

Jordan Dube

CMSC 440

HW 4

Questions: 4.a, 4.b, 10, 12, 13, 17, 19, 21, 26

4.

a.

Destination	Interface
H3	Link 3
H1	Link 1
H2	Link 2
other	Link 4

- b. No you cannot create a forwarding table that forwards traffic from H1 to H3 through Link 3 and all traffic from H2 to H3 through Link 4 because a forwarding table does not store origin information. Packets from both H1 and H2 having the same destination could be mapped to more than 1 interface, but distinguishing between those packets from H1 and H2 is beyond any forwarding table.

10.

a.

Prefix	Interface
11100000 00	0
11100000 01000000	1
11100000 01000001	2
11100001 0	2
otherwise	3

- b. 11001000 10010001 01010001 01010101: does not match the 1st, 2nd, 3rd, or 4th entries, so it is forwarded through link interface 3.

11100001 01000000 11000011 00111100: does not match the 1st, 2nd, or 3rd entries, but it does match the 4th entry, so it is forwarded through link interface 2.

11100001 10000000 00010001 01110111: does not match the 1st, 2nd, 3rd, or 4th entries, so it is forwarded through link interface 3.

12.

prefix	range	Address range size	interface
1	10000000 Through 11111111	$2^7 = 128$	0
10	10000000 Through 10111111	$2^6 = 64$	1
111	11100000 Through 11111111	$2^5 = 32$	2
otherwise	00000000 Through 01111111	$2^7 = 128$	3

13.

Subnet 1: 223.1.17.0/26 (223.1.17.0 - 223.1.17.63) can support 64 interfaces, so it meets the 60 interfaces requirement.

Subnet 2: 223.1.17.64/25 (223.1.17.64 - 223.1.17.191) can support 128 interfaces, so it meets the 90 interfaces requirement.

Subnet 3: 223.1.17.192/28 (223.1.17.192 - 223.1.17.207) can support 16 interfaces, so it meets the 12 interfaces requirement.

17.

a.

Subnet A: 214.97.255/24 ($256 \geq 250$)

Subnet B: 214.97.254.0/25 ($128 \geq 120$)

Subnet C: 214.97.254.128/25 - 214.97.254.128/29 ($128-8 \geq 120$)

Subnet D: 214.97.254.247/31 ($2 \geq 2$)

Subnet E: 214.97.254.249/31 ($2 \geq 2$)

Subnet F: 214.97.254.251/30 ($4 \geq 2$)

b.

R1:

prefix	interface
11010110 01100001 11111111 (214.97.255)	Subnet A
11010110 01100001 11111110 1111100 (214.97.254.247)	Subnet D

11010110 01100001 11111110 111111 (214.97.254.251)	Subnet F
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R2:

prefix	interface
11010110 01100001 11111110 1111101 (214.97.254.249)	Subnet E
11010110 01100001 11111110 111111 (214.97.254.251)	Subnet F
11010110 01100001 11111110 1 (214.97.254.128)	Subnet C

R3:

prefix	interface
11010110 01100001 11111110 1111100 (214.97.254.247)	Subnet D
11010110 01100001 11111110 0 (214.97.255)	Subnet B
11010110 01100001 11111110 1111101 (214.97.254.249)	Subnet E

19.

MTU = 700 B

Total bytes: 2400 B

Datagram Header size: 20 B

Number of fragments = $\text{ceil}((2400-20) / (700-20)) = 4$

Datagram ID number: 422

Frag num	Num of Bytes in payload	ID num	Frag offset	Flag
1	$700-20 = 680$	422	0	1
2	$700-20 = 680$	422	$680/8 = 85$	1
3	$700-20 = 680$	422	$85 * 2 = 170$	1

4	$2380 - 3 * 680 = 340$	422	$85 * 3 = 255$	0
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21.

a.

Home addresses:

Hosts: 192.168.1.1, 192.168.1.2, 192.168.1.3

Router: 192.168.1.4

b.

WAN	LAN
24.34.112.235, 5001	192.168.1.1, 3345
24.34.112.235, 5002	192.168.1.1, 3346
24.34.112.235, 5003	192.168.1.2, 3345
24.34.112.235, 5004	192.168.1.2, 3346
24.34.112.235, 5005	192.168.1.3, 3345
24.34.112.235, 5006	192.168.1.3, 3346

26.

N'	D(v), p(v)	D(w), p(w)	D(t), p(t)	D(u), p(u)	D(y), p(y)	D(z), p(z)
x	3, x	6, x	inf	inf	6, x	8, x
xv	3, x	6, x	7, v	6, v	6, x	8, x
xvu	3, x	6, x	7, v	6, v	6, x	8, x
xvuw	3, x	6, x	7, v	6, v	6, x	8, x
xvuwy	3, x	6, x	7, v	6, v	6, x	8, x
xvuwyt	3, x	6, x	7, v	6, v	6, x	8, x
xvuwytz	3, x	6, x	7, v	6, v	6, x	8, x

X -> x : 0

X -> v : 3

X -> w : 6

X -> t : 7

x -> u : 6

x -> y : 6

x -> z : 8