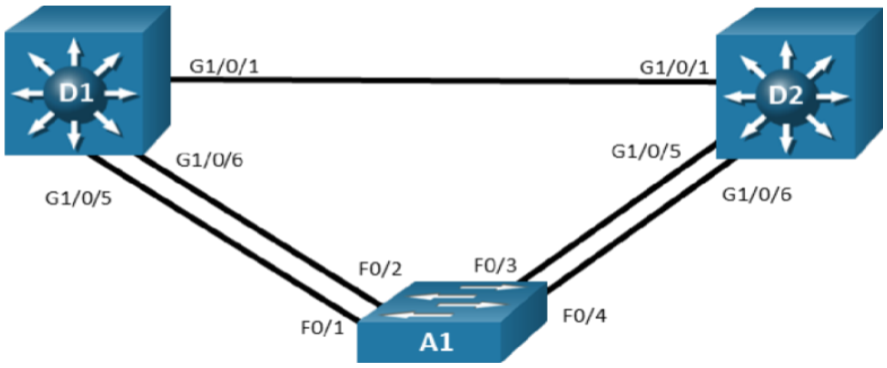
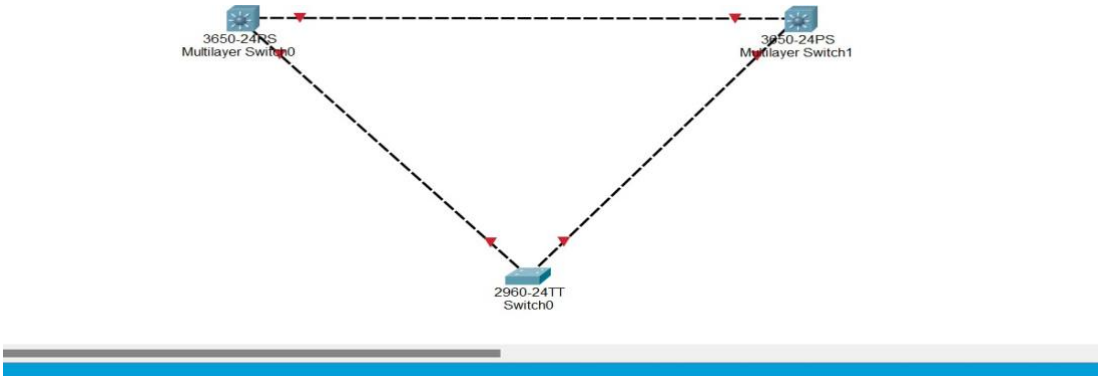
Practical 6

Aim : Observe STP topology changes and implement RSTP





Addressing Table

Device	Interface	IPv4 Address
D1	VLAN1	10.0.0.1/8
D2	VLAN1	10.0.0.2/8
A1	VLAN1	10.0.0.3/8

Objectives:-

Part 1: Build the Network and Configure Basic Device Settings

Part 2: Observe STP Convergence and Topology Change Part 3: Configure and

Required Resources

- 2 Switches (Cisco 3650 with Cisco IOS XE release 16.9.4 universal image or comparable)

