

Introduction to Networks and Distributed Computing  
CECS 327  
Spring 2022  
Due Date: Friday, April 3, 2022 @ 10:00 PM PST

**Assignment 3: Subnetting**

**Instructions** For all problems:

- This is individual assignment
- Use the Subnetting Worksheet to show and record all work for each problem.
- You must explain your conversion below each table. Failure to explain your results will make you lose points.

**Problem 1**

<b>Host IP Address</b>	<b>172.30.1.33</b>
<b>Major Network Mask</b>	<b>255.255.0.0</b>
Major (Base) Network Address	172.30.0.0
Major Network Broadcast Address	172.30.255.255
Total Number of Host Bits Number of Hosts	16 65534
<b>Subnet Mask</b>	<b>255.255.255.0</b>
Number of Subnet Mask Bits	24
Number of Usable Subnets	8
Maximum Subnets	256
Number of Host Bits per Subnet	8
Number of Usable Hosts per Subnet	254
Subnet Address for this IP Address	172.30.1.0
IP Address of First Host on this Subnet	172.30.1.1
IP Address of Last Host on this Subnet	172.30.1.254
Broadcast Address for this Subnet	172.30.1.255

**I used the calculation of**

usable subnet bits = (total # bits subnet mask) - (# of bits in network mask)

number of hosts =  $2^{(\text{usable subnet bits})} - 2$  as seen in a youtube video for the calculation of the subnet bits and the number of hosts

From there I subtracted the number of possible IP's 256 – the number of subnet bits in decimal form to get the number of hosts

This allows me to get a range of IP addresses to get the subnet mask address, broadcast address which is the last IP in the range and the first and last host on the subnet.

## Problem 2

<b>Host IP Address</b>	<b>172.30.1.33</b>
<b>Major Network Mask</b>	<b>255.255.255.0</b>
Major (Base) Network Address	172.30.1.0
Major Network Broadcast Address	172.30.1.255
Total Number of Host Bits Number of Hosts	8 254
<b>Subnet Mask</b>	<b>255.255.255.252</b>
Number of Subnet Mask Bits	30
Number of Usable Subnets Bits	6
Maximum Subnets	64
Number of Host Bits per Subnet	2
Number of Usable Hosts per Subnet	2
Subnet Address for this IP Address	172.30.1.32
IP Address of First Host on this Subnet	172.30.1.33
IP Address of Last Host on this Subnet	172.30.1.34
Broadcast Address for this Subnet	172.30.1.35

**Problem 3**

<b>Host IP Address</b>	<b>192.192.10.234</b>
<b>Major Network Mask</b>	<b>255.255.255.0</b>
Major (Base) Network Address	192.192.10.0
Major Network Broadcast Address	192.192.10.255
Total Number of Host Bits Number of Hosts	8 254
<b>Subnet Mask</b>	<b>255.255.255.248</b>
Number of Subnet Bits Number of Usable Subnets (zero subnet used)	5 31
Number of Host Bits per Subnet Number of Usable Hosts per Subnet	3 6
Subnet Address for this IP Address	192.192.10.232
IP Address of First Host on this Subnet	192.192.10.233
IP Address of Last Host on this Subnet	192.192.10.238
Broadcast Address for this Subnet	192.192.10.239

**Problem 4**

<b>Host IP Address</b>	<b>171.68.99.71</b>
<b>Major Network Mask</b>	<b>255.255.0.0</b>
Major (Base) Network Address	171.68.0.0
Major Network Broadcast Address	171.68.255.255
Total Number of Host Bits Number of Hosts	16 65,536 -2
<b>Subnet Mask</b>	<b>255.255.240.0</b>
Number of Subnet Mask Bits	20
Number of Usable Subnets Bits	4
Maximum Subnets	16
Number of Host Bits per Subnet	12
Number of Usable Hosts per Subnet	4,096 -2 = 4094
Subnet Address for this IP Address	<b>171.68.96.0</b>
IP Address of First Host on this Subnet	171.168.96.1
IP Address of Last Host on this Subnet	171.68.111.254
Broadcast Address for this Subnet	171.68.111.255

### Problem 5

<b>Host IP Address</b>	<b>217.200.3.219</b>
<b>Major Network Mask</b>	<b>255.255.255.0</b>
Major (Base) Network Address	217.200.3.0
Major Network Broadcast Address	217.200.3.255
Total Number of Host Bits Number of Hosts	8 254
<b>Subnet Mask</b>	<b>255.255.255.224</b>
Number of Subnet Mask Bits	27
Number of Usable Subnets Bits	3
Maximum Subnets	8
Number of Host Bits per Subnet	5
Number of Usable Hosts per Subnet	30
Subnet Address for this IP Address	217.200.3.192
IP Address of First Host on this Subnet	217.200.3.193
IP Address of Last Host on this Subnet	217.200.3.222
Broadcast Address for this Subnet	217.200.3.223