

Task 1: Which switch is the root bridge?

Switches Priority and MAC address info:

SW1

- **Pri:** 32769
- **MAC:** 0001.4338.79D8

SW2

- **Pri:** 28673
- **MAC:** 0002.16D6.D0B8

SW3

- **Pri:** 24577
- **MAC:** 00E0.F9E6.44A5

SW4

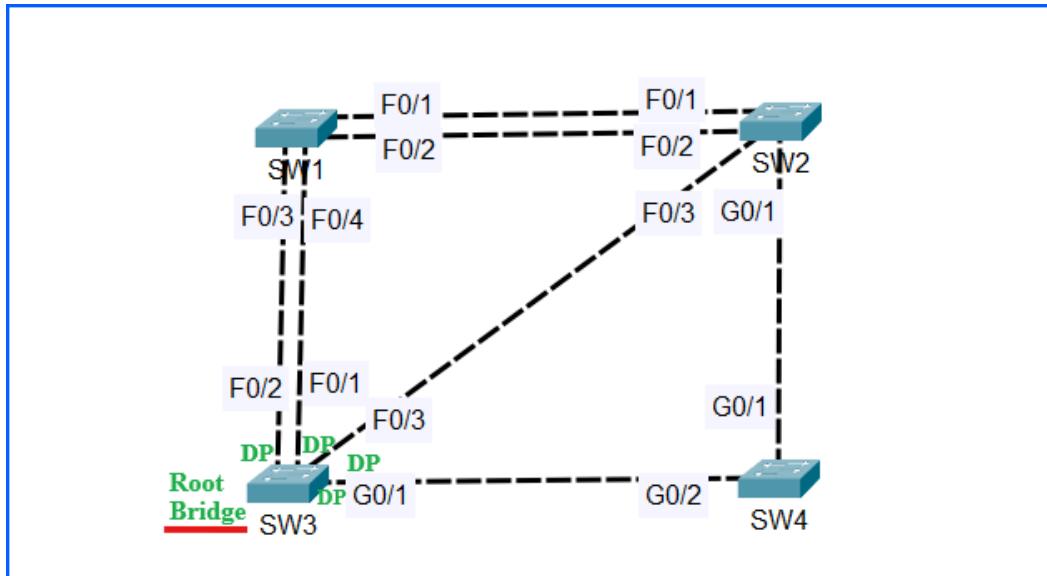
- **Pri:** 32769
- **MAC:** 0090.0C01.9587

Find the Root bridge: check for the switch with lowest priority, if they tie check the lowest MAC Address

SW3 is the Root Bridge because it has the lowest Priority Number.

SW3 is the root bridge so all of its ports will become **designated ports (DP)** in forwarding states. All of the ports on SW3 have a cost of 0 because it's the root bridge

See Below



Task 2: Identify the role (root/designated/non-designated) of each switch port:

COST

100 Mbps (FastEthernet)	19
1 Gbps (GigabitEthernet)	4

Switches Connections:

SW1 F0/1 is connected SW2 F0/1 and SW1 F0/2 is connected SW2 F0/2

SW1 F0/3 is connected SW3 F0/2 and SW1 F0/4 is connected SW3 F0/1

SW2 F0/3 is connected SW3 F0/3 and SW2 G0/1 is connected SW4 G0/1

SW3 G0/1 is connected SW4 G0/2

Calculate the root cost by **adding the individual port costs along the path from the switch to the root**.

