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Roll. No: 8

Batch: A1

PRN: 1032210651

Title: Virtual LAN

Aim: Design and configure a virtual LAN using Packet Tracer.

Objectives:

To understand the concept of VLAN and implement it using packet tracer

Neeraj Varma PRN: 10322106511
Roll No. 08
Batch: A1

CN lab Assignment 2

Theory:-

- What is VLAN?

→ A virtual LAN is a logical overlay network that groups together a subset of devices that share a physical LAN isolating the traffic for each group. A LAN is a group of computers or other devices in the same place.

- Collision Domain

→ A collision domain is defined as a single CSMA/CD network in which there will be a collision if two stations attached to the system transmit at the same time. Each port on a bridge or a switch defines a collision domain

- Broadcast Domain

→ A broadcast domain is a logical division of a computer network, in which all nodes can reach each other by broadcast at the data link layer. A broadcast domain can be within the same LAN segment or it can be bridged to other LAN segments.

* Collision Domain and Broadcast Domain in networking devices

1. Collision Domain

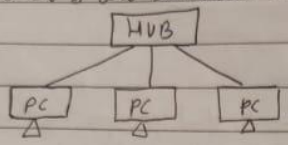
Hub- Simple hubs have one collision domain and one broadcast domain

Switch- Each port of a switch is one collision domain. In other words, the no. of collision domains for a switch is related with the ports of the switch by the default. If switch has 24 ports, it has 24 collision domains

Routers- This is similar to switches. Each port of a router is one collision domain

2. Broadcast Domain

Hub - It is one broadcast domain



Switch - A switch is one broadcast domain by default. Because by default there is no extra VLAN configuration on switches

Router - Each router port is one broadcast domain. By default, router don't pass broadcast ~~do~~ traffic. So, devices connected to the different port of a router, don't receive any broadcast traffic coming from another port

- Access port & Trunk port

1) Access Port

→ An access port is a type of connection on a switch that is used to connect a guest virtual machine that is VLAN unaware. The port provides the virtual machine with connectivity through a switch that is VLAN aware without requiring it to support VLAN tagging

2) Trunk Port

→ A trunk port can have two or VLANs configured on the interface, it can carry traffic for several VLANs simultaneously

FAQ's

1. What is the need for VLANs ?

→ VLAN allows network administrators to automatically limit access to a specified group of users by dividing workstations into different isolated LAN segments. When users move their workstations administrators don't need to reconfigure the network or change VLAN group.

