

Assignment 2: Spanning Tree Protocol STP

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Topology Diagram

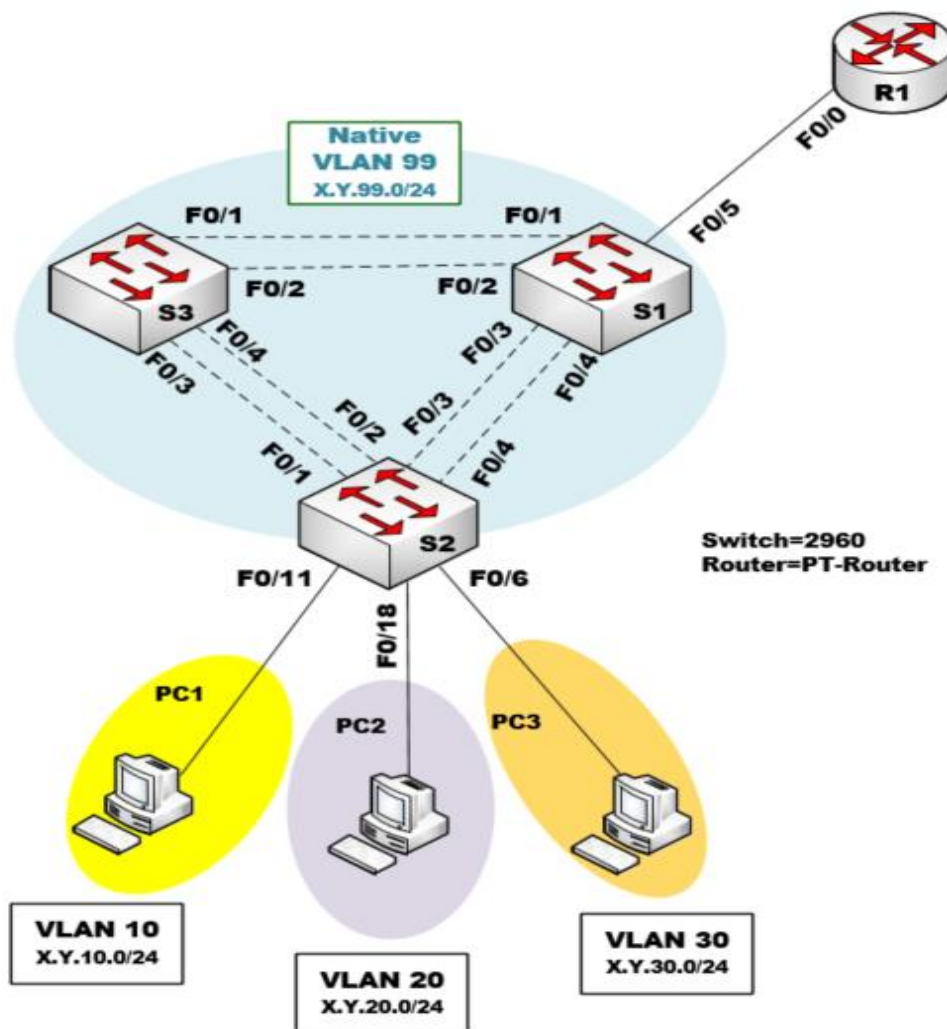


Fig 1

Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
S1	VLAN 99	1.1.99.11	255.255.255.0	N/A
S2	VLAN 99	1.1.99.12	255.255.255.0	N/A
S3	VLAN 99	1.1.99.13	255.255.255.0	N/A
PC1	NIC	1.1.10.254	255.255.255.0	1.1.10.1
PC2	NIC	1.1.20.254	255.255.255.0	1.1.20.1
PC3	NIC	1.1.30.254	255.255.255.0	1.1.30.1

Port Assignments

Ports	Assignment	Network
Fa0/1 - 0/5	802.1q Trunks	
Fa0/6 - 0/10	VLAN 30 – Guest(Default)	1.1.30.0 /24
Fa0/11 - 0/17	VLAN 10 – Faculty/Staff	1.1.10.0 /24
Fa0/18 - 0/24	VLAN 20 - Students	1.1.20.0 /24

