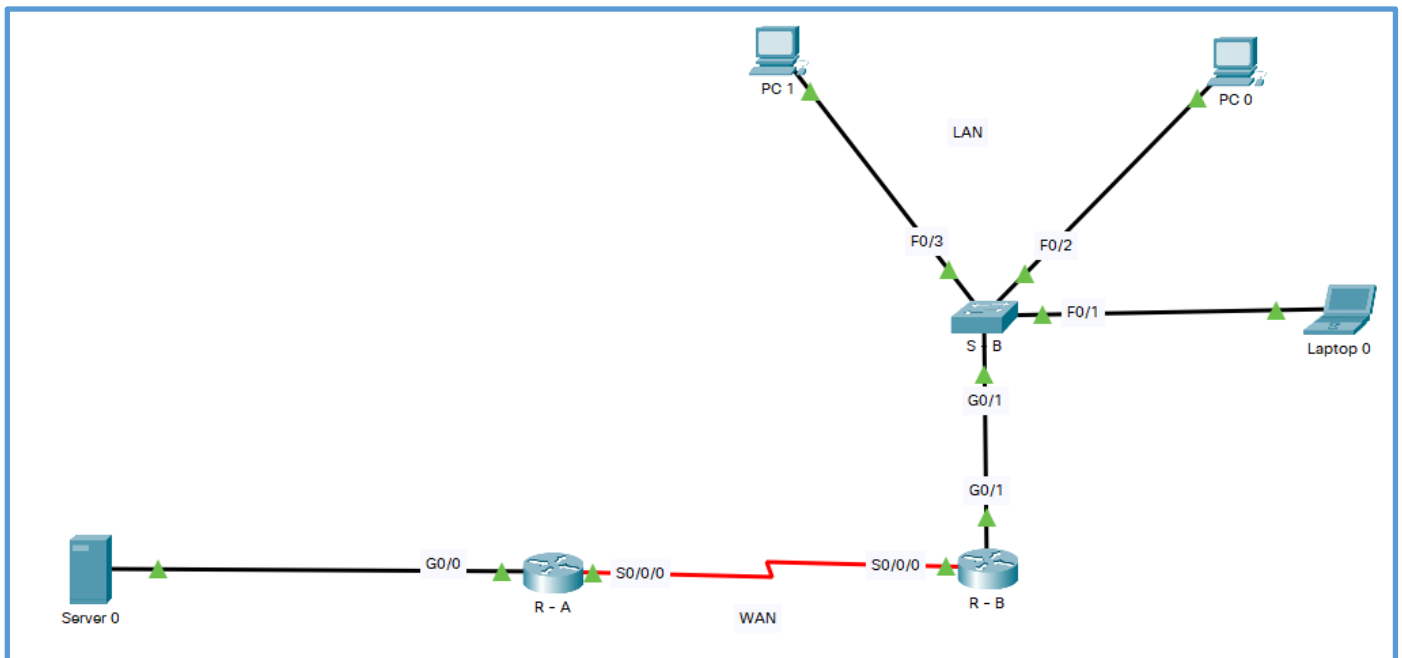


Lab Activity – Subnetting:

1. Please determine the number of subnets based on the host and network requirements. The designing of appropriate addressing scheme is vital.

Scenario 1:

192.168.1.0/24 network address is assigned to you to do subnetting for the topology as illustrated below. Please provide the answers to the questions below, such as the numbers of subnetworks needed and the appropriate design of the IPv4 addressing scheme.



Answer the following questions:

- A. How many subnetworks can be seen as requirements in the figure above?
Answer 3
- B. How many maximum hosts are required in any subnetwork?
Answer 3
- C. How many bits will be borrowed from host's portion to accommodate the required number of subnets?
Answer 2
- D. How many subnetworks will be created by borrowing the bits as mentioned above?
Answer $2^2 = 4$
- E. How many subnetworks will remain unused for future use?
Answer 1 Subnetwork
- F. How many valid host addresses will be available per subnetwork?

