

## Group Assignment 2 - Group Lab Activity 2

TNE10006/TNE60006 S2 2023

**Assignment Weight:**

7.5%

**Assignment Points:**

75

**Submission Due Date:**

By the start of Week 12 Lab session.

**Reference Material:**

- Sample Final Practical Assessment (available in Canvas Lab Sessions page, Week 6a tab)

**Instructions:**

1. Form a group of 3-4 people amongst the students present in the lab session.
2. Your group discussion time will be in the last 60 minutes of the lab session in Collaborate Ultra, Breakout groups.
3. Discuss and answer the questions in Group Assignment 2 in your breakout group.
4. Organise for your group to meet again to complete all the questions.
5. Each group will submit one completed Group Assignment 2
6. Submit Group Assignment 2, in the Canvas shell, under the Group Lab Activity 2
7. Late penalties will apply for submission after the due date.

**Group Assignment 2 Sections:**

- Section 1: Sample Final Practical Assessment – Topology and Specs Analysis (15 marks)
- Section 2: Sample Final Practical Assessment – Configuration (35 marks)
- Section 3: Sample Final Practical Assessment – Validation and Troubleshooting (25 marks)

**Group Assignment 2 Members Information:**

<b>Name</b>	<b>Student Id:</b>
<b>Saw Ko Ko Oo</b>	<b>104150310</b>
<b>Yong Hao Xu</b>	<b>104106821</b>
<b>Hai Nam Ngo</b>	<b>103488515</b>

## Section 1: Sample Final Practical Assessment – Topology and Specs Analysis (15 marks)

When tasked to build a network end to end, you should first take some time to analyse the topology diagram, addressing tables and other specifications to understand the basic network requirements.

Refer to the Sample Final Practical Assessment.

Q1. How many VLANs MUST be configured on the switches? (3 marks)

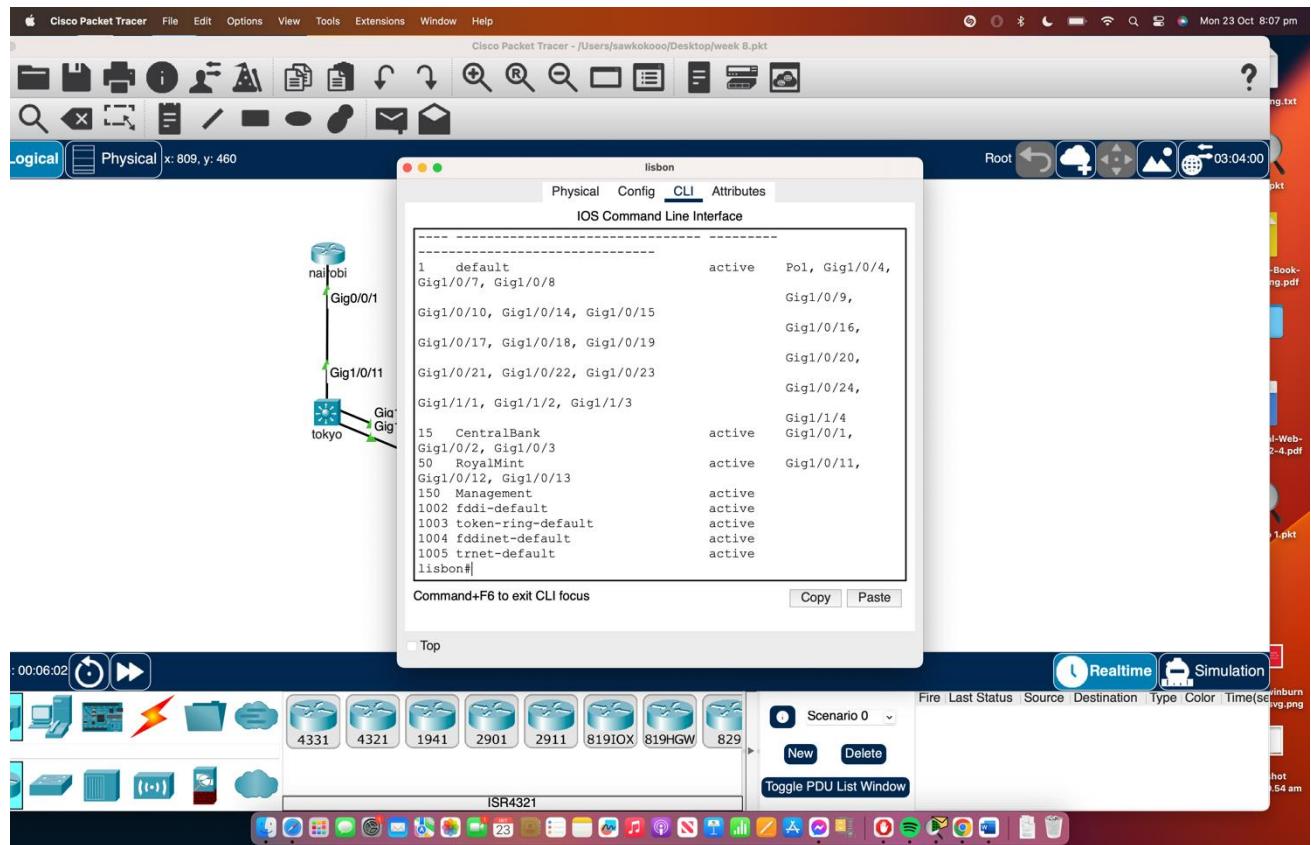
- a) On Lisbon? Please specify VLAN(s) ID

3 Vlans on Lisbon

Vlan 15 CentralBank active

Vlan 50 RoyalMint active

Vlan 150 Management active



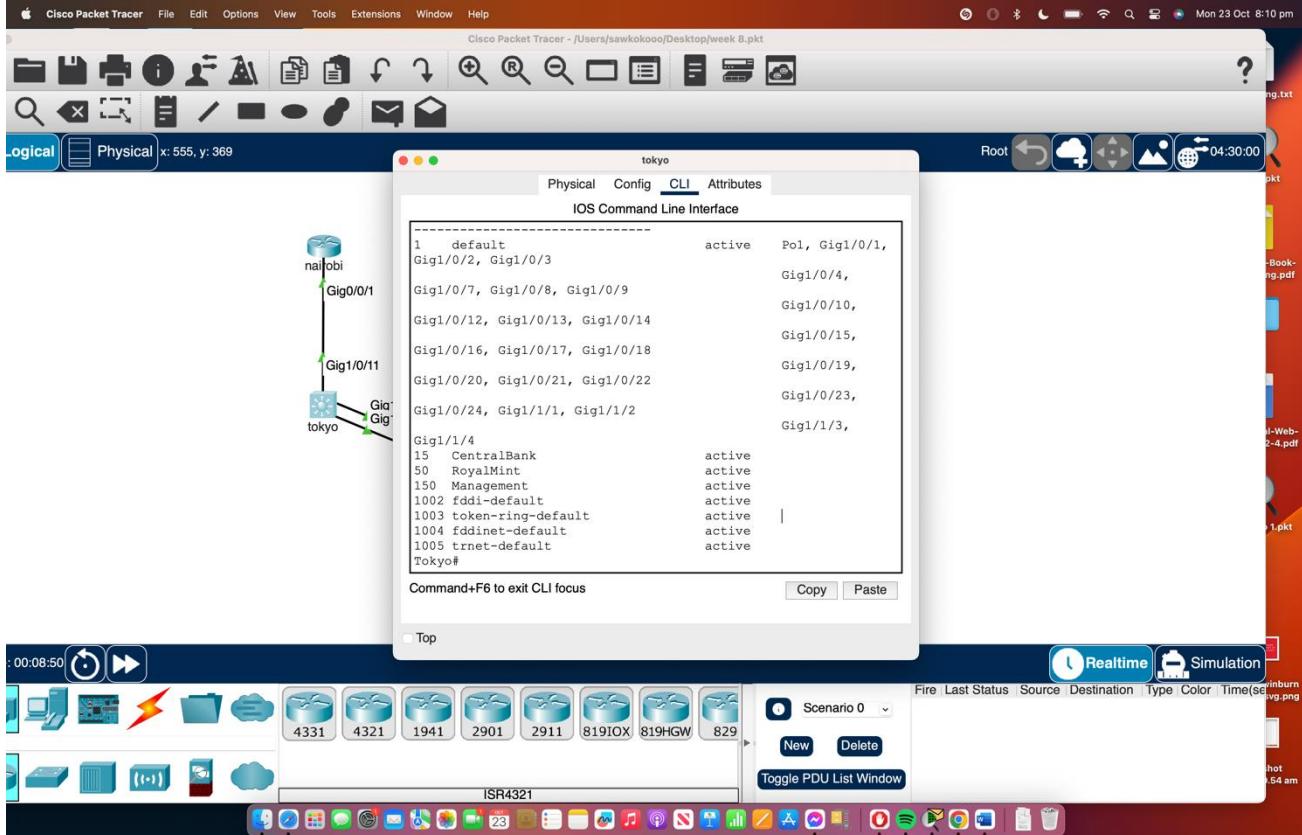
- b) On Tokyo? Please specify VLAN(s) ID

### 3 VLans

Vlan 15 CentralBank active

Vlan 50 RoyalMint active

Vlan 150 Management active



Q2. How many access ports MUST be configured on the switches? (3 marks)

- a) On Lisbon? Please specify switchport to VLAN ID allocation.