Task #1 Configurations

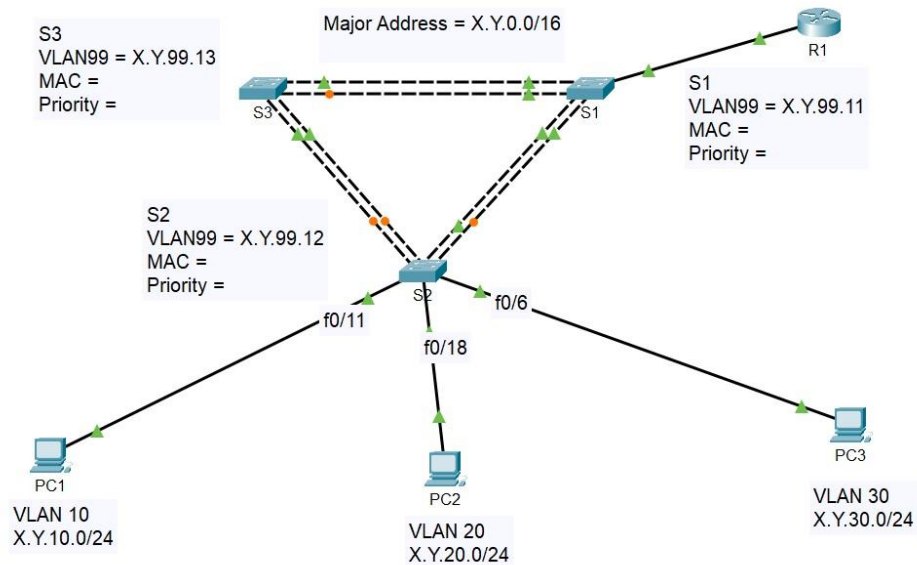
Connect Fig1 topology using your personalized IP address used in Lab3

1. Place your Major IP address on the diagram
2. Configure S1, S2, and S3 switches according to the following guidelines and save all your configurations:
 - a- Set the switch hostname as indicated on the topology.
 - b- Disable DNS lookup
 - c- Configure an encrypted privileged EXEC mode password of class.
 - d- Configure a password of cisco for console connections.
 - e- Configure a password of cisco for vty connections.
3. Configure the Ethernet interfaces of PC1, PC2, and PC3 with the IP address, subnet mask, and gateway indicated in the addressing table.
4. Configure VLANs, assign proper ports to correct VLANs and set proper modes for each interface.
5. Configure R1 to be ROAS
6. Insert a label for each switch including VLAN99 IP address, MAC address and priority for each switch
7. Assign proper IP addresses where needed and label your diagram

