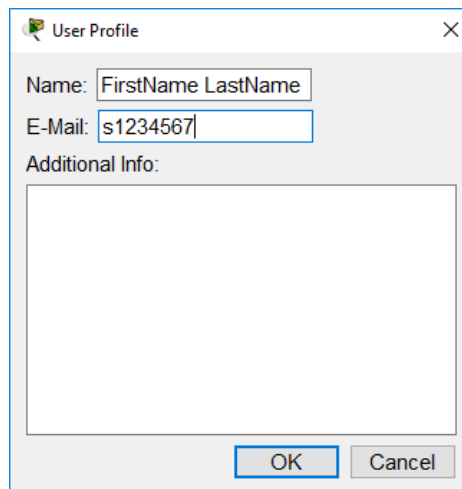


3808ICT Routing and Internetworking – Assignment

(Due Date: 11:59pm, Friday 12 May 2023)

Instructions

1. This is an individual assignment.
2. You must use Packet Tracer v8.2.0 or higher to complete this assignment.
3. The assignment must be completed on the provided Packet Tracer .pka file only. Do not create your own Packet Tracer file as that will not be able to be marked.
4. Please rename your Packet Tracer file to
FirstName_LastName_sNumber_Assignment.pka
5. Open the Packet Tracer file. When the file is first opened, you will need to enter your name and your student ID in the User Profile box, before you can proceed. **Please enter your student ID in the "E-mail" textbox, instead of your email address.**
6. The details in the User Profile box will be used to identify you as the student who completed the assignment on the Packet Tracer file.
7. **Important:** If you do not put your name and student number in the User Profile box, the assignment mark will not be able to be attributed to you.

A screenshot of the 'User Profile' dialog box in Packet Tracer. The dialog has a title bar with a close button. It contains three input fields: 'Name' with the placeholder text 'FirstName LastName', 'E-Mail' with the placeholder text 's1234567', and 'Additional Info' which is a large empty text area. At the bottom right are 'OK' and 'Cancel' buttons.

User Profile

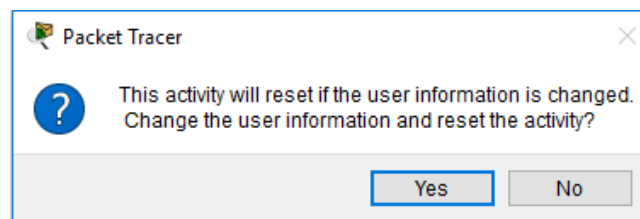
Name:

E-Mail:

Additional Info:

OK Cancel

8. After you clicked OK, a confirmation box will pop-up. Click Yes.

A screenshot of a confirmation dialog box titled 'Packet Tracer'. It features a blue circular icon with a white question mark. The text inside reads: 'This activity will reset if the user information is changed. Change the user information and reset the activity?'. At the bottom are 'Yes' and 'No' buttons.

Packet Tracer

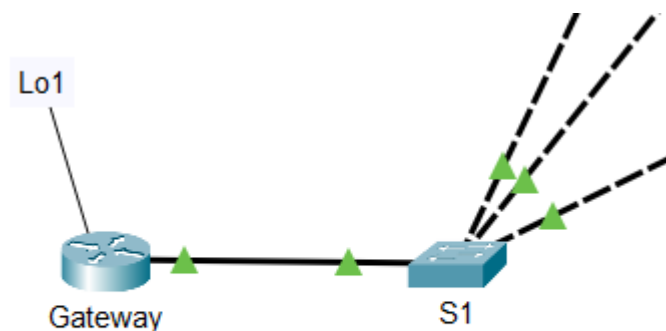
?

This activity will reset if the user information is changed.
Change the user information and reset the activity?

Yes No

9. Once you save your details in the User Profile box, please do not edit it anymore. Any new edits to the User Profile box will reset the whole Packet Tracer file back to a blank template file.
10. **Important:** When you create the network topology for the assignment, you must enter the correct name for the devices as shown in the network topology. For example, the router Gateway must be labelled as “Gateway” as shown below.