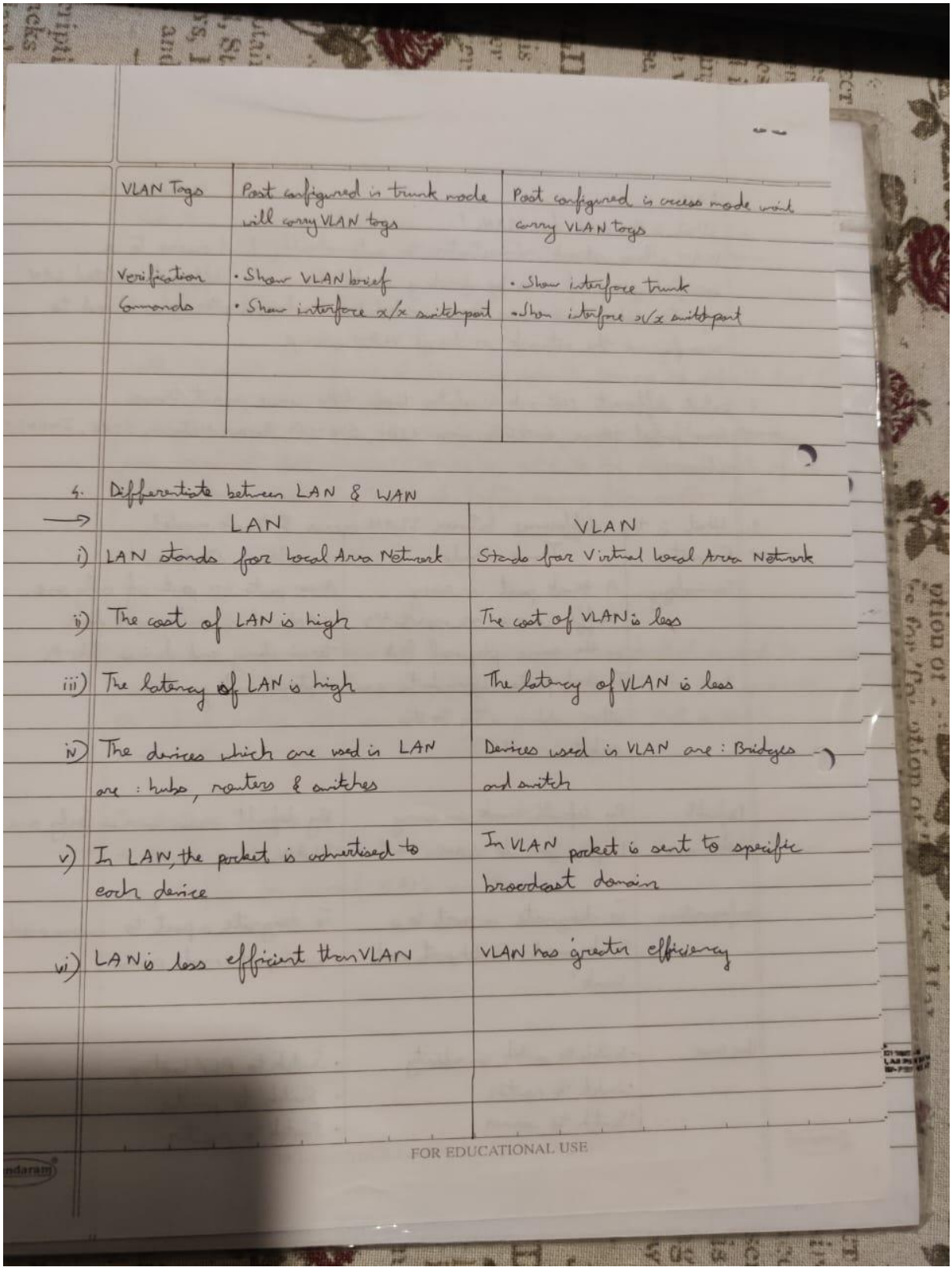
2. Enlist different Network Simulator tools like cisco packet tracer

→ Cisco packet tracer, GNS3, Cisco VIRL, EVE-NG, Boson Netsim, CORE, IMUNES, Cloonix

3. What is the difference between VLAN access & trunk mode?

→

Parameter	Trunk Mode	Access Mode
Terminology	A trunk port can carry traffic in one or more VLANs on the same physical link. Trunked ports differentiate VLANs either adding a tag to the packet or (ISL)	Access ports are ports of only one VLAN and normally used for terminating end devices like PC, laptops and printers
Default behaviour	By default trunk can carry traffic for all VLANs	By default access carries only one VLAN
Configuration	To designate a port to a trunk mode. "switchport mode trunk"	To designate a port to access mode." switchport mode access".
Use case	• Switch to switch connectivity • Switch to router • Switch to server	• Switch to PC/ laptop • Switch to printer • Switch to router



