

Homework 4 Solution

Problem 1

- a) Data destined to host H3 is forwarded through interface 3

Destination Address	Link Interface
H3	3

- b) No, because forwarding rule is only based on destination address.

Problem 2

- a) No, you can only transmit one packet at a time over a shared bus.
- b) No, as discussed in the text, only one memory read/write can be done at a time over the shared system bus.
- c) No, in this case the two packets would have to be sent over the same output bus at the same time, which is not possible.

Problem 5

a)

Prefix Match	Link Interface
11100000 00	0
11100000 01000000	1
1110000	2
11100001 1	3
otherwise	3

- b) Prefix match for first address is 5th entry: link interface 3
Prefix match for second address is 3rd entry: link interface 2
Prefix match for third address is 4th entry: link interface 3

Problem 7

Destination Address Range	Link Interface
11000000 through (32 addresses) 11011111	0

10000000 through(64 addresses) 10111111	1
11100000 through (32 addresses) 11111111	2
00000000 through (128 addresses) 01111111	3

Problem 9

Destination Address	Link Interface
200.23.16/21	0
200.23.24/24	1
200.23.24/21	2
otherwise	3

Problem 14

The maximum size of data field in each fragment = 680 (because there are 20 bytes IP header).

$$\text{Thus the number of required fragments} = \left\lceil \frac{2400 - 20}{680} \right\rceil = 4$$

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.

Problem 16

- a) Home addresses: 192.168.1.1, 192.168.1.2, 192.168.1.3 with the router interface being 192.168.1.4
b)

NAT Translation Table

WAN Side	LAN Side
24.34.112.235, 4000	192.168.1.1, 3345
24.34.112.235, 4001	192.168.1.1, 3346
24.34.112.235, 4002	192.168.1.2, 3445
24.34.112.235, 4003	192.168.1.2, 3446
24.34.112.235, 4004	192.168.1.3, 3545
24.34.112.235, 4005	192.168.1.3, 3546

