Batch: D-2   Roll No.: 16010122151
Experiment / assignment / tutorial No._____
Grade: AA / AB / BB / BC / CC / CD /DD
Signature of the Staff In-charge with date

Experiment No.:7

TITLE: Study Cisco Switch Router Configuration Command using Cisco packet tracer

AIM: To study basic Cisco Switch & Router configuration Commands and configure

i.   Virtual LAN (VLAN).

ii.   Static Routing

Expected Outcome of Experiment:

CO:

How to configure Vlan and Static routing

Books/ Journals/ Websites referred:

1. S. Tanenbaum, "Computer Networks", Pearson Education, Fourth Edition

2. Forouzan, "Data Communications and Networking", TMH, Fourth Edition

Pre Lab/ Prior Concepts: Basics of Routing and Cisco Packet Tracer

New Concepts to be learned: Different Modes of Operation of Cisco router

Cisco IOS Modes of Operation:

- The Cisco IOS software provides access to several different command modes. Each command mode provides a different group of related commands.

- For security purposes, the Cisco IOS software provides two levels of access to commands:
  - User mode
  - Privileged mode

- The unprivileged user mode is called user EXEC mode. The privileged mode is called privileged EXEC mode and requires a password. The commands available in user EXEC mode are a subset of the commands available in privileged EXEC mode.

- The following table describes some of the most commonly used modes, how to enter the modes, and the resulting prompts. The prompt helps you identify which mode you are in and, therefore, which commands are available to you

Modes of Operation	Usage	How to enter the mode	Prompt
User EXEC	Change terminal settings on a temporary basis, perform basic tests, and list system information.	First level accessed.	Router>
Privileged EXEC	System administration, set operating parameters.	From user EXEC mode, enter enable password command	Router#
Global Config	Modify configuration that affect the system as a whole.	From privileged EXEC, enter configure terminal.	Router(config)#
Interface Config	Modify the operation of an interface.	From global mode, enter interface type number.	Router(config-if)#
Setup	Create the initial configuration.	From privileged EXEC mode, enter command setup.	Prompted dialog

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User EXEC Mode:

When you are connected to the router, you are started in user EXEC mode. The user EXEC commands are a subset of the privileged EXEC commands.

Privileged EXEC Mode:

Privileged commands include the following:

• Configure – Changes the software configuration.

• Debug – Display process and hardware event messages.

• Setup – Enter configuration information at the prompts.

Enter the command disable to exit from the privileged EXEC mode and return to user EXEC mode.

Configuration Mode:

Configuration mode has a set of sub-modes that you use for modifying interface settings, routing protocol settings, line settings, and so forth. Use caution with configuration mode because all changes you enter take effect immediately.

To enter configuration mode, enter the command configure terminal and exit by pressing Ctrl-Z.

Note: Almost every configuration command also has a no form. In general, use the no form to disable a feature or function. Use the command without the keyword no to re-enable a disabled feature or to enable a feature that is disabled by default. For example, IP routing is enabled by default. To disable IP routing, enter the no IP routing command and enter IP routing to re-enable it.

i. Virtual LAN (VLAN):

A virtual local area network (VLAN) is a LAN which is not configured by physical wiring but it is configured by software. A VLAN is logical group of network devices that appear to be on same LAN despite their geographical distribution. A VLAN is implemented so that network administrators can connect a group of host in the same domain inspite of their physical location to achieve scalability and improve security features.

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To subdivide a network into virtual LANs, one configures a network switch or router. Simpler network devices can partition only per physical port (if at all) , in which case each VLAN is connected with a dedicated network cable (and VLAN connectivity   is limited by the number of hardware ports available) More sophisticated devices can mark packets through tagging, so that a single interconnect (trunk) may be used to transport data for multiple VLANs. VLAN can greatly simplify network design and deployment, because VLAN membership can be configured through software.

Stepwise-Procedure:

A. Creating a simple LAN network using packet tracer:

Step 1: Select 12 PCs from the end devices and one fast ethernet switch (2950/24 ports)

Step 2: Connect PCs and switch via copper cable from the panel. Connection can be verified by appearance of all green dots on the links.

