

Group Assignment 1 - Group Lab Activity 1

TNE10006/TNE60006 S2 2025

Assignment Weight:

7.5%

Assignment Points:

75

Submission Due Date:

Week 7 Lab session.

Reference Material:

- [Lab SU-5a](#) – Per-Interface Inter-VLAN Routing Configuration
- [Lab SU-5b](#) – Configuring 802.1Q Trunk-Based Inter-VLAN Routing
- [Lab SU-6a](#) – Troubleshooting Inter-VLAN Routing
- [Sample Mid-Sem Skills Exam A](#)

Instructions:

1. Form a group of 3-4 people amongst the students present in the lab session.
2. Discuss and answer the questions in Group Assignment 1 with your group members.
3. Organise for your group to meet as needed to complete all the questions.
4. Each group will submit one completed Group Assignment 1
5. Submit Group Assignment 1, in the Canvas shell, under the Group Lab Activity 1
6. Late penalties will apply for submission after the due date.

Group Assignment 1 Sections:

Section 1: Labs SU-5a and SU-5b Reflection (10 marks)

Section 2: Lab SU-6a Inter-VLAN Routing Troubleshooting (15 marks)

Section 3: Sample Mid-Semester Skills Exam A – Topology Analysis (15 marks)

Section 4: Sample Mid-Semester Skills Exam A – Configuration (20 marks)

Section 5: Sample Mid-Semester Skills Exam A – Troubleshooting (15 marks)

Group Assignment 1 Members Information:

Student Name	Student ID

Section 1: Labs SU-5a and SU-5b Reflection (10 marks)

Q1. Answer the following questions regarding IP settings on layer 2 switches.

- a) On a layer 2 switch, what is the purpose of creating an interface VLAN and allocating an IP address to it?
(1 mark)

- b) On a layer 2 switch, what is the purpose of configuring a default -gateway IP?
(1 mark)

- c) Based on what you learned on labs SU-5a and SU-5b, which IP address should be configured as the default-gateway IP on a layer 2 switch?
(1 mark)

Q2. Answer the following questions regarding inter-VLAN routing configuration.

- a) Explain the benefits of using the **router-on-a-stick** inter-VLAN routing approach instead of configuring per-interface inter-VLAN routing.
(2 marks)

- b) Are there any disadvantages to using **router-on-a-stick** inter-VLAN routing as compared to per-interface routing?
(1 mark)

- c) When configuring a **router-on-a-stick** topology, the link between the switch and the router must carry traffic for multiple VLANs.
How is this achieved on the router?
(1 mark)

How is this achieved on the switch?
(1 mark)

- d) Other than directly connected (C) networks, did you observe other type of networks in the routing table of **R1**? If so, specify the type of networks you observed and what do they represent.
(1 mark)

- e) What was the purpose of configuring a Loopback interface on **R1**?
(1 mark)

Section 2: Lab SU-6a Inter-VLAN Routing Troubleshooting (15 marks)

Q1. Refer to **Lab SU-6a - Part 2 Troubleshoot Inter-VLAN Routing Configuration** and answer the following questions.

- a) Were there any networks missing from the routing table on **R1**? If so, list the missing network(s) specifying network address and subnet mask.
(1.5 marks)

- b) After all relevant **R1** interfaces were enabled, were there any networks still missing from the routing table? If so, list the missing network(s) specifying network address and subnet mask.
(1 mark)

- c) After all relevant **R1** interfaces were enabled, did you observe any incorrect networks on the routing table? If so, list the network(s) specifying network address and subnet mask.
(1 mark)

Q2. Refer to **Lab SU-6a - Part 3 Verify VLAN Configuration and Port Assignments and Trunking** and answer the following questions.

