HW 7 Hands On

Tuesday, November 30, 2021 7:17 AM

hw7-Part_II

CSC 335

Computer Networks

University of Michigan-Flint
Computer Science

COMPUTER SCIENCE

Fall 2021

November 28, 2021

Homework 7 - Part II

(100 points)

due by Dec 6, 2:30pm

Remarks:

- No emailed homeworks will be accepted.
- Only submission is via the Canvas system.
- No late submissions will be accepted.
- No submission means automatic 0.
- Individual submission, not a group work!
- Show your work in getting to your answer to get any credit.
- 30% of Hw7. Remainin 70% is posted separately on Canvas.

Questions for the deliverable:

1. End-of-Chapter Questions, Thought Question 9-3 on p. 320: A firm is assigned the network part 128.171. It selects an 8-bit subnet part.

   (a) Write the bits for the four octets of the IP address of the first host on the first subnet.

   (b) Convert this answer to dotted decimal notation. (If you have forgotten how to do this, it was covered in Chapter 1.)

   (c) Write the bits for the second host on the third subnet. (In binary, 2 is JO, and 3 is 11.)

   (d) Convert this in to dotted decimal notation.

(e) Write the bits for the last host on the third subnet.

(f) Convert this answer in to dotted decimal notation. Can you tell the subnet a host is on just by looking at the dotted decimal notation representation?

2. End-of-Chapter Questions, Thought Question 9-4 on p. 320-1: A firm is assigned the network part 128.171. It selects a 10-bit subnet part.

   (a) Draw the bits for the four octets of the IP address of the first host on the first subnet.

   (b) Convert this answer in to dotted decimal notation.

   (c) Draw the b its for the second host on the third subnet.

   (d) Convert this into dotted decimal notation.

   (e) Draw the bits for the last host on the third subnet.

   (f) Convert this answer into dotted decimal notation. Can you tell the subnet a host is on just by looking at the dotted decimal notation representation?

3. End-of-Chapter Questions, Thought Question 9-5 on p. 321:

   (a) What are the three ranges of private IP addresses?

   (b) If a firm chooses 10.x.x.x for its internal IP addresses, how many hosts can it have internally?

   (c) Repeat for 192.168.x.x.

   (d) Repeat for 172.16.x.x through 172.31.x.x.

4. Your company is given a Class B address of **147.7.x.x**. You are asked to allocate a block of at least 2500 IP addresses to your branch office. What subnet mask would you use in your routers so that the traffic to your branch office gets routed correctly and *you maximize the number of potential subnets*? Please give both dotted decimal notation and Cisco notation for the mask. How many subnets do you have?

5. A Company is assigned Class C address **199.192.48.x** and decides that they want at least 57 subnets. What subnet mask should they use? Denote the subnet both in dotted decimal and Cisco notation. How many hosts per subnet do you have?

bit #	1	2	3	4	5	6	7	8
decimal value if 1 & 0 else	128	64	32	16	8	4	2	1

$2^{\text{the values for the indicator bits}}$

1. End-of-Chapter Questions, Thought Question 9-3 on p. 320: A firm is assigned the network part 128.171. It selects an 8-bit subnet part.

(a) Write the bits for the four octets of the IP address of the first host on the first subnet.

10000000 10101011 00000001 00000001

(b) Convert this answer to dotted decimal notation. (If you have forgotten how to do this, it was covered in Chapter 1.)

128 . 171 . 1 . 1

(c) Write the bits for the second host on the third subnet. (In binary, 2 is JO, and 3 is 11.)

10000000 10101011 00000011 00000010

(d) Convert this in to dotted decimal notation.

128 . 171 . 3 . 2

(e) Write the bits for the last host on the third subnet.

10000000 10101011 00000011 11111111

(f) Convert this answer in to dotted decimal notation. Can you tell the subnet a host is on just by looking at the dotted decimal notation representation?

128 . 171 . 3 . 255 Yes

2. End-of-Chapter Questions, Thought Question 9-4 on p. 320-1: A firm is assigned the network part 128.171. It selects a 10-bit subnet part.

(a) Draw the bits for the four octets of the IP address of the first host on the first subnet.

10000000 10101011 00000000 01000001

(b) Convert this answer in to dotted decimal notation.

128 . 171 . 0 . 65

(c) Draw the b its for the second host on the third subnet.

10000000 10101011 00000000 11000010

(d) Convert this into dotted decimal notation.

128 . 171 . 0 . 194

(e) Draw the bits for the last host on the third subnet.

10000000 10101011 00000000 11111111

(f) Convert this answer into dotted decimal notation. Can you tell the subnet a host is on just by looking at the dotted decimal notation representation?

128 . 171 . 0 . 255 Yes

3. End-of-Chapter Questions, Thought Question 9-5 on p. 321:

(a) What are the three ranges of private IP addresses?

10.x.x.x | 192.168.x.x | 172.16.x.x ↓ 172.31.x.x

(b) If a firm chooses 10.x.x.x for its internal IP addresses, how many hosts can it have internally?

$8 \times 3 = 24$ ∴ $2^{24} - 2$ hosts [16777214]

(c) Repeat for 192.168.x.x.

$8 \times 2 = 16$ ∴ $2^{16} - 2$ hosts [65534]

(d) Repeat for 172.16.x.x through 172.31.x.x.

$31 - 16 + 1 = 16$ & $8 \times 2 = 16$ ∴ $16(2^{16} - 2)$ hosts

$16(65534) =$ [1048544]

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$2^{10} = 1024$ | -2 | 1022
$2^{11} = 2048$ | -2 | 2046
$2^{12} = 4096$ | -2 | 4094

possible hosts

∴ 12 bits needed to allocat 2500 IP's at the branch subnet

16 available Bits

↳ 16 − 12 = 4 bits @ the subnet

subnets = $2^4 - 2$ = [14]

masks

255 − 1 − 2 − 4 − 8 = 240

[255.255.240.0 / 20]

16 + 4 = 20

5. A Company is assigned Class C address **199.192.48.x** and decides that they want at least 57 subnets. What subnet mask should they use? Denote the subnet both in dotted decimal and Cisco notation. How many hosts per subnet do you have?

$2^5 = 32$ | -2 | 30
$2^6 = 64$ | -2 | 62

possible subnets

∴ 6 bits needed to allocate 57 subnets

∴ 2 bits left for hosts per subnet

masks

255 − 2 − 1 = 252

[255.255.255.252 / 30]

32 − 2 = 30

hosts/subnet

$2^2 - 2 = [2]$

Eg. 01 or 10