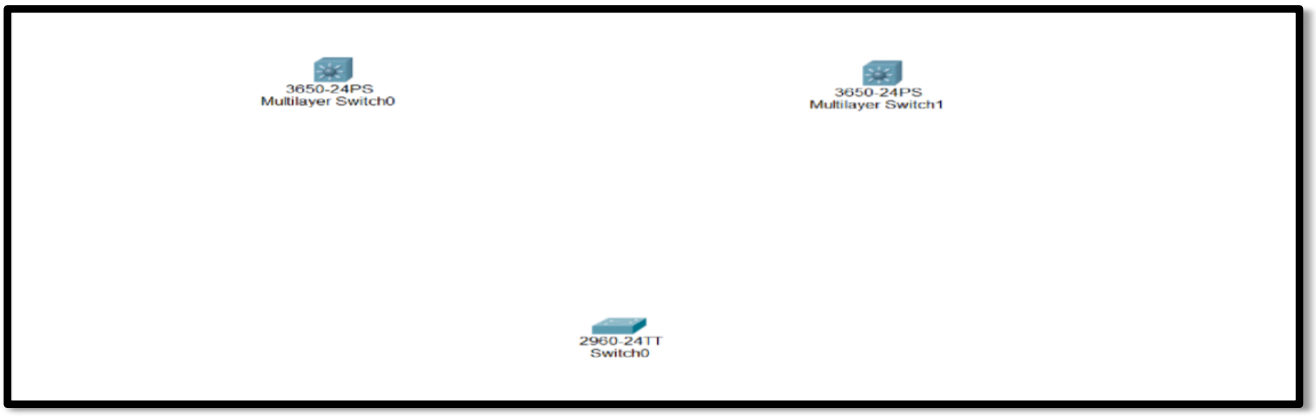
- 1 Switch (Cisco 2960+ with Cisco IOS release 15.2 lanbase image or comparable)
- 1 PC (Windows with a terminal emulation program, such as Tera Term)
- Console cables to configure the Cisco IOS devices via the console ports
- Ethernet cables as shown in the topology

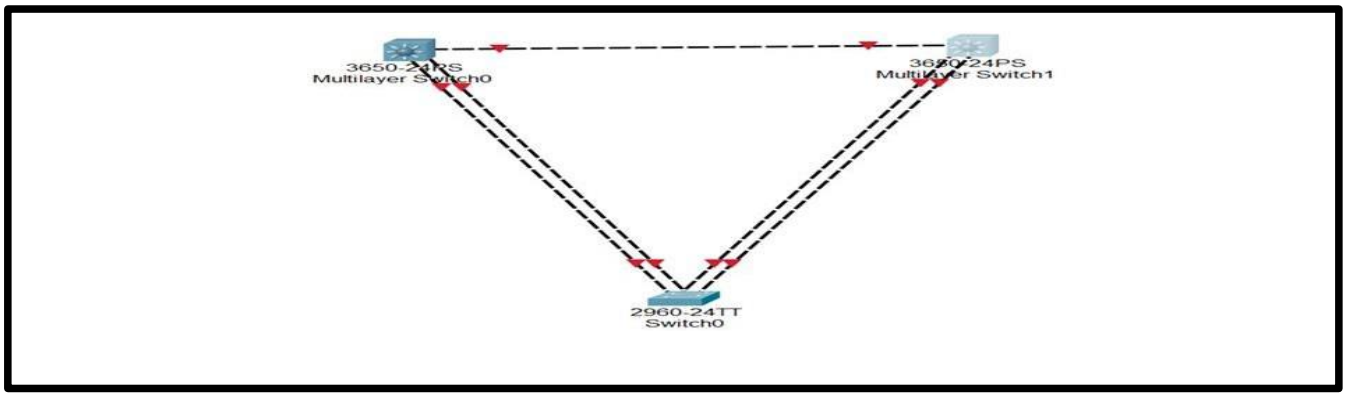
What is STP?

- Spanning Tree Protocol (STP) is a Layer 2 network protocol used to prevent looping within a network topology.
- STP was created to avoid the problems that arise when computers exchange data on a local area network (LAN) that contains redundant paths.
- If the flow of traffic is not carefully monitored and controlled, the data can be caught in a loop that circles around network segments, affecting performance and bringing traffic to a near halt. Networks are often configured with redundant paths when connecting network segments.
- STP can help prevent bridge looping on LANs that include redundant links.
- STP monitors all network links, identifies redundant connections, and disables the ports that can lead to looping.

Part 1: Build the Network and Configure Basic Device Settings and Interface Addressing

Step 1: Cable the network as shown in the topology.





