

## Project 11 – The Carrefour

A supermarket has  $n$  tills. Two policies can be enforced for checkout:

- a) Make a *single queue* in the supermarket, and send the head-of-line customer to the first idle till.
- b) Allow each open till to manage its own (FIFO) queue. In this case, customers are expected to queue up at the till with the shortest queue (ties are broken arbitrarily).

Consider the following workload: customer inter-arrival times are IID RVs (to be described later), their service demands (i.e., checkout times) are IID RV (to be described later). The number of tills can be varied (but stays constant in a single simulation). Under option a), consider that a customer has to reach the first idle open till (say, till  $j$ ), which takes  $\Delta \cdot j$  units of time – during which that till remains idle.

Compare the queueing and response time of the two options under a varying workload. More in detail, at least the following scenarios must be evaluated:

- Exponential distribution of the interarrival times and service demands.
- Lognormal distribution of the service demands.

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)