Answer 62

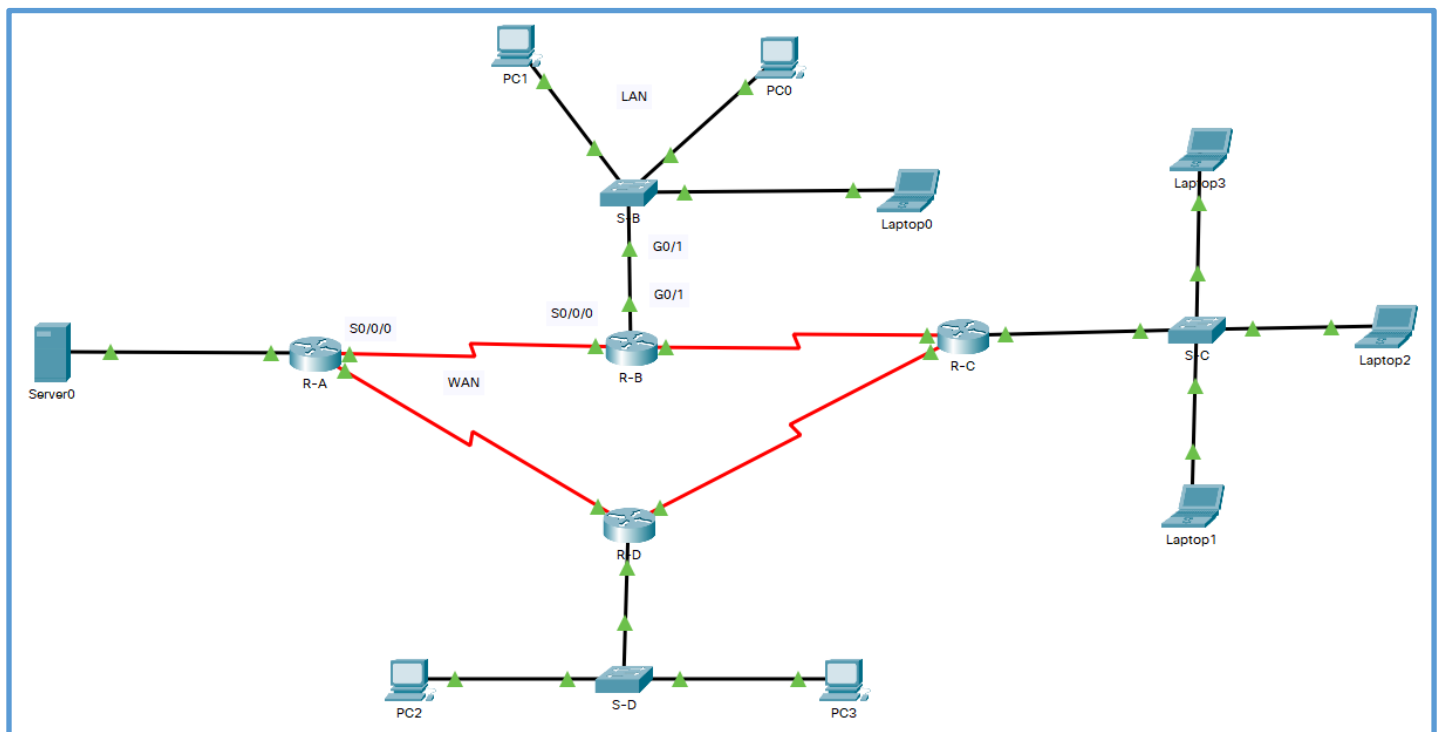
G. After changing the length/CIDR of the original network, what is the new subnet mask? After borrowing 2 bit now it is /26 CIDR

H. Fill in the following table with the subnetwork information.

Subnet Work#	Subnetwork Address	First Valid Host	Last Valid Host	Broadcast Address
1	192.168.1.0/26	192.168.1.1	192.168.1.62	192.168.1.63
2	192.168.1.64/26	192.168.1.65	192.168.1.126	192.168.1.127
3.	192.168.1.128/26	192.168.1.129	192.168.1.190	192.168.1.191
4.	192.168.1.192/26	192.168.1.193	192.168.1.254	192.168.1.255

Scenario 2:

192.168.20.0/24 network address is assigned to you to do subnetting for the topology illustrated below. Please provide the answers to the following questions such as the numbers of subnetworks needed and the appropriate design of IPv4 addressing scheme.



Answer the following questions:

- How many subnetworks can be seen as requirements in the figure illustrated above? Answer 8
- How many maximum hosts are required in any subnetwork? 3

