Q. Create a topology & simulate sending a simple PDU from source to destination using hub & switch & demonstrate ping message

2. Hub & Switch.


```
Hub-PT          Switch-PT
Hub0            Switch0

PC-PT   PC-PT   PC-PT      PC-PT   PC-PT   PC-PT
PC0     PC1     PC2        PC3     PC4     PC5
10.0.0.1  10.0.0.2  10.0.0.3   10.0.0.4  10.0.0.5  10.0.0.6
```
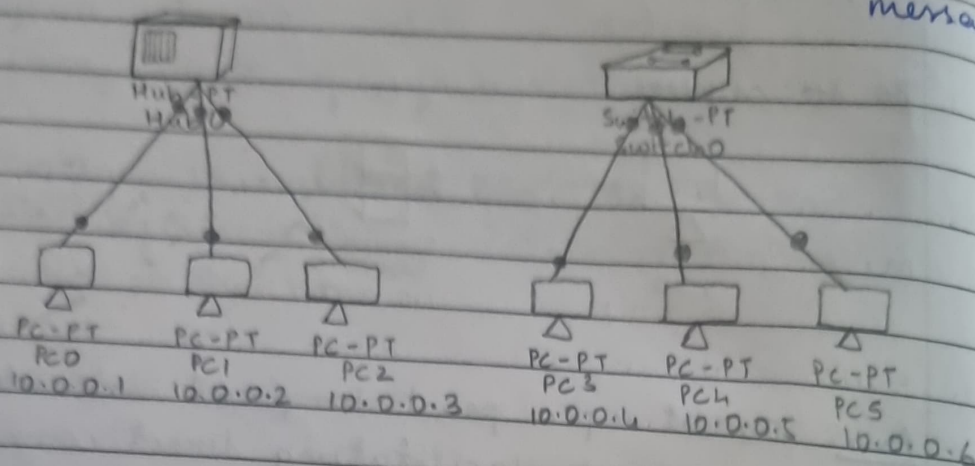
Aim: To create a simple network consisting of three PCs connected to a central hub and another network with three PCs connected to a switch. This configuration will help observe the behaviour of data transmission using hub & switch devices.

Topology:

1. **Hub Network:** Three PCs (PC0, PC1, PC2) are connected to a hub (Hub0) 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 (PC 3, PC4, PC5) are connected to a switch (Switch0) 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 Hub0. III'y connect PC3, PC4 & PC5 to switch0 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.