There are 6 access ports configured on Lisbon

```
interface GigabitEthernet1/0/1
switchport access vlan 15
```

```
interface GigabitEthernet1/0/2
switchport access vlan 15
```

```
interface GigabitEthernet1/0/3
switchport access vlan 15
```

```
interface GigabitEthernet1/0/11
switchport access vlan 50
```

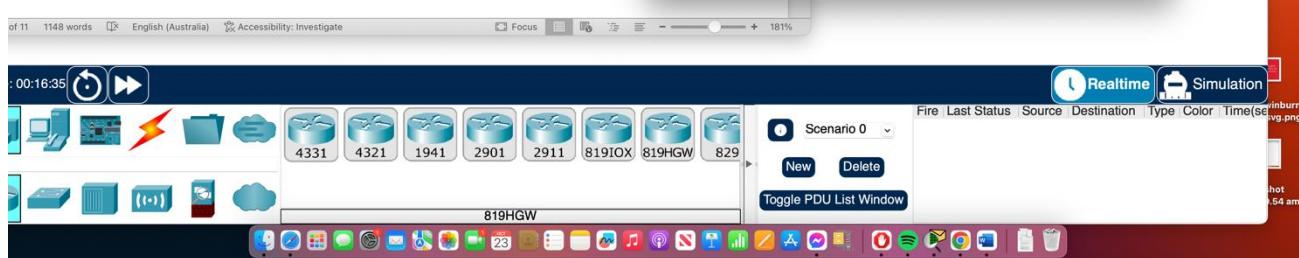
```
interface GigabitEthernet1/0/12
switchport access vlan 50
```

interface GigabitEthernet1/0/13  
switchport access vlan 50

The screenshot shows the Cisco Packet Tracer interface. In the foreground, a terminal window titled 'lisbon' displays the following CLI configuration:

```
!  
interface GigabitEthernet1/0/1  
switchport access vlan 15  
interface GigabitEthernet1/0/2  
switchport access vlan 15  
interface GigabitEthernet1/0/3  
switchport access vlan 15  
interface GigabitEthernet1/0/11  
switchport access vlan 50  
interface GigabitEthernet1/0/12  
switchport access vlan 50  
interface GigabitEthernet1/0/13  
switchport access vlan 50  
interface GigabitEthernet1/0/14  
switchport access vlan 50
```

Below the terminal window, there is a note: "Group Lab Activity 2 – S2 2023 update" followed by the number "4".



The screenshot shows the Cisco Packet Tracer interface with a third configuration. The terminal window titled 'lisbon' now displays:

```
!  
interface Port-channel1  
!  
interface GigabitEthernet1/0/1  
switchport access vlan 15  
switchport mode access  
switchport nonegotiate  
!  
interface GigabitEthernet1/0/2  
switchport access vlan 15  
switchport mode access  
switchport nonegotiate  
!  
interface GigabitEthernet1/0/3  
switchport access vlan 15  
switchport mode access  
switchport nonegotiate  
switchport port-security maximum 2  
switchport port-security mac-address sticky  
switchport port-security violation protect  
!  
interface GigabitEthernet1/0/4  
!
```

The note "Group Lab Activity 2 – S2 2023 update" and the number "4" are also present.



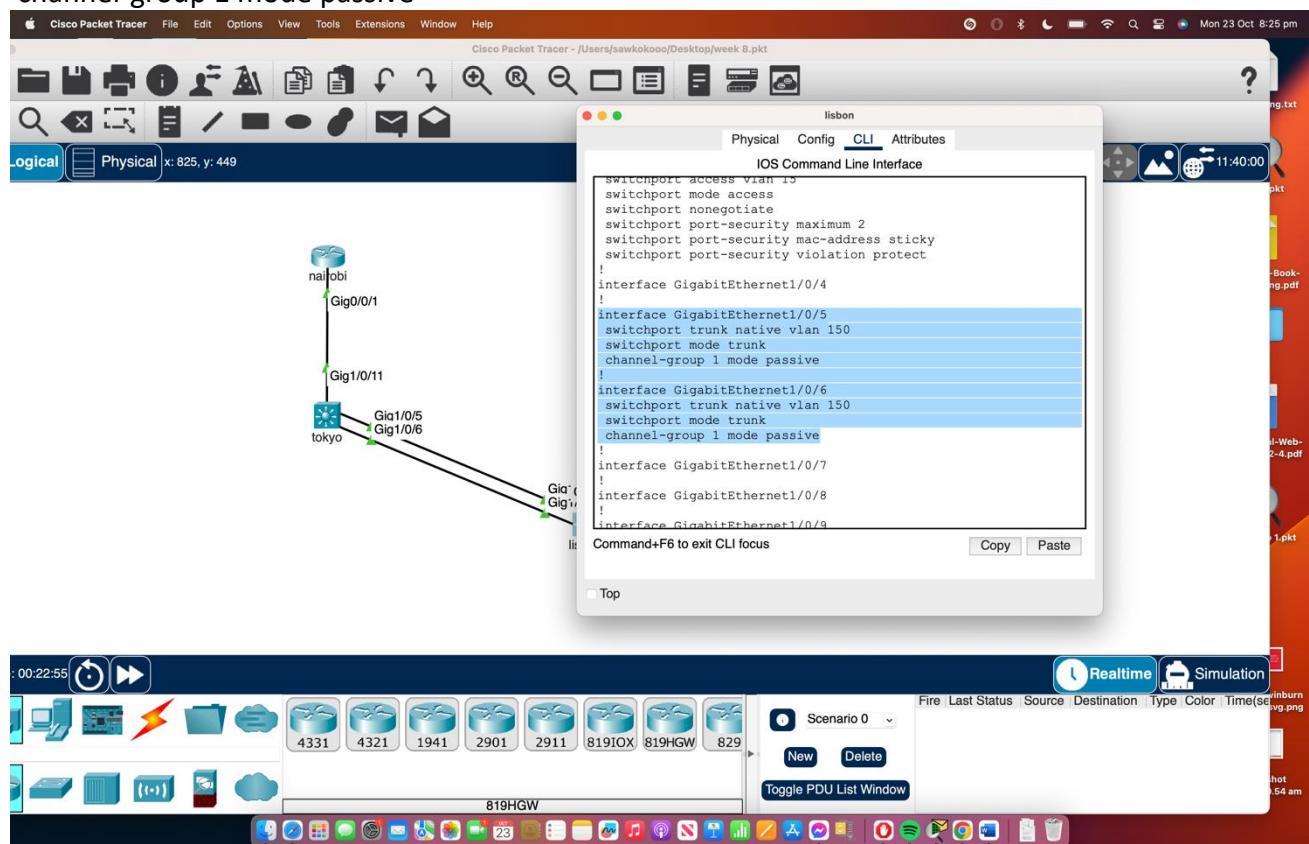
- b) On Tokyo? Please specify switchport to VLAN ID allocation.  
There is no switchport on Tokyo according to guidelines.

Q3. How many 802.1q trunks MUST be configured on the switches? (3 marks)

- a) On Lisbon? Please specify interface(s) ID.