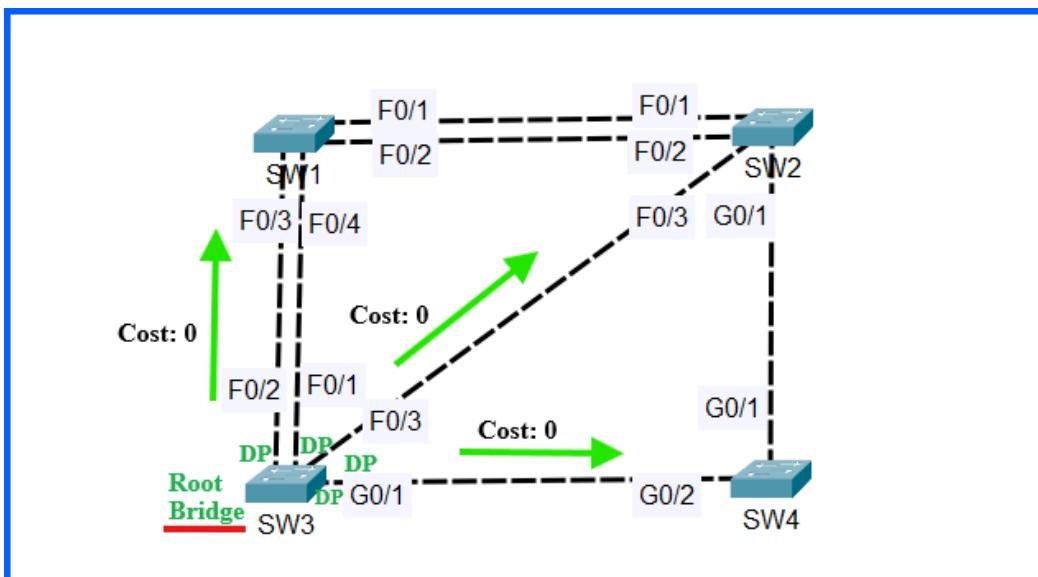
Find Root port: The best path is the one with the lowest cost to reach the **root bridge**.

- First criteria for root port selection is the port with the **lowest root cost**. However, what if a switch has multiple ports with the same root cost?

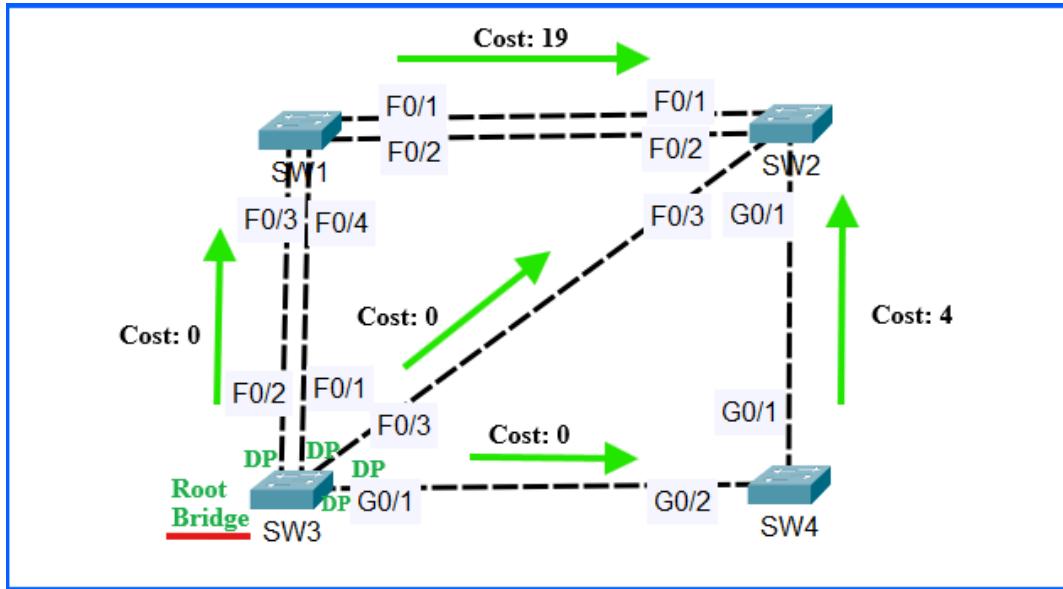
- In that case, the interface connected to the neighbor with the **lowest bridge ID** will be selected as the root port. (**Lowest neighbor ID**)
- However, what if a switch has multiple ports with the same root cost and the **neighbor Bridge ID** are the same?
- **Then we get to the final tie-breaker, the interface connected to the interface on the neighbor switch with the lowest port ID will become the root port.**
 - Similar to the bridge ID, where the MAC address is used as a tiebreaker **if the priorities tie (the same)**, the port number is used.

Use **show spanning-tree** command, look at the **Prio.Nbr** section.