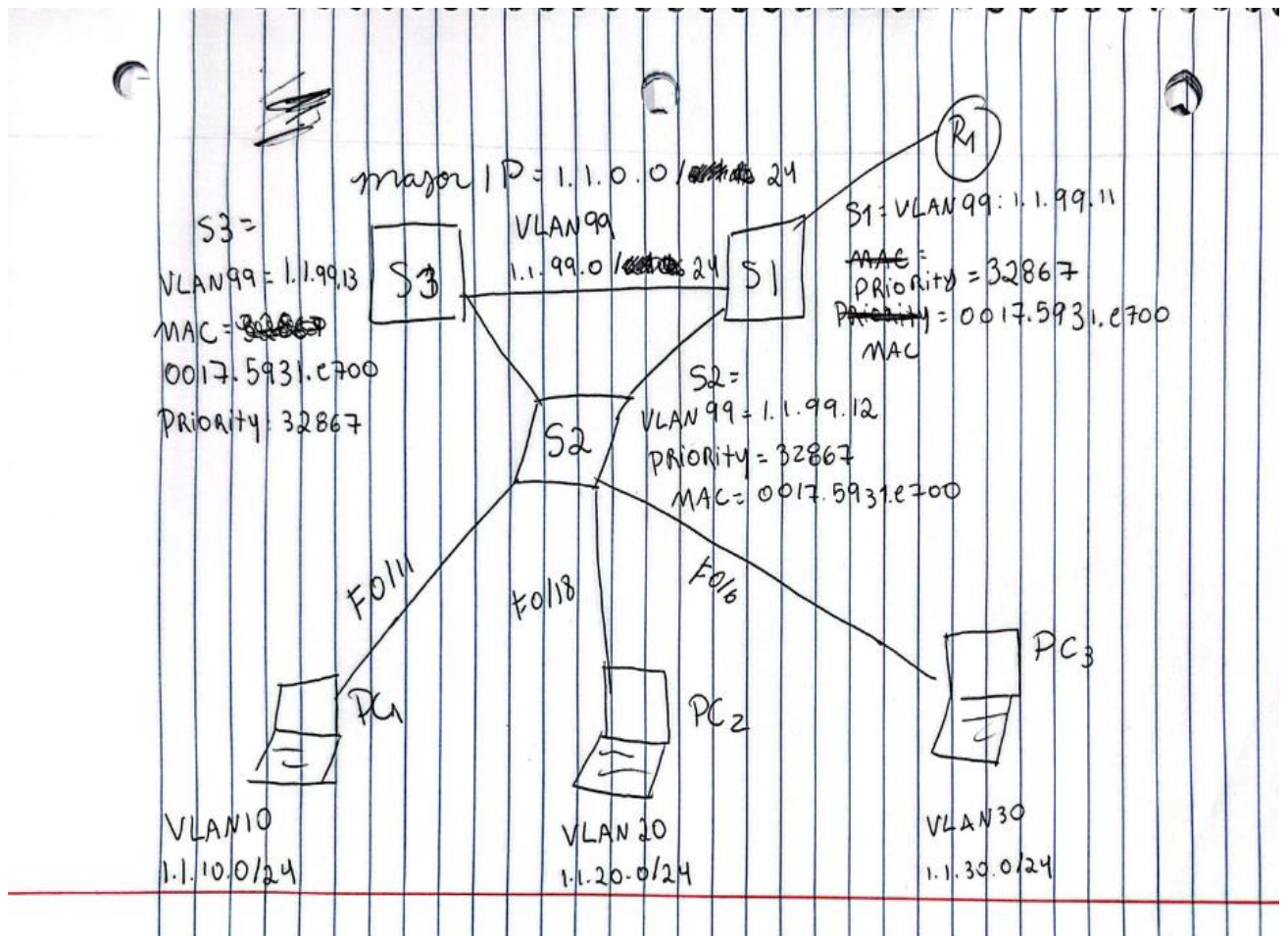
8. All PCs should be able to ping each other now

Task #2 Screenshots

1. Your first screenshot must look somehow like this (with different blocking ports)



2. Take a screenshot of your diagram, and insert it below **[6 marks]**



```
COM3 - PuTTY
% Type "clear ?" for a list of subcommands
S1#show spanning-tree vlan 99

VLAN0099
  Spanning tree enabled protocol ieee
  Root ID    Priority    32867
             Address     0017.5931.e700
             This bridge is the root
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32867 (priority 32768 sys-id-ext 99)
             Address     0017.5931.e700
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  300 sec

Interface                Role Sts Cost      Prio.Nbr Type
-----
Fa0/1                    Desg FWD 19        128.1    P2p
Fa0/2                    Desg FWD 19        128.2    P2p
Fa0/3                    Desg FWD 19        128.3    P2p
Fa0/4                    Desg FWD 19        128.4    P2p

S1#
```

SWITCH 1

Personalized network diagram

```
SW2#show spanning-tree vlan 99

VLAN0099
  Spanning tree enabled protocol ieee
  Root ID    Priority    32867
             Address    0017.5931.e700
             Cost        19
             Port        3 (FastEthernet0/3)
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

  Bridge ID  Priority    32867 (priority 32768 sys-id-ext 99)
             Address    0026.9858.9400
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  300 sec

Interface                Role Sts Cost      Prio.Nbr Type
-----
Fa0/1                    Altn BLK 19        128.1    P2p
Fa0/2                    Altn BLK 19        128.2    P2p
Fa0/3                    Root FWD 19        128.3    P2p
Fa0/4                    Altn BLK 19        128.4    P2p

SW2#
```

