Project 9 – Faculty Bar (2)

Consider a system that manages the orders of customers and the tables in a bar. Orders are issued to a cashier, which has two queues: one for *normal* users and one for *VIP* users. *VIP* users have non-preemptive priority over normal users. Users belonging to the same queue are served according to a FIFO policy. Orders are completed directly by the cashier, with a service rate $r_{cashier}$.
The bar has *n* tables that can contain *m* customers each (both VIP and normal users). When an order is completed the customer queues for a table with available space. Each customer consumes the order at the table for a time t_e than leaves the bar. An order is completed when the corresponding customer leaves the bar. The queue for tables is served in FIFO order.

Consider the following workload: customer interarrival times are IID RVs (to be described later), the service rate $r_{cashier}$ and the eating time t_e are IID RV (to be described later).
The response time of an order is defined as the time between the arrival of an order and the completion of its service.

Model the system described above and study its response time and average queueing time for both queues with a varying workload. Study the relationship between both $r_{cashier}$ and t_e, and length of queues.
More in detail, at least the following scenarios must be evaluated:

- Constant interarrival times, constant service times.
- Exponential distribution of all the above RVs, with the same means as the previous case.

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)