Step 2: Configure basic settings for each switch.

a. Console into each switch, enter global configuration mode, and apply the basic settings and interface addressing. The start-up configuration is provided below for each switch in the topology.

Switch D1 hostname D1 spanning-tree mode

pvst

interface range g1/0/1-24, g1/1/1-4, g0/0

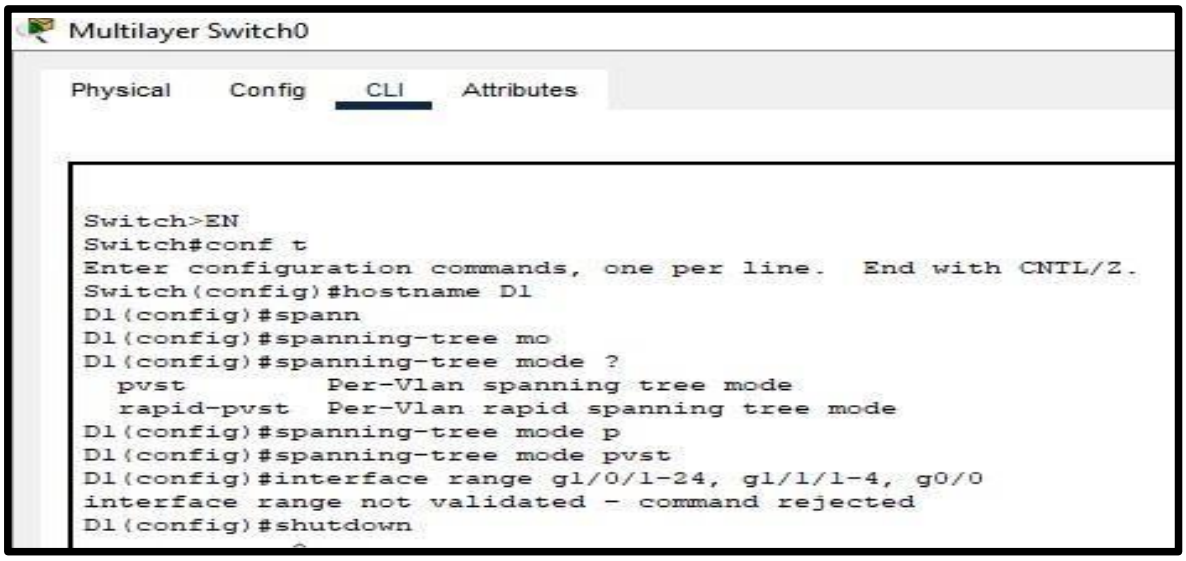
