Lab - Calculate IPv4 Subnets

Objectives

Part 1: Determine IPv4 Address Subnetting

Part 2: Calculate IPv4 Address Subnetting

Background / Scenario

The ability to work with IPv4 subnets and determine network and host information based on a given IP address and subnet mask is critical to understanding how IPv4 networks operate. The first part is designed to reinforce how to compute network IP address information from a given IP address and subnet mask. When given an IP address and subnet mask, you will be able to determine other information about the subnet.

- 1 PC (Windows with Internet access)
- Optional: IPv4 address calculator

Instructions

Fill out the tables below with appropriate answers given the IPv4 address, original subnet mask, and new subnet mask.

Problem 1:

Given:	
Host IP Address:	192.168.200.139
Original Subnet Mask	255.255.255.0
New Subnet Mask:	255.255.255.224

Find:	
Number of Subnet Bits	3
Number of Subnets Created	8
Number of Host Bits per Subnet	5
Number of Hosts per Subnet	30
Network Address of this Subnet	192.168.200.128
IPv4 Address of First Host on this Subnet	192.168.200.129
IPv4 Address of Last Host on this Subnet	192.168.200.158
IPv4 Broadcast Address on this Subnet	192.168.200.159

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Problem 2:

Given:	
Host IP Address:	10.101.99.228
Original Subnet Mask	255.0.0.0
New Subnet Mask:	255.255.128.0

Find:	
Number of Subnet Bits	9
Number of Subnets Created	512
Number of Host Bits per Subnet	15
Number of Hosts per Subnet	32,766
Network Address of this Subnet	10.101.0.0
IPv4 Address of First Host on this Subnet	10.101.0.1
IPv4 Address of Last Host on this Subnet	10.101.127.254
IPv4 Broadcast Address on this Subnet	10.101.127.255

Problem 3:

Given:	
Host IP Address:	172.22.32.12
Original Subnet Mask	255.255.0.0
New Subnet Mask:	255.255.224.0

Find:	
Number of Subnet Bits	3
Number of Subnets Created	8
Number of Host Bits per Subnet	13
Number of Hosts per Subnet	8190
Network Address of this Subnet	172.22.32.0
IPv4 Address of First Host on this Subnet	172.22.32.1
IPv4 Address of Last Host on this Subnet	172.22.63.254
IPv4 Broadcast Address on this Subnet	172.22.63.255

Problem 4:

Given:	
Host IP Address:	192.168.1.245
Original Subnet Mask	255.255.255.0
New Subnet Mask:	255.255.255.252

Find:	
Number of Subnet Bits	6
Number of Subnets Created	64
Number of Host Bits per Subnet	2
Number of Hosts per Subnet	2
Network Address of this Subnet	192.168.1.244
IPv4 Address of First Host on this Subnet	192.168.1.245
IPv4 Address of Last Host on this Subnet	192.168.1.246
IPv4 Broadcast Address on this Subnet	192.168.1.247

Problem 5:

Given:	
Host IP Address:	128.107.0.55
Original Subnet Mask	255.255.0.0
New Subnet Mask:	255.255.255.0

Find:	
Number of Subnet Bits	8
Number of Subnets Created	256
Number of Host Bits per Subnet	8
Number of Hosts per Subnet	254
Network Address of this Subnet	128.107.0.0
IPv4 Address of First Host on this Subnet	128.107.0.1
IPv4 Address of Last Host on this Subnet	128.107.0.254
IPv4 Broadcast Address on this Subnet	128.107.0.255

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Problem 6:

Given:	
Host IP Address:	192.135.250.180
Original Subnet Mask	255.255.255.0
New Subnet Mask:	255.255.255.248

Find:	
Number of Subnet Bits	5
Number of Subnets Created	32
Number of Host Bits per Subnet	3
Number of Hosts per Subnet	6
Network Address of this Subnet	192.135.250.176
IPv4 Address of First Host on this Subnet	192.135.250.177
IPv4 Address of Last Host on this Subnet	192.135.250.182
IPv4 Broadcast Address on this Subnet	192.135.250.183

Reflection Question

Why is the subnet mask so important when analyzing an IPv4 address?

The subnet mask determines everything about the address: the network, number of host bits, number of hosts and the broadcast address.