PAGE NO.
DATE : / /

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ROLL NO: 53
Panel: A
Batch: A4

Lab Assignment 2 (CN)
VIRTUAL LAN

AIM: Design and configure a VLAN using packet tracer

OBJECTIVE: To understand concept of VLAN and implement using packet tracer.

THEORY:

1) What is VLAN?
Ans A virtual LAN is a collection of devices or network nodes that communicate with one another as if they made up a single LAN when in reality they exist in one or several LAN segments.

2) Collision domain
→ A collision domain is part of a network where packet collision can occur.
→ A collision occurs when two devices send a packet at same time on shared network segment.
→ The packets collide and both devices must send packets again which reduces network efficiency.

3) Broadcast domain:

→ A broadcast domain is domain in which a broadcast is forwarded.

→ A broadcast domain contains all devices that can reach each other at data link layer by using broadcast.

4) Collision domain and broadcast domain in networking devices (hub, switch, routers)

→ Collisions are often in a hub environment because each port on a hub is in same collision domain. By contrast, each port on a bridge, a switch or a router is in a separate collision domain.

→ All ports on a hub/switch are by default in same broadcast domain. All ports on a router are in different broadcast domains and routers don't forward broadcast from one broadcast domain to another.

5) Access port and trunk port:

→ access port - a port that can be assigned to a single VLAN. This type of interface is configured on switch ports that are connected to end devices such as workstation, printers or access points.

→ Trunk port - a port that is connected to another switch. This type of interface can convey traffic of multiple VLANs, thus enabling user to extend VLANs ~~across~~ across entire network.

COMMANDS USED FOR THE CONFIGURATION

```
Switch > enable
Switch # show vlan
Switch # config t
Switch (config) # vlan 2
Switch (config - vlan) # name
```

FAQ

Q1 What is the need of VLANs?

Ans VLANs allow a group of Ethernet devices (subnet) to be physically separated by many Ethernet switches but communicate as if they were all connected to the same physical Ethernet switch.

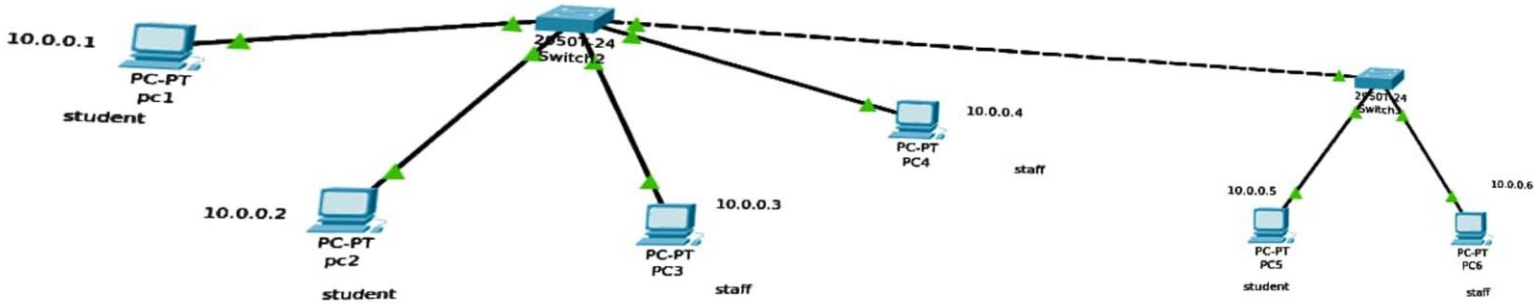
Q2 What is the difference b/w VLAN access and trunk mode?