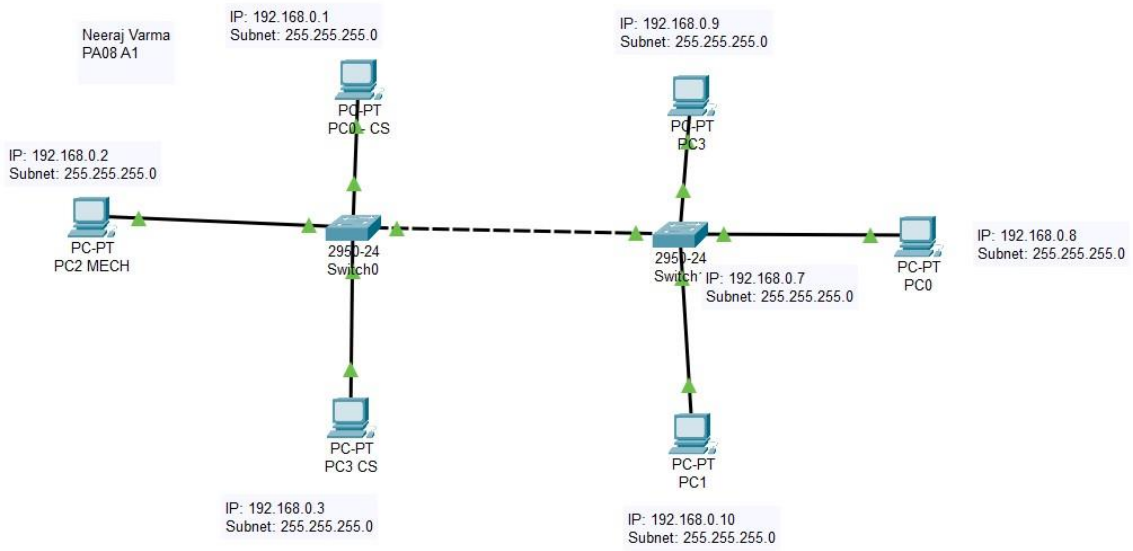
VLAN Tags	Port configured in trunk mode will carry VLAN tags	Port configured in access mode will carry VLAN tags
Verification Commands	• Show VLAN brief • Show interface x/x switchport	• Show interface trunk • Show interface x/x switchport