shutdown

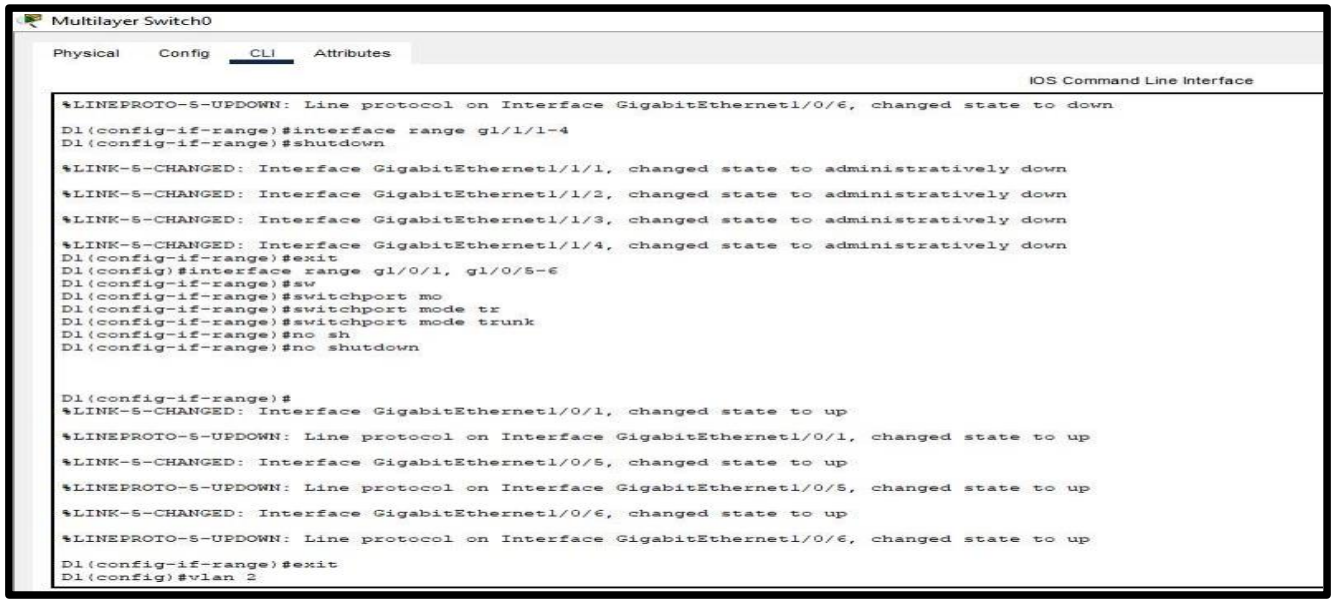
exit

interface range g1/0/1, g1/0/5-6 switchport mode
trunk no shutdown exit vlan 2

name SecondVLAN

exit interface vlan 1 ip address 10.0.0.1 255.0.0.0
no shut exit





Switch D2 hostname D2

banner motd # D2, STP Topology Change and RSTP Lab # spanning-tree mode pvst

interface range g1/0/1-24, g1/1/1-4, g0/0 shutdown