Trunks on two ports

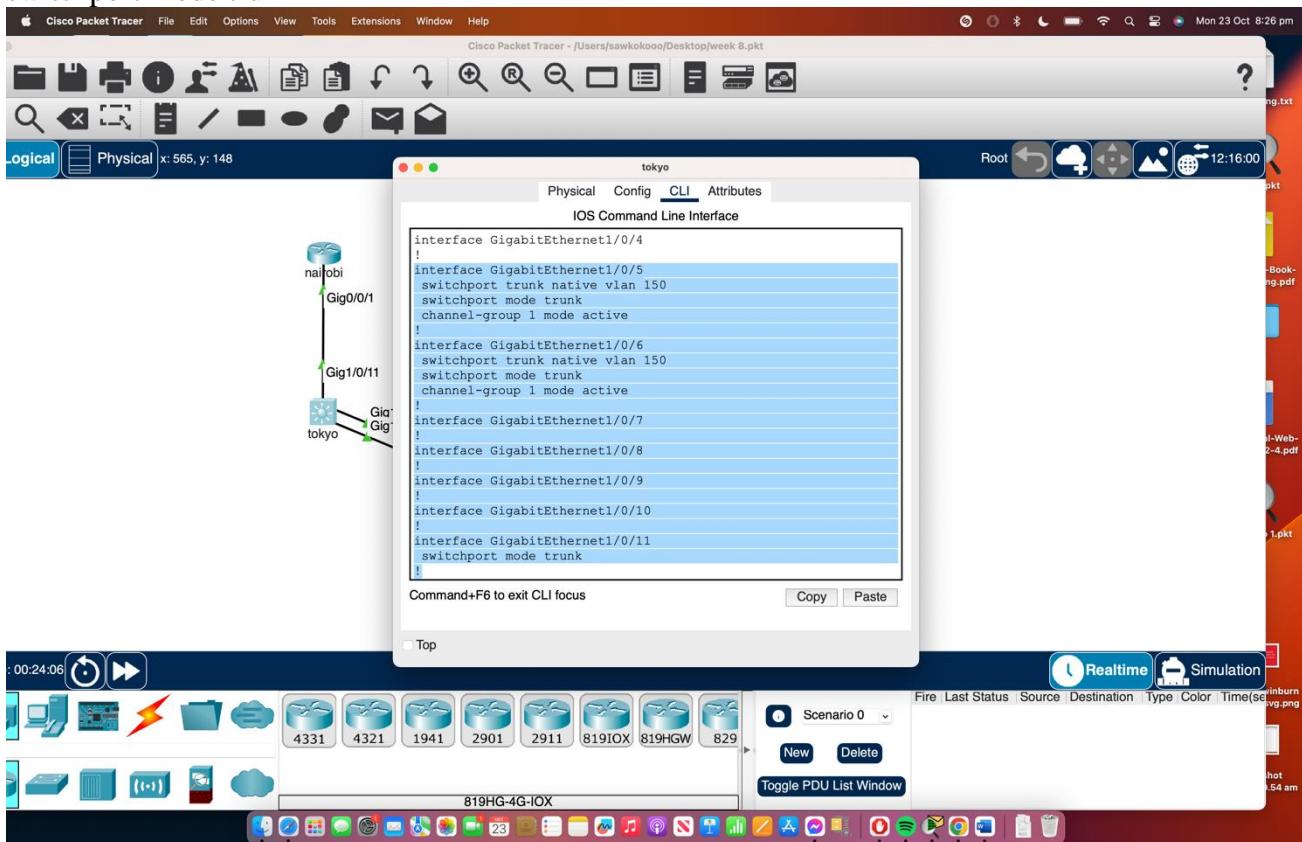
```
interface GigabitEthernet1/0/5
switchport trunk native vlan 150
switchport mode trunk
channel-group 1 mode passive
!
interface GigabitEthernet1/0/6
switchport trunk native vlan 150
switchport mode trunk
channel-group 1 mode passive
```



On Tokyo? Please specify interface(s) ID.

trunks on three ports

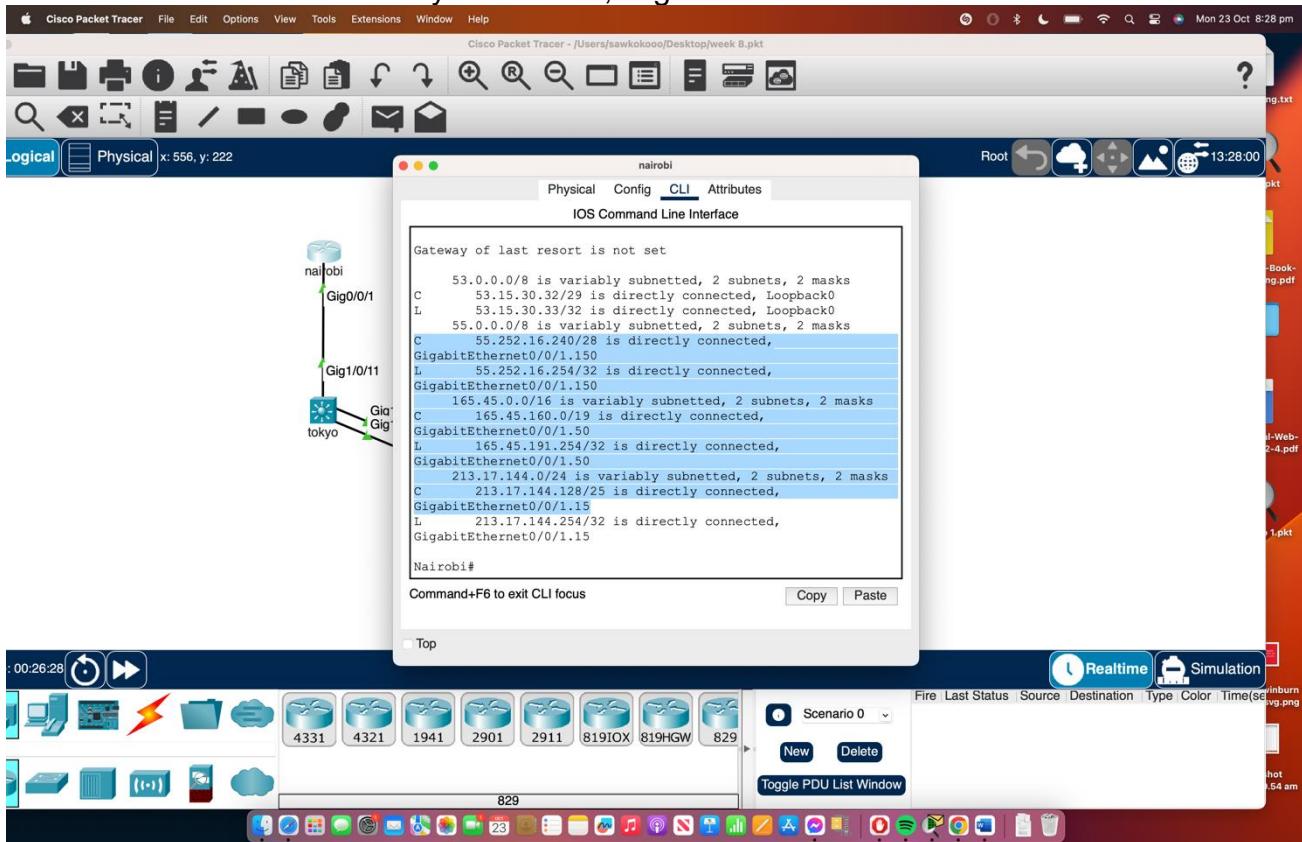
```
interface GigabitEthernet1/0/5
switchport trunk native vlan 150
switchport mode trunk
channel-group 1 mode active
!
interface GigabitEthernet1/0/6
switchport trunk native vlan 150
switchport mode trunk
channel-group 1 mode active
!
interface GigabitEthernet1/0/11
switchport mode trunk
```



Q4. How many sub-interfaces MUST be configured on Nairobi? Please specify sub-interface(s) ID.  
(3 marks)

Three sub-interfaces must be configured on Nairobi  
C 55.252.16.240/28 is directly connected, GigabitEthernet0/0/1.150

C 165.45.160.0/19 is directly connected, GigabitEthernet0/0/1.50  
C 213.17.144.128/25 is directly connected, GigabitEthernet0/0/1.15



Q5. How many interfaces VLAN MUST be configured on the switches? (2 marks)

- a) On Lisbon? Please specify interface(s) ID.

1 interface vlan will be configured: management vlan 150

- b) On Tokyo? Please specify interface(s) ID.

1 interface vlan will be configured: management vlan 150Vlan 150 Management active

Q6. Do we need to set a default-gateway on the switches? If YES, specify the default-gateway IP to be configured. (1 mark)

Yes, ip default-gateway 55.252.16.254 on both switches

## Section 2: Sample Final Practical Assessment - Configuration (35 marks)

After you have a good understanding of the network topology and basic network requirements, you can move on to configuring the devices following a systemic procedure.

Refer to the Sample Final Practical Assessment.

Q1. List the configuration commands required to complete **Task 1: Configure Device Names and MOTD**. For each command, specify the device(s) and operation mode. (2 marks)

**For Router:**

Router>en

Router#conf t

Router(config)#hostname Nairobi

Nairobi(config)#banner motd \*Student ID\*

**For Switch3 (Tokyo):**

Switch>en

Switch#conf t

Switch(config)#hostname Tokyo

Tokyo(config)# banner motd \*Student ID\*

**For Switch4 (Lisbon):**

Switch>en

Switch#conf t

Switch(config)#hostname Lisbon

Lisbon(config)# banner motd \*Student ID\*

Q2. List the configuration commands required to complete **Task 2: Configure VLANs and VLAN membership**. For each command, specify the device(s) and operation mode. (6 marks)

**Requirement: All VLANs must exist on Tokyo and Lisbon**

**Switch Tokyo:**

Tokyo(config)#vl 15

Tokyo(config-vlan)#name Centralbank

```
Tokyo(config-vlan)#vl 50
Tokyo(config-vlan)#name Royalmint
Tokyo(config-vlan)#vl 150
Tokyo(config-vlan)#name Management
Tokyo(config-vlan)#exit
```

**Switch Lisbon:**

```
Lisbon(config)#vl 15
Lisbon(config-vlan)#name Centralbank
Lisbon(config-vlan)#vl 50
Lisbon(config-vlan)#name Royalmint
Lisbon(config-vlan)#vl 150
Lisbon(config-vlan)#name Management
Lisbon(config-vlan)#exit
```

**Requirement: All unused switchports in Lisbon must be disabled, so we turned off all ports and turned on used ports only.**

```
Lisbon(config)#int range g1/0/1-24
Lisbon(config-if-range)#shutdown
```