Step 3: For PCs to communicate click on PC0.

- Dialog box for PC0 appears.
- Click on desktop applications by packet tracer.
- Go to IP configuration.
- Enter IP address to identify host i.e., PC0 (for example: 192.168.1.1)
- Subnet mask-by default already set one can change it as per his/her specification.

Step 4: Repeat step 3 for PC1

Step 5: Ping the PCs and check their working status.

Step 6: Simple PDU (Protocol Data Unit) to simulate network traffic by sending ICMP PDU to   assess the network traffic. View simulation in simulation mode

Step 7: Configure two VLAN in a switch in 6 verticals.

Step 8: As per design, assign membership of VLAN to port using following command.

```
# switch port access vlan2 or vlan3
```

Step 9: Check the status of VLAN.

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ii. Static Routing Configuration

IMPLEMENTATION: (printout of code)

Fa1/1

```
Switch0                                                    —   □   ×

Physical   Config   CLI   Attributes
                        IOS Command Line Interface

Switch>
Switch>enable
Switch#
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface FastEthernet2/1
Switch(config-if)#
Switch(config-if)#
Switch(config-if)#switchport access vlan 1
Switch(config-if)#interface FastEthernet2/1
Switch#
%SYS-5-CONFIG_I: Configured from console by console

Switch#show vlan

VLAN Name                             Status    Ports
---- -------------------------------- --------- -------------------------------
1    default                          active    Fa0/1, Fa2/1, Fa4/1, Fa5/1
10   VLAN10                           active    Fa1/1, Fa3/1
20   VLAN20                           active    Fa6/1, Fa7/1
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 Transl Trans2
---- ----- ---------- ----- ------ ------ -------- ---- -------- ------ ------
1    enet  100001     1500  -      -      -        -    -        0      0
