Solutions of HW7

EE450

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P4.11)

It is been provided that the addresses are 8 bits. Given this and the longest prefix match, it will be easy to get the address range mapped to each outgoing interface.

Outgoing Interface	Prefix Match	Address Range	Number of addresses
0	01	00000000-00111111	$2^6 = 64$
1	010	01000000-01011111	$2^5 = 32$
2	011	01100000-01111111	$2^5 = 32$
2	10	10000000-10111111	$2^6 = 64$
3	11	11000000-11111111	$2^6 = 64$

P4.13)

For the each of the three subnet consider those leave as many free bits that can accommodate the requested number of clients. For example for the first subnet we need to support 60 different hosts. So we need 6 bits to create at least 60 different IP addresses. As a result the subnet mask will have $3 * 8 + 2 = 26$ bits and can be expressed as: $223.1.17.0/26$.

For the second subnet we need to accommodate at least 90 different IPs for which we need at least 7 bits, so the number of the bits in the subnet mask will be 25 and the domain can be expressed as: $223.1.17.128/25$

The third subnet only need to support 12 IPs which can be done with 3 bits. $223.1.17.192/28$

P4.19)

Considering that in each datagram 20 bytes is dedicated for the IP header, each fragment can fit in $700 - 20 = 680$ bytes. Thus the number of required fragments will be $\left\lceil \frac{2400-20}{680} \right\rceil = 4$

Each fragment will have Identification number 422. Each fragment except the last one will be of size 700 bytes (including IP header). The last datagram will be of size 360 bytes (including IP header). The offsets of the 4 fragments will be 0, 85, 170, 255. Each of the first 3 fragments will have flag=1; the last fragment will have flag=0.

P4.28)

Each node in the first round updates its cost to its neighbors based on what she knows in advance and will consider infinity for the cost to all other nodes. In the next step it will ask its neighbors to update her with their cost table to the other nodes. Then she will update her own cost table by summing up her cost to her neighbor with the received cost table of the neighbors and substitute the minimum calculated one in each cell. This process will be repeated rounds and rounds till for the few round the cost table of the nodes remains unchanged.

Cost to

From		u	v	x	y	z
	y	∞	∞	∞	∞	∞
	x	∞	∞	∞	∞	∞
	z	∞	6	2	∞	0

Cost to

From		u	v	x	y	z
	y	1	0	3	∞	6
	x	∞	3	0	3	2
	z	7	5	2	5	0

Cost to

From		u	v	x	y	z
	y	1	0	3	3	5
	x	4	3	0	3	2
	z	6	5	2	5	0

Cost to

From		u	v	x	y	z
	y	1	0	3	3	5
	x	4	3	0	3	2
	z	6	5	2	5	0

P4.31)

Node x table:

	Cost to		
From	**x**	**y**	**z**
x	0	3	4
y	∞	∞	∞
Z	∞	∞	∞

	Cost to		
From	**x**	**y**	**z**
x	0	3	4
y	3	0	6
z	4	6	0

Node y table:

	Cost to		
From	**x**	**y**	**z**
x	∞	∞	∞
y	3	0	6
z	∞	∞	∞

	Cost to		
From	**x**	**y**	**z**
x	0	3	4
y	3	0	6
Z	4	6	0

Node z table:

	Cost to		
From	**x**	**y**	**z**
x	∞	∞	∞
y	∞	∞	∞
z	4	6	0

	Cost to		
From	**x**	**y**	**z**
x	0	3	4
y	3	0	6
Z	4	6	0