SWITCH 2

```
SW3#show Spanning-tree vlan 99

VLAN0099
  Spanning tree enabled protocol ieee
  Root ID    Priority    32867
             Address    0017.5931.e700
             Cost        19
             Port        1 (FastEthernet0/1)
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec

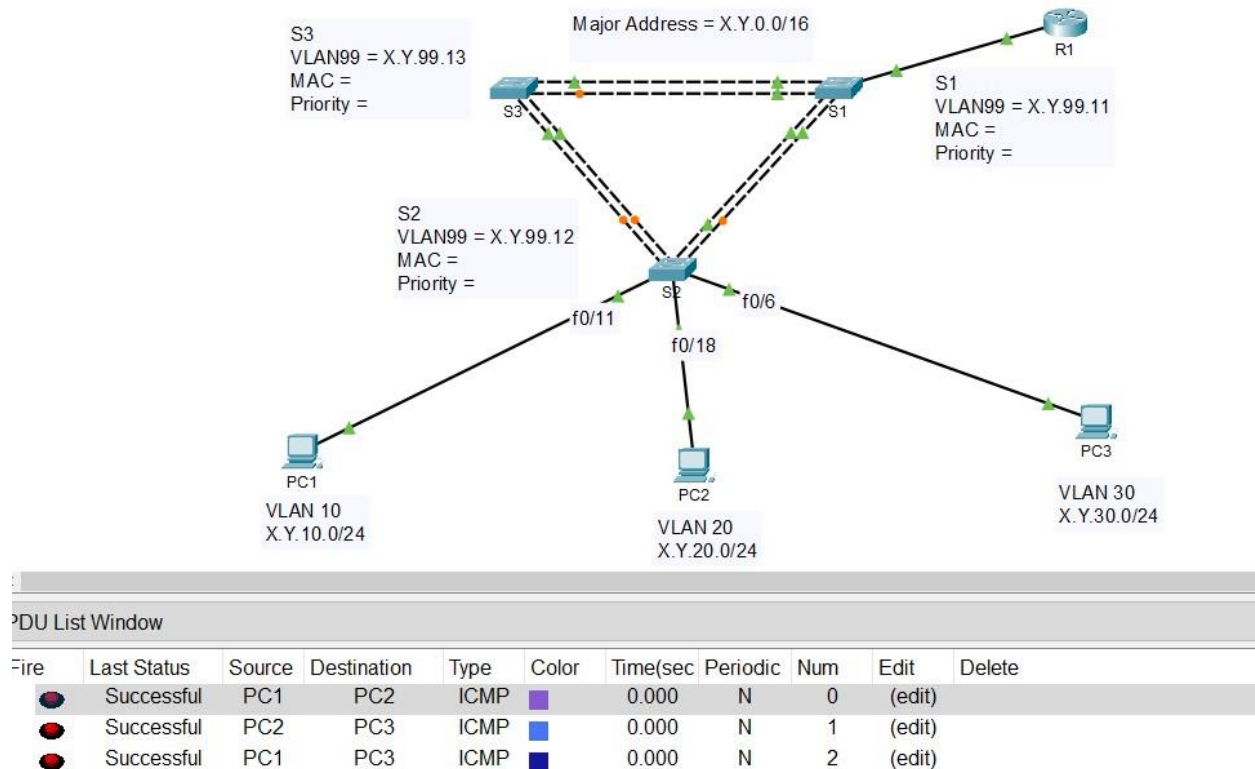
  Bridge ID  Priority    32867 (priority 32768 sys-id-ext 99)
             Address    001d.7188.fe80
             Hello Time  2 sec  Max Age 20 sec  Forward Delay 15 sec
             Aging Time  300 sec

Interface                Role Sts Cost      Prio.Nbr Type
-----
Fa0/1                    Root FWD 19        128.1    P2p
Fa0/2                    Altn BLK 19        128.2    P2p
Fa0/3                    Desg FWD 19        128.3    P2p
Fa0/4                    Desg FWD 19        128.4    P2p

SW3#
```

