Project 6 – Slotted random-access wireless network

In a slotted random-access network, N couples transmitter-receiver share the same communication medium, which consists of C separate channels. Multiple attempts to use the same channel in the same slot by different transmissions will lead to *collision*, hence no receiver listening on that channel will be able to decode the message.

Assume that each of the N transmitters generate packets according to an exponential interarrival distribution, and picks its channel at random on every new transmission. Before sending a packet, it keeps extracting a value from a Bernoullian RV with success probability p on every slot, until it achieves success. Then it transmits the packet and starts over. If a collision occurs, then the transmitter *backs off* for a random number of slots (see later), and then starts over the whole Bernoullian experiment.

The number of backoff slots is extracted as $U(1, 2^{x+1})$, where x is the number of collisions experienced by the packet being transmitted.

Evaluate at least the network throughput and the packet delay as the offered load increases.

In all cases, it is up to the team to calibrate the scenarios so that meaningful results are obtained.

Project deliverables:

a) Documentation (according to the standards set during the lectures)
b) Simulator code
c) Presentation (up to 10 slides maximum)