CS7344 Homework 4

Name: Bingying Liang
ID: 48999397

Nov 1 2023

1. A group of friends gets together to play highly interactive CPU- and network-intensive video games. The friends play together using a high-bandwidth wireless network. The wireless signal cannot propagate through walls, but the friends are all in the same room. In such a setup, would it be best to use nonpersistent CSMA or the token ring protocol? Please explain your answer.

   Solution: Nonpersistent CSMA might be best to use.
   Explain:

   (a) Because the friends are play highly interactive CPU and network intensive video games. In such a scenario, real-time communication and low latency are crucial. And Due to the high-bandwidth wireless network, all the friends are in the same room, the distance and the risk of interference are minimized.

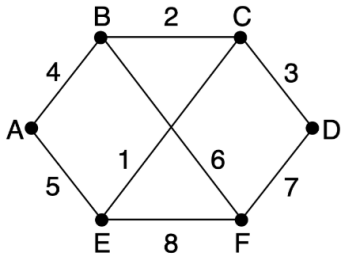
   (b) The high bandwidth of the network means it can handle bursts of data which might come from gaming activities. Since CSMA allows devices to send data immediately if the channel is idle, it might offer lower latency compared to waiting for a token in a Token Ring setup.

   (c) Given that all players are in the same room and the wireless signal doesn't propagate through walls, the likelihood of excessive collisions is reduced. Therefore, the inefficiencies that can plague CSMA in crowded networks are less of a concern here.

   (d) Real-time games require quick response times, and waiting for a token in a Token Ring environment might introduce unwanted latency.

   (e) While Token Ring ensures a collision-free environment, its deterministic nature might not be necessary in the described setup, and the added delay of waiting for the token might be detrimental for real-time gaming. Nonpersistent CSMA, given its nature, would potentially allow for quicker responses and might be more suitable for the gaming scenario described.

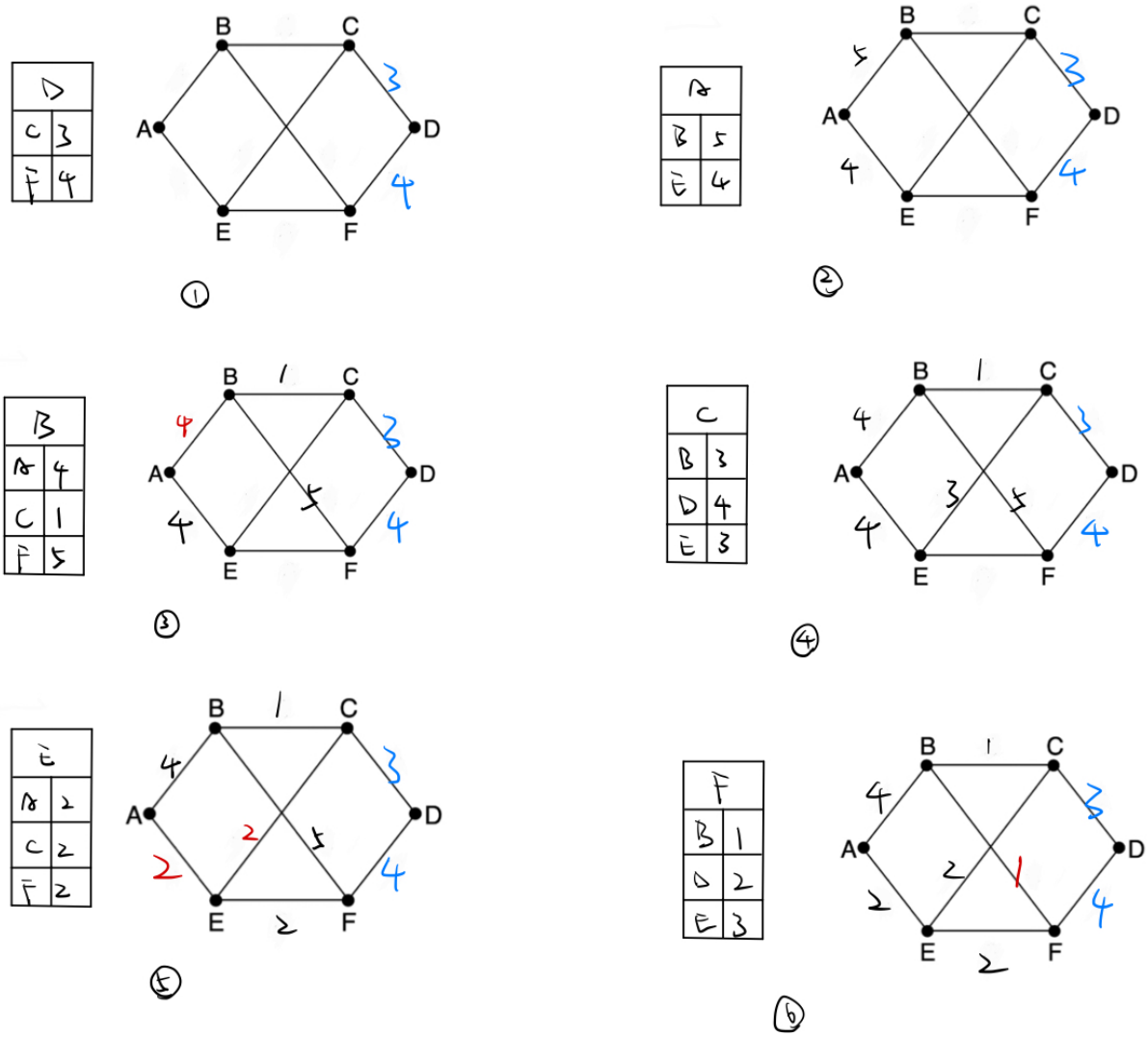
2. Consider the network of Fig. 5-12(a) in your textbook. Distance vector routing is used, and the following link state packets have just come in at router D: from A: (B: 5, E: 4); from B: (A: 4, C: 1, F: 5); from C: (B: 3, D: 4, E: 3); from E: (A: 2, C: 2, F: 2); from F: (B: 1, D: 2, E: 3). The cost of the links from D to C and F are 3 and 4 respectively. What is D's new routing table? Give both the outgoing line to use and the cost.



