## Unit 5 Subnetting Lab 5

Read the lab details listed below, and then answer the questions listed in the lab exercise.

“EMS” Simplified Method for CIDR Class B

In subnetting CIDR “Classless Inter-Domain Routing” for a Class B address the process is again very much the same in creating the cheat sheet chart that we did in a Class C address. The difference now is that now we are using the third and fourth octets that we used in the Class C address. This is because the first two octets are the network values, and the last two Octets are the host values as shown here:

172.16. **3 . 5**

Network **Host** address.

The additional difference is that in this example we use a Class-C mask on this Class-B

Now we will take the same standard Class B guide, but we want a value in the 4th octet. For example, we again want 30 host IP’s but we want them on 2000 networks. Notice below that we get this from the guide at the 32-bit value in the 4th octet as identified below.

Below we see the Class B Subnetting Guide created the same way we did the Class C Subnetting Guide.

Class-B Subnetting Guide

**Groups** 128 64 32 16 8 4 2 1

**1. IP’s** 32768 16384 8192 4096 2048 1024 512 256 128 64 **32** | 16 8 4 2 1

**2. Hosts** 32766 16382 8190 4094 2046 1022 510 254 126 62 **30** | 14 6 2 0

**3. Subnets** 0 2 6 14 30 62 126 254 510 1022 **2046**  | 4094 8190 16382 32766

Remember that using this Cheat-Sheet Guide gives us the usable numbers available for the creation of subnetworks and hosts. The numbers on line 2 are again the numbers of usable hosts. The numbers on line 3 are again the number of usable Sub-networks. That is because we took away both the Network IP and Broadcast IP from each out of line 1.

We again subnet a Class B with this guide by giving up bits from left to right starting with the 128 bit on the far left in the 3rd octet and moving right to get the subnet range we want. If you want 30 host computers on each of the 2000 subnetworks You would give up the 128 bit through the 1 bit in the 3rd octet as well as the 128, the 64, and the 32 bit values of line 1 of the 4th octet. That means you would borrow all 8 bits from the 3rd octet and three more bits from the 4th octet. This now moves down into a Class C range, hence the term CIDR, which stands for Classless Inter-Domain Routing. You can identify this by drawing a line down from the 4 past the 1022 to the 62 as indicated in the example above.

Again, we started with the default mask of 255.255.0.0 To get the new subnet mask we add the values of each all of the borrowed bits from left to right in the 3rd octet and those three bits of the 4th octet on line 1. If you add all the bits in the 3rd octet, you would get 255; then you would add the 128 and 64 and the 32 bits from the 4th octet together and get 224. The new subnet mask is 255.255.255.224

These same processes for a CIDR Class-B can be seen here in Table 3.

**Table 3**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Subnet 1 | **3rd Octet**  0. | 172.16.0 | **4th Octet Values**  0---------31 | **Assignable 4th Octet Values**  1-------30 |
| Subnet 2 | 0. | 172.16.0 | 32--------63 | 33------62 |
| Subnet 3 | 0. | 172.16.0 | 64--------95 | 65------94 |
| Subnet 4 | 0. | 172.16.0 | 96-------127 | 97-----126 |
| Subnet 5 | 0. | 172.16.0 | 128------159 | 129----158 |
| Subnet 6 | 0. | 172.16.0 | 160------191 | 161----190 |
| Subnet 7 | 0. | 172.16.0 | 192------223 | 193----222 |
| Subnet8 | 0. | 172.16.0 | 224------255 | 225----254 |
| Subnet 9 | 1. | 172.16.1 | 0---------31 | 1-------30 |
| Subnet 10 | 1. | 172.16.1 | 32--------63 | 33------62 |
| Subnet 11 | 1. | 172.16.1 | 64--------95 | 65------94 |
| Subnet 12 | 1. | 172.16.1 | 96-------127 | 97-----126 |
| Subnet 13 | 1. | 172.16.1 | 128------159 | 129----158 |
| Subnet 14 | 1. | 172.16.1 | 160------191 | 161----190 |
| Subnet 15 | 1. | 172.16.1 | 192------223 | 193----222 |
| Subnet16 | 1. | 172.16.1 | 224------255 | 225----254 |

This table would continue down until the 3rd octet has used all values from 0 to 255.

## Subnetting Lab 5 Exercise

Using the Class B Subnetting Guide, answer the following:

Given an IP address of 172.16.3.1 use the guide to get 50 hosts on each of your 1000 networks:

1. What Class is this IP address? \_\_\_\_\_
2. How many bits would you borrow or take? \_\_\_\_\_\_\_
3. What subnet mask would you generate? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What is the first subnetwork range created? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What is the last subnetwork range created? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Given an IP address of 172.16.4.1 use the guide to get 12 hosts on each of your 4000 networks:

1. What Class is this IP address? \_\_\_\_\_
2. How many bits would you borrow or take? \_\_\_\_\_\_\_
3. What subnet mask would you generate? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What is the first subnetwork range created? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What is the last subnetwork range created? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Given an IP address of 172.16.5.1 use the guide to get 5 hosts on each of your 8000 networks:

1. What Class is this IP address? \_\_\_\_\_
2. How many bits would you borrow or take? \_\_\_\_\_\_\_
3. What subnet mask would you generate? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What is the first subnetwork range created? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What is the last subnetwork range created? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_