- a) Were there any missing or unnamed VLANs on the VLAN database of **S3**? If so, list them.
(0.5 mark)

- b) Were all access ports on **S3** assigned to the correct VLANs? If not, list the missing or incorrect port assignments.
(0.5 mark)

- c) Were there any missing or unnamed VLANs on the VLAN database of **S4**? If so, list them.
(0.5 mark)

- d) Were all access ports on **S4** assigned to the correct VLANs? If not, list the missing or incorrect port assignments.
(0.5 mark)

- e) Based on **Lab SU-6a** topology diagram, which port(s) on **S3** should operate in switchport mode trunk?
(1 marks)

- f) Based on **Lab SU-6a** topology diagram, which port(s) on **S4** should operate in switchport mode trunk?
(0.5 mark)

Q3. Use the table to list the configuration errors you found in **Lab SU-6a**. For each error, specify the device(s) you found it on, a short description of the error, troubleshooting command(s) that helped you find it, and the configuration command(s) you used to fix it.

(8 marks)

Device(s)	Error Description	Troubleshooting Command(s)	Re-configuration Command(s)
<i>Example: S3</i>	<i>Missing VLAN 100</i>	<i>S3#show vlan brief</i>	<i>S3(config)#vlan 100 S3(config-vlan)#name example</i>

Note: the re-configuration commands must display device name and configuration mode.

Section 3: Sample Mid-Sem Skills Exam A – Topology Analysis (15 marks)

When tasked to build a network end to end, you should first analyse the topology diagram, addressing tables, and other relevant specifications to understand basic network configuration requirements. In this section, you must refer to the information on **Sample Mid-Sem Skills Exam A** and discuss configuration requirements with your group. The questions below will help guide the topology analysis discussion.

Note: the topology analysis group discussion should be carried out before configuring the network.

Q1. Refer to **Sample Mid-Sem Skills Exam A** and answer the following questions regarding VLANs, VLAN membership and 802.1q trunking requirements.

- a) How many VLANs must be configured on **Ecuador**? If any, list the required VLANs specifying VLAN ID and name.
(1 mark)

- b) How many VLANs must be configured on **Peru**? If any, list the required VLANs specifying VLAN ID and name.
(1 mark)

- c) How many access ports must be configured on **Ecuador**? If any, list the required access ports specifying port ID and VLAN membership.
(1 mark)

- d) How many access ports must be configured on **Peru**? If any, list the required access ports specifying port ID and VLAN membership.
(1 mark)

- e) How many 802.1q trunks must be configured on **Ecuador**? If any, list the required trunks specifying port ID and switchport mode.
(2 marks)

- f) How many 802.1q trunks must be configured on **Peru**? If any, list the required trunks specifying port ID and switchport mode.
(1 mark)

Q2. Refer to **Sample Mid-Sem Skills Exam A** and answer the following questions regarding inter-VLAN routing requirements.

- a) How many sub-interfaces, if any, must be configured on **Bolivia**?
(1 mark)

- b) Use the table to list all interfaces and sub-interfaces that must be configured on **Bolivia**. For each, specify interface ID, IP address, subnet mask, and 802.1q ID when applicable.
(3 marks)

Interface ID	IP address	Subnet Mask	802.1q ID
<i>Example: Loopback 10</i>	<i>115.23.10.100</i>	<i>255.255.255.240</i>	<i>Not applicable</i>

Note: you might not need to use all rows.

Q3. Refer to **Sample Mid-Sem Skills Exam A** and answer the following questions regarding switch IP management requirements.

- a) How many VLAN interfaces must be configured on **Ecuador**? If any, list all required VLAN interfaces specifying interface ID, IP address and subnet mask.
(1 mark)

- b) How many VLAN interfaces must be configured on **Peru**? If any, list all required VLAN interfaces specifying interface ID, IP address and subnet mask.
(1 mark)

- c) Must a default-gateway be configured on **Ecuador**? If so, specify the default-gateway IP.
(0.5 mark)

- d) Must a default-gateway be configured on **Peru**? If so, specify the default-gateway IP.
(0.5 mark)

Q4. Refer to **Sample Mid-Sem Skills Exam A** and answer the following questions regarding end-host IP configuration.

- a) What IPv4 settings can be configured on PC-A?
(1 mark)

IP address:
Subnet Mask:
Default Gateway:

Section 4: Sample Mid-Sem Skills Exam A – Configuration (20 marks)

Once you have a good understanding of the topology and configuration requirements, you can move on to build the network. For this, you must use Cisco CLI configuration commands on the switches and routers, as well as verification commands to validate the settings. In this section, you will be asked to specify the CLI commands you used to complete **Sample Mid-Sem Skills Exam A**.