SWITCH 3

3. Ping the three PCs using the simple PDU, your PING results must look somehow like this



4. Take a screenshot of your pinging, and insert it below **[9 marks]**

```
C:\Users\fmnoor>ping 1.1.10.254

Pinging 1.1.10.254 with 32 bytes of data:
Reply from 1.1.10.254: bytes=32 time=1ms TTL=127
Reply from 1.1.10.254: bytes=32 time=1ms TTL=127
Reply from 1.1.10.254: bytes=32 time=1ms TTL=127
Reply from 1.1.10.254: bytes=32 time=1ms TTL=127

Ping statistics for 1.1.10.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\fmnoor>ping 1.1.30.254

Pinging 1.1.30.254 with 32 bytes of data:
Reply from 1.1.30.254: bytes=32 time=1ms TTL=127
Reply from 1.1.30.254: bytes=32 time=1ms TTL=127
Reply from 1.1.30.254: bytes=32 time=1ms TTL=127
Reply from 1.1.30.254: bytes=32 time=2ms TTL=127

Ping statistics for 1.1.30.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\Users\fmnoor>
```

PC2 PINGING PC1 and 3


```

C:\Users\fmnoor>ping 1.1.20.254

Pinging 1.1.20.254 with 32 bytes of data:
Reply from 1.1.20.254: bytes=32 time=1ms TTL=127
Reply from 1.1.20.254: bytes=32 time=2ms TTL=127
Reply from 1.1.20.254: bytes=32 time=1ms TTL=127
Reply from 1.1.20.254: bytes=32 time=1ms TTL=127

Ping statistics for 1.1.20.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\Users\fmnoor>ping 1.1.30.254

Pinging 1.1.30.254 with 32 bytes of data:
Reply from 1.1.30.254: bytes=32 time=1ms TTL=127
Reply from 1.1.30.254: bytes=32 time=2ms TTL=127
Reply from 1.1.30.254: bytes=32 time=1ms TTL=127
Reply from 1.1.30.254: bytes=32 time=1ms TTL=127

Ping statistics for 1.1.30.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\Users\fmnoor>

```

Pc1 pinging pc2 and pc3

```

C:\Users\zmmohamed>ping 1.1.20.254

Pinging 1.1.20.254 with 32 bytes of data:
Reply from 1.1.20.254: bytes=32 time=1ms TTL=127
Reply from 1.1.20.254: bytes=32 time=1ms TTL=127
Reply from 1.1.20.254: bytes=32 time=1ms TTL=127
Reply from 1.1.20.254: bytes=32 time=1ms TTL=127

Ping statistics for 1.1.20.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 1ms, Average = 1ms

C:\Users\zmmohamed>ping 1.1.30.254

Pinging 1.1.30.254 with 32 bytes of data:
Reply from 1.1.30.254: bytes=32 time<1ms TTL=128
Reply from 1.1.30.254: bytes=32 time<1ms TTL=128
Reply from 1.1.30.254: bytes=32 time<1ms TTL=128
Reply from 1.1.30.254: bytes=32 time<1ms TTL=128

Ping statistics for 1.1.30.254:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\zmmohamed>

```

PC3 PINGING PC1, PC2

ROAS working

5. Take a screenshot of S2 vlans brief listing, and insert it below **[3 marks]**

SW2#show vlan brief

VLAN	Name	Status	Ports
1	default	active	Fa0/5, Gi0/1, Gi0/2
10	Faculty	active	Fa0/11, Fa0/12, Fa0/13, Fa0/14 Fa0/15, Fa0/16, Fa0/17
20	Students	active	Fa0/18, Fa0/19, Fa0/20, Fa0/21 Fa0/22, Fa0/23, Fa0/24
30	Guests	active	Fa0/6, Fa0/7, Fa0/8, Fa0/9 Fa0/10
99	Management	active	
1002	fddi-default	act/unsup	
1003	token-ring-default	act/unsup	
1004	fddinet-default	act/unsup	
1005	trnet-default	act/unsup	