If you make a labelling mistake when creating the network topology, for example labelling the router as “Router0”, “gateway” or “gw”, then your work will be marked as incorrect.



11. **Important:** You must use the 2911 router and the 2960 switch in this assignment.

Marking Scheme

No.		Marks
1	Basic device settings configured correctly – Task 1	15
2	Network interface addresses configured correctly – Task 2	40
3	Switches settings configured correctly – Task 3	294
4	Inter-VLAN settings configured correctly – Task 4	61
5	Network connectivity tests – Task 5	100
Total Marks		510

Note: The total marks will be scaled back to 100%

Task Description

Topology

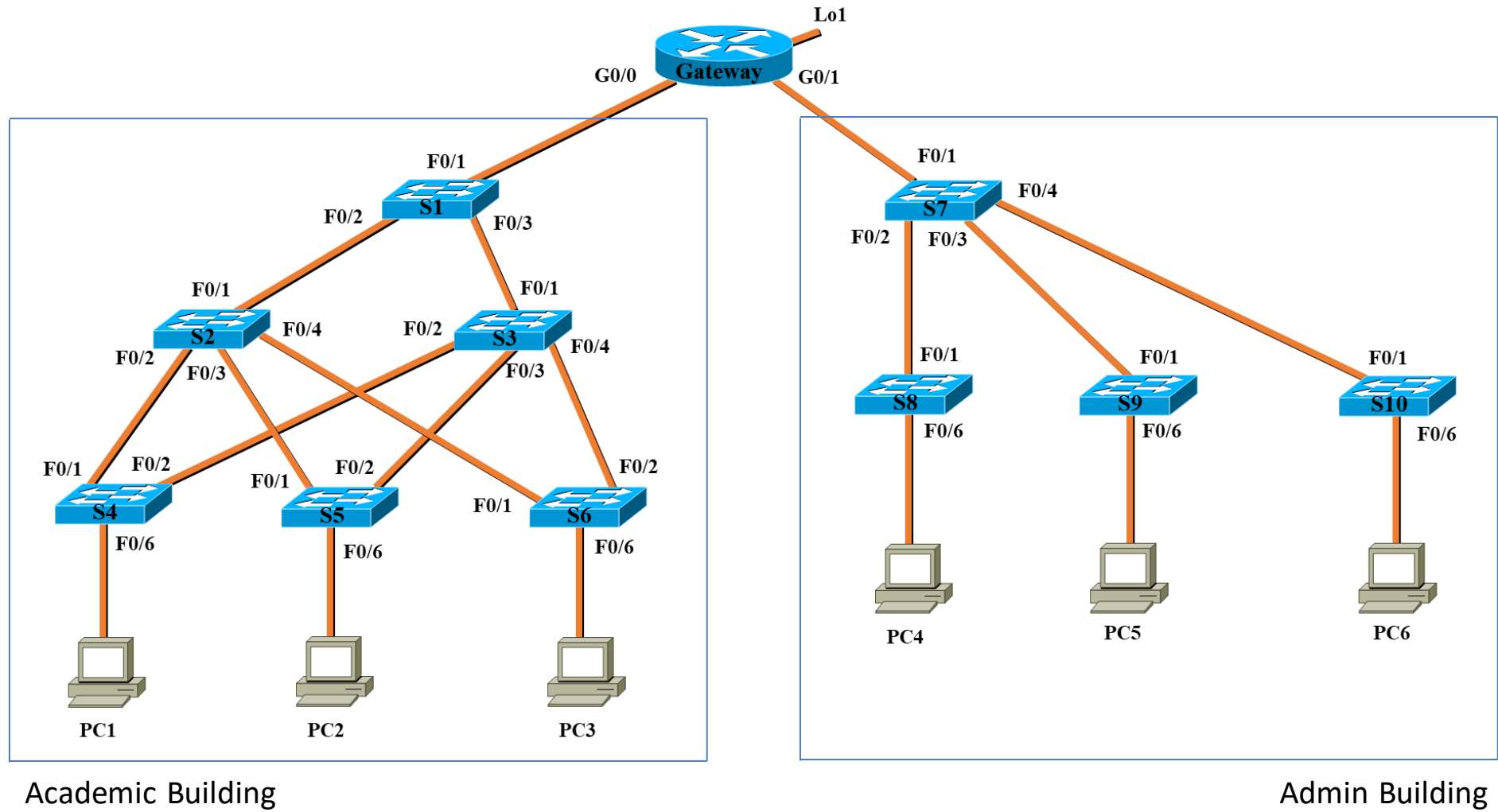


Figure 1 Network Topology

You are the network engineer for a small college. You have been asked to design and setup the network infrastructure in their two Admin and Academic buildings. Based on their business requirements, you have produced the following technical design:

1. A network topology diagram as shown in Figure 1 above.

2. VLAN Table

VLAN	Name	Devices
10	ICT	S4: F0/6
20	Business	S5: F0/6
30	Law	S6: F0/6
40	HR	S8: F0/6
50	Marketing	S9: F0/6
60	Finance	S10: F0/6
99	Academic_Manage	S1: VLAN 99 S2: VLAN 99 S3: VLAN 99 S4: VLAN 99 S5: VLAN 99 S6: VLAN 99
100	Admin_Manage	S7: VLAN 100 S8: VLAN 100 S9: VLAN 100 S10: VLAN 100
555	Parking_Lot	All unused ports in all switches
1000	Native	N/A

3. The Internet Service Provider (ISP) for the college has allocated the 172.50.20.0/22 network address to the college. You have decided to create multiple subnets out of the 172.50.20.0/22 network address space to meet the following requirements, while conserving as many addresses as possible for future use:

- The VLAN 10 network requires 150 host IP addresses
- The VLAN 20 network requires 200 host IP addresses
- The VLAN 30 network requires 100 host IP addresses
- The VLAN 40 network requires 20 host IP addresses
- The VLAN 50 network requires 50 host IP addresses
- The VLAN 60 network requires 18 host IP addresses
- The VLAN 99 network requires 14 host IP addresses
- The VLAN 100 network requires 10 host IP addresses

4. The Gateway addresses will be assigned the first available host address in each subnet that is created. The remaining devices' IP addresses will be assigned as follows:

Device	IP Address
PC1	The 2 nd available host address in the VLAN 10 network
PC2	The 2 nd available host address in the VLAN 20 network
PC3	The 2 nd available host address in the VLAN 30 network
PC4	The 2 nd available host address in the VLAN 40 network
PC5	The 2 nd available host address in the VLAN 50 network
PC6	The 2 nd available host address in the VLAN 60 network
S1 VLAN 99	The 2 nd available host address in the VLAN 99 network
S2 VLAN 99	The 3 rd available host address in the VLAN 99 network
S3 VLAN 99	The 4 th available host address in the VLAN 99 network
S4 VLAN 99	The 5 th available host address in the VLAN 99 network
S5 VLAN 99	The 6 th available host address in the VLAN 99 network
S6 VLAN 99	The 7 th available host address in the VLAN 99 network
S7 VLAN 100	The 2 nd available host address in the VLAN 100 network
S8 VLAN 100	The 3 rd available host address in the VLAN 100 network
S9 VLAN 100	The 4 th available host address in the VLAN 100 network
S10 VLAN 100	The 5 th available host address in the VLAN 100 network

5. You have also assigned the IPv6 addresses as shown below in the Addressing Table.
Note that the “?”s (question marks) represent the IPv4 addresses that you calculated in Steps #3 and #4 above. You have also decided not to assign IPv6 addresses to the VLAN 99 and VLAN 100 networks.

