Instructions

Part 1: Subnet the Assigned Network

Step 1: Create a subnetting scheme that meets the required number of subnets and required number of host addresses.

In this scenario, you are a network technician assigned to install a new network for a customer. You must create multiple subnets out of the 192.168.0.0/24 network address space to meet the following requirements:

a. The first subnet is the LAN-A network. You need a minimum of 50 host IP addresses.

b. The second subnet is the LAN-B network. You need a minimum of 40 host IP addresses.

c. You also need at least two additional unused subnets for future network expansion.

Note: Variable length subnet masks will not be used. All of the device subnet masks should be the same length.

d. Answer the following questions to help create a subnetting scheme that meets the stated network requirements:

How many host addresses are needed in the largest required subnet?
64 host addresses, with 62 usable

What is the minimum number of subnets required?
4 subnets (2 bits borrowed, 6 left for the host portion)

The network that you are tasked to subnet is 192.168.0.0/24. What is the /24 subnet mask in binary?
255.255.255.0

e. The subnet mask is made up of two portions, the network portion, and the host portion. This is represented in the binary by the ones and the zeros in the subnet mask.

In the network mask, what do the ones represent?
Fixed bits - which the network the device belongs to

In the network mask, what do the zeros represent?
Variable bits - specific device within that network

f. To subnet a network, bits from the host portion of the original network mask are changed into subnet bits. The number of subnet bits defines the number of subnets.

Given each of the possible subnet masks depicted in the following binary format, how many subnets and how many hosts are created in each example?

Hint: Remember that the number of host bits (to the power of 2) defines the number of hosts per subnet (minus 2), and the number of subnet bits (to the power of two) defines the number of subnets. The subnet bits (shown in bold) are the bits that have been borrowed beyond the original network mask of /24. The /24 is the prefix notation and corresponds to a dotted decimal mask of 255.255.255.0.

1) (/25) 11111111.11111111.11111111.**1**0000000 1 bit borrowed, 7 left for the host portion

Dotted decimal subnet mask equivalent:
255.255.255.128

Number of subnets? Number of hosts?
2 subnets, 126 hosts

2) (/26) 11111111.11111111.11111111.**11**000000 2 bits borrowed, 6 left

Dotted decimal subnet mask equivalent:
255.255.255.192

Number of subnets? Number of hosts?
4 subnets, 62 hosts

3) (/27) 11111111.11111111.11111111.**111**00000 3 bits borrowed, 5 left

Dotted decimal subnet mask equivalent:
255.255.255.224

Number of subnets? Number of hosts?
8 subnets, 30 hosts

4) (/28) 11111111.11111111.11111111.**1111**0000 4 bits borrowed, 4 left

Dotted decimal subnet mask equivalent:
255.255.255.240

Number of subnets? Number of hosts?
16 subnets, 14 hosts

5) (/29) 11111111.11111111.11111111.**11111**000 5 bits borrowed, 3 left

Dotted decimal subnet mask equivalent:
255.255.255.248

Number of subnets? Number of hosts?
32 subnets, 6 hosts

6) (/30) 11111111.11111111.11111111.**111111**00 6 bits borrowed, 2 left

Dotted decimal subnet mask equivalent:
255.255.255.252

Number of subnets? Number of hosts?
64 subnets, 2 hosts

Considering your answers above, which subnet masks meet the required number of minimum host addresses?　62　　　126
255.255.255.192, 255.255.255.128

Considering your answers above, which subnet masks meets the minimum number of subnets required?　4　　　8　　　16　　　32　　　64
255.255.255.192, 255.255.255.224, 255.255.255.240, 255.255.255.248, 255.255.255.252

Considering your answers above, which subnet mask meets both the required minimum number of hosts and the minimum number of subnets required?
255.255.255.192

When you have determined which subnet mask meets all of the stated network requirements, derive each of the subnets. List the subnets from first to last in the table. Remember that the first subnet is 192.168.0.0 with the chosen subnet mask.