

Project 3 – Quick checkout

Customers arrive at the tills for check out according to an inter-arrival time of T seconds, and each of them has M items in the shopping cart. Two policies can be enforced for checkout:

- a) Undistinguished tills: any customer can check out at any till.
- b) Quick-checkout tills: a percentage p of tills is reserved for customers whose shopping cart holds less than K items (K being the quick-checkout threshold).

In both cases, a customer queues up at the till with the smallest queue among those where (s)he is allowed to queue. Service time for a customer with M items is given by $S = M \times 3s$.

Consider the following workload: customers' inter-arrival times (i.e, T) and the number of items in their shopping cart are IID RVs (to be described later). The percentage of quick-checkout tills can be varied (but stays constant in a single simulation), and so does K .

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

- Exponential distribution of T and M .
- Lognormal distribution of M .

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 and up to 10 pages)
- b) Simulator code
- c) Presentation (up to 10 slides)