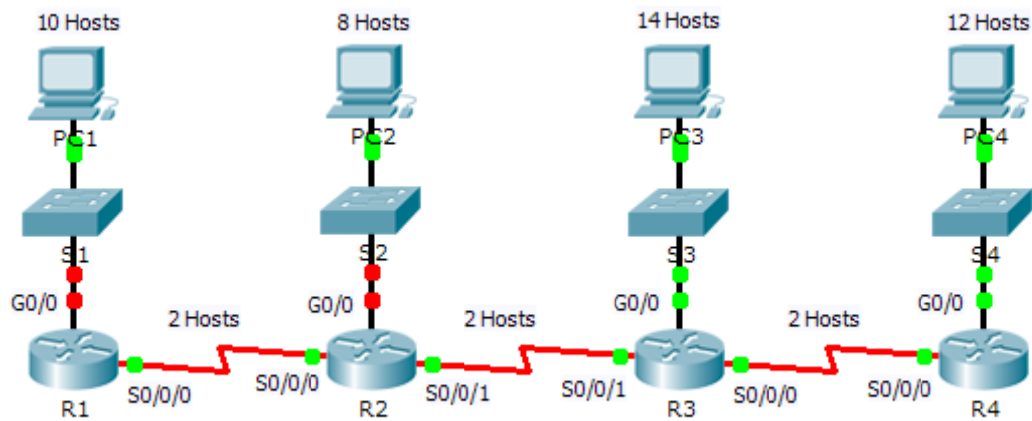


## Packet Tracer - Subnet Scenario 2

### Topology



## Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/0			N/A
	S0/0/0			N/A
R2	G0/0			N/A
	S0/0/0			N/A
	S0/0/1			N/A
R3	G0/0			N/A
	S0/0/0			N/A
	S0/0/1			N/A
R4	G0/0			N/A
	S0/0/0			N/A
S1	VLAN 1			
S2	VLAN 1			
S3	VLAN 1			
S4	VLAN 1			
PC1	NIC			
PC2	NIC			
PC3	NIC			
PC4	NIC			

## Objectives

**Part 1: Design an IP Addressing Scheme**

**Part 2: Assign IP Addresses to Network Devices and Verify Connectivity**

## Scenario

In this activity, you are given the network address of 172.31.1.0 /24 to subnet and provide the IP addressing for the network shown in the Topology. The required host addresses for each WAN and LAN link are labeled in the topology.

## Part 1: Design an IP Addressing Scheme

**Step 1: Subnet the 172.31.1.0/24 network based on the maximum number of hosts required by the largest subnet.**

- Based on the topology, how many subnets are needed?
- How many bits must be borrowed to support the number of subnets in the topology table?

- c. How many subnets does this create?
- d. How many usable host addresses does this create per subnet?

**Note:** If your answer is less than the 14 maximum hosts required for the R3 LAN, then you borrowed too many bits.

- e. Calculate the binary value for the first five subnets. Subnet zero is already shown.

Net 0: 172 . 31 . 1 . 0 0 0 0 0 0 0 0

Net 1: 172 . 31 . 1 . \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_

Net 2: 172 . 31 . 1 . \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_

Net 3: 172 . 31 . 1 . \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_

Net 4: 172 . 31 . 1 . \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_

- f. Calculate the binary and decimal value of the new subnet mask.

11111111.11111111.11111111. \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_ \_\_\_\_

255 . 255 . 255 . \_\_\_\_\_

- g. Complete the **Subnet Table**, listing all available subnets, the first and last usable host address, and the broadcast address. The first subnet is done for you. Repeat until all addresses are listed.

**Note:** You may not need to use all rows.

## Subnet Table

Subnet Number	Subnet IP	First Usable Host IP	Last Usable Host IP	Broadcast Address
0	172.31.1.0	172.31.1.1	172.31.1.14	172.16.1.15
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

### Step 2: Assign the subnets to the network shown in the topology.

When assigning the subnets, keep in mind that routing is necessary to allow information to be sent throughout the network.

- a. Assign Subnet 0 to the R1 LAN:
- b. Assign Subnet 1 to the R2 LAN:
- c. Assign Subnet 2 to the R3 LAN:
- d. Assign Subnet 3 to the R4 LAN:
- e. Assign Subnet 4 to the link between
- f. Assign Subnet 5 to the link between
- g. Assign Subnet 6 to the link between

### Step 3: Document the addressing scheme.

Complete the **Addressing Table** using the following guidelines:

- a. Assign the first usable IP addresses to routers for each of the LAN links.
- b. Use the following method to assign WAN link IP addresses:

- For the WAN link between R1 and R2, assign the first usable IP address to R1 and last usable IP address R2.
  - For the WAN link between R2 and R3, assign the first usable IP address to R2 and last usable IP address R3.
  - For the WAN link between R3 and R4, assign the first usable IP address to R3 and last usable IP address R4.
- c. Assign the second usable IP addresses to the switches.
- d. Assign the last usable IP addresses to the hosts.

## Part 2: Assign IP Addresses to Network Devices and Verify Connectivity

Most of the IP addressing is already configured on this network. Implement the following steps to complete the addressing configuration.

**Step 1: Configure IP addressing on R1 and R2 LAN interfaces.**

**Step 2: Configure IP addressing on S3, including the default gateway.**

**Step 3: Configure IP addressing on PC4, including the default gateway.**

**Step 4: Verify connectivity.**

You can only verify connectivity from R1, R2, S3, and PC4. However, you should be able to ping every IP address listed in the **Addressing Table**.

## Suggested Scoring Rubric

Activity Section	Question Location	Possible Points	Earned Points
Part 1: Design an IP Addressing Scheme	Step 1a	1	
	Step 1b	1	
	Step 1c	1	
	Step 1d	1	
	Step 1e	4	
	Step 1f	2	
Complete Subnet Table	Step 1g	10	
Assign Subnets	Step 2	10	
Document Addressing	Step 3	40	
<b>Part 1 Total</b>		<b>70</b>	
<b>Packet Tracer Score</b>		<b>30</b>	
<b>Total Score</b>		<b>100</b>	