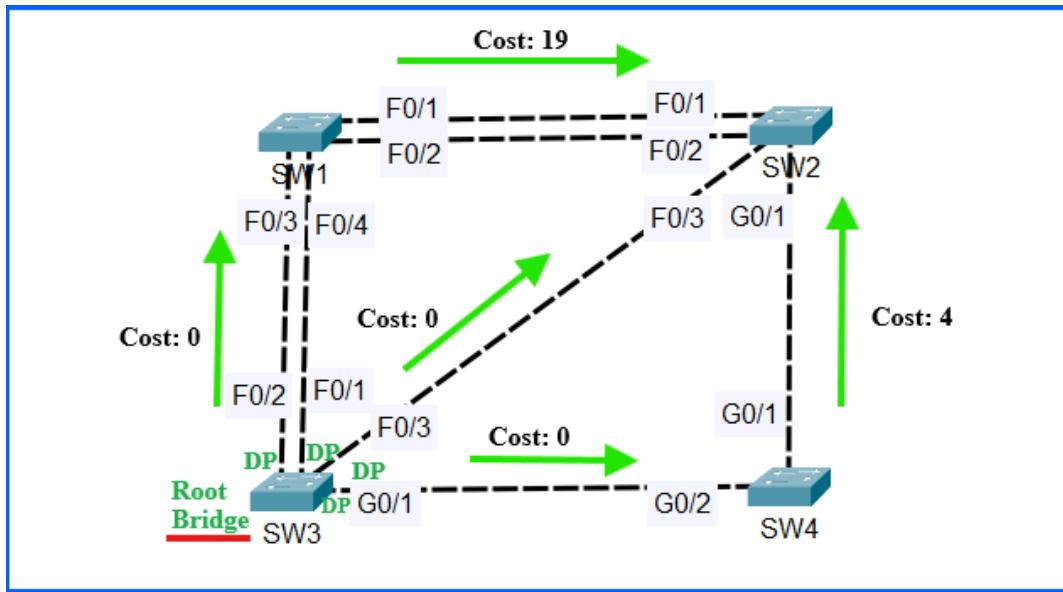
STP port ID = the port priority + the port number



- SW3 advertise its Root cost of **0** to the **SW1, SW2 and SW4**



- SW1 advertise its Root cost of **19** to the SW2
- SW4 advertise its Root cost of **4** to the SW2



SW1 was advertised a cost of **0** on its **F0/3** and **F0/4** interface but the cost of its FastEthernet interfaces is **19** so the total root cost via **SW1 F0/3** and **F0/4** is **19 (0+19)**.

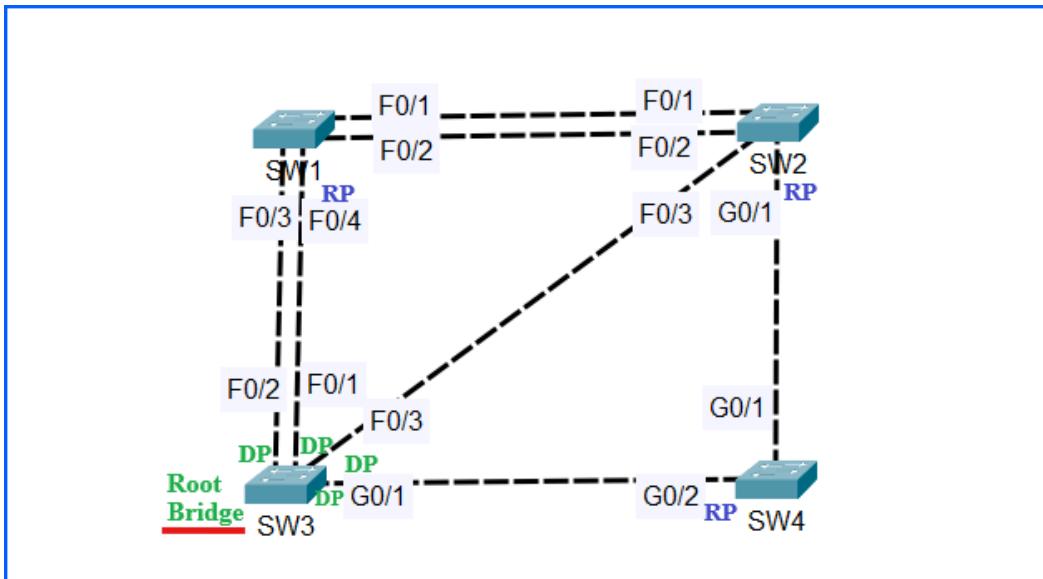
SW2 was advertised a cost of **19** on its **F0/1** and **F0/2** interfaces but the cost of its FastEthernet interfaces is **19** so the total root cost via **SW2 F0/1** and **F0/2** is **28 (19+19)**.

SW2 was also advertised a cost of **0** on its **F0/3** interface but the cost of its **F0/3** (FastEthernet) interface is **19** so the total root cost via **SW2 F0/3** is **19 (0+19)**.