10   enet  100010     1500  -      -      -        -    -        0      0
20   enet  100020     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 Transl Trans2

Switch#
Switch#configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Switch(config)#interface FastEthernet2/1
Switch(config-if)#

                                                    Copy        Paste

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```
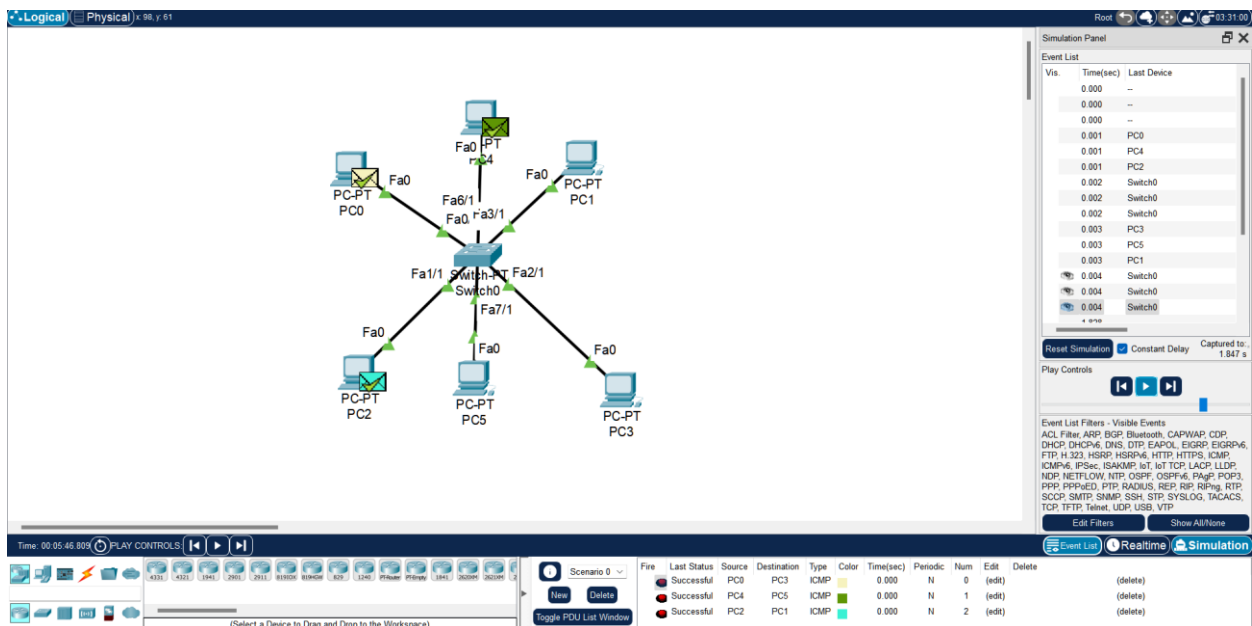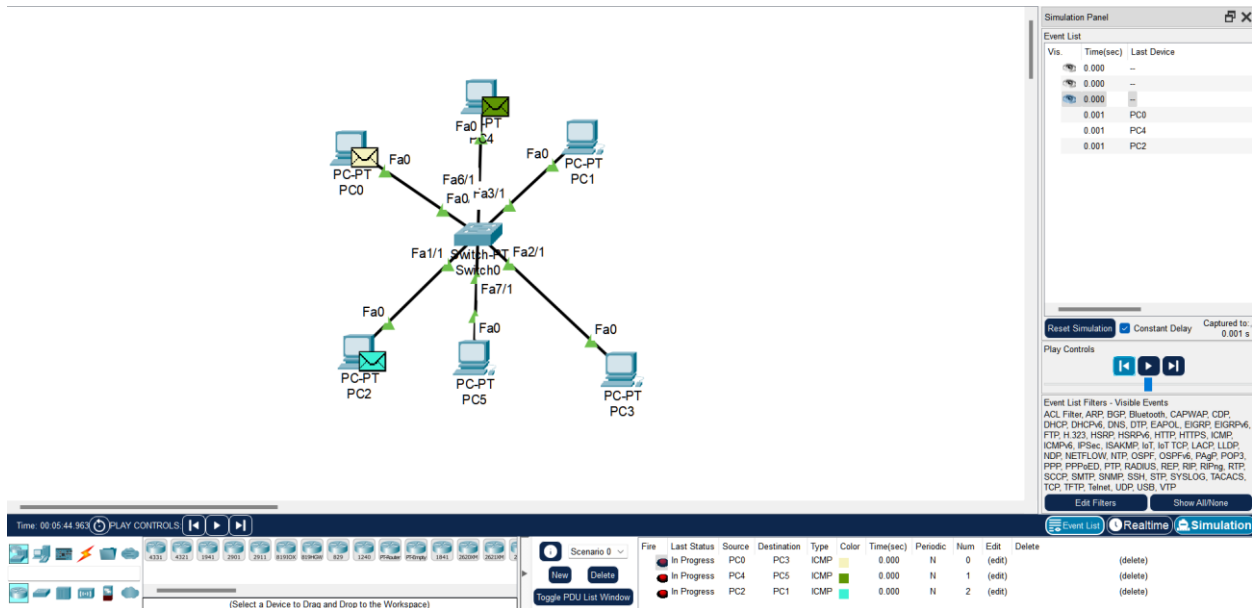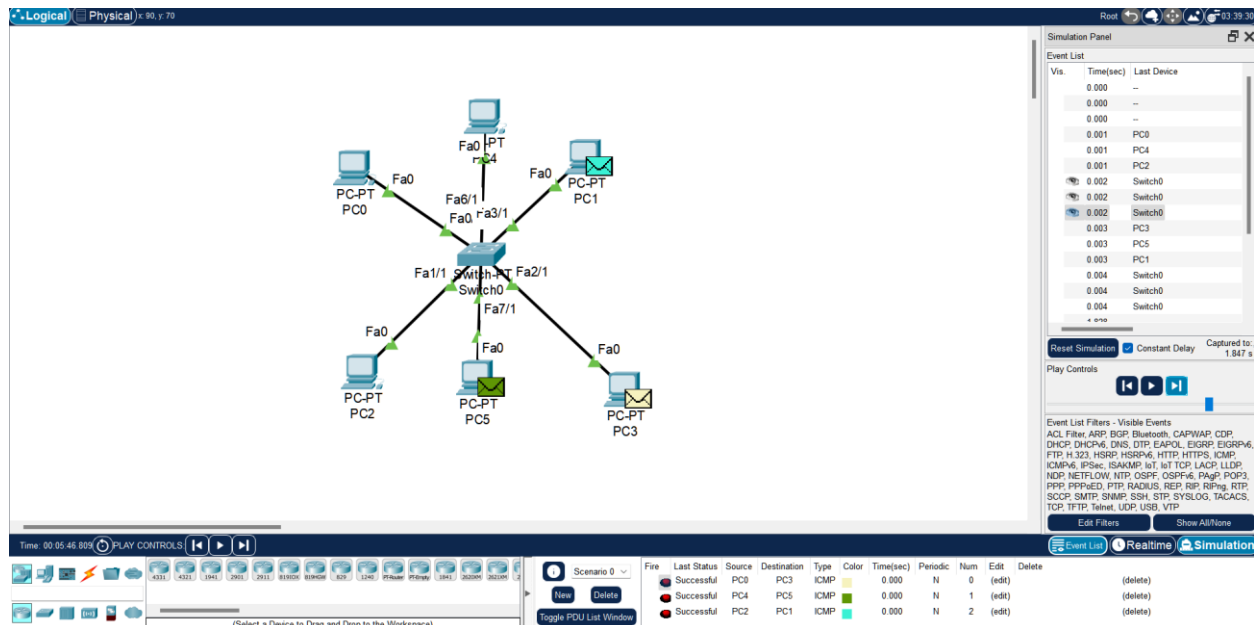
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CONCLUSION: We learned what is Vlan and how configure It practically in cisco packet tracer.

Post Lab Subjective/Objective type Questions:

1. Describe the concept of Virtual LAN.

Subjective Answer: A Virtual Local Area Network (VLAN) is a logical subdivision of a physical network that allows multiple networks to coexist on a single physical infrastructure. VLANs enable network administrators to group devices and users into separate networks regardless of their physical location. This segmentation enhances network efficiency, improves security, and simplifies management.

VLANs operate at Layer 2 (Data Link Layer) of the OSI model, where switches use tagging protocols like IEEE 802.1Q to distinguish traffic from different VLANs. Each VLAN is treated as a separate broadcast domain, which helps in reducing broadcast traffic and improves performance. VLANs can be configured based on various criteria, such as device type, department, or function, allowing for more flexible and organized network management.

2. Compare LAN with VLAN.

Feature	LAN (Local Area Network)	VLAN (Virtual Local Area Network)
Definition	A network that connects devices in a specific physical location.	A logical network that segments a physical network into multiple broadcast domains.

Feature	LAN (Local Area Network)	VLAN (Virtual Local Area Network)