TRUNK	ACCESS
→ It carries traffic on one or more VLANs on same physical links.	→ It's a port of only 1 VLAN and is normally used for terminating end devices
→ Higher bandwidth	→ Lower bandwidth
→ Multiple untagged VLANs	→ Single untagged VLAN.
→ To designate port to trunk mode switchport mode trunk.	→ To designate port to access mode switchport mode access

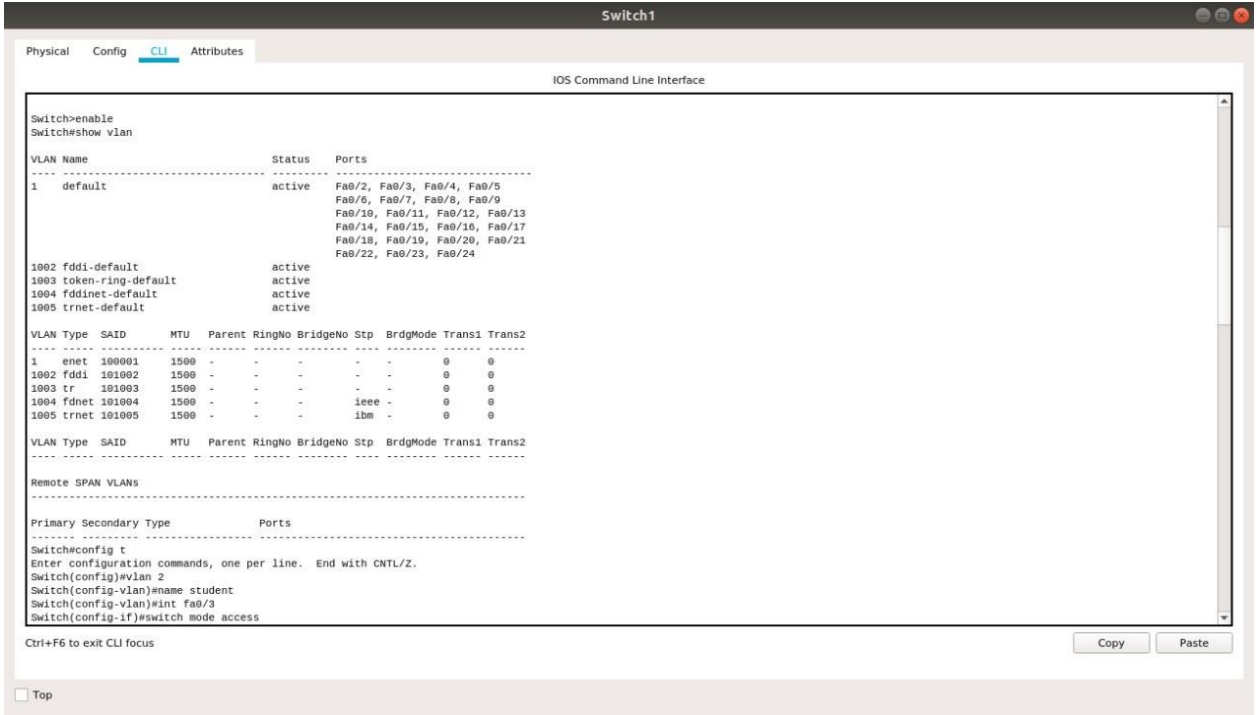
Q.3 Enlist different network simulator tools like Cisco packet tracer

