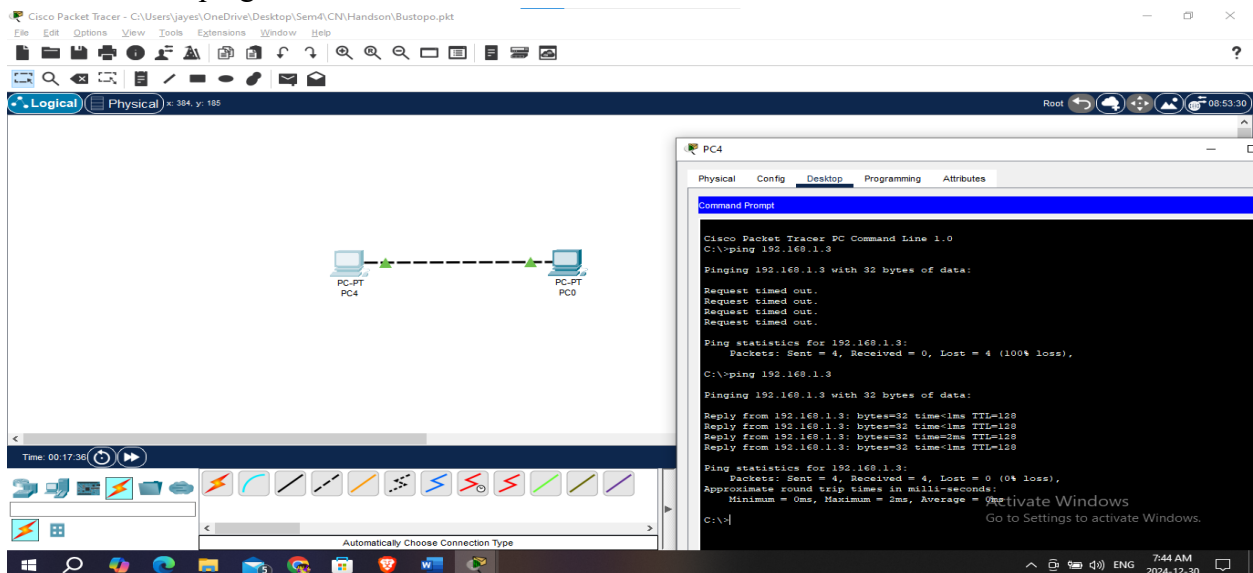
#### **PC (Personal Computer):**

##### **Description:**

- End-user devices used to send and receive data in a network.
- Operates at the Application Layer of the OSI model.
- Requires IP address configuration for communication.
- Can simulate tasks like ping and data exchange.

##### **Practical Task:**

1. Drag and drop two PCs into the Cisco Packet Tracer workspace.
2. Assign IP addresses:
  - **PC1:** IP - 192.168.1.2, Subnet Mask - 255.255.255.0.
  - **PC2:** IP - 192.168.1.3, Subnet Mask - 255.255.255.0.
3. Test communication between PCs by using the **ping** command.
  - On PC1, open **Command Prompt** and type:
  - `ping 192.168.1.3`