Physical Layout	Typically confined to a small geographic area like an office or building.	Can span multiple locations and connect devices across different physical segments.
Broadcast Domain	All devices on the same LAN share the same broadcast domain.	Each VLAN is a separate broadcast domain, isolating traffic.
Management	Simple to manage but can become complex with many devices.	Provides flexibility in management and organization of devices based on logical groupings.
Security	Limited security features; relies on physical separation.	Enhanced security through traffic segmentation and isolation between VLANs.
Configuration	Requires hardware changes for segmentation (e.g., adding more switches).	Can be configured via software on existing network devices without physical chang

3. State the benefits of implementing VLAN.

- Improved Security: VLANs enhance security by isolating sensitive data and users into separate networks, reducing the risk of unauthorized access and broadcast storms.

- Reduced Broadcast Traffic: By limiting the size of broadcast domains, VLANs decrease unnecessary broadcast traffic, leading to better overall network performance.

- Simplified Management: VLANs allow for easier management of network resources, as devices can be grouped logically rather than physically, simplifying changes and troubleshooting.

- Enhanced Network Performance: Segmentation can lead to increased network efficiency, as devices within a VLAN communicate directly without interference from other VLANs.

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- Flexibility and Scalability: VLANs provide the flexibility to reconfigure the network without changing the physical layout, allowing for easy adaptation to changing organizational needs.
- Cost Efficiency: Utilizing VLANs can reduce the need for additional hardware by maximizing the use of existing network infrastructure.

Date:11-11-2024   Signature of faculty in-charge

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