*Note: your answers must show CLI commands that include parameters specific to **Sample Mid-Sem Skills Exam A** (i.e. generic command sets will not be considered correct answers).*

Q1. Refer to **Sample Mid-Sem Skills Exam A** and answer the following questions regarding **global and remote management** configuration.

- a) Use the table to list the command(s) used to configure global settings and remote management on each device.
(4 marks)

Setting	Bolivia	Ecuador	Peru
Device Hostname			
Banner MOTD			
Disable Domain Lookup			
Synchronous Logging			
Disable Unused Ports			
SSH Management			

Note: if a setting is not required on a device, leave the cell blank or type "Not Required".

b) List the commands used to configure interface descriptions on **Bolivia**?
(0.5 mark)

c) What command(s) can be used on **Bolivia** to verify that interface descriptions have been configured as required?
(0.5 mark)

Q2. Refer to **Sample Mid-Sem Skills Exam A** and answer the following questions regarding VLANs, VLAN membership and 802.1q trunking configuration.

a) Use the table to list the commands used on **Ecuador** and **Peru** to configure VLANs and VLAN membership when applicable.
(2 marks)

Switch Name	VLANs Configuration	VLAN Membership Configuration
Example: S3	<code>S3(config)#vlan 100</code> <code>S3(config-vlan)#name example1</code> <code>S3(config)#vlan 200</code> <code>S3(config-vlan)#name example2</code>	Not applicable
Ecuador		
Peru		

Note: if VLANs or VLAN membership configuration is not required on a device, leave the cell blank or type "Not Required".

- b) What command(s) can be used to verify VLANs and VLAN membership configuration on **Ecuador** and **Peru**?
(0.5 mark)

- c) Use the table to list the commands used on **Ecuador** and **Peru** to configure 802.1q trunk interfaces.
(2 marks)

Switch Name	Trunk Interface(s) Configuration
Ecuador	
Peru	

- d) What command(s) can be used to verify 802.1q trunking configuration on **Ecuador** and **Peru**?
(0.5 mark)

Q3. Refer to **Sample Mid-Sem Skills Exam A** and answer the following questions regarding inter-VLAN routing configuration.

- a) Use the table to list the commands used on **Bolivia** to configure interfaces, sub-interfaces and loopback interfaces.
(5 marks)

Interface ID	Interface Configuration
<i>Example: Loopback 100</i>	<i>R1(config)#interface loopback 100 R1(config-if)description THIS IS AN EXAMPLE R1(config-if) ip address 115.23.10.10 255.255.128.0</i>

Note: you might not need to use all rows.

- b) What command(s) can be used to verify Inter-VLAN routing configuration on **Bolivia**?
(1 mark)

Q4. Refer to **Sample Mid-Sem Skills Exam A** and answer the following questions regarding switch management IP settings configuration.

- a) Use the table to list the commands used on **Ecuador** and **Peru** to configure management IP settings.
(2 marks)

Switch Name	Management IP Configuration
Ecuador	
Peru	

- b) What command(s) can be used to verify management IP settings on **Ecuador** and **Peru**?
(0.5 mark)

Q5. Refer to **Sample Mid-Sem Skills Exam A** and answer the following questions regarding switchport port-security configuration.

- a) Use the table to list the command(s) used on **Ecuador** and **Peru** to configure switchport port-security.
(1 mark)

Switch Name	Port-Security Configuration
Ecuador	
Peru	

Note: if port-security is not required on a device, leave the cell blank or type "Not Required".

- b) What command(s) can be used to verify switchport port-security settings on **Ecuador** and **Peru**?
(0.5 mark)

Section 5: Sample Mid-Sem Skills Exam A – Troubleshooting (15 marks)

After building a network, you should validate that the network is fully functional and that it meets all specifications. For this, you can use Cisco CLI **show** commands to validate the settings on switches and routers, as well as **ping** commands to test connectivity from each device to all other devices (including a test PC). This process is known as **troubleshooting** and will allow you to detect and fix configuration errors. In this section, you will find **show** outputs and **ping** results based on **Sample Mid-Sem Skills Exam A**. You must discuss this troubleshooting information with your group to detect configuration errors and specify the commands that must be used to fix them.

