Expt. 11 – 18/12/2024

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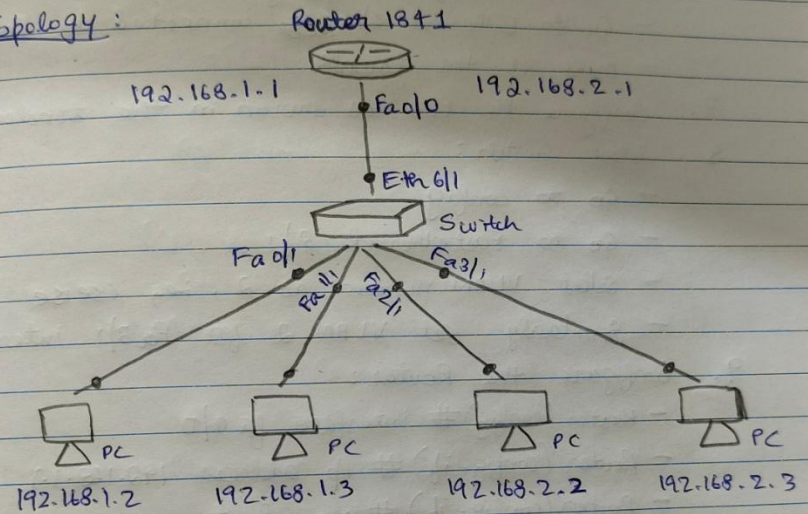
Expt. 11 :

Aim : To construct a VLAN & make the PCs communicate among a VLAN.

Topology :



Procedure :

1. Place a 1841 router, a switch & 4 PCs
2. Connect the 4 PCs to the switch via fastethernet
3. Since only 4 fastethernet ports are available on the switch, we have to add an ethernet port.
4. - Switch off the power button of switch
   - Add the ethernet port to switch
   - Switch on the power button
   - Connect the router to switch via Ethernet 0/1
5. In the switch, go to config tab & -
   - Select VLAN Database

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- Give VLAN number, say 2
- Give VLAN name say, 'cselse'
- Add it to the Database.

6. Select the Switch:
   - Go to config
   - Go to Ethernet 0/1 that is 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
   - Select VLAN number as 2, ie, cselse
   - Similarly set VLAN 2 for Fa 3/1 interface
9. Configure the Router:

```
Router(config)# interface fa 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 interface:

```
Router(config)# interface Fa 0/0.1
Router(config-subif)# encapsulation dot1q 2
                    # ip address 192.168.2.1 255.255.255.0
                    # no shut
                    # exit
```

10. Ping devices within the same VLAN as to devices of different VLAN.

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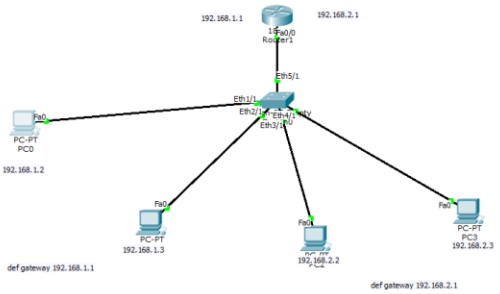
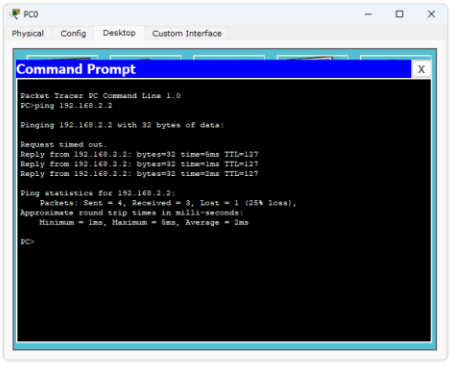
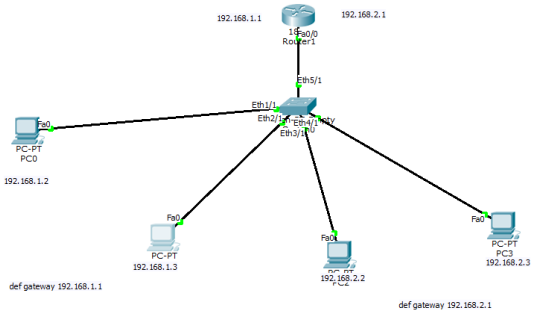
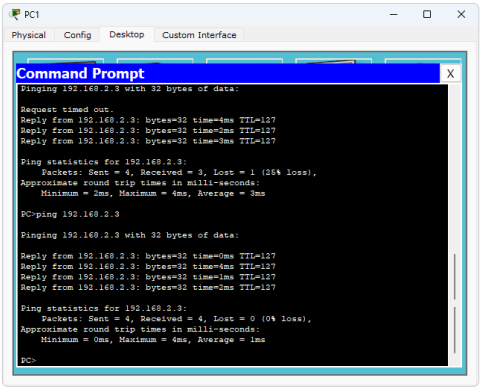
Observations:

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 router
   - The switch forwards the packet without 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 packets journey is as follow:
     192.168.1.2 → Switch → Router → 192.168.2.3 ← Switch
3. VLANs divide a single switch into multi point logical switches
   - Devices in one VLAN can't 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 one VLAN do not reach devices in another VLAN.
5. VLAN trunking allows switches to forward frames from different VLANs over a single links called trunk
   - This is done by adding an additional header information called tag to the ethernet frame - VLAN tagging


192.168.1.1
192.168.2.1
Router1
Fa0/0
Eth5/1
Eth1/1
Eth2/1
Eth3/1
Eth4/1
Fa0
PC-PT
PC0
192.168.1.2
PC-PT
192.168.1.3
PC-PT
192.168.2.2
PC-PT
PC3
192.168.2.3
def gateway 192.168.1.1
def gateway 192.168.2.1


PC0
Physical
Config
Desktop
Custom Interface
Command Prompt
X
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=5ms TTL=127
Reply from 192.168.2.2: bytes=32 time=1ms TTL=127
Reply from 192.168.2.2: bytes=32 time=1ms 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 = 1ms, Maximum = 5ms, Average = 2ms
PC>


192.168.1.1
192.168.2.1
Router1
Fa0/0
Eth5/1
Eth1/1
Eth2/1
Eth3/1
Eth4/1
Fa0
PC-PT
PC0
192.168.1.2
PC-PT
192.168.1.3
PC-PT
192.168.2.2
PC-PT
PC3
192.168.2.3
def gateway 192.168.1.1
def gateway 192.168.2.1


PC1
Physical
Config
Desktop
Custom Interface
Command Prompt
X
Pinging 192.168.2.3 with 32 bytes of data:
Request timed out.
Reply from 192.168.2.3: bytes=32 time=4ms TTL=127
Reply from 192.168.2.3: bytes=32 time=2ms TTL=127
Reply from 192.168.2.3: bytes=32 time=3ms 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 = 2ms, Maximum = 4ms, Average = 3ms
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=4ms TTL=127
Reply from 192.168.2.3: bytes=32 time=1ms TTL=127
Reply from 192.168.2.3: bytes=32 time=2ms 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 = 4ms, Average = 1ms
PC>