**LAB 6 SUBNET MASKING**

COMPLETE THE FOLLOWING SUBNETTING PROBLEMS

**ANSWER EXAMPLE I**

**Your new Company has applied and received a public IP address from your local ISP. The address is 218.5.67.0/24**

1. What is the Class of this IP address? C
2. What is the network address for your company? 218.5.67.0
3. What is the maximum number of hosts you can have on your network? 254
4. What is the broadcast address for your entire network? 218.5.67.255
5. What is the default subnet mask for this network? 255.255.255.0

You require 5 subnets.

1. How many host bits do you need to use to create subnet identifiers? 3
2. What is the new customised subnet mask for this network? 255.255.255.224
3. What is the maximum number of hosts that can be connected to each subnet? 30
4. What is the maximum number of hosts you can have on your entire new subnetted network? 240

Complete the table overleaf.

The following data packets arrive at your network’s border router.

Determine which subnet that the data is destined for and to which host on that subnet they are addressed for.

1. 218.5.67.89 218.5.67.64 218.5.67.95
2. 218.5.67.23 218.5.67.0 218.5.67.31
3. 218.5.67.109 218.5.67.96 218.5.67.64.127
4. 218.5.67.91 218.5.67.64 218.5.67.95
5. 218.5.67.64 218.5.67.64
6. 218.5.67.252 218.5.67.64
7. 218.5.67.115 218.5.67.64
8. 218.5.67.143 218.5.67.64 **Check your answers using Solar Winds Subnet Calculator**

**ANSWER EXAMPLE I**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Subnet No. | Subnet Bits - Binary | Subnet Bits - Decimal | Binary Range  of Host Bits | Decimal Range  SN+Host Bits | Subnet Address | Subnet  Broadcast Address |
| #0 | 000 | 0 | 00000-111111 | 0-31 | 218.5.67.0 | 218.5.67.31 |
| #1 | 001 | 32 | 00000-111111 | 32-63 | 218.5.67.32 | 218.5.67.63 |
| #2 | 002 | 64 | 00000-111111 | 64-95 | 218.5.67.64 | 218.5.67.95 |
| #3 | 003 | 96 | 00000-111111 | 96-127 | 218.5.67.96 | 218.5.67.127 |
| #4 | 004 | 128 | 00000-111111 | 128-159 | 218.5.67.128 | 218.5.67.159 |
| #5 | 005 | 160 | 00000-111111 | 160-191 | 218.5.67.160 | 218.5.67.191 |
| #6 | 006 | 192 | 00000-111111 | 192-223 | 218.5.67.192 | 218.5.67.223 |
| #7 | 007 | 224 | 00000-111111 | 224-255 | 218.5.67.224 | 218.5.67.255 |

EXAMPLE II

**Your new Company has applied and received a public IP address from your local ISP. The address is 153.218.0.0/16**

1. What is the Class of this IP address? B
2. What is the network address for your company? 153.218.0.0
3. What is the maximum number of hosts you can have on your network? 65534
4. What is the broadcast address for your entire network? 153.218.255.255
5. What is the default subnet mask for this network? 255.255.0.0

You require 12 subnets.

1. How many host bits do you need to use to create subnet identifiers? 4
2. What is the new customised subnet mask for this network? 255.255.255.240.0
3. What is the maximum number of hosts that can be connected to each subnet? 4094
4. What is the maximum number of hosts you can have on your entire new subnetted network? 65504

Complete the table overleaf .

The following data packets arrive at your network’s border router.

Determine which subnet that the data is destined for and to which host on that subnet they are addressed for.

1. 153.218.206.56
2. 153.218.191.255
3. 153.218.38.117
4. 153.218.127.127
5. 153.218.96.0
6. 153.218.192.0
7. 153.218.15.241
8. 153.218.241.15 **Check your answers using Solar Winds Subnet Calculator**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Subnet No. | Subnet Bits – Binary  (octet 3) | Subnet Bits - Decimal | Binary Range  of Host Bits | Decimal Range  SN+Host Bits  (last 2 octets) | Subnet Address | Subnet  Broadcast Address |
| #0 | 0000 | 0 | 0000 00000000  1111 11111111 | 0.0 – 15.255 |  |  |
| #1 | 0001 | 16 | 0000 00000000  1111 11111111 | 16.0 – 31.255 |  |  |
| #2 | 0010 | 32 | 0000 00000000  1111 11111111 | 32.0 – 47.255 |  |  |
| #3 | 0011 | 48 | 0000 00000000  1111 11111111 | 48.0 – 63.255 |  |  |
| #4 | 0100 | 64 | 0000 00000000  1111 11111111 | 64.0 – 79.255 |  |  |
| #5 | 0101 | 80 | 0000 00000000  1111 11111111 | 80.0 – 95.255 |  |  |
| #6 | 0110 | 96 | 0000 00000000  1111 11111111 | 96.0 – 111.255 |  |  |
| #7 | 0111 | 112 | 0000 00000000  1111 11111111 | 112.0 – 127.255 |  |  |
| #8 | 1000 | 128 | 0000 00000000  1111 11111111 | 128.0 – 143.255 |  |  |
| #9 | 1001 | 144 | 0000 00000000  1111 11111111 | 144.0 – 159.255 |  |  |
| #10 | 1010 | 160 | 0000 00000000  1111 11111111 | 160.0 – 175.255 |  |  |
| #11 | 1011 | 176 | 0000 00000000  1111 11111111 | 176.0 – 181.255 |  |  |
| #12 | 1100 | 182 | 0000 00000000  1111 11111111 | 182.0 – 195.255 |  |  |
| #13 | 1101 | 196 | 0000 00000000  1111 11111111 | 196.0 – 207.255 |  |  |
| #14 | 1110 | 208 | 0000 00000000  1111 11111111 | 208.0 – 223.255 |  |  |
| #15 | 1111 | 224 | 0000 00000000  1111 11111111 | 224.0 – 255.255 |  |  |

**EXAMPLE III (more difficult problem!)**

**Your new Company has applied and received a public IP address from your local ISP. The address is 11.5.67.64/26**

1. What is the Class of this IP address? A
2. What is the network address for your company? 11.5.67.64
3. What is the maximum number of hosts you can have on your network? 62
4. What is the broadcast address for your entire network? 11.5.67.127
5. What is the subnet mask for this network? 255.255.255.192

You require 3 subnets.

1. How many host bits do you need to use to create subnet identifiers? 2
2. What is the new customised subnet mask for this network? 255.255.255.240
3. What is the maximum number of hosts that can be connected to each subnet? 14
4. What is the maximum number of hosts you can have on your entire new subnetted network?

Complete the table overleaf.

Data packets arrive at your network’s border router with the following destination IP addresses.

Determine which subnet that the data is destined for and to which host on that subnet they are addressed for.

1. 11.5.67.89
2. 11.5.67.73
3. 11.5.67.109
4. 11.5.67.117
5. 11.5.67.94
6. 11.5.67.125
7. 11.5.67.115
8. 11.5.67.68

**Check your answers using Solar Winds Subnet Calculator**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Subnet No.** | **Subnet Bits - Binary** | **Subnet Bits - Decimal** | **Binary Range**  **of Host Bits** | **Decimal Range**  **SN+Host Bits** | **Subnet Address** | **Subnet**  **Broadcast Address** |
| #0 | 00 | 0 | 000 - 111 | 0-15 |  |  |
| #1 | 01 | 16 | 000 - 111 | 16-31 |  |  |
| #2 | 10 | 32 | 000 - 111 | 32-47 |  |  |
| #3 | 11 | 48 | 000 - 111 | 48-64 |  |  |