

**CE 472 Data Communications and Networks
Spring 2014, Laboratory Assignment III**

Due: 13/06/2014 Friday, 23:59

1 General Information

This laboratory assignment is concerned with simulation of the slotted Aloha protocol.

2 Methodology

In the slotted Aloha protocol, each station transmits with a certain probability in each slot. If there are N users and each of them transmits in each slot with probability p , the total traffic load is $G = Np$.

In each slot, you will generate random numbers between 0 and 1 for each of the N stations. The stations whose random numbers are less than p is assumed to transmit in that slot.

In each slot:

- if no stations transmit, the slot is said to be *idle*,
- if exactly one station transmits, a packet is *successfully transmitted*, and
- if two or more stations transmit, there occurs a *collision*.

Perform this simulation over 10^6 slots and count the number of idle, success and collision slots. Dividing them by the number of slots, you obtain the probability of a slot being idle, success or collision slot. Also, the probability of a slot being a success slot gives you the throughput.

3 Deliverables

There will be two inputs to the program:

- (i) number of stations, N , and
- (ii) the offered load, G .

You can then compute the transmission probability as $p = G/N$.

Your program should display the probability of a slot being idle, success or collision slot. You should observe that maximum throughput is achieved when $G = 1$, and that its value approaches 0.368 as N is increased.

Each student is required to submit the source code of his/her program and the executable. There is no restriction on the programming language.