

Simulate a Simple Supply Chain

Problem description

There are ten store outlets that get replenishments from a single warehouse. Initially, there are 100 units of product at each of the outlets. Inventory changes due to the following reasons only: Sales, expirations, damages, replenishment.

- Sales Demand at each outlet follow Normal distribution: $N(70, 6^2)$.
- Expirations follow the Poisson distribution: $P(3)$
- Damages follow the Poisson distribution: $P(2)$
- At every time step, 100 items are dispatched from the warehouse to each of the outlets. The lead time for those items to arrive at any of the outlet follows the Poisson distribution: $P(3 \text{ timesteps})$.

Your task is to simulate sales, damages, expirations, replenishments and inventory at each outlet and keep track of these quantities. Also, calculate the quantity *Lost Sales (LS)* for each timestep, where;

LS = unfulfilled Sales due to stockouts.

Run the simulation for 50 timesteps ($t=1, 2 \dots 50$). At the end of the simulation, output all the tracked quantities in tabular format for one outlet of your choice.

We are looking for good coding practices and overall approach to the solving the problem. Use Python.