

State machines

A mobile phone repair shop, due to Pandemic Restrictions, can only allow a customer at a time to enter. As soon as a new customer enters, a first attendant determines whether her request can be satisfied or not. This takes an $Erlang<0.1\text{ s}^{-1}, 3>$ distributed amount of time. The request can be accepted with 80% probability. If accepted, the customer can go to the service stage, that takes an exponentially $Exp<0.01\text{ s}^{-1}>$ distributed amount of time; otherwise she leaves. As soon as the customer leaves, another one enters immediately with probability 50%. Otherwise the average time after which a new customer will arrive is exponentially $Exp<0.005\text{ s}^{-1}>$ distributed.

- Draw a state machine based model of the system
- Implement it in a programming language of your choice
- Compute the probability of having a customer in the first stage, in the second stage, or having the shop empty and waiting for a new customer.
- Determine the utilization of the system.