Q1. Refer to **Sample Mid-Sem Skills Exam A** and answer the following questions regarding **physical topology** troubleshooting.

- a) Based on the **show ip interface brief** outputs, are all interfaces in the correct status? If not, use the table to list the error(s). For each error, specify the configuration command(s) that must be used to fix it.

(1 mark)

Note: for this question, assume all required cables between the devices are in place.

Bolivia#show ip interface brief

Interface	IP-Address	OK?	Method	Status	Protocol
GigabitEthernet0/0/0	unassigned	YES	unset	administratively down	down
GigabitEthernet0/0/1	unassigned	YES	unset	administratively down	down
Serial0/1/0	unassigned	YES	unset	administratively down	down
Serial0/1/1	unassigned	YES	unset	administratively down	down
GigabitEthernet0	unassigned	YES	unset	administratively down	down

Ecuador#show ip interface brief

Any interface listed with OK? value "NO" does not have a valid configuration

Interface	IP-Address	OK?	Method	Status	Protocol
Vlan1	unassigned	YES	unset	administratively down	down
GigabitEthernet0/0	unassigned	NO	unset	down	down
GigabitEthernet1/0/1	unassigned	YES	unset	down	down
GigabitEthernet1/0/2	unassigned	YES	unset	down	down
GigabitEthernet1/0/3	unassigned	YES	unset	down	down
GigabitEthernet1/0/4	unassigned	YES	unset	down	down
GigabitEthernet1/0/5	unassigned	YES	unset	up	up
GigabitEthernet1/0/6	unassigned	YES	unset	down	down
GigabitEthernet1/0/7	unassigned	YES	unset	down	down
GigabitEthernet1/0/8	unassigned	YES	unset	down	down
GigabitEthernet1/0/9	unassigned	YES	unset	down	down
GigabitEthernet1/0/10	unassigned	YES	unset	down	down
GigabitEthernet1/0/11	unassigned	YES	unset	down	down
GigabitEthernet1/0/12	unassigned	YES	unset	down	down
--More--					

```

Peru#show ip interface brief
Any interface listed with OK? value "NO" does not have a valid configuration

Interface                IP-Address      OK? Method Status              Protocol
Vlan1                    unassigned      YES unset  administratively down down
GigabitEthernet0/0       unassigned      NO  unset  down                down
GigabitEthernet1/0/1     unassigned      YES unset  down                down
GigabitEthernet1/0/2     unassigned      YES unset  down                down
GigabitEthernet1/0/3     unassigned      YES unset  down                down
GigabitEthernet1/0/4     unassigned      YES unset  down                down
GigabitEthernet1/0/5     unassigned      YES unset  up                  up
GigabitEthernet1/0/6     unassigned      YES unset  down                down
GigabitEthernet1/0/7     unassigned      YES unset  up                  up
GigabitEthernet1/0/8     unassigned      YES unset  down                down
GigabitEthernet1/0/9     unassigned      YES unset  down                down
GigabitEthernet1/0/10    unassigned      YES unset  down                down
GigabitEthernet1/0/11    unassigned      YES unset  down                down
GigabitEthernet1/0/12    unassigned      YES unset  down                down
--More--

```

Error Description	Re-configuration Command(s)

Note: you might not need to use all rows.

Q2. Refer to **Sample Mid-Sem Skills Exam A** and answer the following questions regarding **VLANs and VLAN membership** troubleshooting.

- a) Based on the **show vlan brief** output, is the VLANs and VLAN membership configuration correct on **Ecuador**? If not, use the table to list the error(s). For each error, specify the configuration command(s) that must be used to fix it.

(1 mark)

Ecuador#show vlan brief		
VLAN Name	Status	Ports
1 default	active	Gi1/0/1, Gi1/0/2, Gi1/0/3 Gi1/0/4, Gi1/0/5, Gi1/0/6, Gi1/0/7, Gi1/0/8, Gi1/0/9, Gi1/0/10, Gi1/0/11, Gi1/0/12 Gi1/0/13, Gi1/0/14, Gi1/0/15 Gi1/0/16, Gi1/0/17, Gi1/0/18 Gi1/0/19, Gi1/0/20, Gi1/0/21 Gi1/0/22, Gi1/0/23, Gi1/0/24 Gi1/1/1, Gi1/1/2, Gi1/1/3, Gi1/1/4
10 Management	active	
1002 fddi-default	act/unsup	
1003 token-ring-default	act/unsup	
1004 fddinet-default	act/unsup	
1005 trnet-default	act/unsup	

Error Description	Re-configuration Command(s)

Note: you might not need to use all rows.

Note: the re-configuration commands must display device name and configuration mode.

- b) Based on the **show vlan brief** output, is the VLANs and VLAN membership configuration correct on **Peru**? If not, use the table to list the error(s). For each error, specify the configuration command(s) that must be used to fix it.
(2 marks)

Peru#show vlan brief		
VLAN Name	Status	Ports
-----	-----	-----
1 default	active	Gi1/0/1, Gi1/0/2, Gi1/0/3 Gi1/0/4, Gi1/0/5, Gi1/0/6 Gi1/0/8, Gi1/0/9, Gi1/0/10 Gi1/0/11, Gi1/0/12, Gi1/0/13 Gi1/0/14, Gi1/0/15, Gi1/0/16 Gi1/0/17, Gi1/0/18, Gi1/0/19 Gi1/0/20, Gi1/0/21, Gi1/0/22 Gi1/0/23, Gi1/0/24, Gi1/1/1 Gi1/1/2, Gi1/1/3, Gi1/1/4
165 Andes	active	Gi1/0/7
10 Management	active	
1002 fddi-default	act/unsup	
1003 token-ring-default	act/unsup	
1004 fddinet-default	act/unsup	
1005 trnet-default	act/unsup	

Error Description	Re-configuration Command(s)

Note: you might not need to use all rows.

Note: the re-configuration commands must display device name and configuration mode.

Q3. Refer to **Sample Mid-Sem Skills Exam A** and answer the following questions regarding **802.1q trunking** troubleshooting.

- a) Based on the **show interfaces trunk** output, is 802.1q trunking configured following best practices on **Peru**? If not, use the table to list the error(s). For each error, specify the configuration command(s) that must be used to fix it.
(2 marks)

Peru#show interfaces trunk				
Port	Mode	Encapsulation	Status	Native vlan
Gi1/0/5	desirable	802.1q	trunking	1
Port	Vlans allowed on trunk			
Gi1/0/5	1-4094			
Port	Vlans allowed and active in management domain			
Gi1/0/5	1,10,165			
Port	Vlans in spanning tree forwarding state and not pruned			
Gi1/0/5	1,10,165			

Error Description	Re-configuration Command(s)

Note: you might not need to use all rows.

Note: the re-configuration commands must display device name and configuration mode.

- b) Based on the **show interfaces trunk** output, is 802.1q trunking correctly configured on **Ecuador**? If not, use the table to list the error(s). For each error, specify the configuration command(s) that must be used to fix it.

(2 marks)

Note: assume all required interfaces, on all devices, are enabled and in the up/up status.

Ecuador#show interfaces trunk				
Port	Mode	Encapsulation	Status	Native vlan
Gi1/0/5	on	802.1q	trunking	1
Port	Vlans allowed on trunk			
Gi1/0/5	1-4094			
Port	Vlans allowed and active in management domain			
Gi1/0/5	1,10,165			
Port	Vlans in spanning tree forwarding state and not pruned			
Gi1/0/5	1,10,165			

Error Description	Re-configuration Command(s)

Note: you might not need to use all rows.

Note: the re-configuration commands must display device name and configuration mode.

Q4. Refer to **Sample Mid-Sem Skills Exam A** and answer the following questions regarding **inter-VLAN routing** troubleshooting.