SW4 was advertised a cost of **0** on its **G0/2** interface but the cost of its **G0/2** (GigabitEthernet) interface is **4**, so the total root cost via **SW4 G0/2** is **4 (0+4)**.

SW2 was also advertised a cost of **4** on its **G0/1** interface but the cost of its interface **G0/1** (GigabitEthernet) is **4**, so the total root cost via **SW2 G0/1** is **8 (4+4)**.

Note **SW1** has **2** connections to the **Root Bridge (SW3)** and they both have the same root cost, which is a Tie.



Note: Each Switch must have a single **root port**

SW1 has 2 connections to Root Bridge with the same root cost

The **Root Port** for **SW1** is **F0/4**

SW3 is connected to SW1 (the neighbor in this case)

show spanning-tree on **SW3**(the neighbor portID = priority + port number)

Results:

- **SW3 F0/1 is $128+1 = 129$ (lowest Port ID)**
- **SW3 F0/2 is $128+2 = 130$**

The Root port for SW1

- **Reasoning:** because it connected to the lowest port ID on the **neighbor** SW3. (FW3 F0/1 PortID is **129** & SW3 F0/1 is **130**.)

The Root Port For SW2 is G0/1

- **Reasoning:** SW2 was also advertised a cost of 4 on its **G0/1** interface but the cost of its interface **G0/1** (GigabitEthernet) is 4, so the total root cost via **SW2 G0/1** is **8 (4+4)**.

The Root Port For SW4 is G0/2

- **Reasoning:** SW4 was advertised a cost of **0** on its **G0/2** interface but the cost of its **G0/2** (GigabitEthernet) interface is 4, so the total root cost via **SW4 G0/2** is **4 (0+4)**.

Non-Designated ports (Blocked ports)

SW1 F0/3 is connected to the Root Bridge (SW3) so its a **Non designated Port**

SW2 F0/3 is connected to the Root Bridge (SW3) so its a **Non designated Port**

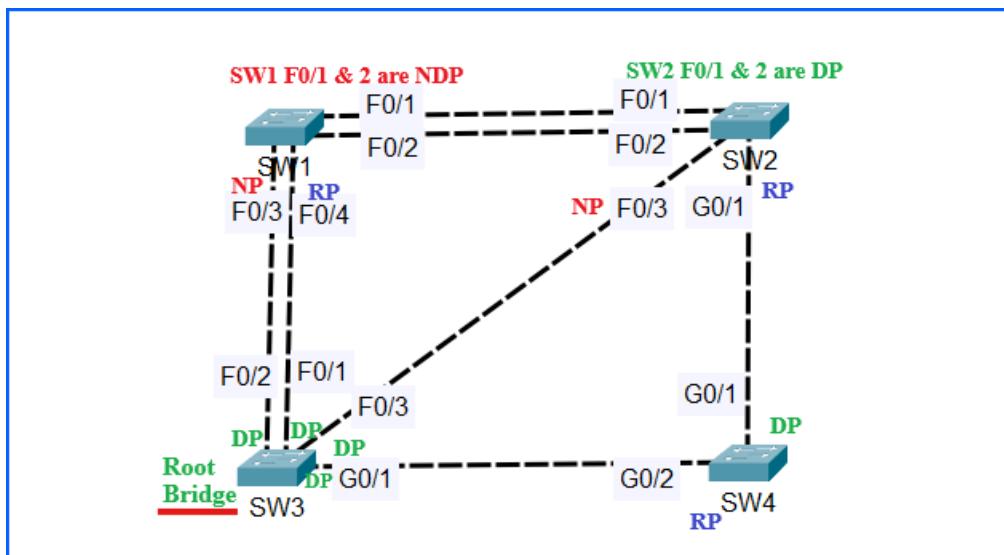
The collision domain between SW1 and SW2.

- **Root Cost:** The interfaces on the switch with the lower root cost will be designated the other side will be non designated.

SW1 root cost is 19 via **F0/4**

SW2 root cost is 8 via **G0/1** (Lower Root cost)

Therefore **SW2 F0/1** and **F0/2** interfaces will be Designated ports and **SW1 F0/1** and **F0/2** interfaces will be non-designated.



Check with CLI

Run **show spanning-tree** in privileged EXEC mode:

Run **show spanning-tree vlan 1** in privileged EXEC mode:

Run **show spanning-tree detail** privileged EXEC mode: to see total root cost

Run **show spanning-tree vlan 2** privileged EXEC mode: