LAB 1 – C00236160 – Patrick Donnelly

Notes:

Number of subnets is : 2S

Number of Hosts per subnet is : (2H)-2

|  |  |  |
| --- | --- | --- |
| Class | First Octet Address | Default Subnet Mask |
| A | 1 – 127n | 255 . 0 . 0. 0 |
| B | 128 - 191 | 255 . 255 . 0 . 0 |
| C | 192 -223 | 255 . 255 . 255 . 0 |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Decimal | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| value | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 |
| Bit Position | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 128 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 192 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 224 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 |
| 240 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 248 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| 252 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 254 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 |
| 255 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

Problem 7:

Needed Subnets 2000

Needed Hosts 15

Network Address 178.100.0.0

*Address Class:* B

*Default Subnet Mask:* 255.255.0.0

*Custom Subnet Mask:* 255.255.255.224

*Total number of subnets:* 2048

*Total number of host addresses:* 32

*Number of usuable addresses:* 30

*Number of bits borrowed:* 11

*Workings:*

Number of Subnets = 211 = 2048 (11 bits)

Number of Host address = 25 = 32 (5 bits)

Number of usable hosts = (25) – 2 = 30 (Subtract two, one for broadcast, one for the network)

Custom Subnet Mask =

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Decimal | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| value | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 |
| Bit Position | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Borrowed 11 bits.

First 8 bits 128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = 255

Remaining 3 bits from the 4th octet = 128 + 64 + 32 = 224

Therefore custom subnet mask is 255.255.255.224

Problem 15:

Need 50 hosts

Network address: 172.59.0.0

*Address Class:* B

*Default subnet mask:* 255.255.0.0

*Custom subnet mask:* 255.255.255.192

*Total number of subnets:* 1024

*Total number of Host addresses:* 64

*Number of usuable addresses:* 62

*Number of bits borrowed:* 10

*Workings:*

Number of Subnets = 210 = 1024 (10 bits)

Number of Host address = 26 = 64 (6 bits)

Number of usable hosts = (26) – 2 = 62 (Subtract two, one for broadcast, one for the network)

Custom Subnet Mask =

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Decimal | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| value | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 |
| Bit Position | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Borrowed 10 bits.

First 8 bits 128 + 64 + 32 + 16 + 8 + 4 + 2 + 1 = 255

Remaining 2 bits from the 4th octet = 128 + 64 = 192

Therefore custom subnet mask is 255.255.255.192

Problem 11

Needed Hosts: 8,000

Network Address : 135.70.0.0

*Address Class:* B

*Default subnet mask:* 255.255.0.0

*Custom subnet mask:* 255.255.224.0

*Total No. of Subnets:* 8

*Total number of host addresses:* 8192

*No of usuable addresses:* 8190

*No of bits borrowed:* 3

*Workings:*

Number of Subnets = 213 = 8192 (13 bits)

Number of Host address = 23 = 8 (3 bits)

Number of usable hosts = (213) – 2 = 8190 (Subtract two, one for broadcast, one for the network)

Custom Subnet Mask =

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Decimal | 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
| value | 27 | 26 | 25 | 24 | 23 | 22 | 21 | 20 |
| Bit Position | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |

Borrowed 3 bits.

3 bits from the 3rd octet = 128 + 64 + 32 = 224

Therefore custom subnet mask is 255.255.224.0