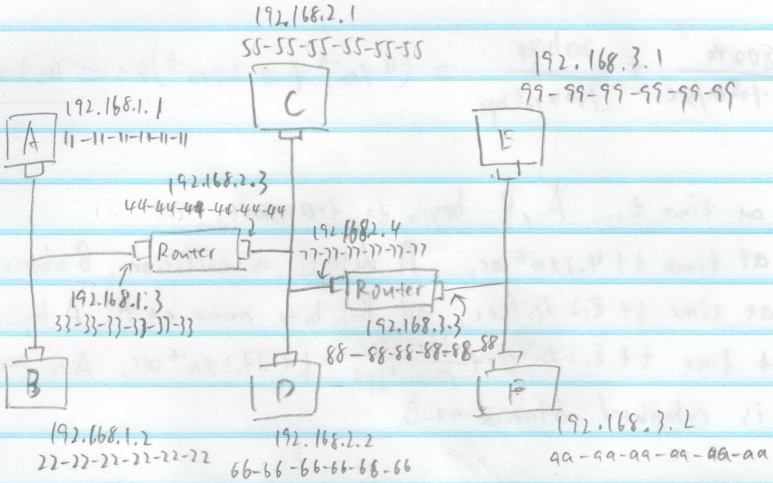
Zi Yan

CS654

Chapter1 P14.

a, b.




c. 1. Forwarding table in E determines the packet should be sent to interface 192.168.3.3

2. Host E uses ARP table and get the MAC address for 192.168.3.3 is 88-88-88-88-88-88.

3. A's adapter creates a Ethernet packet with destination address 88-88-88-88-88-88.

4. When the router gets the packet, it will determine that the packet should be forword to 192.168.2.3 from interface 192.168.2.4 by looking at forwarding table.

5. The router gets MAC address of 192.168.2.3, and sends the packet with source MAC address: 77-77-77-77-77-77, dest MAC address: 44-44-44-44-44-44,

6. The router gets the packet, it will determine that the packet should go to 192.168.1.2 from interface 192.168.1.3, by looking at forwarding table.

7. From ARP table, the router knows MAC address of 192.168.1.2 is 22-22-22-22-22-22, so creates a packet with src MAC address 33-33-33-33-33-33 to dest MAC address 22-22-22-22-22-22.

8. The packet reaches B.

P25.

a. $\frac{800\text{ m}}{2\cdot10^8\text{ m/sec}} + \frac{20\text{ bits}}{100\times10^6\text{ bps}} = (4\times10^{-6} + 0.2\times10^{-6})\text{ sec} = \underline{4.2\times10^{-6}\text{ sec}}$

b. ① at time $t$, A, B begin to transmit.

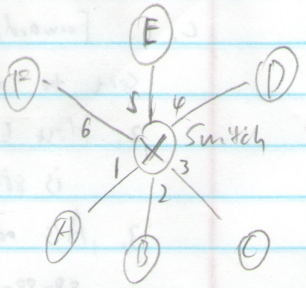
② at time $t + 4.2\times10^{-6}$ sec, A detects a collision, B aborts its transmission

③ at time $t + 8.2\times10^{-6}$ sec, all B's bits arrive at A, A begins to retransmit.

④ at time $t + 8.2\times10^{-6}\text{ sec} + \frac{1500\text{ bits}}{100\times10^6\text{ bps}} = t + 23.2\times10^{-6}$ sec, A's packet is completed delivered at B.

c. $t_{prop} + 5\times t_{trans} = 4.2\times10^{-6} + 5\times\frac{1500\text{ bits}}{100\times10^6\text{ bps}} = 79.2\times10^{-6}$ sec.

P32.




① before (i), switch table is empty.

② after (i), before (ii),

| addr | interface | time |
|---|---|---|
| B | 2 | $t_1$ |

③ after (ii), before (iii),

| addr | interface | time |
|---|---|---|
| B | 2 | $t_1$ |
| E | 5 | $t_2$ |

④ after (iii) before (iv)

| addr | interface | time |
|---|---|---|
| B | 2 | $t_1$ |
| E | 5 | $t_2$ |
| A | 1 | $t_3$ |

⑤ after (iv)

| addr | interface | time |
|---|---|---|
| B | 2 | $t_1$ |
| E | 5 | $t_2$ |
| A | 1 | $t_3$ |

event (i) the frame will be forwarded to all interfaces except 2, because the switch table does not have entry for E, and the frame is from interface 2.

event (ii) the frame will be forwarded to interface 2, because switch table knows B is at interface 2.

event (iii) the frame will be forwarded to interface 2, because switch knows B is at interface 2.
event (iv) the frame will be forwarded to interface 1, because switch knows A is at interface 1.

P37 ①. After the computer is on, the computer will send a packet to 255.255.255.255:67, asking for a IP address. Then, DHCP server will reply to 255.255.255.255:68 with assigned IP address and other information. The computer will choose this IP and send request back to 255.255.255.255:67. Finally, the DHCP server will confirm to the IP address just assigned.

②. You open a browser, and type in the domain name of a website. The browser will first look up for the IP address of the website.

