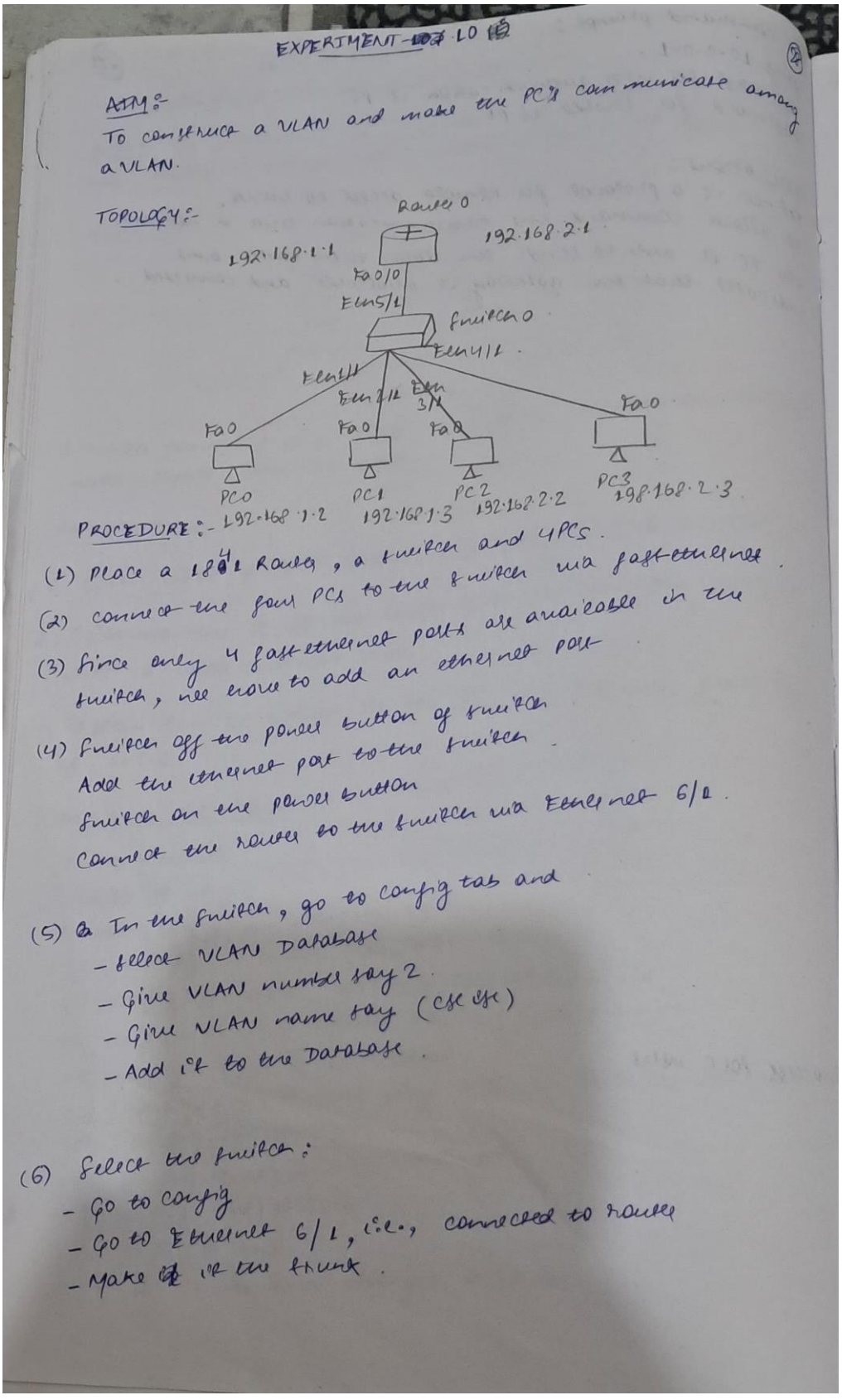
Program 10

Aim: To construct a VLAN and make the PC's communicate among a VLAN .

