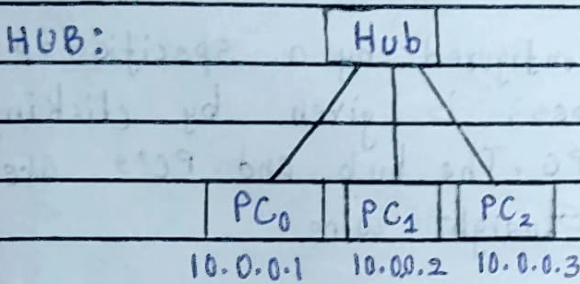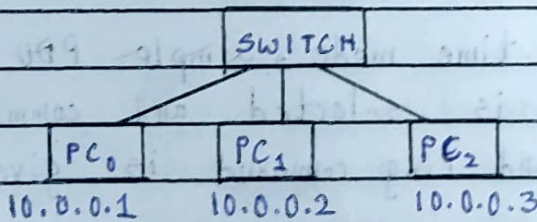Aim: Createing a topology and simulating a simple PDU from source to destination using hub and switch as connecting devices

Topology

HUB:

```
              Hub
          /    |    \
       PC_0   PC_1   PC_2
     10.0.0.1 10.0.0.2 10.0.0.3
```
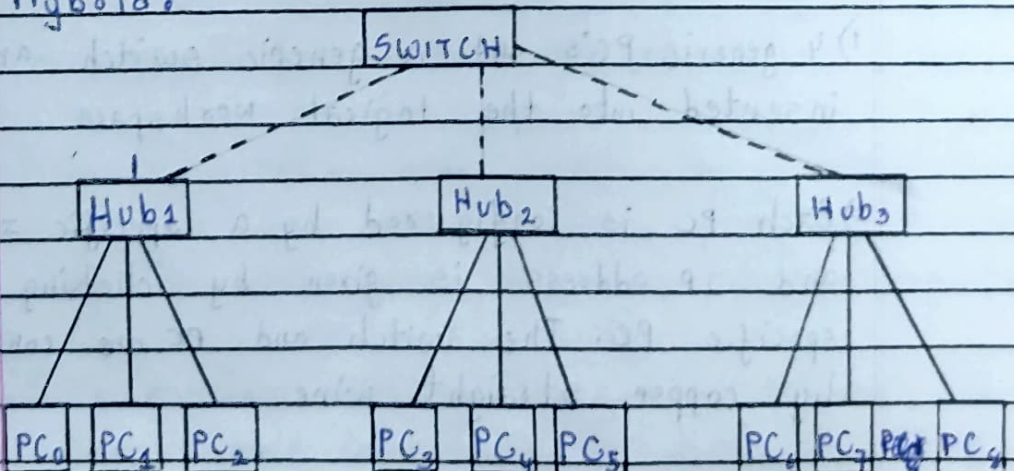
SWITCH:

```
              SWITCH
          /     |      \
        PC_0   PC_1    PC_2
     10.0.0.1 10.0.0.2 10.0.0.3
```

Hybrid:

```
                    SWITCH
            /         |          \
        Hub1        Hub2          Hub3
       / | \       / | \         / | \
  PC_0 PC_1 PC_2  PC_3 PC_4 PC_5  PC_6 PC_7 PC_8 PC_9
```

Procedure:

hub

1) 7 generic PC's and a generic hub are inserted into the logical workspace

2) Each PC is configured by a specific IP address and IP address is given by clicking on a specific PC. The hub and PC's are connected by copper straight wire

3) In simulation mode, simple PDU is established b/w to send devices and packet transfer can be seen

4) In real-time mode, simple PDU is established one PC is selected and command prompt is opened and ping command is given

switch

1) 4 generic PC's and a generic switch are inserted into the logical workspace

2) Each PC is configured by a specific IP address and IP address is given by clicking on a specific PC. The switch and PC are connected by copper straight wire

3) In simulation mode simple PDU is established two end devices and auto capture is clicked the packet transfer can be seen b/w the switch and PC's

4) In real-time mode, any PC can be selected and command prompt is opened and ping IP-address is given

Hybrid

1) 12 generic PC's, 3 Hubs and switch is taken 4 generic PC's are connected to each hub and all 3 hubs are connected to switch.

2) All the nodes for 12 PC's are placed and the PC's are connected to their respective hub by copper-straight wire and the three hubs are connected to their switch by copper Cross-over wire. The IP address of all PC's are given by clicking on them.

3) In simulation mode simple PDU is established between two end devices and packet transfer can be seen from the source to the destination.

4) In real-time mode, a PC can be selected and the command prompt can be opened and ping command is given and output can be seen on the command prompt screen.

Observation:

1) Hub

Learning Outcome:

The hub sends message to all the end devices & except to the one it receives the message from but the message is read only by the specified destination and destination & responds by sending a packet

Result

Ping 10.0.0.5

Pinging 10.0.0.5 with 32 bytes of data:

Reply from 10.0.0.5 : bytes = 32 time = 0ms TTL=128
Reply from 10.0.0.5 : bytes = 32 time = 0ms TTL=128
Reply from 10.0.0.5 : bytes = 32 time = 1ms TTL=121
Reply from 10.0.0.5 : bytes = 32 time = 0ms TTL=128

Ping statistics for 10.0.0.5:
    Packets : Sent = 4, Recvr Received = 4, Lost = 0 (0%)
Approximate round trip times in milli-seconds:
    minimum = 0ms, Maximum = 1ms, Average = 0ms

2) Switch

Learning Outcome:

+) switch does not establish connection immediately there is a contain time called learning time and message cannot be done until the green light connection is established

*) Switch only sends the message to the end device (Reciever)

Result

Ping 10.0.0.3

Pinging 10.0.0.3 with 32 bytes of data:

Reply from 10.0.0.3 : bytes= 32 time=0ms TTL=128
Reply from 10.0.0.3 : bytes = 32 time =1ms TTL = 128
Reply from 10.0.0.3 : bytes=32 time =0ms TTL =128
Reply from 10.0.0.3 : bytes=32 time= 0ms TTL =128

Ping statistics for 10.0.0.3:
    Packets: sent = 4, Received = 4, Lost =0 (0% Loss),
Approximate round trip times in milli- seconds:
    minimum =0ms, Maximum =1ms, Average =0ms

3) Hybrid
    Learning Outcome:
    The switch first sends the message to all the hubs then learns about the IP address of the end system. Then it only sends message to the hub to which the end device is connected
    Result:
        Ping 10.0.0.12
        pinging 10.0.0.12 with 32 bytes of data
        :
    Ping statistics for 10.0.0.12:
    Packets: sent=4, Received=4, Lost=0