Addressing Table

Device	Interface	IP Address / Prefix	Default Gateway
Gateway	G0/0.10	?	N/A
		2001:DB8:ACAD:10::1 /64	
		FE80::1	
	G0/0.20	?	
		2001:DB8:ACAD:20::1 /64	
		FE80::1	
	G0/0.30	?	
		2001:DB8:ACAD:30::1 /64	
		FE80::1	
	G0/0.99	?	
	G0/0.1000	N/A	
	G0/1.40	?	
		2001:DB8:ACAD:40::1 /64	
		FE80::1	
	G0/1.50	?	
		2001:DB8:ACAD:50::1 /64	
		FE80::1	
	G0/1.60	?	
		2001:DB8:ACAD:60::1 /64	
		FE80::1	
	G0/1.100	?	
	G0/1.1000	N/A	
	Lo1 (representing the Internet)	50.50.50.50 /24	
		2001:DB8:CAFE::50 /64	
S1	VLAN 99	?	?
S2	VLAN 99	?	?

Device	Interface	IP Address / Prefix	Default Gateway
S3	VLAN 99	?	?
S4	VLAN 99	?	?
S5	VLAN 99	?	?
S6	VLAN 99	?	?
S7	VLAN 100	?	?
S8	VLAN 100	?	?
S9	VLAN 100	?	?
S10	VLAN 100	?	?
PC1	NIC	?	?
		2001:DB8:ACAD:10::2 /64	FE80::1
PC2	NIC	?	?
		2001:DB8:ACAD:20::2 /64	FE80::1
PC3	NIC	?	?
		2001:DB8:ACAD:30::2 /64	FE80::1
PC4	NIC	?	?
		2001:DB8:ACAD:40::2 /64	FE80::1
PC5	NIC	?	?
		2001:DB8:ACAD:50::2 /64	FE80::1
PC6	NIC	?	?
		2001:DB8:ACAD:60::2 /64	FE80::1

Based on the information in the technical design above, you will implement the following Tasks in this assignment.

Task 1: Perform Basic Device Configurations (15 marks)

Step 1: Set up a network that is similar to the one in the topology diagram in Figure 1.

Step 2: Configure the router and switches according to the following guidelines. Use **cisco** for all passwords in this assignment, except for the enable secret password, which is **class**.

- Configure the device hostname.
- Disable DNS lookup.
- Configure an EXEC mode password.
- Configure a password for the console line and enable login.
- Configure logging synchronous for the console and vty lines.
- Encrypt the plaintext passwords.
- Create a banner that warns anyone accessing the device that unauthorized access is prohibited.
- Configure SSH access on the router and switches. Use username **admin** and password **cisco**. Use **cisco.com** as the domain name.

Task 2: Configure Network Interface Addresses (40 marks)

Step 1: Configure the network interfaces addresses according to the Addressing Table.

Task 3: Configure Switches (294 marks)

Step 1: Configure the relevant VLANs, access and trunk ports on the switches. Assign all unused ports on the switches to the Parking_Lot VLAN and administratively deactivate them.

Step 2: Configure Management IPv4 addresses on the switches.

Step 3: Configure S1 as the Root Bridge for the switched network in the Academic Building.

Step 4: Configure S7 as the Root Bridge for the switched network in the Admin Building.

Step 5: Configure PortFast and enable BPDU guard on the appropriate ports on the switches.

Task 4: Configure Inter-VLAN Routing (61 marks)

Step 1: Configure inter-VLAN routing (IPv4 and IPv6) on the respective devices in the network topology.

Task 5: Network Connectivity Tests (100 marks)

Verify network connectivity with the following tests:

- The end devices in VLANs 10, 20, 30, 40, 50 and 60 can ping each other on IPv4 and IPv6
- The end devices in VLANs 10, 20, 30, 40, 50 and 60 can ping Gateway's Lo1 interface on IPv4 and IPv6
- The end devices in VLANs 10, 20, 30, 40, 50 and 60 can SSH to all of the switches and the router on IPv4