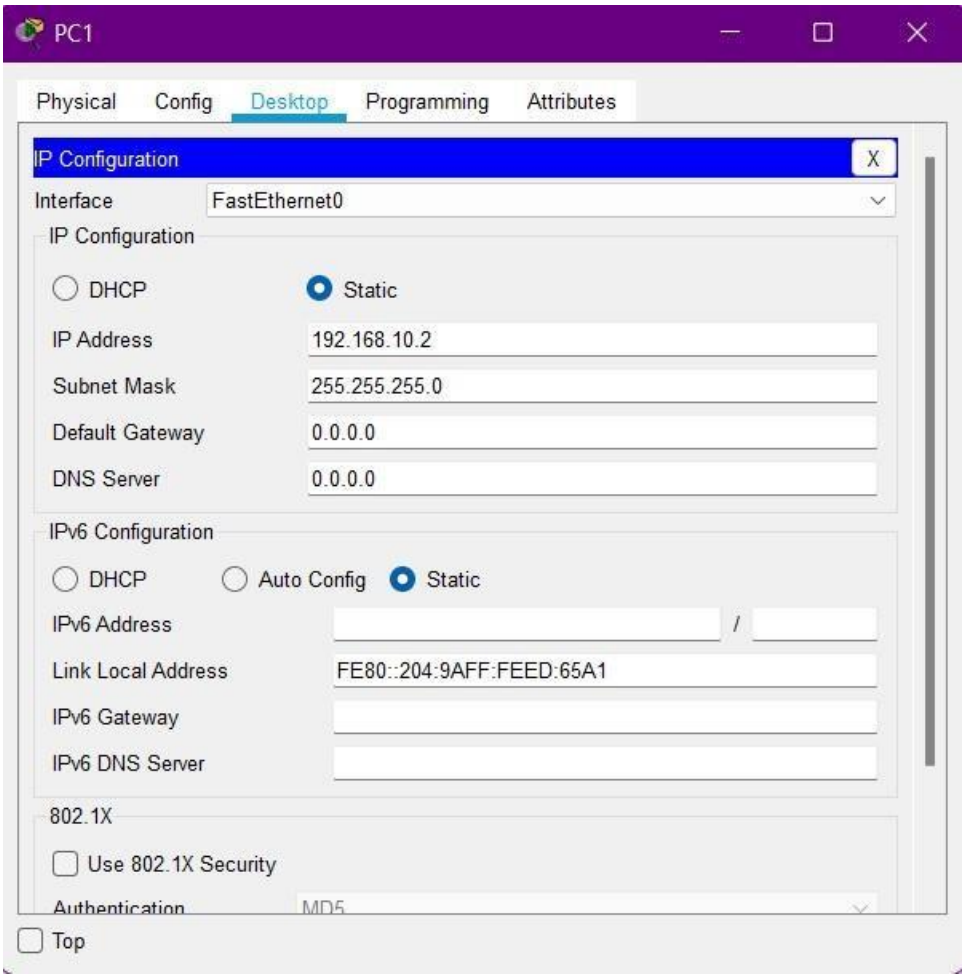
4. Differentiate between LAN & WAN

→

	LAN	VLAN
i)	LAN stands for Local Area Network	Stands for Virtual local Area Network
ii)	The cost of LAN is high	The cost of VLAN is less
iii)	The latency of LAN is high	The latency of VLAN is less
iv)	The devices which are used in LAN are : hubs, routers & switches	Devices used in VLAN are : Bridges and switch
v)	In LAN, the packet is advertised to each device	In VLAN packet is sent to specific broadcast domain
vi)	LAN is less efficient than VLAN	VLAN has greater efficiency

Screenshots:


Neeraj Varma
PA08 A1
IP: 192.168.0.1
Subnet: 255.255.255.0
PC-PT
PC0 CS
IP: 192.168.0.9
Subnet: 255.255.255.0
PC-PT
PC3
IP: 192.168.0.2
Subnet: 255.255.255.0
PC-PT
PC2 MECH
2950-24
Switch0
2950-24
Switch1
IP: 192.168.0.7
Subnet: 255.255.255.0
PC-PT
PC0
IP: 192.168.0.8
Subnet: 255.255.255.0
PC-PT
PC3 CS
PC-PT
PC1
IP: 192.168.0.3
Subnet: 255.255.255.0
IP: 192.168.0.10
Subnet: 255.255.255.0


PC1
Physical
Config
Desktop
Programming
Attributes
IP Configuration
X
Interface
FastEthernet0
IP Configuration
DHCP
Static
IP Address
192.168.10.2
Subnet Mask
255.255.255.0
Default Gateway
0.0.0.0
DNS Server
0.0.0.0
IPv6 Configuration
DHCP
Auto Config
Static
IPv6 Address
/
Link Local Address
FE80::204:9AFF:FEED:65A1
IPv6 Gateway
IPv6 DNS Server
802.1X
Use 802.1X Security
Authentication
MD5
Top