③ Befor that, the packet sent to DNS server needs to reach the gateway router. The computer will use ARP to get the MAC address of the router.

④ It will send message to FF-FF-FF-FF-FF-FF to ask for the MAC address of the router whose IP address is given at DHCP time. The router will reply to the computer with its MAC address. Then, the computer knows the MAC address

⑤ The DNS request will be forwarded to DNS server via several routers. And DNS server will reply with the IP address of the website.

⑥. The browser will establish TCP connection the website at port 80, then send HTTP request in HTTP protocol to the website. The website will reply with the content of the website to the computer.

⑦ The browser will render the html files from the website. You can see the website now.

Chapter 7 10.

a.

| Packet | delay |
|---|---|
| 2 | 7 |
| 3 | 9 |
| 4 | 8 |
| 5 | 7 |
| 6 | 9 |
| 7 | 8 |
| 8 | 8 |

b. packet 3, 4, 6, 7, 8 will not arrive in time.

c. packet 3, 6 will not arrive in time.

d. The dely should be at least 9 time units.

P20 For three classes, their fraction will be $\frac{0.5}{0.5+0.25+0.25}=0.5$, $\frac{0.25}{1}=0.25$, $\frac{0.25}{1}=0.25$.

a. sequence will be 1 1 2 3 1 1 2 3 1 1 2 3 ...

b. The sequence will still be 1 1 2 1 1 2 ...

P21 a.

| Packet | time to leave | delay |
|---|---|---|
| 2 | 0 1 | 1 |
| 3 | 1 2 | 1 |
| 4 | 1 3 | 2 |
| 5 | 3 5 | 2 |
| 6 | 3 4 | 2 |
| 7 | 3 6 | 3 |
| 8 | 5 7 | 2 |
| 9 | 5 8 | 3 |
| 10 | 7 9 | 2 |
| 11 | 8 10 | 2 |
| 12 | 8 11 | 3 |

Avg overall delay:
$(0+1+1+2+2+2+3+2+3+2+2+2+3)/12$
$= 23/12 = 1.92$

b.

| Packet | time to leave | delay |
|---|---|---|
| 2 | 2 | 2 |
| 3 | 1 | 0 |
| 4 | 6 | 5 |
| 5 | 3 | 0 |
| 6 | 7 | 5 |
| 7 | 4 | 1 |
| 8 | 9 | 4 |
| 9 | 5 | 0 |
| 10 | 10 | 3 |
| 11 | 8 | 0 |
| 12 | 11 | 3 |

avg delay
$(0+2+0+5+0+5+1+4+0+3+0+3)/12$
$= 23/12 = 1.92$

c.

| Packet | time to leave | delay |
|---|---|---|
| 2 | 2 | 2 |
| 3 | 4 | 3 |
| 4 | 1 | 0 |
| 5 | 3 | 0 |
| 6 | 6 | 4 |
| 7 | 5 | 2 |
| 8 | 7 | 2 |
| 9 | 9 | 4 |
| 10 | 11 | 4 |
| 11 | 8 | 0 |
| 12 | 10 | 2 |

avg delay:
$(0+2+3+0+0+4+2+2+4+4+0+2)/12$
$= 23/12 = 1.92$

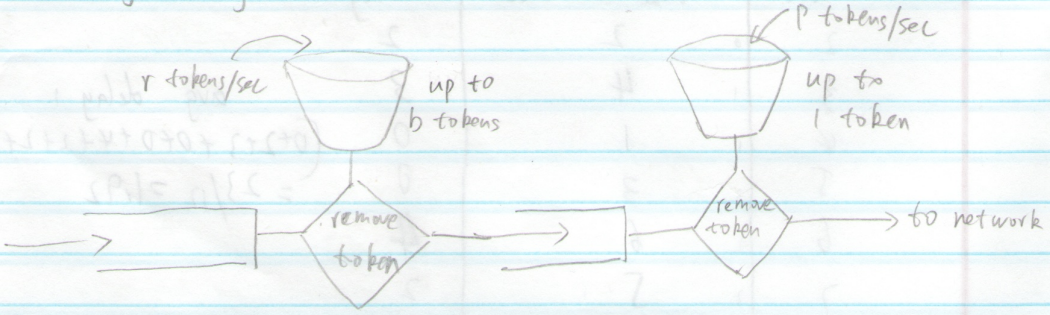
d.

| packet | time to leave | delay | note |
|---|---|---|---|
| 2 | 2 | 2 | |
| 3 | 1 | 0 | |
| 4 | 5 | 4 | |
| 5 | 3 | 0 | |
| 6 | 7 | 5 | no packet from class 1 |
| 7 | 4 | 1 | |
| 8 | 9 | 4 | no packet from class 1 |
| 9 | 6 | 1 | |
| 10 | 10 | 3 | no packet from class 1 |
| 11 | 8 | 0 | |
| 12 | 11 | 3 | no packet from class 1 |

avg delay:
$(0+2+0+4+0+5+1+4+1+3+0+3)/12$
$= 23/12 = 1.92$

e. the ~~average~~ delays are all the same.

P26.




For second bucket, its size is 1,
and token generation rate is P tokens/sec.