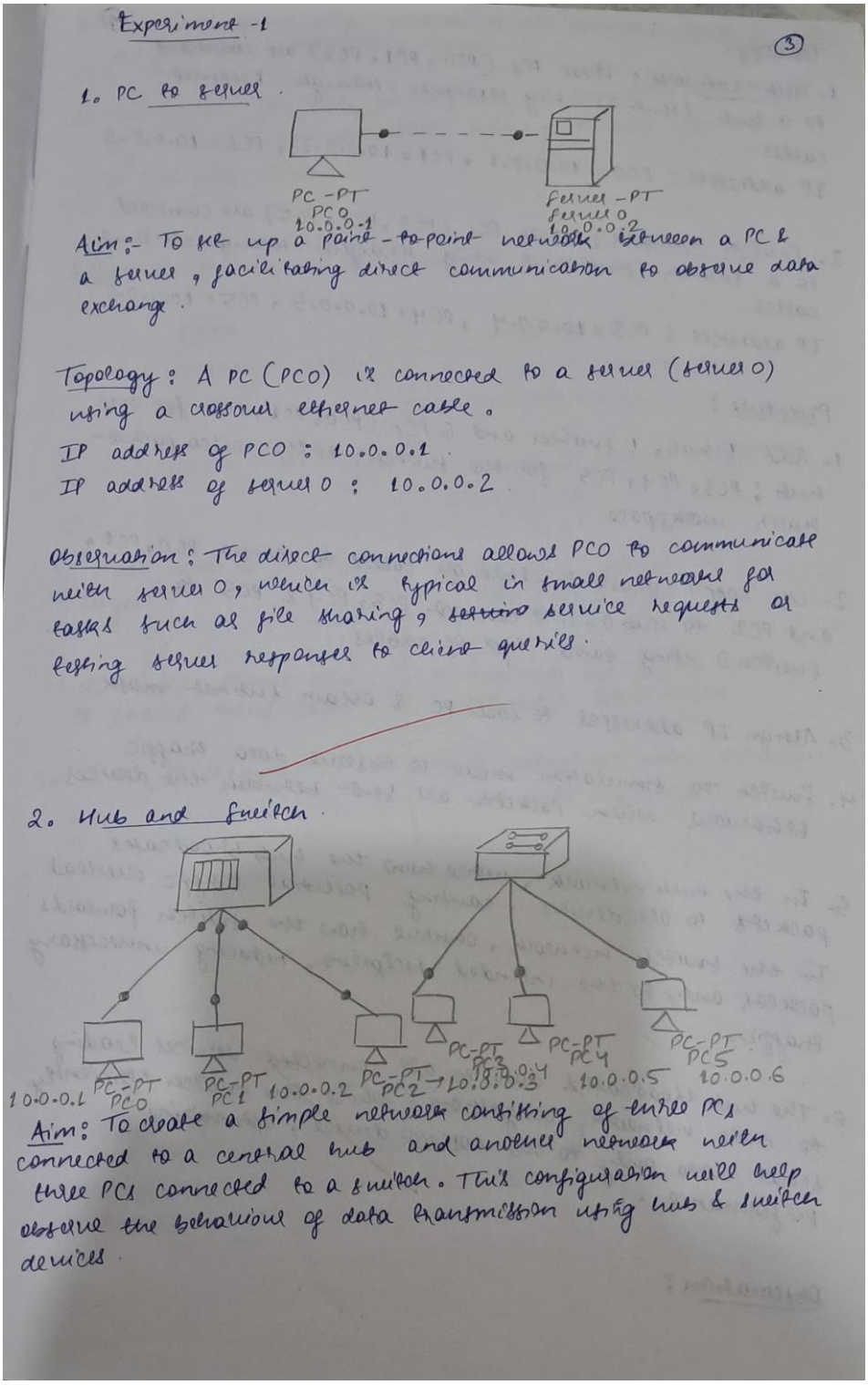
Program 1

Aim: Create a topology and simulate sending a simple PDU from source to destination using hub and switch as connecting devices and demonstrate ping messages.

Topology, Procedure and Observation:



Topology:

1. Hub Network: Three PCs (PC0, PC1, PC2) are connected to a hub (Hub 0) using straight-through Ethernet cables.
IP addresses: PC0 = 10.0.0.1, PC1 = 10.0.0.2, PC2 = 10.0.0.3.

2. Switch Network: Three PCs (PC3, PC4, PC5) are connected to a switch (switch 0) using straight-through ethernet cables.
IP addresses: PC3 = 10.0.0.4, PC4 = 10.0.0.5, PC5 = 10.0.0.6.

Procedure:

1. Add 1 hub, 1 switch and 6 PCs (PC0, PC1, PC2 for the hub; PC3, PC4, PC5 for the switch) to the cisco packet-tracer workspace.

2. Use copper straight-through cables to connect PC0, PC1, and PC2 to Hub 0. Similarly connect PC3, PC4 & PC5 to switch 0 using same type of cables.

3. Assign IP addresses to each PC & obtain subnet mask.

4. Switch to simulation mode to observe data traffic behaviour when packets are sent between the devices.

5. In the hub network, notice how the hub broadcasts packets to all devices, causing potential traffic overload. In the switch network, observe how the switch forwards packets only to the intended recipient, reducing unnecessary traffic.

6. The hub broadcasts data to all connected devices leading to more network congestion, while the switch efficiently sends data only to the correct device, optimizing performance.

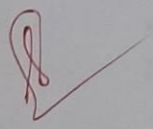
Observation:

1. The hub broadcasts packets to all devices, which may cause unnecessary traffic.

2. The switch forwards packets only to the appropriate device by learning MAC addresses, making it more efficient in reducing traffic.

Difference between Hubs and Switches.

Hubs	Switches
1. Hub broadcast data to all devices	1. Switches send it only to the destination.
2. Hubs create more traffic	2. Switches reduces traffic by directing data.
3. Hubs work at physical layer.	3. Switches operate at the data link layer.
4. Hubs are slower due to shared bandwidth.	4. Switches are faster with dedicated bandwidth.
5. Hubs are cheaper.	5. Switches are more expensive but more efficient.



Screen Shots: