

# COMPUTER NETWORKS ASSIGNMENT

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**Class:** BCSE-III  
**Section:** A1  
**Assignment:** 3

## **Problem statement:**

In this assignment, you have to implement 1-persistent, non-persistent and p-persistent CSMA techniques. Measure the performance parameters like throughput (i.e., average amount of data bits successfully transmitted per unit time) and forwarding delay (i.e., average end-to-end delay, including the queuing delay and the transmission delay) experienced by the CSMA frames (IEEE 802.3). Plot the comparison graphs for throughput and forwarding delay by varying p. State your observations on the impact of performance of different CSMA techniques.

## **Design**

### **1-persistent**

The algorithm of 1-persistent CMSA is:

- When a frame is ready, the transmitting station checks whether the channel is idle or busy.
- If the channel is busy, the station waits and continually checks until the channel becomes idle.
- If the channel is idle then it transmits the frame immediately, with a probability 1.
- A collision may occur if two or more channels transmit simultaneously. If collision occurs, the station waits for a random period of time and restarts the algorithm all over again.

## **P-persistent**

The algorithm of p-persistent CMSA is:

- When a frame is ready, the transmitting station checks whether the channel is idle or busy.
- If the channel is idle then it transmits the frame immediately.
- If the channel is busy, the station waits and continually checks until the channel becomes idle.
- When the channel becomes idle, the station transmits the frame with a probability  $p$ .
- With a probability  $(1 - p)$ , the channel waits for next time slot. If the next time slot is idle, it again transmits with a probability  $p$  and waits with a probability  $(1 - p)$ .
- The station repeats this process until either frame has been transmitted or another station has begun transmitting.
- If another station begins transmitting, the station waits for a random amount of time and restarts the algorithm.

## **Non – persistent**

The algorithm of non-persistent CMSA is

- When a frame is ready, the transmitting station checks whether the channel is idle or busy.
- If the channel is idle then it transmits the frame immediately.
- If the channel is busy, the station waits for a random time period during which it does not check whether the channel is idle or busy.
- At the end of the waiting time period, it again checks the status of the channel and restarts the algorithm.

## Results:

### For 1-persistent

```
Enter your choice -1 to exit
0- one persistent
1- non persistent
2- p persistent
0
frame no0    00110010  thread no 1
frame no1    01100100  thread no 1
frame no0    00000010  thread no 3
frame no0    01010011  thread no 0
frame no1    01101001  thread no 0
frame no0    01000011  thread no 9
frame no0    01100010  thread no 6
frame no1    00000100  thread no 6
frame no1    01000011  thread no 3
frame no0    00101001  thread no 7
frame no1    00001110  thread no 7
frame no0    01110011  thread no 4
frame no1    10100100  thread no 4
frame no1    00111000  thread no 9
frame no0    00001001  thread no 5
frame no1    11000110  thread no 5
frame no0    00101001  thread no 2
frame no1    00011100  thread no 2
frame no0    11000001  thread no 8
frame no1    01001010  thread no 8
Total Collision: 0
Total transmission time for all frame: 88556
average transmission time: 4427.8
Total time taken: 95189
ThroughPut: 0.201704
Efficiency: 100
```

## For non-persistent

```
Enter your choice -1 to exit
0- one persistent
1- non persistent
2- p persistent
1
frame no 0    00101001  thread no 2
frame no 1    00011100  thread no 2
frame no 0    00001001  thread no 5
frame no 0    01010011  thread no 0
frame no 1    01101001  thread no 0
frame no 1    11000110  thread no 5
frame no 0    00110010  thread no 1
frame no 0    01000011  thread no 9
frame no 1    00111000  thread no 9
frame no 0    00000010  thread no 3
frame no 1    01100100  thread no 1
frame no 0    00101001  thread no 7
frame no 1    00001110  thread no 7
frame no 1    01000011  thread no 3
frame no 0    01100010  thread no 6
frame no 1    00000100  thread no 6
frame no 0    01110011  thread no 4
frame no 1    10100100  thread no 4
frame no 0    11000001  thread no 8
frame no 1    01001010  thread no 8
Total Collision: 2
Total transmission time for all frame: 65616
average transmission time: 3280.8
Total time taken: 66783
ThroughPut: 0.287498
Efficiency: 90.9091
```

## For p-persistent

```
Enter your choice -1 to exit
0- one persistent
1- non persistent
2- p persistent
2
collision occured for thread 0
frame no 0    00110010  thread no 1
frame no 1    01100100  thread no 1
frame no 0    01100010  thread no 6
frame no 1    00000100  thread no 6
frame no 0    01000011  thread no 9
frame no 0    01010011  thread no 0
frame no 1    01101001  thread no 0
frame no 0    01110011  thread no 4
frame no 0    11000001  thread no 8
frame no 1    01001010  thread no 8
frame no 0    00000010  thread no 3
frame no 0    00101001  thread no 2
frame no 1    00011100  thread no 2
frame no 0    00101001  thread no 7
frame no 1    00001110  thread no 7
frame no 1    10100100  thread no 4
frame no 1    00111000  thread no 9
frame no 1    01000011  thread no 3
frame no 0    00001001  thread no 5
frame no 1    11000110  thread no 5
Total Collision: 1
Total transmission time for all frame: 118020
average transmission time: 5901
Total time taken: 118374
ThroughPut: 0.162198
Efficiency: 95.2381
```