Ryerson University

Ted Rogers School of Information Technology Management

CITM600 Data Communications and Network Design

Individual Assignment # 3 – IP addressing and Subnetting

Name: _____ Student Number: _____

Assumption: All subnet values can be used and the all "0"s is the first subnet.

Question 1 – In Table 1A, fill out the network number, class, default subnet mask, and CIDR notation for the network numbers. (30 points)

Table 1A

IP Address	CIDR Network Number	Class	Default Subnet Mask
220.200.200.220	220.200.200.220/24	C	255.255.255.0
128.24.10.255	128.24.10.255/16	B	255.255.0.0
93.1.1.101	93.1.1.101/8	A	255.0.0.0
110.110.110.200	110.110.110.200/8	A	255.0.0.0
179.34.35.34	179.34.35.34/16	B	255.255.0.0
147.147.0.222	147.147.0.222/16	B	255.255.0.0
65.99.255.201	65.99.255.201/8	A	255.0.0.0
231.50.15.26	231.50.15.26/24	C	255.255.255.0
191.10.0.31	191.10.0.31/16	B	255.255.0.0
7.10.12.12	7.10.12.12/8	A	255.0.0.0

Question 2 - You have been assigned the 175.40.40.0/24 network number. (15 points)

a) **Define an extended network prefix that allows the creation of 28 Hosts on each subnet. List the network prefix and the equivalent customized subnet mask. (3 points)**

A 27 bit mask is 11111111.11111111.11111111.111 00000
Hosts: 30
255.255.255.224
subnet mask: 175.40.40.0/27
175.40.40.0/27
175.40.40.32/27
175.40.40.64/27
175.40.40.96/27
175.40.40.128/27
175.40.40.160/27
175.40.40.192/27
175.40.40.224/27

b) **What is the maximum number of hosts that can be assigned to each subnet? List the first usable address in the first 3 subnets**. **(3 points)**

The maximum number of hosts that can be assigned to each subnet is 254. 175.40.40.1 is the first usable address in the first 3 subnets
175.40.40.1 to 175.40.40.30

c) **What is the maximum number of subnets that can be defined? List the subnets with their prefix below. (3 points)**

The maximum number of subnet is 8 hosts can be defined.

175.40.40.0/27
175.40.40.32/27
175.40.40.64/27
175.40.40.96/27
175.40.40.128/27
175.40.40.160/27
175.40.40.192/27
175.40.40.224/27

d) **What is the network IP address for the last subnet with network prefix and subnet mask? (3 points)**

175.40.40.244 is the network IP address for the last subnet with network prefix and 255.255.0.0 is the subnet mask

e) **What is the broadcast address of the second subnet? (3 points)**

175.40.40.255 is the broadcast address of the second subnet

Question 3 - You have been assigned the 15.0.0.0/8 network number to deploy a large corporate network. (15 points)

a) **Subnet this network to be able to support approximately 8000 subnets, list the network prefix and the equivalent customized subnet mask. (3 points)**

15.0.0.0/8
15.0.0.32/8
15.0.0.64/8
15.0.0.128/8
15.0.0.160/8
15.0.0.192/8
15.0.0.224/8

2^13-2 = 8190 subnets

b) **How many total subnets are actually available based on the network prefix selected above? List the first four subnets with their prefix and customized subnet mask. (3 points)**

15.0.0.32/8 255.0.0.0
15.0.0.64/8 255.0.0.0
15.0.0.128/8 255.0.0.0
15.0.0.160/8 255.0.0.0
15.0.0.192/8 255.0.0.0
15.0.0.224/8 255.0.0.0

c) **What is the maximum number of IP addresses available for hosts on each subnet? List the first usable IP Address in the first four subnets (3 points)**

8190 is the maximum number of IP addresses available for the hosts on each subnets and 15.0.0.32/8 is the first usable IP address in the first four subnets

d) **What is the network IP address for the last subnet with the prefix and customized subnet mask? (3 points)**

15.0.0.224/8 255.0.0.0 is the network IP address for the last subnet with the prefix and customized subnet mask

e) **What is the broadcast address of the fifth subnet? (3 points)**

15.0.0.159 is the broadcast address of the fifth subnet

Question 4 - You have been assigned the 218.0.0.128/26 network number. ABC Company has three departments: Marketing, Sales, and Administration. The ABC Company would like to have each department on a separate segment. The last usable IP address from each segment is allocated to the router interface. Each segment will not have more than 10 workstations at any time. Provide a subnetting solution for the ABC Company. Use Table 4A. (40 points)

Table 4A

	CIDR Subnet address	Customized Subnet Mask	# of usable IP addresses in each subnet	# of hosts reserved for static IP addresses	First usable IP address byte 4	IP address of default gateway	Broadcast address byte 4
MD	172/16	255.255.255.192/26	64	62	218.0.0.129	218.0.0.128	218.0.0.31
SD	173/16	255.255.255.192/26	64	62	218.0.0.130	218.0.0.128	218.0.0.63
AD	174/16	255.255.255.192/26	64	62	218.0.0.130	218.0.0.128	218.0.0.95
Available	65534/16		192	186			