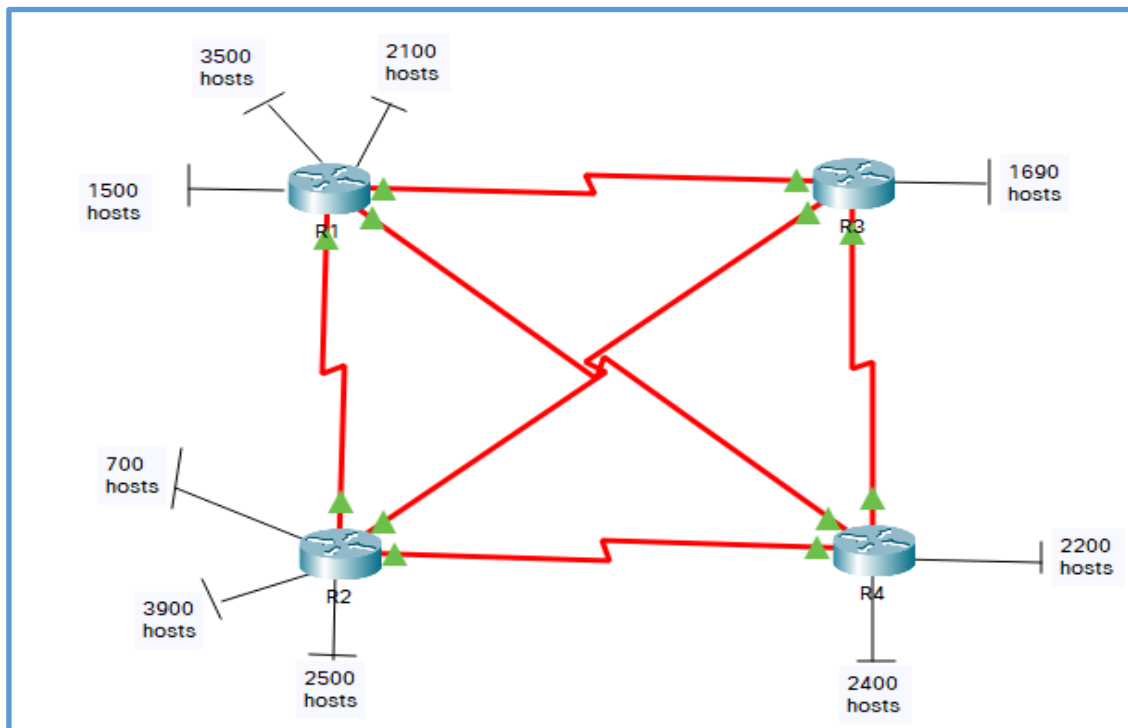
- C. How many bits will be borrowed from the host portion to accommodate the required number of subnets? Ans 3 bits
- D. How many subnetworks will be created by borrowing the bits as mentioned above? Ans $2^3 = 8$
- E. How many subnetworks will remain unused for future use? Ans 0
- F. How many valid host addresses will be available per subnetwork? Ans $2^5 - 2 = 30$
- G. After changing the length/CIDR of the original network, what is the new subnet mask? Ans after borrowing 3 bits 255.255.255.224/27

H. Fill in the following table with the subnetwork information.

Subnet Work #	Subnetwork Address	First Valid Host	Last Valid Host	Broadcast Address
1	192.168.20.0/27	192.168.20.1	192.168.20.30	192.168.20.31
2	192.168.20.32/27	192.168.20.33	192.168.20.62	192.168.20.63
3	192.168.20.64/27	192.168.20.65	192.168.20.94	192.168.20.95
4	192.168.20.96/27	192.168.20.97	192.168.20.126	192.168.20.127
5	192.168.20.128/27	192.168.20.129	192.168.20.158	192.168.20.159
6	192.168.20.160/27	192.168.20.161	192.168.20.190	192.168.20.191
7	192.168.20.192/27	192.168.20.193	192.168.20.222	192.168.20.223
8	192.168.20.224/27	192.168.20.225	192.168.20.254	192.168.20.255

Scenario 3:

172.16.0.0/16 network address is assigned to you to do subnetting for the topology as illustrated below. Please provide the answers to the following questions, such as the numbers of subnetworks needed and the appropriate design of IPv4 addressing scheme.



Answer the following questions:

- A. How many subnetworks can be seen as requirements in the figure illustrated above? Ans 15
- B. How many maximum hosts are required in any subnetwork? 3900 hosts
- C. How many bits will be borrowed from the host's portion to accommodate the required number of subnets? 4 bits
- D. How many subnetworks will be created by borrowing the bits as mentioned above? Answer 16 subnetwork
- E. How many subnetworks will remain unused for future use? Answer 1
- F. How many valid host addresses will be available per subnetwork?
Answer $2^{16}-2 = 4096-2 = 4094$
- G. After changing the length/CIDR of the original network, what is the new subnet mask? Answer after borrowing 4bits, new subnet mask is 255.255.240.0 /20
- H. Fill in the following table with the subnetwork's information.

Subnet Work #	Subnetwork Address	First Valid Host	Last Valid Host	Broadcast Address
1	172.16.0.0/20	172.16.0.1	172.16.15.254	172.16.15.255
2	172.16.16.0/20	172.16.16.1	172.16.31.254	172.16.31.255
3	172.16.32.0/20	172.16.32.1	172.16.47.254	172.16.47.255
4	172.16.48.0/20	172.16.48.1	172.16.63.254	172.16.63.255
5	172.16.64.0/20	172.16.64.1	172.16.79.254	172.16.79.255
6	172.16.80.0/20	172.16.80.1	172.16.95.254	172.16.95.255
7	172.16.96.0/20	172.16.96.1	172.16.111.254	172.16.111.255
8	172.16.112.0/20	172.16.112.1	172.16.127.254	172.16.127.255
9	172.16.128.0/20	172.16.128.1	172.16.143.254	172.16.143.255
10	172.16.144.0/20	172.16.144.1	172.16.159.254	172.16.159.255
11	172.16.160.0/20	172.16.160.1	172.16.175.254	172.16.175.255
12	172.16.176.0/20	172.16.176.1	172.16.191.254	172.16.191.255
13	172.16.192.0/20	172.16.192.1	172.16.207.254	172.16.207.255
14	172.16.208.0/20	172.16.208.1	172.16.223.254	172.16.223.255
15	172.16.224.0/20	172.16.224.1	172.16.239.254	172.16.239.255
16	172.16.240.0/20	172.16.240.1	172.16.255.254	172.16.255.255