Topology, Procedure and Observation:



EXPERIMENT-10

AIM:-
To construct a VLAN and make the PC's communicate among a VLAN.

TOPOLOGY:-

PROCEDURE:-

(1) Place a 1841 Router, a switch and 4 PCs.

(2) Connect the four PCs to the switch via fast-ethernet.

(3) Since only 4 fast-ethernet ports are available in the switch, we have to add an ethernet port

(4) Switch off the power button of switch
Add the ethernet port to the switch
Switch on the power button
Connect the router to the switch via Ethernet 6/1.

(5) In the switch, go to config tab and
- Select VLAN Database
- Give VLAN number say 2.
- Give VLAN name say (CSE dept)
- Add it to the Database.

(6) Select the switch:
- Go to config
- Go to Ethernet 6/1, i.e., connected to router
- Make it the trunk.

(7) Configure the PCs as shown in the topology

(8) Select switch
- Go to config
- Go to FastEthernet 2/1
- Set VLAN number as 2, i.e., click ok
- Similarly set VLAN 2 for FastEthernet 3/1 interfaces.

(9) Config the Router:
Router (config) # interface fastEthernet 0/0
Router (config-if) # ip address 192.168.1.1 255.255.255.0
Router (config-if) # no shut
Router (config-if) # exit

Now, to configure the router's VLAN interfaces
Router (config) # interface fastethernet 0/0.1
Router (config-subif) # encapsulation dot1q 2
Router (config-subif) # ip address 192.168.2.1 255.255.255.
Router (config-subif) # exit

(10) Ping devices within same VLAN and to devices of different VLAN.

OBSERVATIONS:-

(1) When devices are pinged within same VLAN:
- Pinging 192.168.1.3 from 192.168.1.2
- the data packet doesn't go to the router
- the switch forwards the packet within out the need of the router

(2) When a device pings a device of another VLAN
- Pinging 192.168.2.3 from 192.168.1.2
- the data packet's journey is as follows:-

192.168.1.2 → switch → Router

192.168.2.3 ← switch ←

(3) VLANs divide a single switch into multiple logical switches

- Devices in one VLAN cannot directly communicate with devices in another VLAN without a router.

(4) Traffic Isolation:-

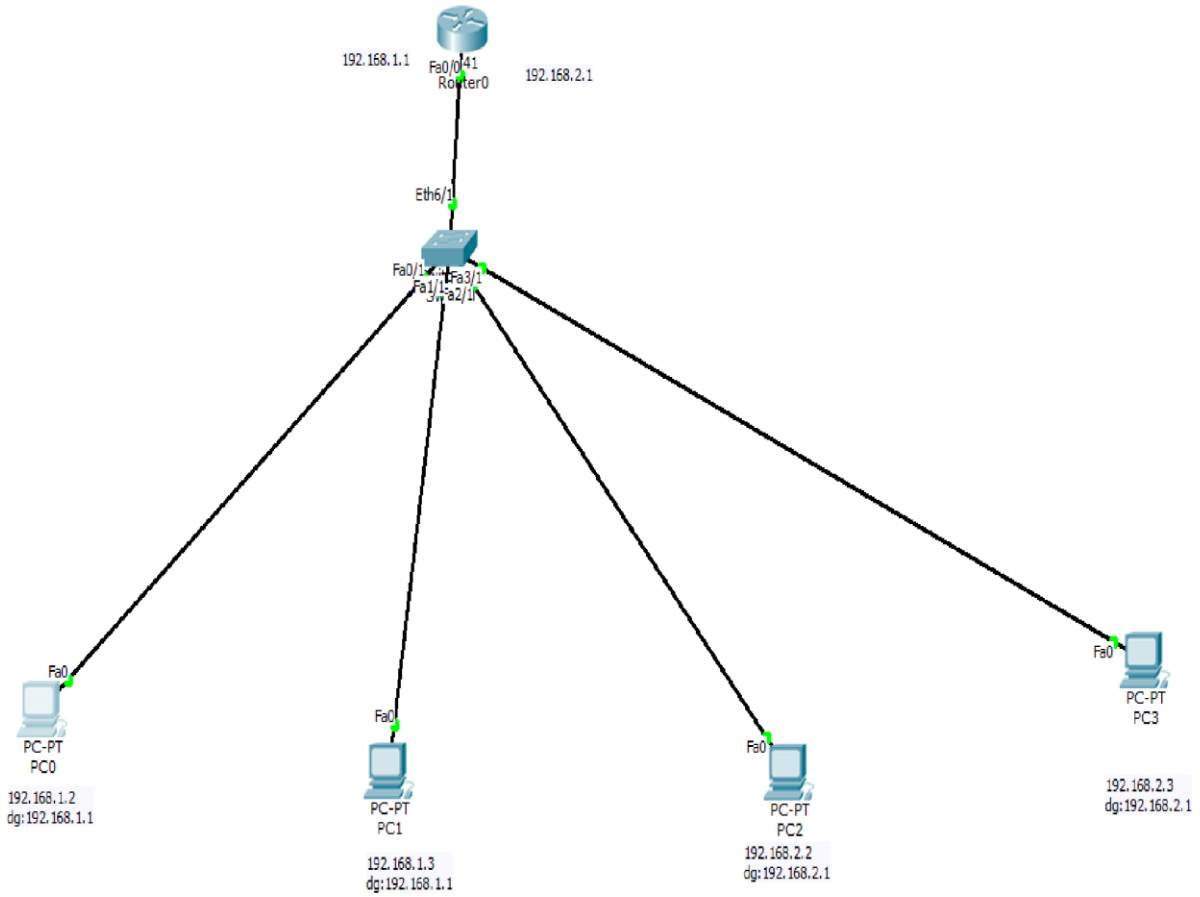
- Each VLAN maintains its own broadcast-domain
- Broadcasts sent by devices in an VLAN do not reach devices in another VLAN.

(5) VLAN trunking allows switches to forward frames from different VLANs over a single link called trunk.

- This is done by adding an additional header information called tag to the ethernet frame.

- VLAN tagging.

Screen Shots:



Command Prompt

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Packet Tracer PC Command Line 1.0
PC>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Request timed out.
Reply from 192.168.2.2: bytes=32 time=0ms TTL=127
Reply from 192.168.2.2: bytes=32 time=0ms TTL=127
Reply from 192.168.2.2: bytes=32 time=4ms TTL=127

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 4ms, Average = 1ms

PC>ping 192.168.2.2

Pinging 192.168.2.2 with 32 bytes of data:

Reply from 192.168.2.2: bytes=32 time=0ms TTL=127
Reply from 192.168.2.2: bytes=32 time=0ms TTL=127
Reply from 192.168.2.2: bytes=32 time=2ms TTL=127
Reply from 192.168.2.2: bytes=32 time=0ms TTL=127

Ping statistics for 192.168.2.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms

PC>ping 192.168.2.3

Pinging 192.168.2.3 with 32 bytes of data:

Request timed out.
Reply from 192.168.2.3: bytes=32 time=3ms TTL=127
Reply from 192.168.2.3: bytes=32 time=2ms TTL=127
Reply from 192.168.2.3: bytes=32 time=1ms TTL=127

Ping statistics for 192.168.2.3:
    Packets: Sent = 4, Received = 3, Lost = 1 (25% loss),
Approximate round trip times in milli-seconds:
    Minimum = 1ms, Maximum = 3ms, Average = 2ms

PC>ping 192.168.2.3

Pinging 192.168.2.3 with 32 bytes of data:

Reply from 192.168.2.3: bytes=32 time=0ms TTL=127
Reply from 192.168.2.3: bytes=32 time=0ms TTL=127
Reply from 192.168.2.3: bytes=32 time=2ms TTL=127
Reply from 192.168.2.3: bytes=32 time=0ms TTL=127

Ping statistics for 192.168.2.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 2ms, Average = 0ms

PC>
```