Project 8 – Edge computing-enabled cellular network

A cellular network is composed of M base stations, placed within a 2D floorplan of size $L \times H$ according to a regular grid. Each base station also has *edge computing* capabilities, i.e., it can receive computing tasks from cellular network's users and serve them at a rate equal to S instructions per seconds following a First Come First Served (FCFS) policy. Assume that all base stations are interconnected between each other via mesh topology.
Consider N users placed at random locations (x, y) within the same 2D floorplan, where coordinates x and y are random variables to be defined later. Each user generates a new computing task request every *T* seconds, and each request consists of *I* instructions to be executed. *T* and *I* are exponentially distributed RVs. In particular, a user sends each new task request to its serving base station (i.e., the closest one), which in turn can follow one of methods below:

a. serve the request *locally*, or
b. forward the request to the *less-loaded* base station.

For option b), assume that forwarding the request adds a fixed latency of *D* milliseconds.

Evaluate at least the time required to complete a computing task for various values of *N* for both methods.

At least the following scenarios must be evaluated:

- uniform distribution of x and y;
- lognormal distribution of x and y.

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)