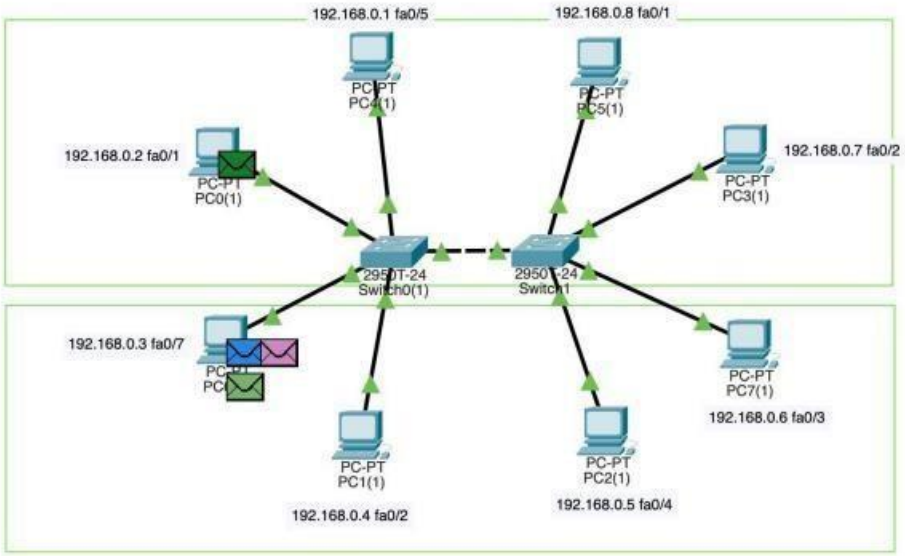
PC0

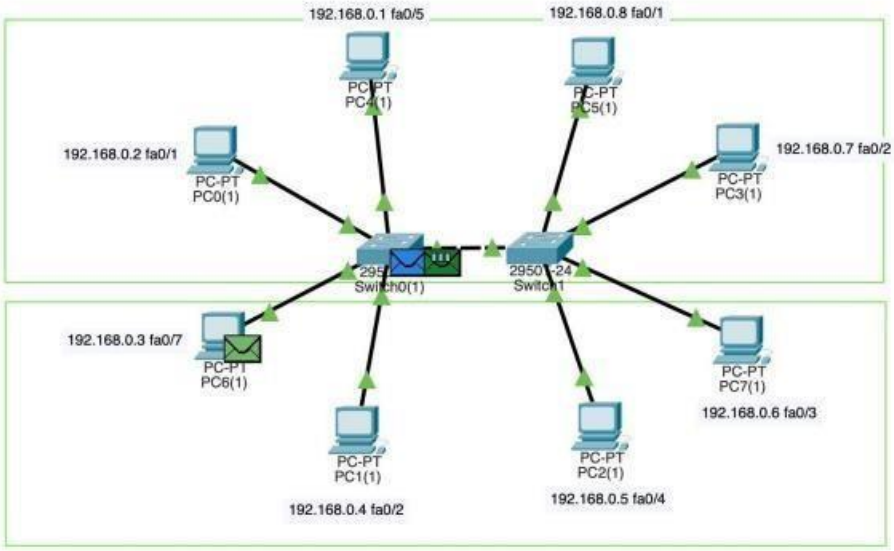
Physical Config Desktop Programming Attributes

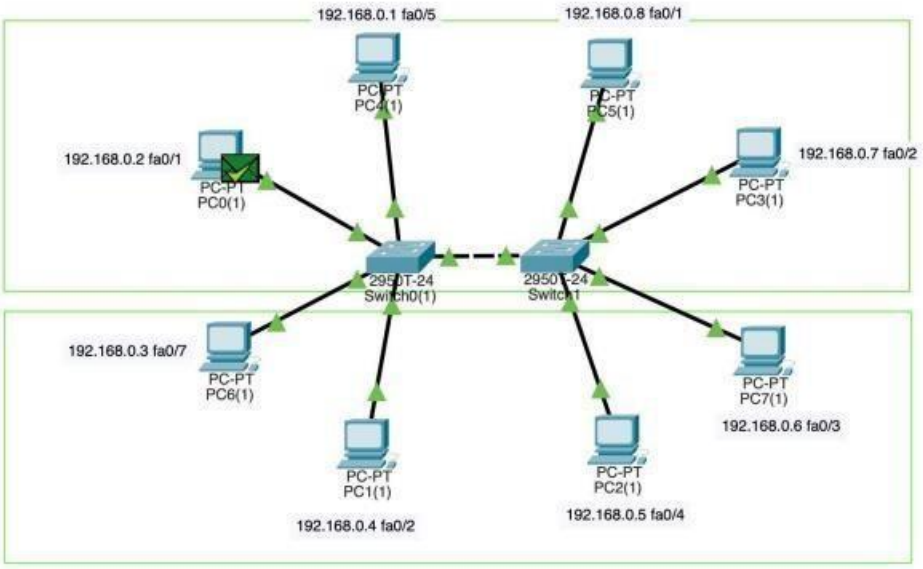
Command Prompt X

```
Packet Tracer PC Command Line 1.0
C:\>ping 192.168.10.1

Pinging 192.168.10.1 with 32 bytes of data:

Reply from 192.168.10.1: bytes=32 time<1ms TTL=128
Reply from 192.168.10.1: bytes=32 time=3ms TTL=128
Reply from 192.168.10.1: bytes=32 time=2ms TTL=128
Reply from 192.168.10.1: bytes=32 time=2ms TTL=128

Ping statistics for 192.168.10.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 3ms, Average = 1ms

C:\>
```

Top







Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	PC6(1)	PC2(1)	IC...		0.000	N	0	(...	(delete)
	Successful	PC0(1)	PC5(1)	IC...		0.000	N	1	(...	(delete)
	Failed	PC6(1)	PC0(1)	IC...		0.000	N	2	(...	(delete)