Sure! Here's a complete lab report for "Switch Connection Between Two PCs" in Cisco Packet Tracer:

Title:
Switch Connection Between Two PCs

Objective:
To establish a network connection between two PCs using a switch and verify their connectivity by pinging between the devices.

Equipment:
- CISCO Packet Tracer software
- 2 PCs (PC1 and PC2)
- 1 Switch (8-port or 24-port)
- 2 Straight-through Ethernet cables

Theory:
A switch is a network device that operates at Layer 2 of the OSI model (Data Link Layer). Unlike a hub, which broadcasts all incoming data to every connected device, a switch is more intelligent. It forwards data only to the specific destination device by learning and storing the MAC addresses of connected devices in its MAC address table. This reduces network congestion and improves communication efficiency.

In this lab, two PCs will be connected to a switch. Both PCs will be assigned unique IP addresses within the same subnet, and we will test the connection between them using the ping command. If the network is set up correctly, the ping command will successfully send ICMP packets from one PC to another and receive replies.

Procedure:
1. **Open Cisco Packet Tracer.** - Start the Cisco Packet Tracer software and ensure that the workspace is clear.

2. **Add Devices to the Workspace:**
   - From the **End Devices** section on the left side of the interface, drag and drop **2 PCs** into the workspace. These will be labeled as PC1 and PC2.
   - From the **Network Devices** section, select **Switches** and choose a standard switch (e.g., an **8-port switch**), and place it in the workspace.
3. **Connect the Devices with Cables:**

- Use **Straight-through Ethernet cables** to connect the PCs to the switch:
  - Click on **PC1**, select the **FastEthernet0** port, and connect it to **Port 1** on the switch.
  - Click on **PC2**, select the **FastEthernet0** port, and connect it to **Port 2** on the switch.

4. **Assign IP Addresses to the PCs:**
   - On PC1:
     - Click on PC1, go to the **Desktop** tab, and select **IP Configuration**.
     - Assign the IP address **192.168.1.1** and set the **Subnet Mask** to **255.255.255.0**.
   - On PC2:
     - Click on PC2, go to the **Desktop** tab, and select **IP Configuration**.
     - Assign the IP address **192.168.1.2** and set the **Subnet Mask** to **255.255.255.0**.
5. **Test the Network Connection Using Ping:**
   - On PC1:
     - Open the **Command Prompt** from the **Desktop**.
     - Type the command `ping 192.168.1.2` and press Enter.
     - Observe the output to see if the ICMP request packets are being sent and if replies are received from PC2.
   - On PC2:
     - Similarly, open the **Command Prompt** and type `ping 192.168.1.1` to check if PC2 can communicate with PC1.
6. **Switch to Simulation Mode:**
   - In Cisco Packet Tracer, switch to **Simulation Mode** (lower-right corner of the screen).
   - In **Simulation Mode**, repeat the ping command from PC1 to PC2 and observe the packet flow:
     - Watch how the switch processes the data frames and forwards them only to the correct destination based on MAC addresses, unlike a hub which would broadcast to all ports.

Results:

- **In Real-Time Mode:**

The ping command executed from PC1 to PC2 was successful, confirming the two PCs are properly connected through the switch. Similarly, the ping from PC2 to PC1 was also successful. This indicates a fully functional connection between the devices.

- **In Simulation Mode:**
  The simulation showed that the switch learns and stores the MAC addresses of the connected devices after receiving the initial packet. Future

packets are then forwarded directly to the intended recipient rather than being broadcast to all ports, demonstrating the switch's efficient handling of network traffic.

Conclusion:
In this lab, we successfully connected two PCs using a switch and verified their connectivity through the ping command. Unlike a hub, the switch efficiently forwards data only to the target device, reducing unnecessary network traffic. This lab demonstrated the fundamental operation of a switch at the Data Link Layer and reinforced the concept of MAC address-based forwarding. Switches are a vital component in modern networks due to their ability to manage traffic and reduce network congestion.

If you'd like to explore any specific concepts, such as how switches manage MAC address tables or further details about OSI layers, feel free to ask!