exit interface range g1/0/1, g1/0/5-6 switchport

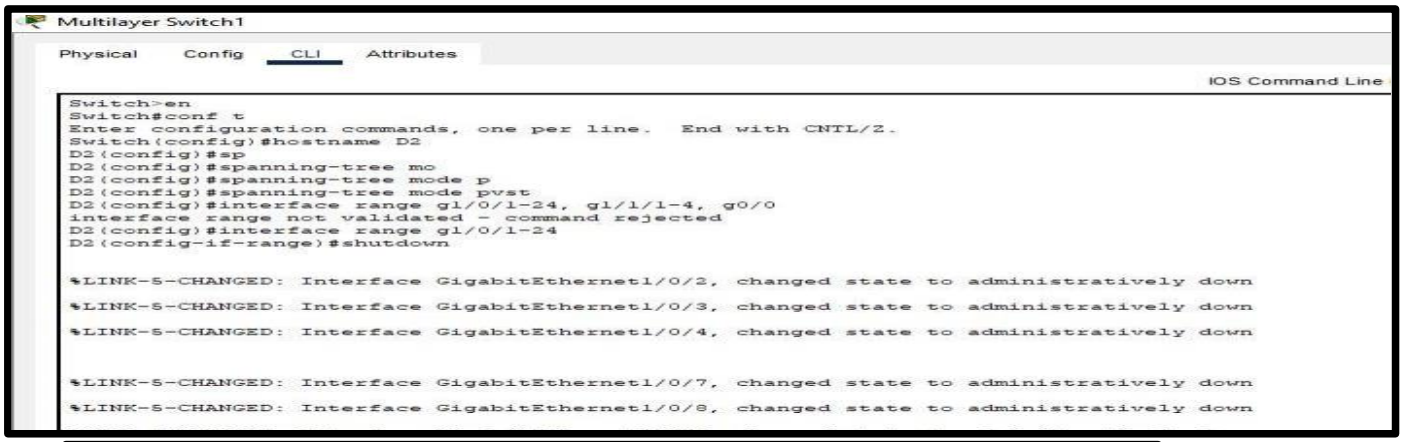
mode trunk no shutdown exit vlan 2

name SecondVLAN

exit interface vlan 1 ip address 10.0.0.2

255.0.0.0 no shut

exit



Switch A1

hostname A1

banner motd # A1, STP Topology Change and RSTP Lab # spanning-tree mode

pvst line con 0 exec-timeout 0 0 logging synchronous exit

