

Jeans store management

Changes to the setup introduced by the simulation project:

1. Demand for each size is independent and follows a Poisson process with a given rate per day. Due to the popularity of the jeans, in the first 30 days of the season demand is 50% higher ($1.50\lambda_s$) and in the last 20 days it is 25% lower ($0.75\lambda_s$). For the rest of the season the arrival rate for each item is given in the following table:

Waist	32			33			34			36		
Length	30	32	34	30	32	34	30	32	34	30	32	34
λ_s	2	5	4	13	15	12	11	17	13	4	7	5

2. The shipment arrives 10 days after placing an order. To be precise, if an order is placed on day t , it arrives at the beginning of day $t + 10$, and jeans from it can be sold on that day.
3. If a customer cannot be served with the available jeans inventory, the store incurs a lost sale, which impacts future demand by diverting customers to the competition. Each single lost sale leads to a 0.1% reduction of the current basic arrival rate (λ_s) across all types of jeans. This is to be scaled for the beginning and the end of the season.
4. You have the freedom to decide the order times and order quantities of each type of jeans, but you are limited to 4 orders in total per season.



Maknoon, Markov

Project 2, Group 1: Jeans store management

Tasks:

1. Identify the decision variables of the jeans store management problem.
2. Define the objective function.
3. Design an optimization algorithm and apply it to solve the problem. The value of the objective function is evaluated by discrete event simulation.
4. Like in the simulation project, the objective function can reflect various policies of the decision maker: whether they want to optimize over the average, best, worst, or certain percentile of the objective function distribution. Decide what your position is and justify it, or present results for several alternatives.
5. Use your creativity and explore service strategies, for example related to the reduction of length, that leads to a lower cost solution.

Bonus question: Design a series of what-if scenarios of the impact of the demand parameters given in your problem on the value and structure of the best solution. Interpret the results.