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| **KING SAUD UNIVERSITY**  **COLLEGE OF COMPUTER AND INFORMATION SCIENCES**  **COMPUTER SCIENCE DEPARTMENT** | | | |
| **CSC 329: Computer Network** | **Tutorial 8** | | **1st Semester 1437-1438** |
| **Name:** | | **Student ID:** | |
| **Serial Number:** | | **Section Number:** | |

**Part1: Multiple-Choice Questions**

1. The most primitive random access method is \_\_\_\_\_\_\_\_\_

a. ALOHA

h. CSMA

c. Channelization

d. Token passing

2. In the \_\_\_\_\_\_\_\_\_ random-access method there is no collision.

a. ALOHA

b. CSMA/CD

c. CSMA/CA

d. Token-passing

3. In the \_\_\_\_\_\_\_\_ random-access method, stations do not sense the medium.

a. ALOHA

b. CSMA/CD

c. CSMA/CA

d. Ethernet

4. In the 1-persistent approach, when a station finds an idle line, it \_\_\_\_\_\_\_\_

a. Waits 0.1 s before sending

b. Waits 1 s before sending

c. Waits a time equal to 1—p before sending

d. Sends immediately

5. In the p-persistent approach, when a station finds an idle line, it \_\_\_\_\_\_\_

a. Waits 1 s before sending

b. Sends with probability I —p

c. Sends with probability p

d. Sends immediately

6. The 1-persistent approach can be considered a special case of the p-persistent approach with p equal to \_\_\_\_\_\_\_

a. 0.1

b. 0.5

c. 1.0

d. 2.0

7. \_\_\_\_\_\_\_\_\_ is a random-access protocol.

a. CSMA

b. Polling

c. FDMA

d. CDMA

8. \_\_\_\_\_\_\_ is the access protocol used by traditional Ethernet.

a. CSMA

b. CSMA/CD

C.CSMA/CA

d. Token ring

9. When a collision is detected in a network using CSMA/CD, \_\_\_\_\_

a. The frame is immediately resent

b. A jam signal is sent by the station

c. The back-off value is set to 0

d. The back-off value is decremented by 1

**Part2: Exercises**

1) Complete the next table for the different protocols discussed in this chapter. Answer yes or no.

|  |  |  |
| --- | --- | --- |
| **Characteristic** | **ALOHA** | **CSMA/CD** |
| **Multiple access** | yes | yes |
| **Carrier Sense** | no | yes |
| **Collision checking** | no | yes |
| **Acknowledgment** | yes | no |

2) A slotted ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together) produces 333 frames per second?

The **Frame transmission time** = 200/200 kbps or 1 ms.

If the system creates 333 frames per second, this is (1/3) frame per millisecond.

The load is 1/3. In this case   
**S = G× e−G** = 0.238 (23.8 percent).

This means  
 that the **throughput** is 333 × 0.238 = 79.5 frames.  
 Only 79 frames out of 333 will probably survive.

3) In a CSMA/CD network with a data rate of 10Mbps, the minimum frame size is found to be 512 bits for the correct operation of the collision detection process. What Should be the minimum frame size if we increase the data rate to

Transmission Time >= 2x Propagation Time.

= 2x Propagation Time

 = 2 x 

Minimum frame size= 2 x 

K1=

Minimum frame size= K1 x 

In this question the distance is same So: K2=K1\* distance

Minimum frame size= K2 

Here BW=10 Mbps.

Minimum frame size= K2 

512 = 107

1. **100 Mbps?**

Minimum frame size= K2 

512 x10 = 108

5120=108

1. **Gbps?**

Minimum frame size= K2 

512 x 100 = 109

51200= 109

4) The distance between two stations A and C is 2600 m, the data rate is 10 Mbps and the propagation speed is 2x108 m/s. Station A starts sending a long frame at time t1 = 0; station C starts sending a long frame at time t2 = 4 s. Find

A

C

2600 m

t1=0

t2 = 4 s

Time

s

When a station sends a frame it still takes time for the first bit to reach each station

1. **The time when station C hears the collision**

we need to compute the time needed for the first bit to reach station c

Propagation time= distance/speed

=2600/2\*108 = 13 s

C will hear the collision t3= t1 + TP = 13 s

1. **The time when station A hears the collision**

Propagation time= 13 s

A will hear the collision t4= t2 + TP = 17 s

1. **The number of bits station A has sent before detecting the collision**

Number of bits = t4 – t1 \* data rate = 17 \*10-6\* 10 \* 106 = 170 bit

1. **The number of bits station C has sent before detecting the collision**

Number of bits = t3-t2 \* data rate = 9 \*10-6\* 10 \* 106 = 60 bit