- a) Based on the **show ip route** and **sh running-config** outputs, are all router interfaces, sub-interfaces and loopback interfaces configured correctly? If not, use the table to list the error(s). For each error, specify the configuration command(s) that must be used to fix it. (3 marks)

```
Bolivia#sh ip route
Codes: L - local, C - connected, S - static, R - RIP, M - mobile, B - BGP
       D - EIGRP, EX - EIGRP external, O - OSPF, IA - OSPF inter area
       N1 - OSPF NSSA external type 1, N2 - OSPF NSSA external type 2
       E1 - OSPF external type 1, E2 - OSPF external type 2, E - EGP
       i - IS-IS, L1 - IS-IS level-1, L2 - IS-IS level-2, ia - IS-IS inter area
       * - candidate default, U - per-user static route, o - ODR
       P - periodic downloaded static route

Gateway of last resort is not set

    48.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       48.123.64.0/18 is directly connected, GigabitEthernet0/0/1.165
L       48.123.64.2/32 is directly connected, GigabitEthernet0/0/1.165
    113.0.0.0/8 is variably subnetted, 2 subnets, 2 masks
C       113.50.24.112/29 is directly connected, Loopback0
L       113.50.24.118/32 is directly connected, Loopback0
    217.5.25.0/24 is variably subnetted, 2 subnets, 2 masks
C       217.5.25.240/28 is directly connected, GigabitEthernet0/0/1.10
L       217.5.25.242/32 is directly connected, GigabitEthernet0/0/1.10
```

```
Bolivia#sh running-config | section interface
interface Loopback0
  description INTERNET-SIMULATION
  ip address 113.50.24.118 255.255.255.248
interface GigabitEthernet0/0/0
  no ip address
  shutdown
  negotiation auto
interface GigabitEthernet0/0/1
  description TO-ECUADOR-TRUNK
  no ip address
  negotiation auto
interface GigabitEthernet0/0/1.10
  description TO-MANAGEMENT-VLAN
  encapsulation dot1Q 100
  ip address 217.5.25.242 255.255.255.240
interface GigabitEthernet0/0/1.165
  description TO-ANDES-VLAN
  encapsulation dot1Q 165
  ip address 48.123.64.2 255.255.192.0
--More--
```

Error Description	Re-configuration Command(s)

Note: you might not need to use all rows.

Note: the re-configuration commands must display device name and configuration mode.

Q5. Refer to **Sample Mid-Sem Skills Exam A** and answer the following questions regarding **switch management IP settings** troubleshooting.

- a) Based on the **show ip interface brief** output, is the VLAN interfaces configuration correct on **Ecuador**? If not, use the table to list the error(s). For each error, specify the configuration command(s) that must be used to fix it.

(1 mark)

```
Ecuador#show ip interface brief
Any interface listed with OK? value "NO" does not have a valid configuration

Interface          IP-Address      OK? Method Status          Protocol
Vlan1               unassigned     YES unset  administratively down  down
Vlan10              217.5.25.254   YES manual up              up
Vlan165             45.123.127.254 YES manual up              up
GigabitEthernet0/0  unassigned     NO  unset  down            down
GigabitEthernet1/0/1 unassigned     YES unset  down            down
GigabitEthernet1/0/2 unassigned     YES unset  down            down
GigabitEthernet1/0/3 unassigned     YES unset  down            down
GigabitEthernet1/0/4 unassigned     YES unset  down            down
GigabitEthernet1/0/5 unassigned     YES unset  up              up
GigabitEthernet1/0/6 unassigned     YES unset  down            down
GigabitEthernet1/0/7 unassigned     YES unset  down            down
GigabitEthernet1/0/8 unassigned     YES unset  down            down
GigabitEthernet1/0/9 unassigned     YES unset  down            down
GigabitEthernet1/0/10 unassigned     YES unset  down            down
GigabitEthernet1/0/11 unassigned     YES unset  up              up
GigabitEthernet1/0/12 unassigned     YES unset  down            down
--More--
```


Error Description	Re-configuration Command(s)

Note: you might not need to use all rows.

Note: the re-configuration commands must display device name and configuration mode.

Q6. When running **ping** tests from **Peru**, this switch can ping **Ecuador** and the Management IP configured on **Bolivia**. However, **Peru** cannot ping any other IP on **Bolivia** nor the IP of **PC-A**.

a) What is the most likely configuration error causing the connectivity issue described?
(2 marks)

b) What commands must be used on **Peru** to fix this error?
(1 mark)