interface range f0/1-24, g0/1-2 shutdown

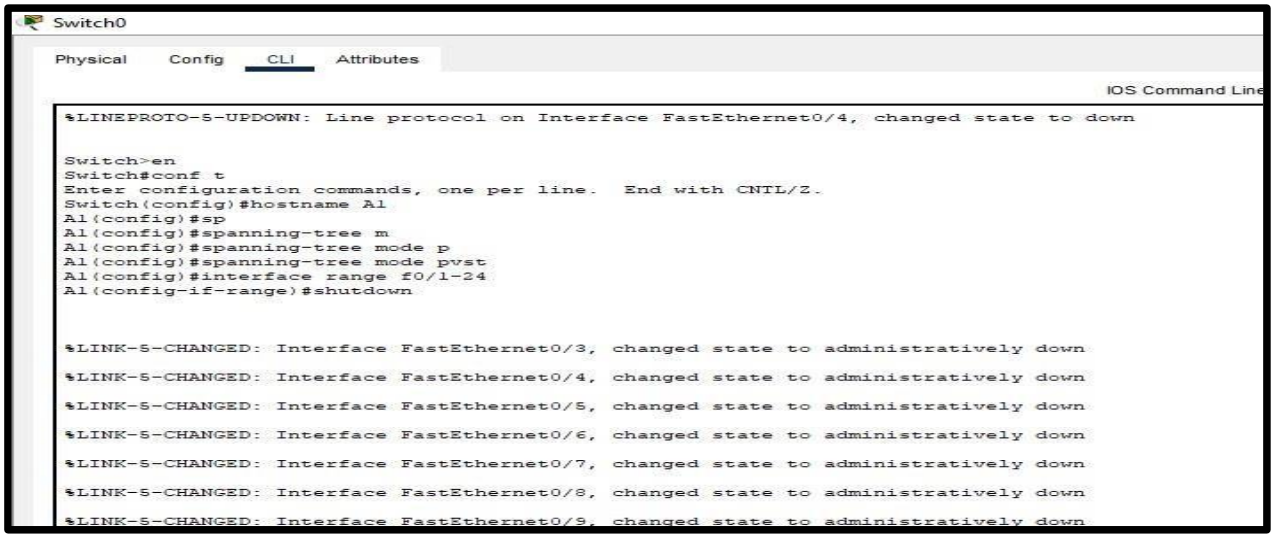
exit interface range f0/1-4 switchport

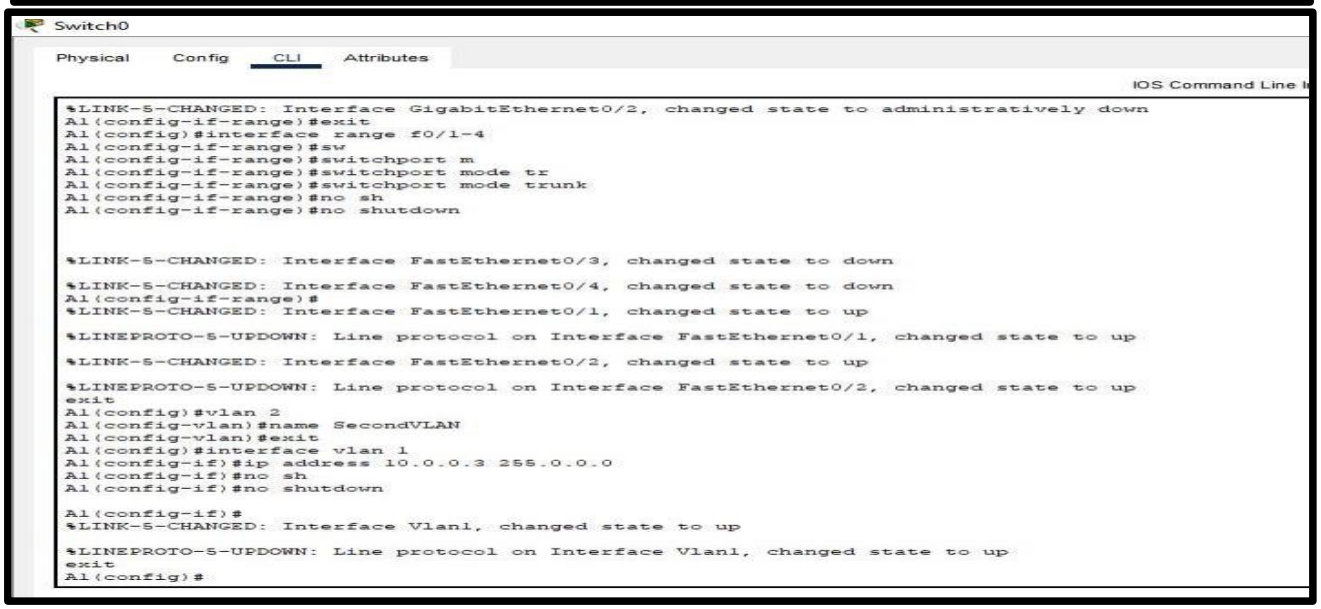
mode trunk no shutdown

exit vlan 2

name SecondVLAN

exit





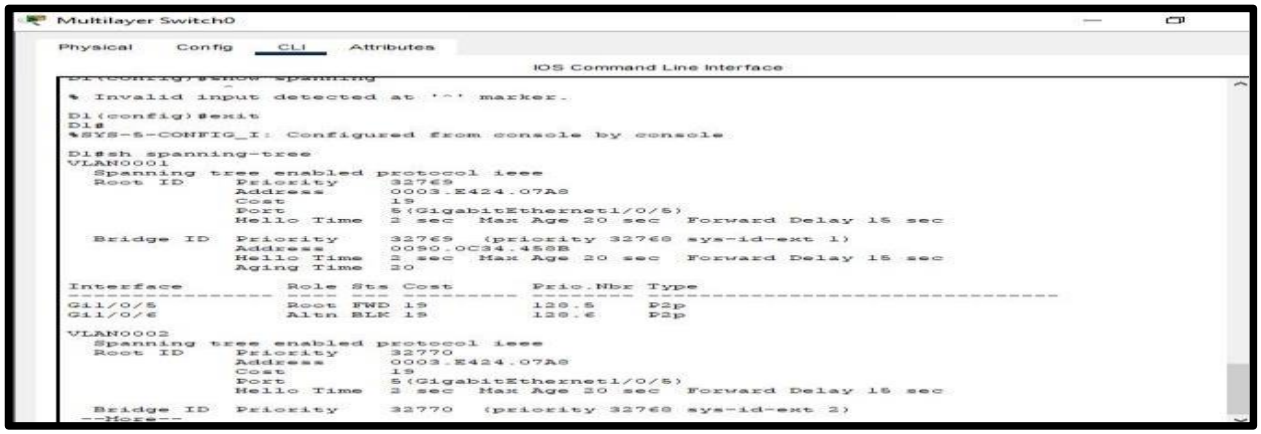
b. Set the clock on each switch to UTC time.

c. Save the running configuration to startup-config.