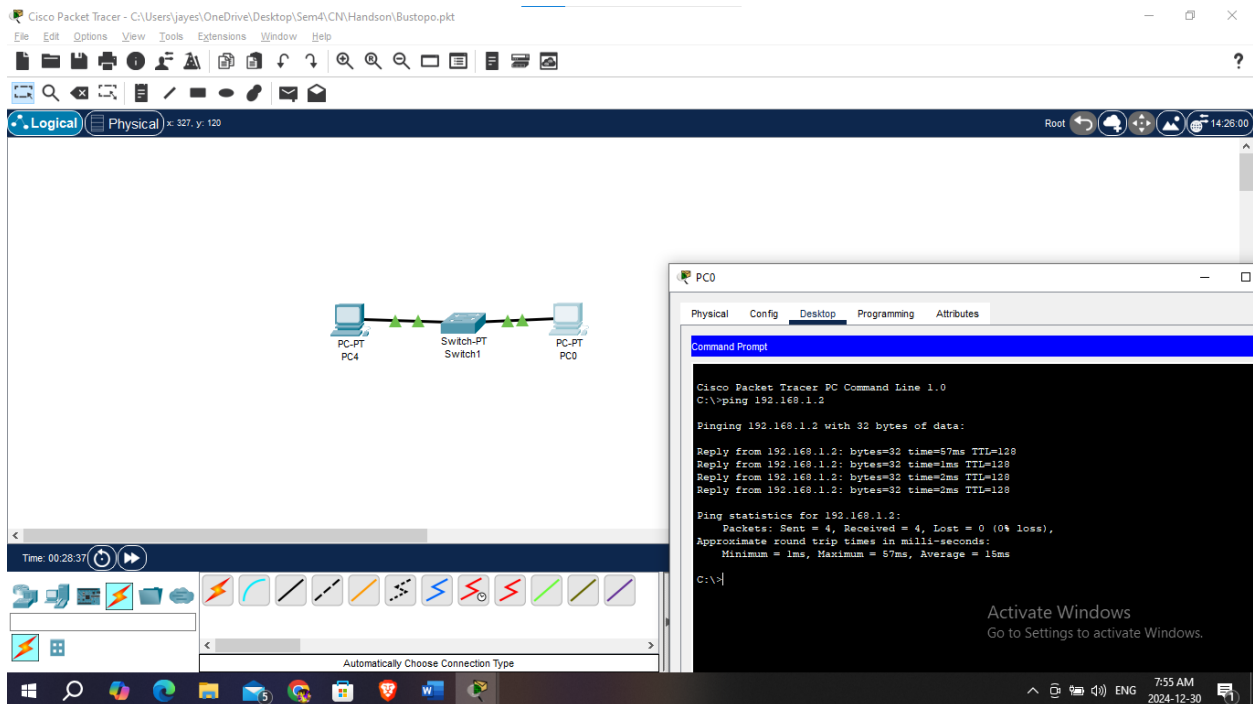
## Switch:

### Description:

- Layer 2 device in the OSI model for connecting devices within a LAN.
- Forwards data based on MAC addresses, reducing network collisions.
- Supports VLANs and other configurations in managed switches.
- Used for efficient communication within the same subnet.

### Practical Task:

1. Drag and drop a Switch into the workspace.
2. Connect the PCs to the Switch using **straight-through cables**:
  - PC1 → Switch (FastEthernet0/1).
  - PC2 → Switch (FastEthernet0/2).
3. Verify connectivity between the PCs by testing with the **ping** command as above.



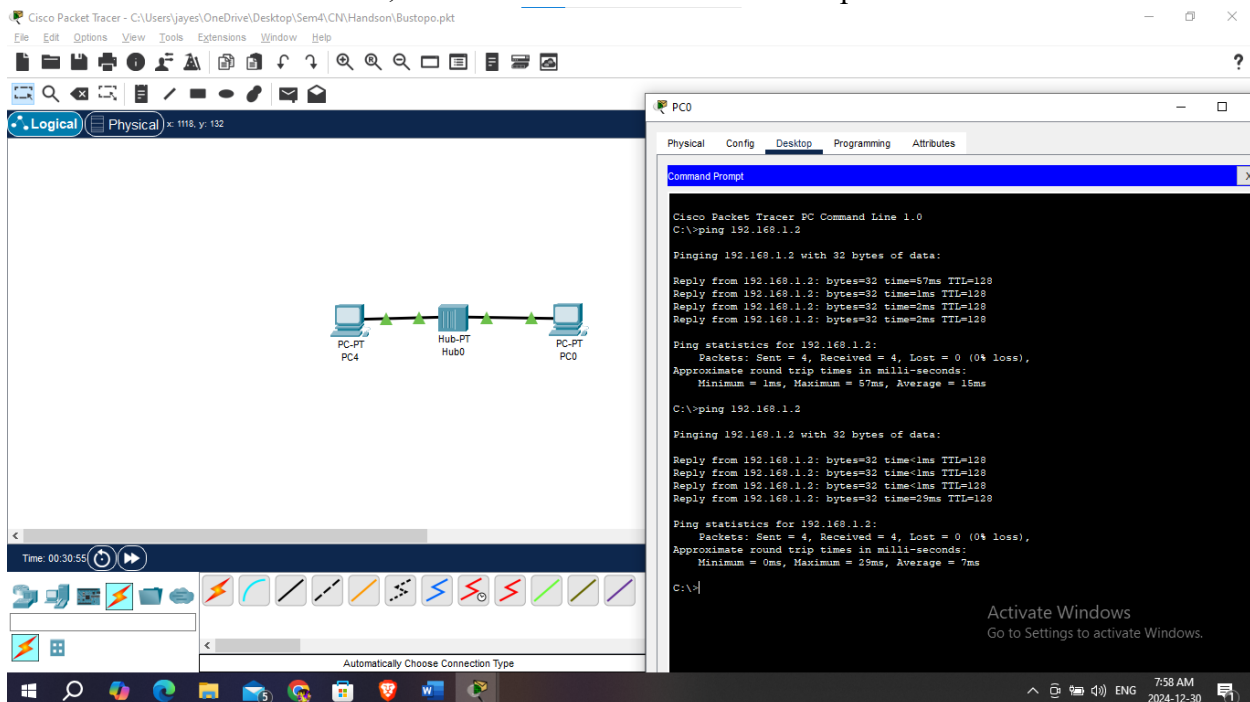
## Hub:

### Description:

- Layer 1 device that broadcasts data to all connected devices.
- Creates a single collision domain, leading to less efficient performance compared to switches.
- Best suited for small and simple networks.
- Does not require configuration.

### Practical Task:

1. Drag and drop a Hub into the workspace.
2. Connect the PCs to the Hub using **straight-through cables**:
  - PC1 → Hub (Port 1).
  - PC2 → Hub (Port 2).
3. Test communication between the PCs using the **ping** command. Observe that communication works, but the Hub broadcasts data to all ports.



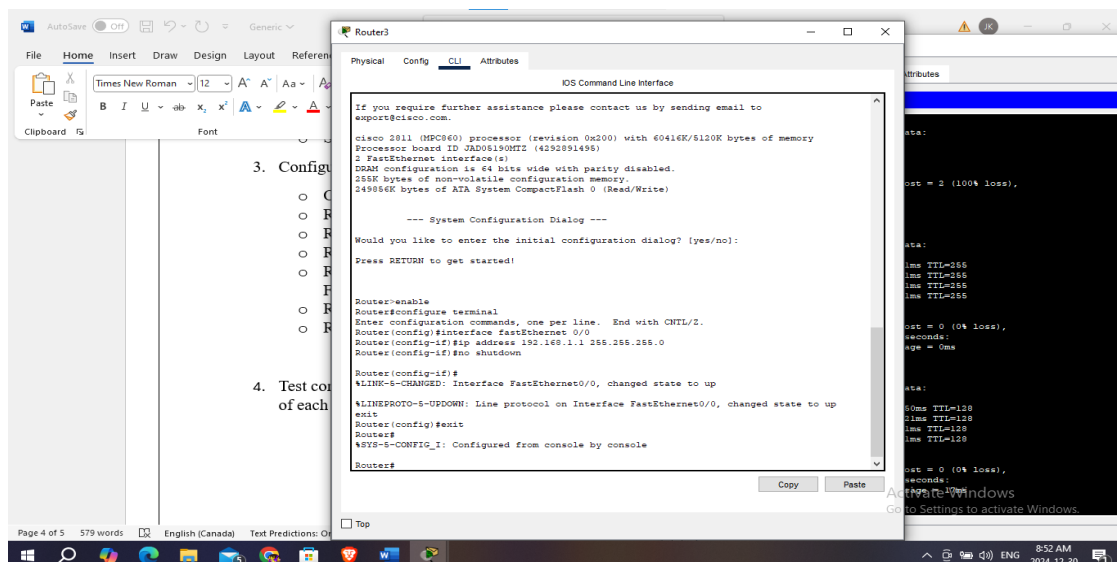
## Router:

### Description:

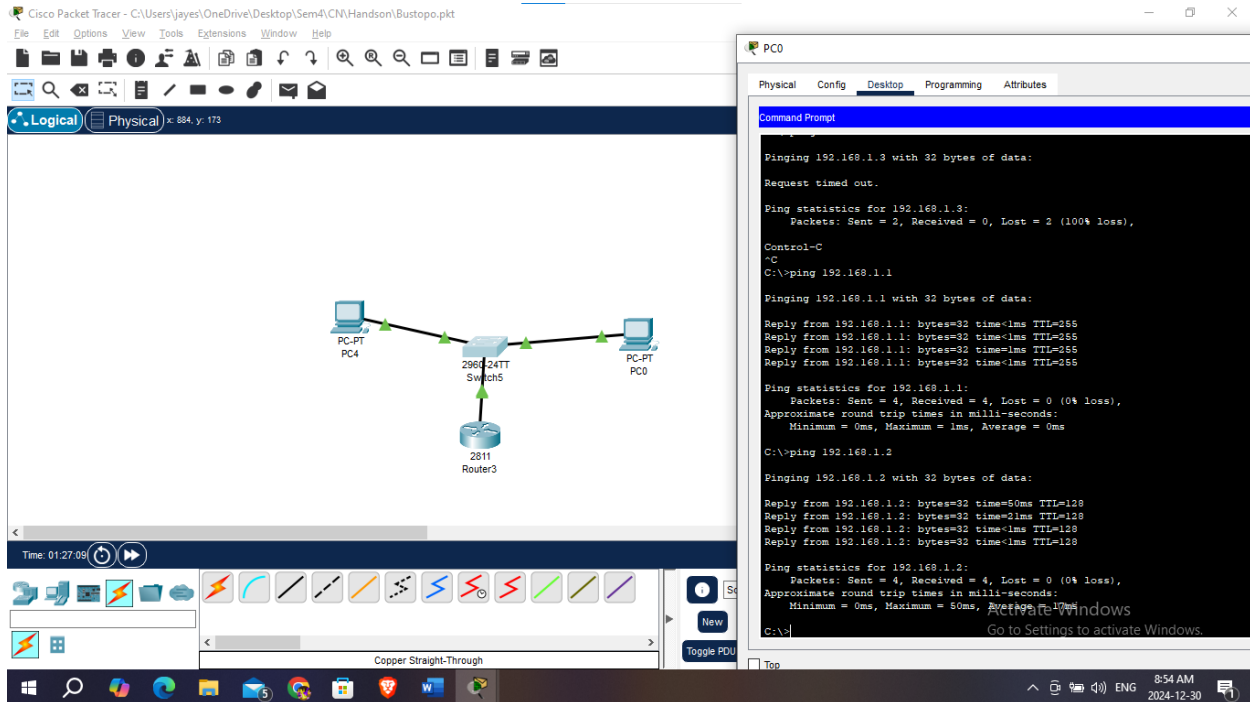
- Layer 3 device that connects multiple networks and routes packets based on IP addresses.
- Determines the best path for data transmission.
- Requires configuration of interfaces and routing protocols.
- Essential for inter-network communication.

### Practical Task:

1. Drag and drop a Router into the workspace.
2. Connect the Switch to the Router using a **straight-through cable**:
  - Switch (FastEthernet0/0) → Router.
3. Configure the Router:
  - Open the **CLI** tab on the Router and execute the following commands:
  - Router> enable (Enter privileged exec mode)
  - Router# configure terminal (Enter global configuration mode)
  - Router(config)# interface fastEthernet 0/0 (Select interface connected to PC1)
  - Router(config-if)# ip address 192.168.1.1 255.255.255.0 (Assign IP address to FastEthernet0/0)
  - Router(config-if)# no shutdown (Enable the interface)
  - Router(config-if)# exit (Exit interface configuration mode)



- Test communication between the PCs through the Router by setting the default gateway of each PC to 192.168.1.1.



## Conclusion:

In this practical, we successfully studied and configured the behavior of various networking devices using Cisco Packet Tracer. By simulating the operation of **PCs**, **Switches**, **Hubs**, and **Routers**, we gained a better understanding of their roles in a network.

- PCs** allowed us to simulate end-user communication by assigning IP addresses and testing connectivity using the ping command.
- Switches** facilitated efficient data transfer between connected devices, showcasing their role in reducing network collisions.
- Hubs**, while still functional, demonstrated less efficient data handling by broadcasting data to all devices in the network.
- Routers** provided the crucial role of inter-network communication, routing data between different networks and managing traffic with IP addressing.

Overall, this practical exercise reinforced key networking concepts and provided hands-on experience in configuring and understanding the behavior of networking devices in a simulated environment. This knowledge is fundamental for building and troubleshooting real-world networks.