**Requirement: Ports gi1/0/1-3 in Lisbon must be access ports for the Centralbank VLAN**

```
Lisbon(config-if-range)#int range g1/0/1-3
Lisbon(config-if-range)#switchport mode access
Lisbon(config-if-range)#switchport access vlan 15
Lisbon(config-if-range)#no shutdown
```

**Requirement: Ports gi1/0/11-13 in Lisbon must be access ports for the Royalmint VLAN**

```
Lisbon(config)#int range g1/0/11-13
Lisbon(config-if-range)#switchport mode access
Lisbon(config-if-range)#switchport access vlan 50
```

Q3. List the configuration commands required to complete **Task 3: Configure Router-on-a-Stick**. For each command, specify the device(s) and operation mode. (8 marks)

**Router:**

```
Nairobi(config)#int g0/0/1
```

```
Nairobi(config-if)#no shutdown
```

```
Nairobi(config-if)#exit
```

```
Nairobi(config)#int g0/0/1.15
```

```
Nairobi(config-subif)#encapsulation dot1Q 15
```

```
Nairobi(config-subif)#ip address 213.17.144.254 255.255.255.128
```

```
Nairobi(config-subif)#exit
```

```
Nairobi(config)#int g0/0/1.50
```

```
Nairobi(config-subif)#encapsulation dot1Q 50
```

```
Nairobi(config-subif)#ip address 165.45.191.254 255.255.224.0
```

```
Nairobi(config-subif)#exit
```

```
Nairobi(config)#int g0/0/1.150
```

```
Nairobi(config-subif)#encapsulation dot1Q 150
```

```
Nairobi(config-subif)#ip address 55.252.16.254 255.255.255.240
```

```
Nairobi(config-subif)#exit
```

**Configure the Loopback0 with IP 53.15.30.33/29**

```
Nairobi(config)#int Loopback0
```

```
Nairobi(config-if) #ip address 55.15.30.33 255.255.255.248
```

```
Nairobi(config-if)#exit
```

**Tokyo:**

```
Tokyo(config)#int g1/0/11
Tokyo(config-if) #switchport mode trunk
Tokyo(config-if) #exit
Tokyo(config)#int range g1/0/5-6
Tokyo(config-if-range) #switchport mode trunk
Tokyo(config-if-range) #exit
```

**Lisbon:**

```
Lisbon(config)#int range g1/0/5-6
Lisbon(config-if-range)#switchport mode trunk
Lisbon(config-if-range)#exit
```

Q4. List the configuration commands required to complete **Task 4: Configure Switch Management**.

For each command, specify the device(s) and operation mode. (6 marks)

Configure Management IP on Tokyo and Lisbon:

The management IP on Tokyo: 55.252.16.253

The management IP on Lisbon: 55.252.16.252

```
Tokyo(config)#int vlan 150
Tokyo(config-if)#ip address 55.252.16.253 255.255.255.240
Tokyo(config-if)#exit
Tokyo(config)#ip default-gateway 55.252.16.254

Lisbon(config)#int vlan 150
Lisbon(config-if)#ip address 55.252.16.252 255.255.255.240
Lisbon(config-if)#exit
Lisbon(config)#ip default-gateway 55.252.16.254
```

**Configure SSH on Lisbon:**

```
Lisbon(config)#ip domain-name ccna.lab
```

```
Lisbon(config)#crypto key generate rsa general-keys modulus 1024
Lisbon(config)#username cisco privilege 15 secret cisco
Lisbon(config)#line vty 0 15
Lisbon(config-line)#transport input ssh
Lisbon(config-line)#login local
Lisbon(config-line)#end
```

Q5. List the configuration commands required to complete **Task 5: Fine-tune STP**. For each command, specify the device(s) and operation mode. (4 marks)

**Switch Tokyo:**

```
Tokyo(config)#spanning-tree vlan 50 root primary
```

**Switch Lisbon:**

```
Lisbon(config)#spanning-tree vlan 15 root primary
Lisbon (config)#interface range g1/0/1-3
Lisbon (config-if-range)#spanning-tree portfast
Lisbon (config-if-range)#end
```

```
Lisbon (config)#interface range g1/0/11-13
Lisbon (config-if-range)#spanning-tree portfast
Lisbon (config-if-range)#end
```

Q6. List the configuration commands required to complete **Task 6: Configure Port-Security**. For each command, specify the device(s) and operation mode. (4 marks)

```
Lisbon(config)#int g1/0/3
Lisbon (config-if)#switchport mode access
Lisbon (config-if)#switchport port-security violation protect
Lisbon (config-if)#switchport port-security mac-address sticky
Lisbon (config-if)#switchport port-security maximum 2
```

Q7. List the configuration commands required to complete **Task 7: Configure EtherChannel**. For each command, specify the device(s) and operation mode. (4 marks)

```
Lisbon (config)#interface range g1/0/5-6
Lisbon (config-if)#switchport trunk native vlan 150
Lisbon (config-if)#switchport mode trunk
Lisbon (config-if)#channel-group 1 mode passive
```

```
Tokyo (config)#interface range g1/0/5-6
Tokyo (config-if)#switchport trunk native vlan 150
Tokyo (config-if)#switchport mode trunk
Tokyo (config-if)#channel-group 1 mode Active
```

Q8. List the configuration commands required to complete **Task 8: Additional Settings**. For each command, specify the device(s) and operation mode. (1 mark)

**Switch Tokyo:**

```
Tokyo(config)#no ip domain lookup
Tokyo(config)#line console 0
Tokyo(config-line)#logging synchronous
```

**Switch Lisbon:**

```
Lisbon(config)#no ip domain lookup
Lisbon(config)#line console 0
Lisbon(config-line)#logging synchronous
```

**Router Nairobi:**

```
Nairobi(config)#int g0/0/1
Nairobi(config-if)#desc Interface for sub-interfaces
Nairobi(config-if)#int g0/0/1.15
Nairobi(config-subif)#desc Connection for Vlan 15
```

```
Nairobi(config-subif)#int g0/0/1.50
Nairobi(config-subif)# desc Connection for Vlan 50
```

```
Nairobi(config-subif)#int g0/0/1.150
Nairobi(config-subif)# desc Connection for Vlan 150
```

```
Nairobi(config-subif)#int Loopback0
Nairobi(config-if)#desc This is Loopback0
Nairobi(config-if)#end
```

## Section 2: Sample Final Practical Assessment - Validation and Troubleshooting (25 marks)

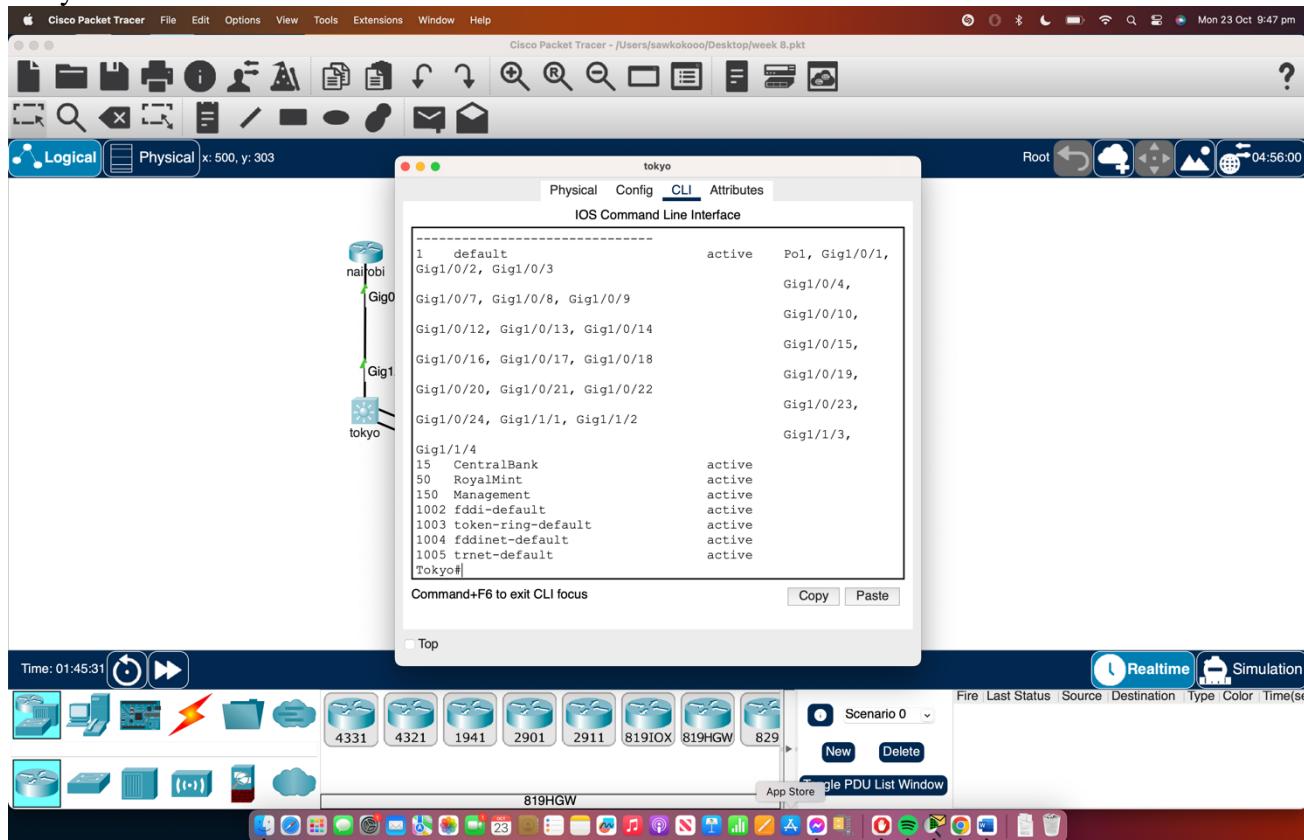
Upon completing your configuration, you should validate all settings using troubleshooting commands, such as Cisco **show** commands. You should also run connectivity tests using ICMP tools, such as **ping**.