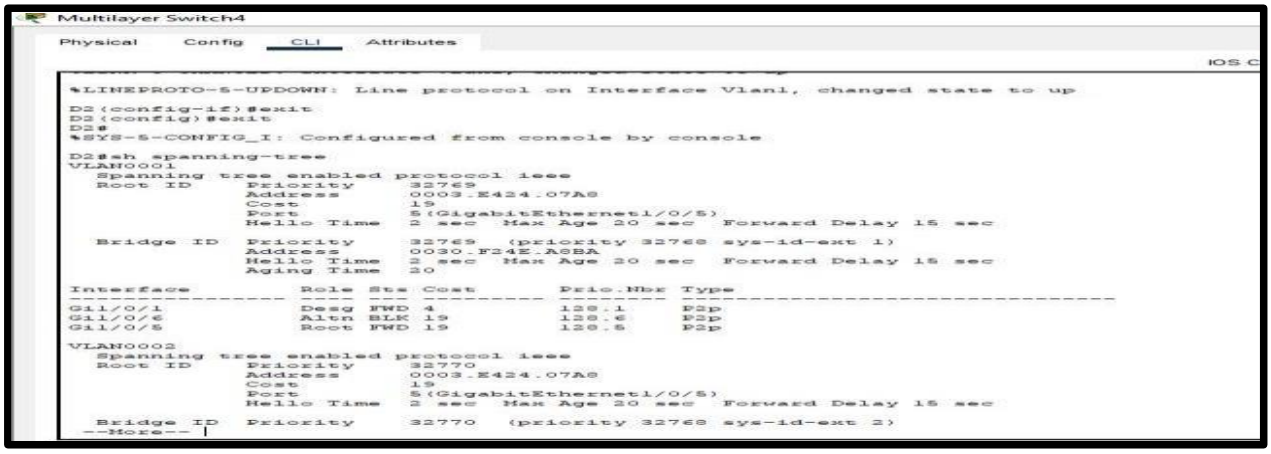
Part 2: Discover the Default Spanning Tree

Your switches have been configured and interfaces have been enabled, and the Spanning Tree Protocol, operational by default, has already converged onto a loop-free logical network. In this part of the lab, we will discover what that default spanning tree looks like and evaluate why it converged the way it did

