Computer Networks Lab (CS 353): Lab 6

This lab will be graded.
Total Marks: 10

In this assignment you are going to compare the performance of Pure Aloha and Slotted Aloha protocols through experiments in NetSim. You will also compare the experimental values with the corresponding theoretical values.

First build an ad hoc network of K=10 wireless nodes numbered 1 to 10.

Then, create a Custom application (assume exponential distribution of frame inter arrival times and inter arrival time of 200 millisec) from nodes 2,3,..,10 to node 1. Ensure that there is no frame loss (In Adhoc Link Properties, channel characteristics must be set as "No Path Loss"). Configure the link bandwidth to be 10 Mbps. Set the retry limits to 0. Set the frame size to 1460 bytes. Set the slot length to 1200 microseconds for Slotted Aloha (equal to one frame time).

Offered load G (in frames per frame time) = (No of frames transmitted by all stations / simulation time) * frame time length
Throughput per frame time S = (No of frames successfully received / simulation time) * frame time length

Experiment 1:

1. Measure the following for your network:
   a. Number of frames transmitted
   b. Number of frames collided
   c. Number of frames successfully received
   d. Simulation time
2. Calculate the following for your network:
   a. Offered load (G)
   b. Throughput per frame time (S)
   c. Theoretical throughput
3. Repeat the experiment for various values of G by changing the link bandwidth.
4. Plot G (on the x-axis) vs experimental values of S and theoretical values of S, for 5 different values of G. Is there a difference? Why? **[5 Marks]**

Experiment 2

Repeat the experiment for Slotted Aloha. Use the appropriate formula for calculating S. Remember to change the slot length when you change the value of G. Plot the throughput of Slotted Aloha and Pure Aloha on the same graph.**[5 Marks]**