Refer to the Sample Final Practical Assessment.

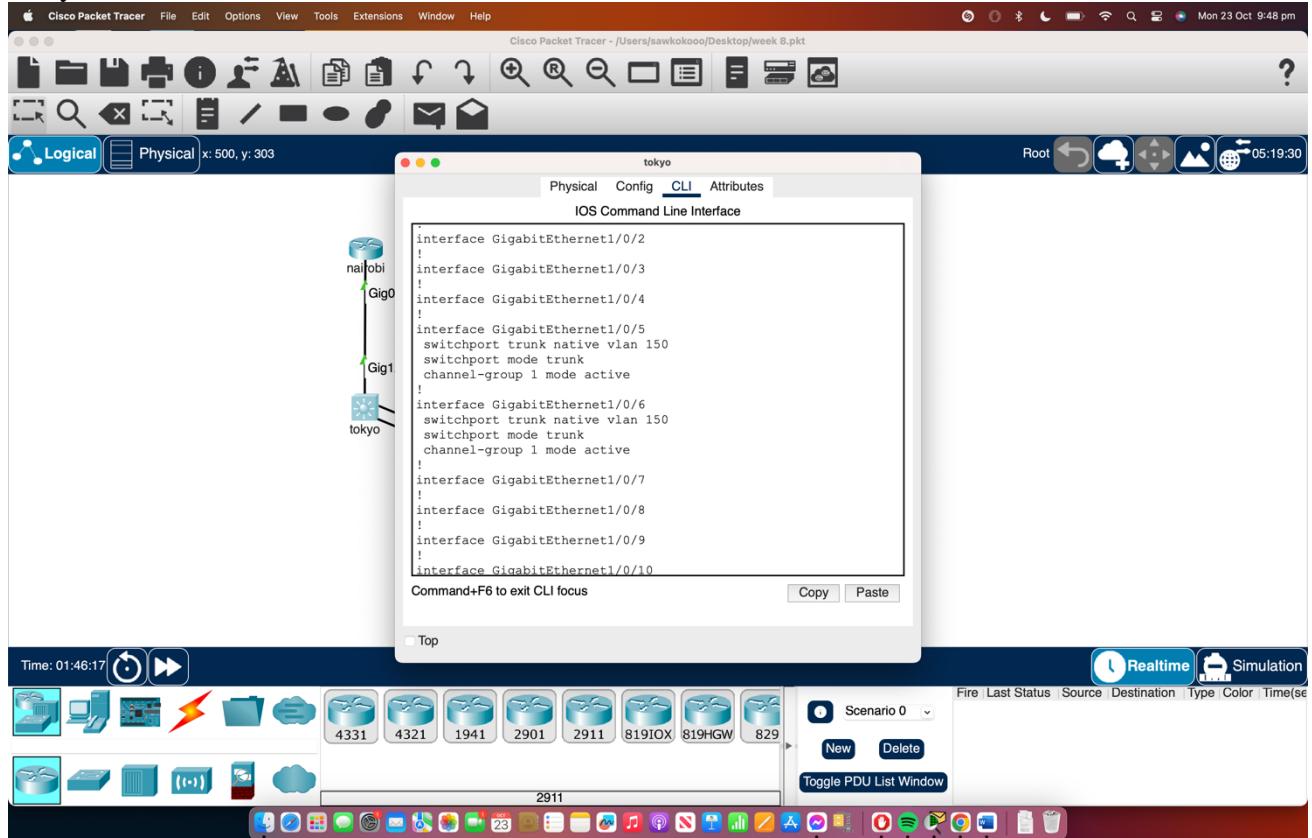
Q1. Answer the following questions regarding validating and troubleshooting **VLANs and VLAN membership**.

- a) What command(s) can be used on **Tokyo** to validate VLANs and VLAN membership configuration? For each command, describe the expected output. (2 marks)

Tokyo#sh vlan brief

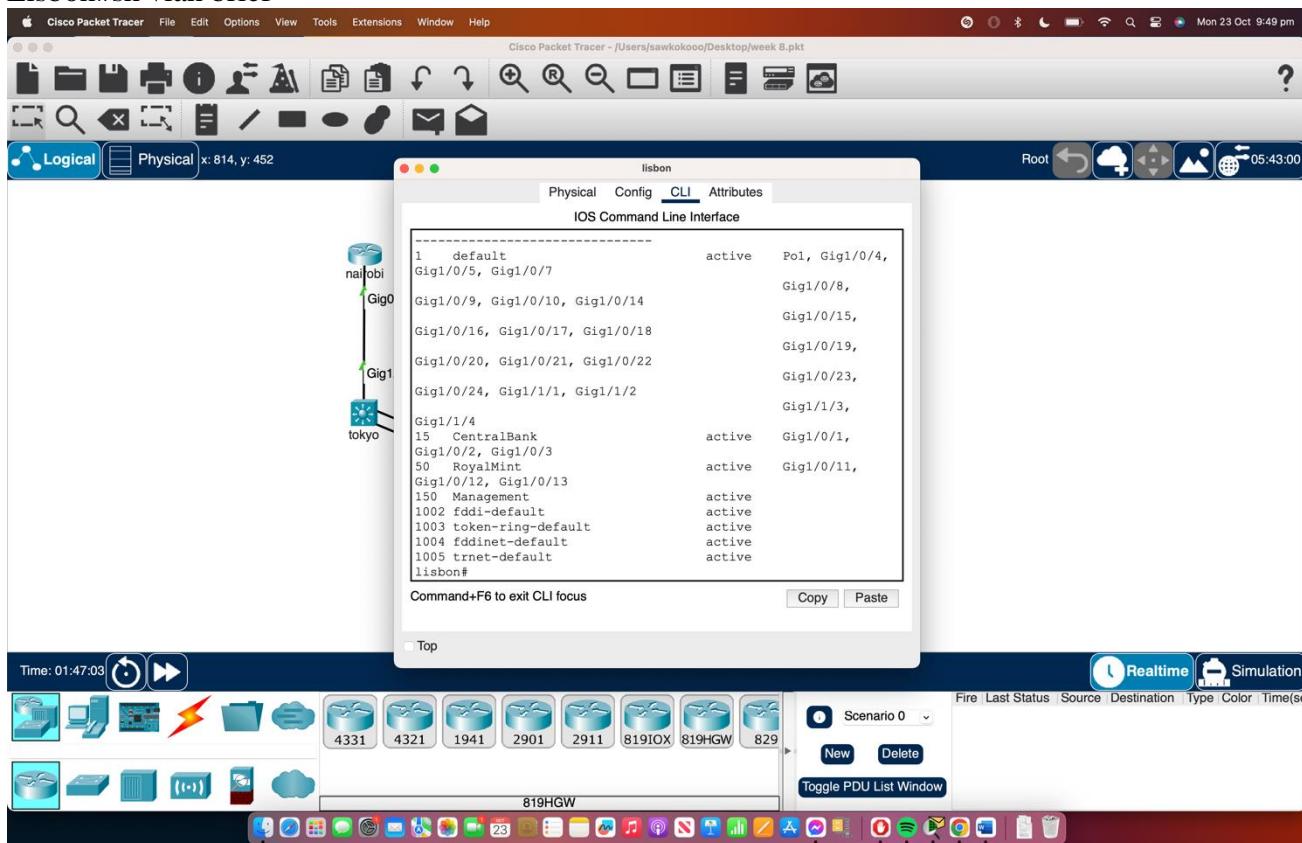


Tokyo#sh run



- b) What command(s) can be used on **Lisbon** to validate VLANs and VLAN membership configuration? For each command, describe the expected output. (2 marks)