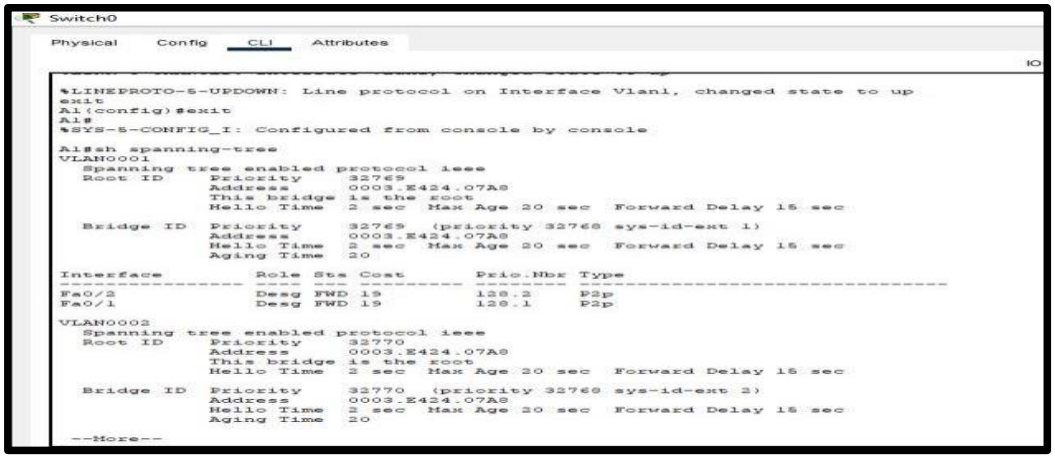
 # show spanning-tree Switch D1



Switch D2

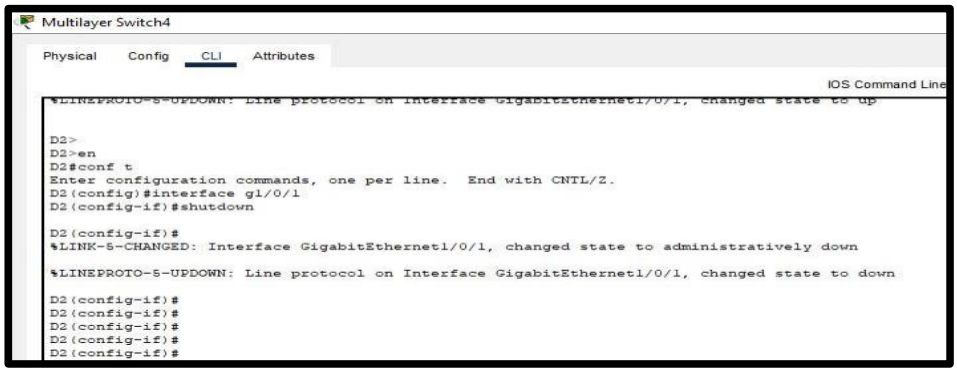


Switch A1

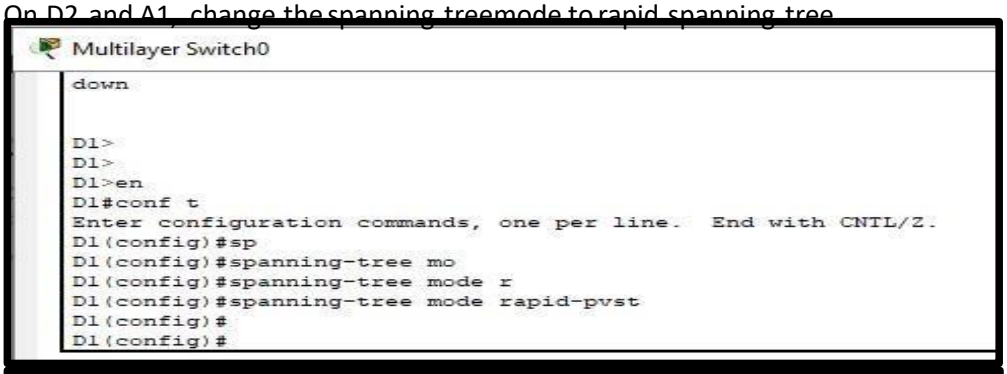


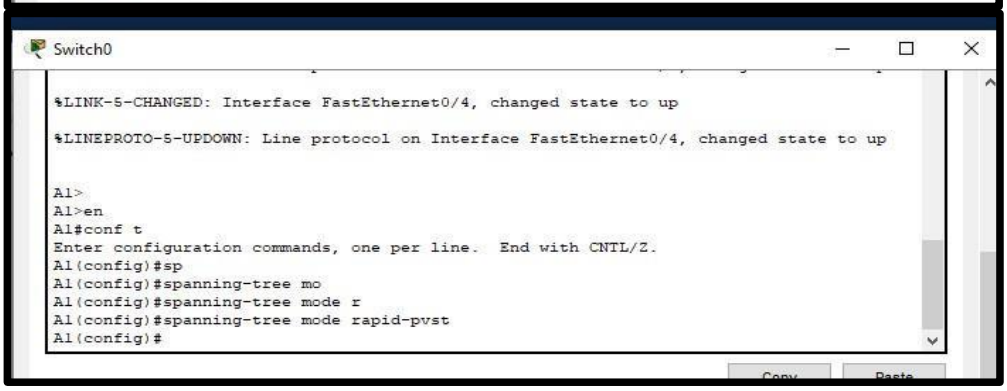
Part 3: Implement and Observe Rapid Spanning Tree Protocol

a. On D2, issue the debug spanning-tree events command, and then issue the shutdown command for interface g1/0/1 and observe the output.



b. On D2 and A1, change the spanning-tree mode to rapid spanning-tree





c. On D1, issue the command show spanning-tree.

A1 was the last switch that was configured for RSTP. As you can see, interface

VLAN1 was only down for 0.048 seconds. This is the “rapid” in rapid spanning tree.