CNT 125 Online - Subnetting Problems Lab

Background: A subnetwork, or subnet, is a logically visible subdivision of an IP network. The practice of creating subnetworks is called subnetting. All computers that belong to a subnet are addressed with a common, identical, most-significant bit-group in their IP address. This part of the address is known as the routing prefix or network number. The size of the routing prefix may be indicated using CIDR notation or through specification of a subnet mask.

Learning Outcomes: Upon successful completion of the course the student will be able to:

* Implement a subnetted TCP/IP network using routers and switches

Directions:

1. Download a copy of this lab to your PC
2. Either …. Print out a copy so you write on the page … or … Type into the copy of the lab (feel free to use a colored font or highlighting to help your work to stand out) to complete the lab
3. Use the Podcasts available on D2L with this lab to aid in completing the lab.

#1 - The Crazy Guys Cable Company needs their network subnetted to help organize the network. They need at least 5 subnets for their network. The Network Number for their network is: 195.40.25.0

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| --- | --- | --- | --- | --- | --- |
| SNM Bit Count | SNM – Dotted Decimal | # Bits Borrowed | # of SN Created  (2# of Borrowed Bits ) | # of Addresses/SN  ( 2# of Remaining Bits ) | # of Usable  ( 2# of Remaining Bits – 2 ) |
| /27 | 255.255.255.224 | 3 | 8 | 32 | 30 use able |

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| --- | --- | --- |
| SN # | Usable host range | SN BA |
| 0 | .1 - .30 | 31 |
| 32 | .33 - .62 | 63 |
| 64 | .65 - .94 | 95 |
| 96 | .97 - .126 | 127 |
| 128 | .129 - .158 | 159 |
| 160 | .161 - .190 | 191 |
| 192 | .193 - .222 | 223 |
| 224 | .225 - .254 | 255 |
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What subnet does the following destination IP address belong to? 195.40.25.189

(Use the ANDING Method.)

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| --- | --- | --- | --- | --- |
| Destination IP | 195 | 40 | 25 | 189 |
| Subnet Mask | 255 | 255 | 255 | 224 |
| Result | 195 | 40 | 25 | 10100000 |

#2 - ACME Magnet Company needs their network subnetted to help organize the network. They need at least 12 subnets for their network. The network # for the network is: 201.100.50.0

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| SNM Bit Count | SNM – Dotted Decimal | # Bits Borrowed | # of SN Created  (2# of Borrowed Bits ) | # of Addresses/SN  ( 2# of Remaining Bits ) | # of Usable  ( 2# of Remaining Bits – 2 ) |
| /24 | 255.255.255.240 | 4 | 2^4=16 | 2^4=16 | 14 |

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| --- | --- | --- |
| SN # | Usable host range | SN BA |
| 0 | .1 - .14 | 15 |
| 16 | .17 - .30 | 31 |
| 32 | .33 - .46 | 47 |
| 48 | .49 -. 62 | 65 |
| 64 | .65 -. 78 | 79 |
| 80 | .81 – .94 | 95 |
| 96 | .97 - .110 | 111 |
| 112 | .113 - .126 | 127 |
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What subnet does the following destination IP address belong to? 201.100.50.72

(Use the ANDING Method.)

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| --- | --- | --- | --- | --- |
| Destination IP | 201 | 100 | 50 | 72 |
| Subnet Mask | 255 | 255 | 255 | 240 |
| Result | 201 | 100 | 50 | 64 |

#3 - The Crazy Guys Cable Company decided to use NAT and translate the Public IP Address they were allocated to a Private B Address to support the IP Address needs for the network. To help organize the network they have decided that they will need at least 6 subnets for their network. The Network Number for their network is: 172.16.0.0

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| SNM Bit Count | SNM – Dotted Decimal | # Bits Borrowed | # of SN Created  (2# of Borrowed Bits ) | # of Addresses/SN  ( 2# of Remaining Bits ) | # of Usable  ( 2# of Remaining Bits – 2 ) |
| /19 | 255.255.224.0 | 3 | 2^3=8 | 2^13 8192 | 8190 |

|  |  |  |
| --- | --- | --- |
| SN # | Usable host range | SN BA |
| 0.0 | 0.1 - 31.254 | 31.255 |
| 32.0 | 32.1 - 63.254 | 63.255 |
| 64.0 | 64.1 - 95.254 | 95.255 |
| 96.0 | 96.1 - 127.254 | 127.255 |
| 128.0 | 128.1 - 159.254 | 159.255 |
| 160.0 | 160.1 - 191.254 | 191.255 |
| 192.0 | 192.1 - 223.254 | 223.255 |
| 224.0 | 224.1 - 255.254 | 255.255 |
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What subnet does the following destination IP address belong to? 172.16.100.50

(Use the ANDING Method.)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Destination IP | 172 | 16 | 100 | 50 |
| Subnet Mask | 255 | 255 | 224 | 0 |
| Result | 172 | 16 | 96 | 0 |

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#4 - The Rotten Router IT Company decided to use NAT and translate the Public IP Address they were allocated to a Private B Address to support the IP Address needs for the network. To help organize the network they have decided that they will need at least 60 subnets for their network. The Network Number for their network is: 172.16.0.0

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| SNM Bit Count | SNM – Dotted Decimal | # Bits Borrowed | # of SN Created  (2# of Borrowed Bits ) | # of Addresses/SN  ( 2# of Remaining Bits ) | # of Usable  ( 2# of Remaining Bits – 2 ) |
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| --- | --- | --- |
| SN # | Usable host range | SN BA |
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What subnet does the following destination IP address belong to? 172.16.129.10

(Use the ANDING Method.)

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| --- | --- | --- | --- | --- |
| Destination IP |  |  |  |  |
| Subnet Mask |  |  |  |  |
| Result |  |  |  |  |

*Lab Submission*

*To receive credit for completing this lab complete the following:*

*1 - Scan the 4 completed pages …. OR … Take Pictures of the 4 completed pages … OR …. Save the file you typed on.*

*2 - Submit this Scan … or … Pictures … or … Saved File of the 4 completed pages to the Dropbox on D2L for the Subnetting Problems Lab.*

*3 - After the lab is submitted … Mr. Brown will check the submission - He will be checking for completeness. If the 4 pages have been attempted/completed you will receive full points for the lab submission.*

*4 - After the lab has been graded an Answer Sheet will become visible in D2L with answers to all of the questions. This will appear in the folder where this lab was originally located on D2L.*