SW2#

S2#sh vlan brief

6. Take a screenshot of R2 interface brief listing, and insert it below **[3 marks]**

```
Router#show ip interface brief
Interface                IP-Address      OK? Method Status              Protocol
FastEthernet0/0          unassigned      YES unset    up                  up
FastEthernet0/0.10       1.1.10.1        YES manual    up                  up
FastEthernet0/0.20       1.1.20.1        YES manual    up                  up
FastEthernet0/0.30       1.1.30.1        YES manual    up                  up
FastEthernet0/0.99       1.1.99.1        YES manual    up                  up
FastEthernet0/1          unassigned      YES unset    administratively down down
Serial0/0/0              unassigned      YES unset    administratively down down
Serial0/0/1              unassigned      YES unset    administratively down down
Router#
```

R1#sh ip int brief

Task #3 Spanning Tree Verification

Download the “**STP table Assignment2_Stu.xlsx**” file and fill the two sheets as follows: **[23 marks for the Excel file]**

Equal Priority sheet

For the first sheet of equal priority, fill the status of each interface for each switch for each VLAN, answer the below questions:

7. What is the bridge ID priority for switches S1, S2, and S3 on VLAN 99?

[3 marks]

- a. S1: 32867 (priority 32768 sys-id-ext 99)

- b. S2: 32867 (priority 32768 sys-id-ext 99)
 - c. S3: 32867(priority 32768 sys-id-ext 99)_
8. What is the bridge ID priority for S2 on VLANs 10, 20, 30, and 99? **[4 marks]**
- d. VLAN 10: 32778 (priority 32768 sys-id-ext 10)
 - e. VLAN 20: 32788 (priority 32768 sys-id-ext 20)
 - f. VLAN 30: 32798 (priority 32768 sys-id-ext 30)
 - g. VLAN 99: 32867 (priority 32768 sys-id-ext 99)
9. Which switch is the root for: **[4 marks]**
- a. VLAN 10 spanning tree? **S1**
 - b. VLAN 20 spanning tree? **S1**
 - c. VLAN 30 spanning tree? **S1**
 - d. VLAN 99 spanning tree? **S1**
10. On VLAN 99, which spanning tree ports are in the blocking state on the root switch? **None – All ports on the root switch are in the forwarding state.**
This is because in Spanning Tree Protocol (STP), the root bridge acts as the central point of the VLAN topology and never blocks any of its ports. STP is designed to eliminate loops by placing redundant ports into a blocking state—but only on non-root switches. The root switch always forwards traffic on all of its active ports to maintain efficient communication across the network. [1 mark]

Task #4 Optimizing STP

Make proper changes to your diagram in Fig1 so that you change the root bridge of VLAN99 to another switch (if the root bridge was S1, then change it to S2 or S3)

Hint: use the following commands

```
S#(config)#spanning-tree vlan 99 priority ?
<0-61440> bridge priority in increments of 4096
```

```
S#(config)#spanning-tree vlan 99 priority 4096
S#(config)#exit
```

(The lower number indicates a higher priority for root selection)

Different Priority sheet

For the second sheet of the excel file “STP table Assignment2_Stu.xlsx”:

11. Fill the status of each interface for each switch for each VLAN and save the file

under the name “**STP table Assignment2_learnname.xlsx**” where learnname is your Seneca learn name

12. Which switch is the root for VLAN99 now? SW2 [1 mark]
13. Which switch is the root for VLAN10 now? S1 [1 mark]
14. Which switch is the root for VLAN20 now? S1 [1 mark]
15. Which switch is the root for VLAN30 now? S1 [1 mark]
16. Save this document as word document for your own modifications and save another copy as “.PDF”
17. Submit the PDF file with the excel sheet file “**STP table Assignment2_learnname.xlsx**” to your Assignment 2 submission