Lisbon#sh vlan brief



Lisbon#sh run

```

Cisco Packet Tracer - /Users/sawkokooo/Desktop/week 8.pkt
Cisco Packet Tracer - /Users/sawkokooo/Desktop/week 8.pkt

Physical Config CLI Attributes
IOS Command Line Interface

interface GigabitEthernet1/0/1
switchport access vlan 15
switchport mode access
switchport nonegotiate
spanning-tree portfast
spanning-tree bpduguard enable
!
interface GigabitEthernet1/0/2
switchport access vlan 15
switchport mode access
switchport nonegotiate
spanning-tree portfast
spanning-tree bpduguard enable
!
interface GigabitEthernet1/0/3
switchport access vlan 15
switchport mode access
switchport nonegotiate
switchport port-security maximum 2
switchport port-security mac-address sticky
switchport port-security violation protect
spanning-tree portfast
spanning-tree bpduguard enable

Command+F6 to exit CLI focus
Copy Paste
Top

Time: 01:48:15 (↻) (▶)
Scenario 0 New Delete Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(s)
Cisco Packet Tracer File Edit Options View Tools Extensions Window Help
Cisco Packet Tracer - /Users/sawkokooo/Desktop/week 8.pkt
Cisco Packet Tracer - /Users/sawkokooo/Desktop/week 8.pkt

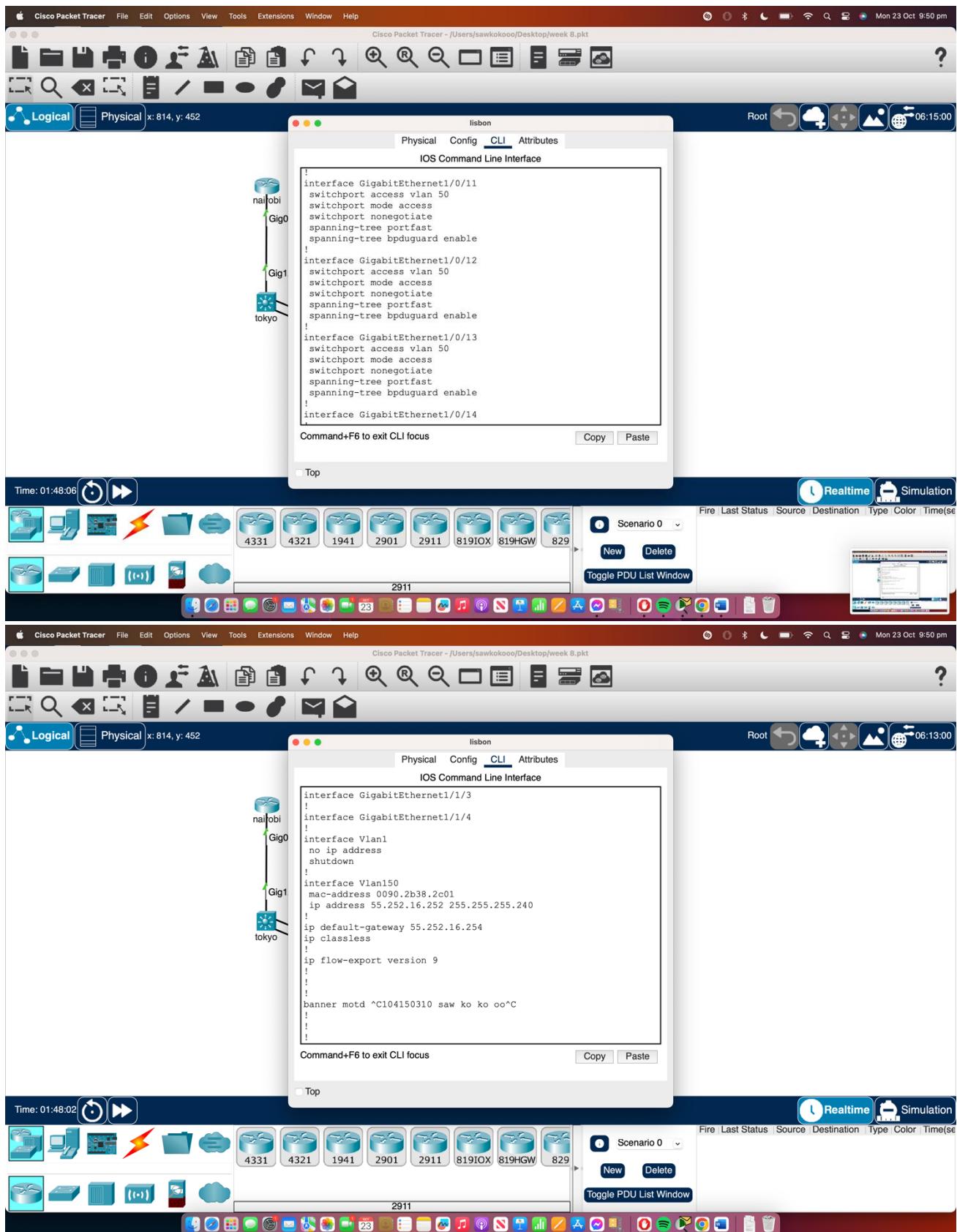
Physical Config CLI Attributes
IOS Command Line Interface

switchport access vlan 15
switchport mode access
switchport nonegotiate
switchport port-security maximum 2
switchport port-security mac-address sticky
switchport port-security violation protect
spanning-tree portfast
spanning-tree bpduguard enable
!
interface GigabitEthernet1/0/4
!
interface GigabitEthernet1/0/5
switchport trunk native vlan 150
switchport mode trunk
channel-group 1 mode passive
!
interface GigabitEthernet1/0/6
switchport trunk native vlan 150
switchport mode trunk
channel-group 1 mode passive
!
interface GigabitEthernet1/0/7
!

Command+F6 to exit CLI focus
Copy Paste
Top

Time: 01:48:10 (↻) (▶)
Scenario 0 New Delete Toggle PDU List Window
Fire Last Status Source Destination Type Color Time(s)

```



- c) What command(s) can be used on **Lisbon** to validate that all unused ports have been disabled? For each command, describe the expected output. (2 marks)

First of all, type( #sh ip int brief ) to find out which ports are there in switches and shut it all down first by tying

```
lisbon(config)#int range g1/0/4-10
lisbon(config-if-range)#shutdown
```

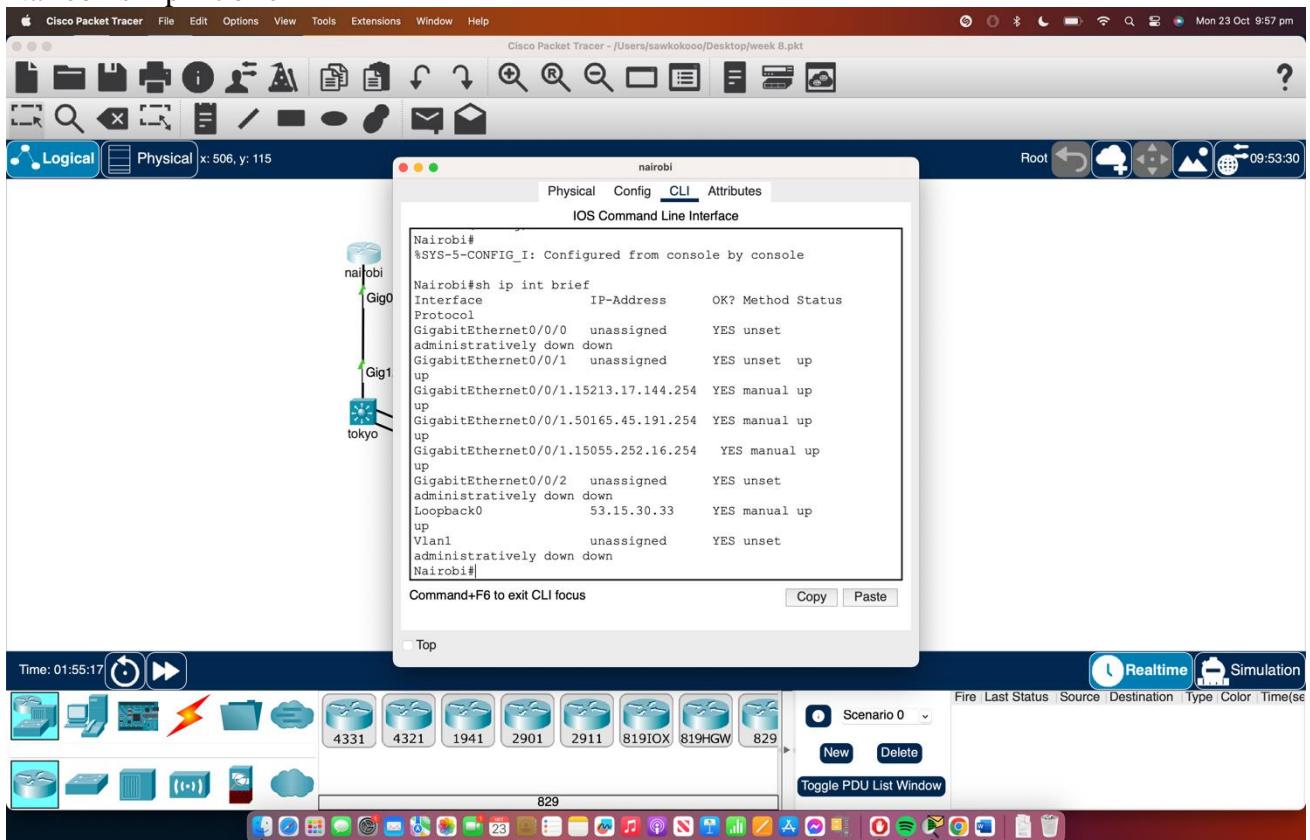
```
lisbon(config-if-range)#exit
```

```
lisbon(config)#int range g1/0/14-24
lisbon(config-if-range)#shutdown
```