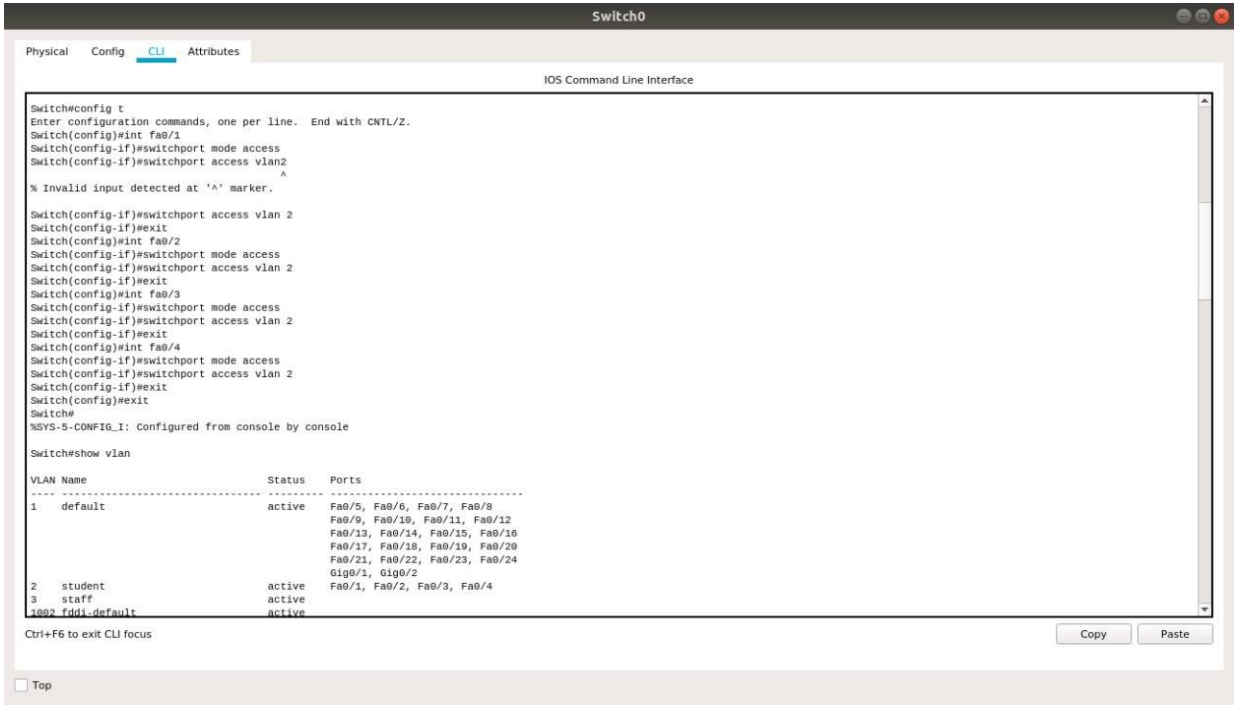
Ans → Boson Netsim
→ GNS3
→ VIRL
→ EVE-NG

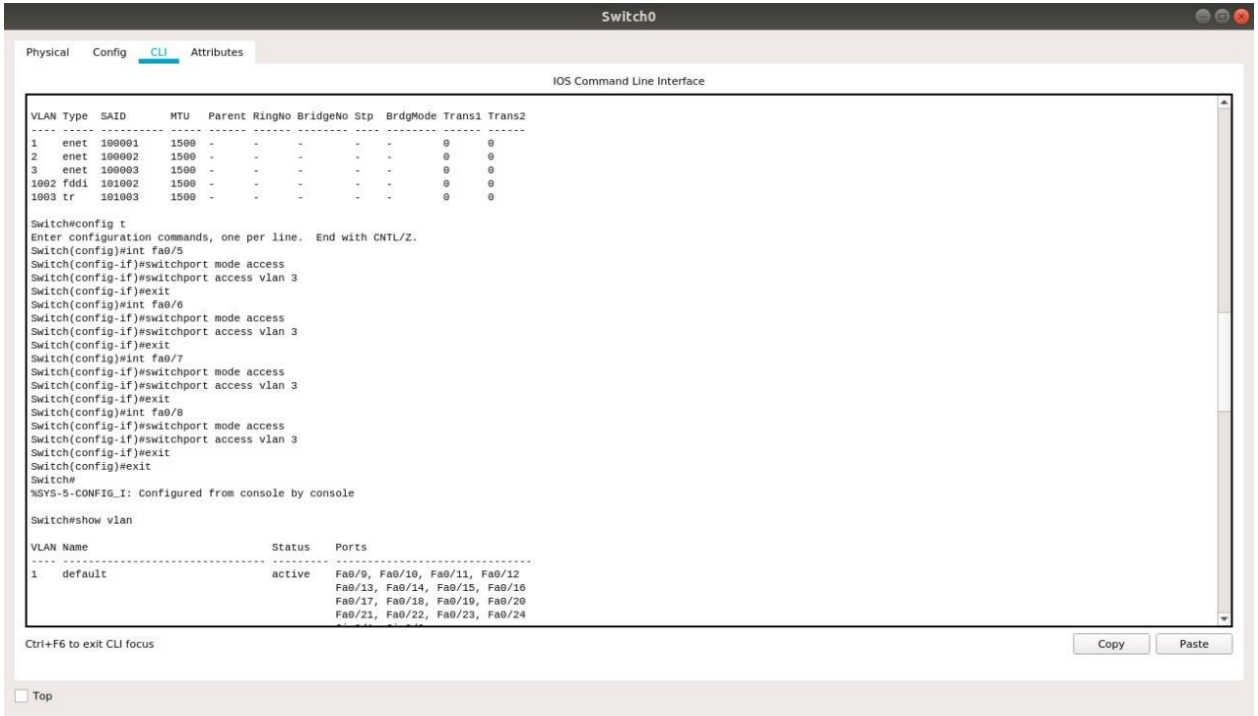
OUTPUT:

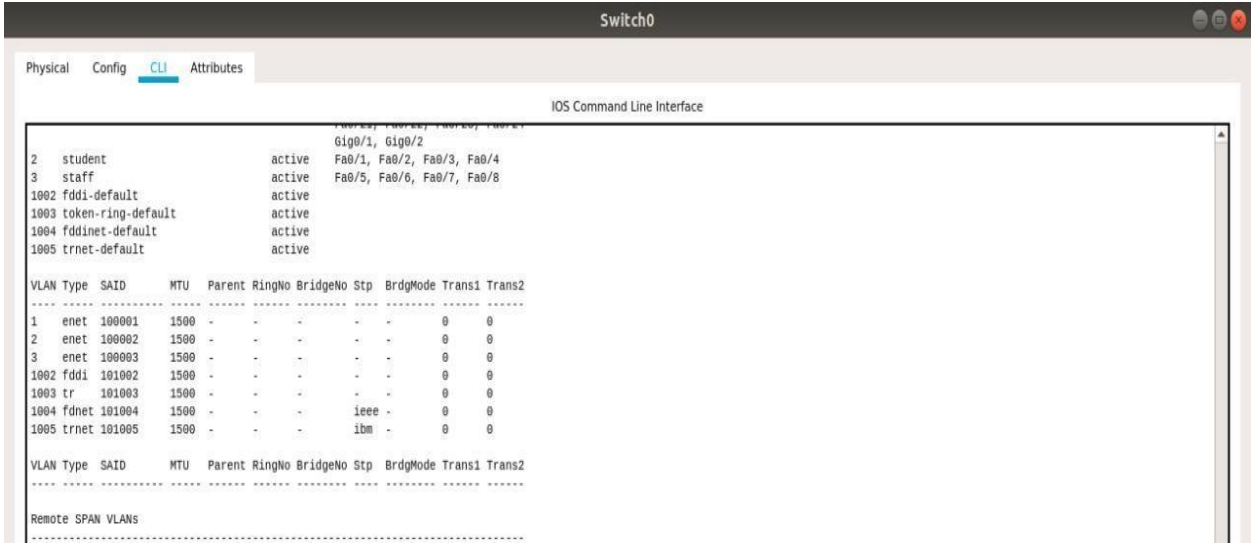

10.0.0.1
PC-PT
pc1
student
2950T-24
Switch2
10.0.0.2
PC-PT
pc2
student
PC-PT
PC3
10.0.0.3
staff
PC-PT
PC4
10.0.0.4
staff
2950T-24
Switch3
10.0.0.5
PC-PT
PC5
student
10.0.0.6
PC-PT
PC6
staff

CLI:


Switch1
Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch>enable
Switch#show vlan
VLAN Name Status Ports
---- -------------------------------- --------- -------------------------------
1 default active Fa0/2, Fa0/3, Fa0/4, Fa0/5
Fa0/6, Fa0/7, Fa0/8, Fa0/9
Fa0/10, Fa0/11, Fa0/12, Fa0/13
Fa0/14, Fa0/15, Fa0/16, Fa0/17
Fa0/18, Fa0/19, Fa0/20, Fa0/21
Fa0/22, Fa0/23, Fa0/24
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1 enet 100001 1500 - - - - - 0 0
1002 fddi 101002 1500 - - - - - 0 0
1003 tr 101003 1500 - - - - - 0 0
1004 fdnet 101004 1500 - - - ieee - 0 0
1005 trnet 101005 1500 - - - ibm - 0 0
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
Remote SPAN VLANs
Primary Secondary Type Ports
------- --------- ----------------- --
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#vlan 2
Switch(config-vlan)#name student
Switch(config-vlan)#int fa0/3
Switch(config-if)#switch mode access
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


Switch0
Physical
Config
CLI
Attributes
IOS Command Line Interface
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int fa0/1
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan2
^
% Invalid input detected at '^' marker.
Switch(config-if)#switchport access vlan 2
Switch(config-if)#exit
Switch(config)#int fa0/2
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 2
Switch(config-if)#exit
Switch(config)#int fa0/3
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 2
Switch(config-if)#exit
Switch(config)#int fa0/4
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 2
Switch(config-if)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#show vlan
VLAN Name Status Ports
---- -------------------------------- --------- -------------------------------
1 default active Fa0/5, Fa0/6, Fa0/7, Fa0/8
Fa0/9, Fa0/10, Fa0/11, Fa0/12
Fa0/13, Fa0/14, Fa0/15, Fa0/16
Fa0/17, Fa0/18, Fa0/19, Fa0/20
Fa0/21, Fa0/22, Fa0/23, Fa0/24
Gig0/1, Gig0/2
2 student active Fa0/1, Fa0/2, Fa0/3, Fa0/4
3 staff active
1002 fddi-default active
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


Switch0
Physical
Config
CLI
Attributes
IOS Command Line Interface
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1 enet 100001 1500 - - - - - 0 0
2 enet 100002 1500 - - - - - 0 0
3 enet 100003 1500 - - - - - 0 0
1002 fddi 101002 1500 - - - - - 0 0
1003 tr 101003 1500 - - - - - 0 0
Switch#config t
Enter configuration commands, one per line. End with CNTL/Z.
Switch(config)#int fa0/5
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 3
Switch(config-if)#exit
Switch(config)#int fa0/6
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 3
Switch(config-if)#exit
Switch(config)#int fa0/7
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 3
Switch(config-if)#exit
Switch(config)#int fa0/8
Switch(config-if)#switchport mode access
Switch(config-if)#switchport access vlan 3
Switch(config-if)#exit
Switch(config)#exit
Switch#
%SYS-5-CONFIG_I: Configured from console by console
Switch#show vlan
VLAN Name Status Ports
---- -------------------------------- --------- -------------------------------
1 default active Fa0/9, Fa0/10, Fa0/11, Fa0/12
Fa0/13, Fa0/14, Fa0/15, Fa0/16
Fa0/17, Fa0/18, Fa0/19, Fa0/20
Fa0/21, Fa0/22, Fa0/23, Fa0/24
Ctrl+F6 to exit CLI focus
Copy
Paste
Top


Switch0
Physical
Config
CLI
Attributes
IOS Command Line Interface
Gig0/1, Gig0/2
2 student active Fa0/1, Fa0/2, Fa0/3, Fa0/4
3 staff active Fa0/5, Fa0/6, Fa0/7, Fa0/8
1002 fddi-default active
1003 token-ring-default active
1004 fddinet-default active
1005 trnet-default active
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
1 enet 100001 1500 - - - - - 0 0
2 enet 100002 1500 - - - - - 0 0
3 enet 100003 1500 - - - - - 0 0
1002 fddi 101002 1500 - - - - - 0 0
1003 tr 101003 1500 - - - - - 0 0
1004 fdnet 101004 1500 - - - ieee - 0 0
1005 trnet 101005 1500 - - - ibm - 0 0
VLAN Type SAID MTU Parent RingNo BridgeNo Stp BrdgMode Trans1 Trans2
Remote SPAN VLANs