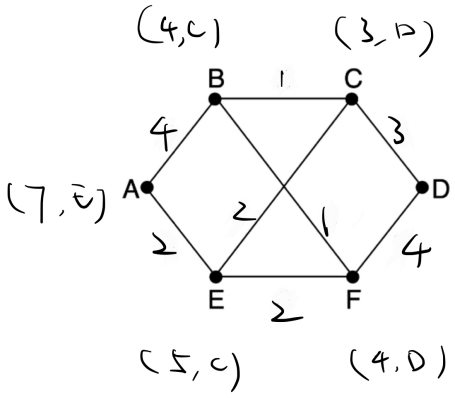
(a)

Figure 5-12. (a)

Solution:



∵ Distance vectoring routing is used

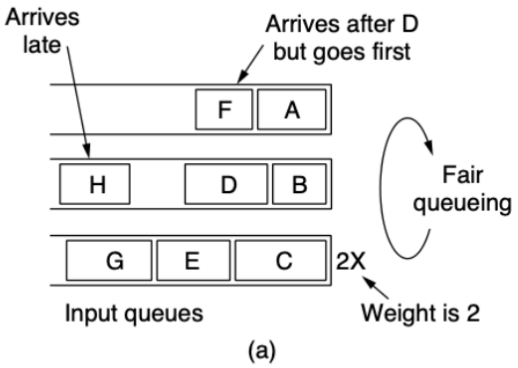


∴

Go to	outline	cost
A	C	7
B	C	4
C	C	3
D	-	0
E	C	5
F	F	4

∴

3. Consider the packet queues shown in Fig. 5-29 in your textbook. What is the finish time and output order of the packets if the middle queue, instead of the bottom queue, has a weight of 2? Order packets with the same finish time alphabetically.

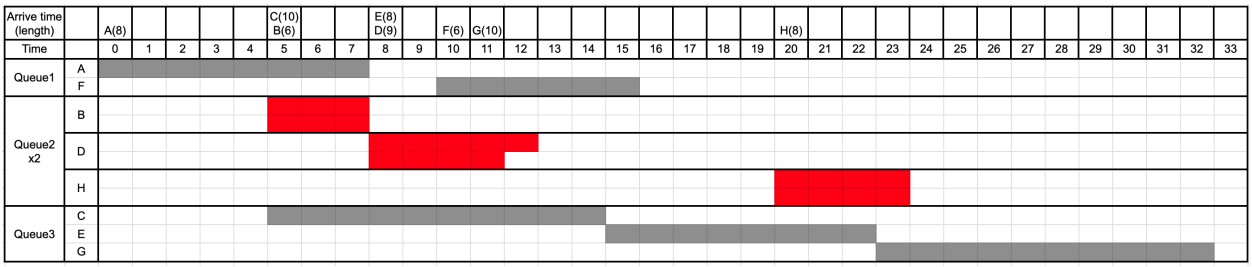


Packet	Arrival time	Length	Finish time	Output order
A	0	8	8	1
B	5	6	11	3
C	5	10	10	2
D	8	9	20	7
E	8	8	14	4
F	10	6	16	5
G	11	10	19	6
H	20	8	28	8

(b)

Figure 5-29. (a) Weighted Fair Queueing. (b) Finishing times for the packets.

Solution:



The finish time is:

Packet	Finish
A	8
B	8
C	15
D	13
E	23
F	16
G	33

The process is in the above picture. And the finish order is: A B D C F E H G (A B finish first at the same time).

4. Looking at the network of Fig. 5-6 in your textbook, how many packets are generated by a broadcast from B, using a) reverse path forwarding? and b) the sink tree?

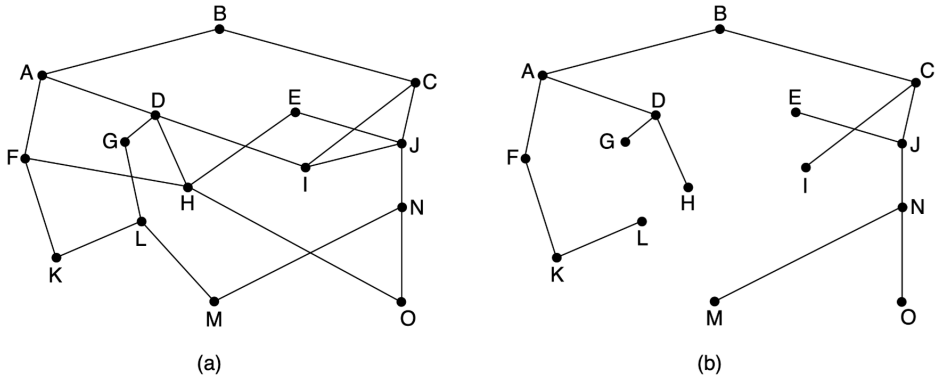
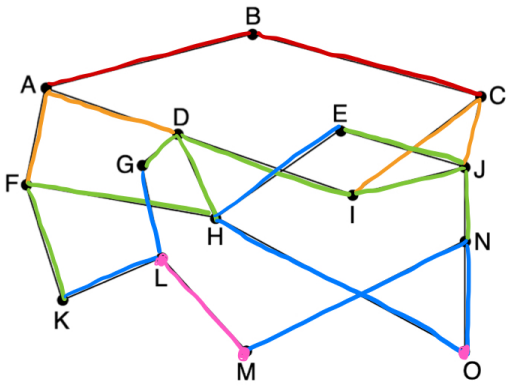


Figure 5-6. (a) A network. (b) A sink tree for router *B*.

Solution:

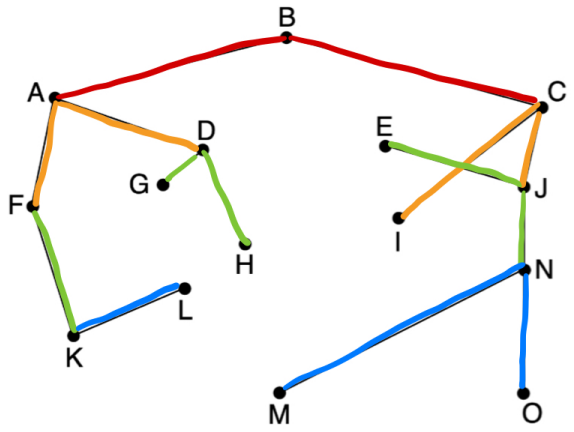
(a) From the picture below:



(a)

From the above, can get that the reverse path forwarding algorithm takes five rounds to finish. There are 21 edges which means a total of 21 packets are generated.

(b) From the picture below:



(b)

(b) A sink tree for router *B*.

① B A BC

② AF AD . CI CJ

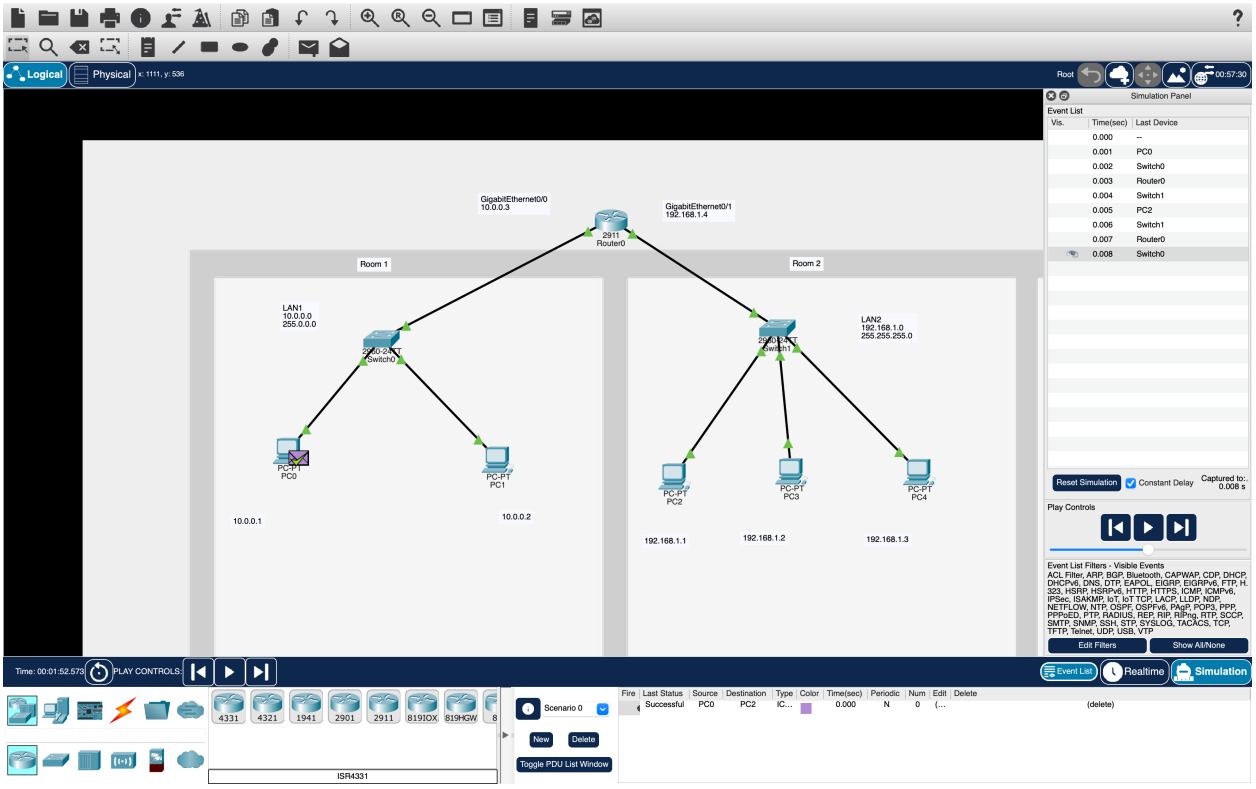
③ FK . DG . DH . JE . JN

④ KI NM NO

From the above, can get that the sink tree needs four rounds. There are 14 edges which means a total of 14 packets are generated.

5. Suppose your house has two rooms. In the first room, 2 computers are connected with a LAN, and in the second room, 3 computers are connected with another LAN. And both of the LANs are connected with a router. Can you design this network using cisco packet tracer and show the data flow from one computer of room 1 to another computer in room 2? To submit the answer to this question you have to record a video of the data flow of the network and upload it to a server (YouTube/ drive). Then share the link of the video as your answer. Make sure the link is public. To get help with cisco packet tracer you can follow this tutorial (link to an external site.).

Solution: https:youtu.beiX50bO4jMGI


Logical
Physical
Root
00:57:30
Simulation Panel
Event List
Vis.
Time(sec)
Last Device
0.000 --
0.001 PC0
0.002 Switch0
0.003 Router0
0.004 Switch1
0.005 PC2
0.006 Switch1
0.007 Router0
0.008 Switch0
GigabitEthernet0/0
10.0.0.3
2911
Router0
GigabitEthernet0/1
192.168.1.4
Room 1
Room 2
LAN1
10.0.0.0
255.0.0.0
LAN2
192.168.1.0
255.255.255.0
2960-24TT
Switch0
2960-24TT
Switch1
PC-PT
PC0
PC-PT
PC1
PC-PT
PC2
PC-PT
PC3
PC-PT
PC4
10.0.0.1
10.0.0.2
192.168.1.1
192.168.1.2
192.168.1.3
Reset Simulation
Constant Delay
Captured to:
0.008 s
Play Controls
Event List Filters - Visible Events
ACL Filter, ARP, BGP, Bluetooth, CAPWAP, CDP, DHCP, DHCPv6, DNS, DTP, EAPOL, EIGRP, EIGRPv6, FTP, H.323, HSRP, HSRPv6, HTTP, HTTPS, ICMP, ICMPv6, IPSec, ISAKMP, IoT, IoT TCP, LACP, LLDP, NDP, NETFLOW, NTP, OSPF, OSPFv6, PAgP, POP3, PPP, PPPoED, PTP, RADIUS, REP, RIP, RIPng, RTP, SCCP, SMTP, SNMP, SSH, STP, SYSLOG, TACACS, TCP, TFTP, Telnet, UDP, USB, VTP
Edit Filters
Show All/None
Time: 00:01:52.573
PLAY CONTROLS:
Event List
Realtime
Simulation
4331
4321
1941
2901
2911
819IOX
819HGW
ISR4331
Scenario 0
New
Delete
Toggle PDU List Window
Fire
Last Status
Source
Destination
Type
Color
Time(sec)
Periodic
Num
Edit
Delete
Successful
PC0
PC2
IC...
0.000
N
0
(...
(delete)