## Q2. Answer the following question regarding validating and troubleshooting **Router-on-a-Stick**

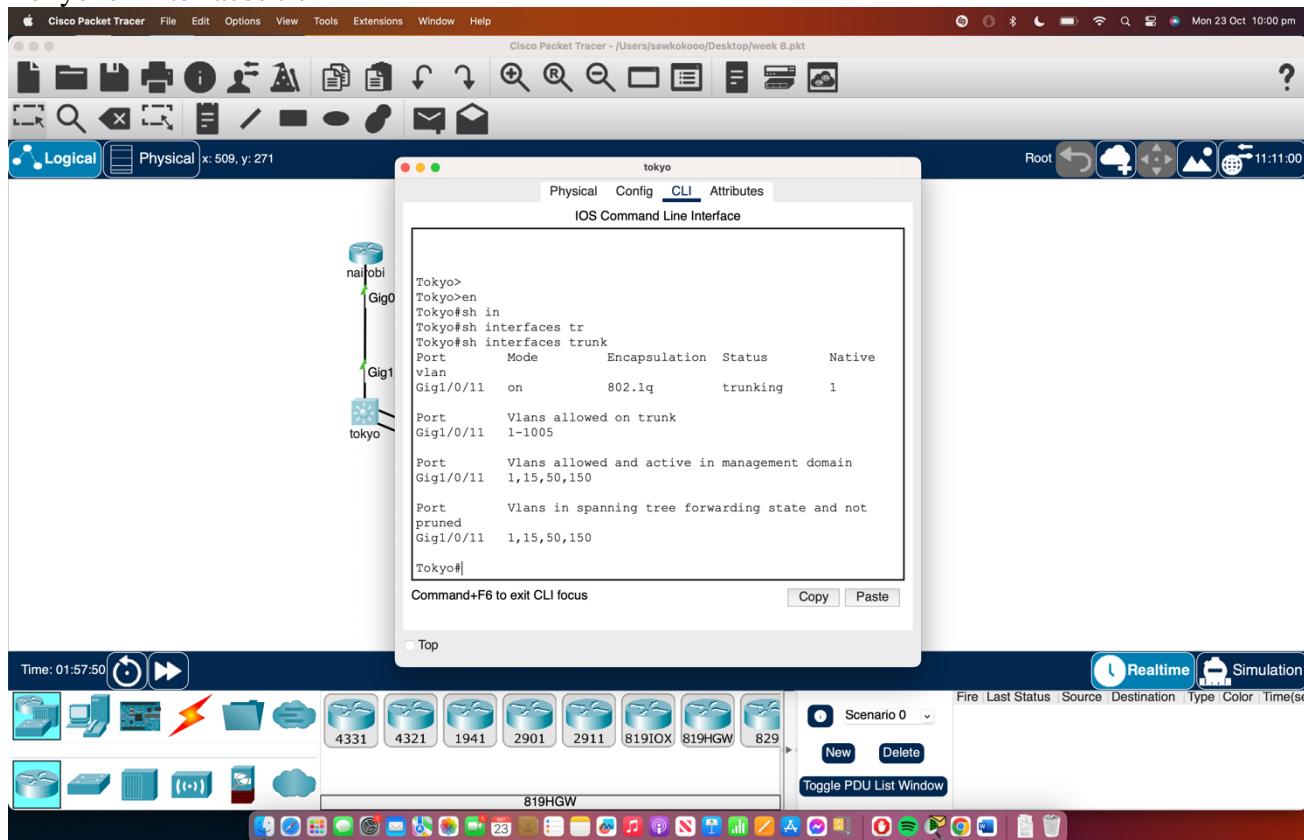
- a) What command(s) can be used on **Nairobi** to validate Router-on-a-Stick configuration? List at least 2. For each command, describe the expected output. (4 marks)

```
Nairobi#sh ip int brief
```



- b) What command(s) can be used on **Tokyo** to validate Router-on-a-Stick configuration? For each command, describe the expected output. (2 marks)

Tokyo#sh interfaces trunk



- c) Troubleshooting Scenario: The routing table on **Nairobi** is not displaying all the correct connected (C) routes and their exit interfaces.

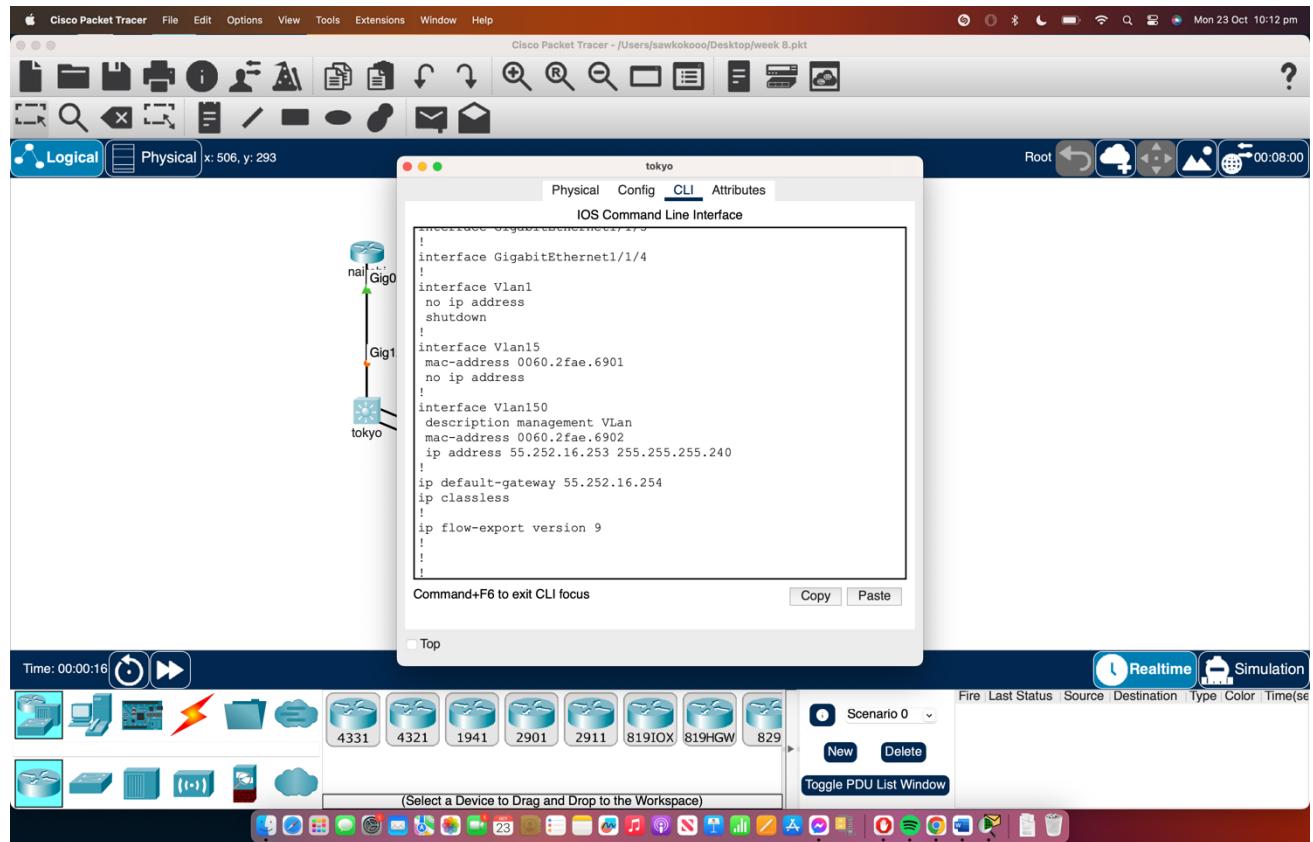
What are the possible configuration issues? List at least 3 possible issues. (3 marks)

1. The port g0/0/1 is shutdown or disconnected
2. no trunking on g1/0/11 in Tokyo
3. Wrong Sub-interfaces configuration

**Q3.** Answer the following questions regarding validating and troubleshooting **Switch Management**

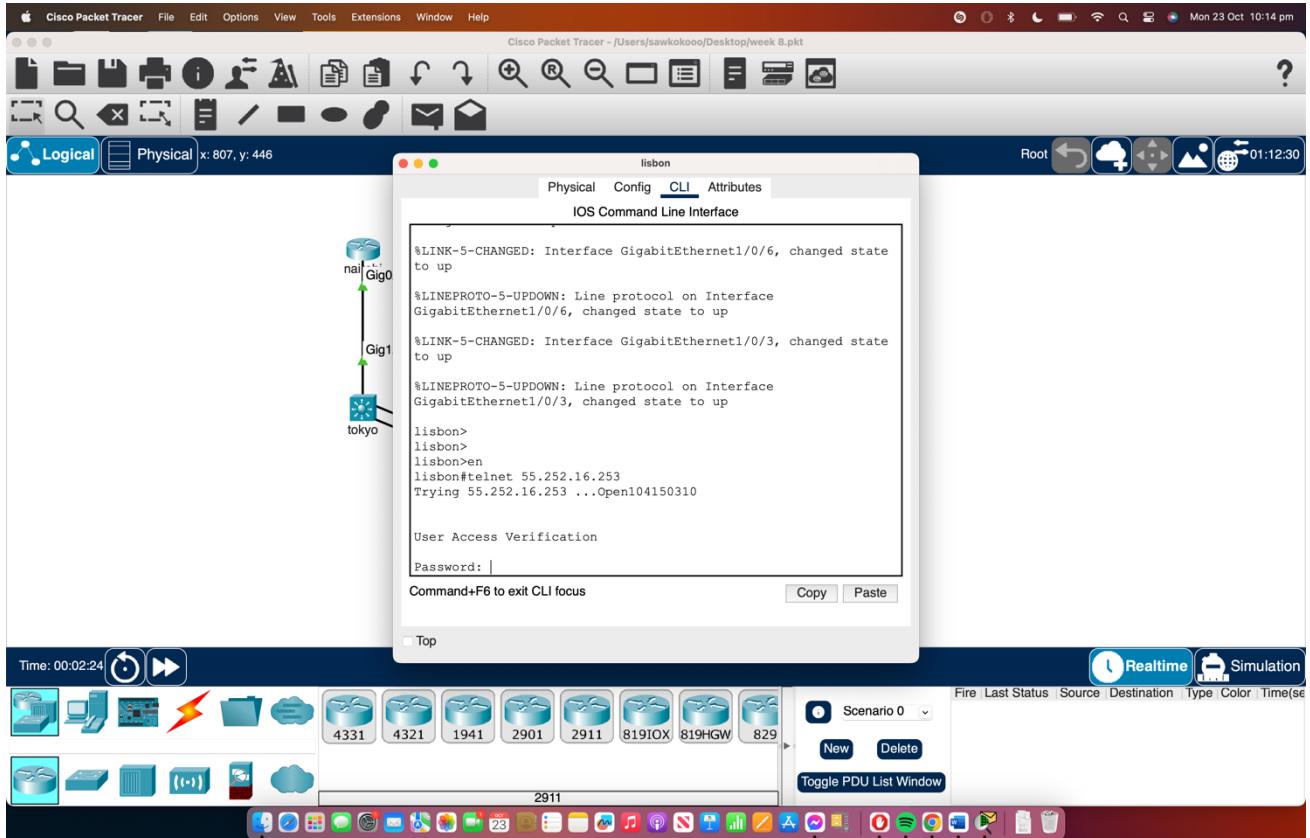
- a) What command(s) can be used on **Tokyo** to validate that the Management IP has been correctly configured? For each command, describe the expected output. (1 mark)

Type “sh run” and find the IP address of management



b) What command(s) can be used on **Tokyo** to test SSH access to **Lisbon**? (1 mark)

lisbon#telnet 55.252.16.253



- c) Troubleshooting Scenario: **Tokyo** and **Lisbon** can ping each other. **Tokyo** can ping all IP addresses configured on **Nairobi**. However, **Lisbon** can only ping the IP address configured on **Nairobi's** Management sub-interface; it cannot ping any other router IP.

What is the most likely configuration issue? (2 marks)

VLAN Configuration on Router Nairobi:

Check the VLAN configurations on router Nairobi, especially the subinterfaces associated with each VLAN. Ensure that the subinterfaces have the correct IP addresses and are associated with the appropriate VLAN IDs.

Trunk Configuration on Switches:

Verify that the links between Lisbon (switch) and Nairobi (router) and between Tokyo (switch) and Nairobi (router) are correctly configured as trunk links. Trunk links should allow the VLANs to pass through.

Check the trunk configurations on both switches to ensure that the VLANs are allowed on these trunk links.

Routing Configuration on Router Nairobi:

Examine the routing configuration on router Nairobi. Ensure that it is configured to route traffic between the VLANs and that there are no routing issues.

Check if router Nairobi is running a dynamic routing protocol (e.g., OSPF, EIGRP) and whether it's advertising the correct routes to both switches.

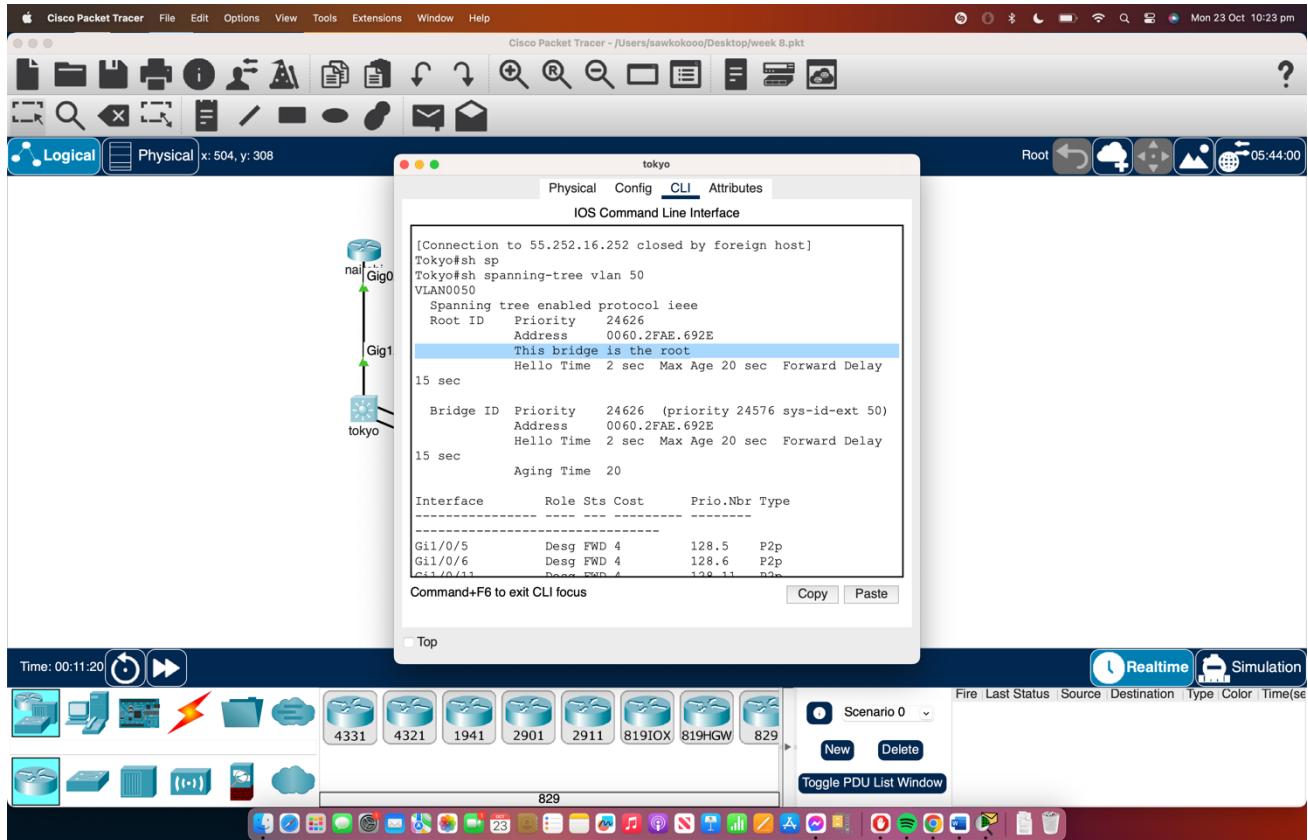
Default Gateway Configuration on Lisbon:

Verify the default gateway configuration on the Lisbon switch. The default gateway should be set to the IP address of the router Nairobi's Management sub-interfaces.

Q4. Answer the following questions regarding validating and troubleshooting **STP, Port-Security and EtherChannel**

- a) Using the **show spanning-tree** command, how do we validate that **Tokyo** has been correctly configured as the root bridge for the Royalmint VLAN? (2 marks)

Tokyo#sh spanning-tree vlan 50



- b) What command can be used on **Lisbon** to validate the current Port-Security status of interface Gi1/0/3? (2 marks)

lisbon#sh port-security interface g1/0/3

- c) If the Port-Channel between **Tokyo** and **Lisbon** has been correctly configured and is fully operational; what should be the status flag(s) next to the Port-Channel interface on the **show etherchannel summary** output? (1 mark)

1 Po1(SU) LACP gi1/0/1(P) gi1/0/2(P) gi1/0/3(P)

- d) If the Port-Channel between **Tokyo** and **Lisbon** has been correctly configured and is fully operational; what should be the status flag(s) next to the member interfaces on the **show etherchannel summary** output? (1 mark)

1 Po1(SU) LACP gi1/0/1(P) gi1/0/2(P) gi1/0/3(P)