Modeling and Simulation for Inventory System

Name
Muaad Siala

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- Part 1: Problem formulation

A car dealer has a car display showroom (i.e., for customers to closely inspect the car and its options) that can hold a maximum of 4 cars. Further, there is an inventory that holds a maximum of 8cars. Every day there is a demand on cars where the distribution of the number of cars demanded per day is shown in Table 1. The cars are sold first from the inventory, and when the inventory runs out of cars, the cars in the showroom are sold. When the number of cars in the inventory reaches a certain minimum, the car dealer places an order to fill the inventory and the showroom to their maximum limit. The lead time is the time from placement of an order by the car dealer to receive new lot of cars until the order is received. Here, lead time is a random variable, as shown in Table 2. During the lead time, demands also occur at random.

It is assumed that orders are placed at the close of business and are received for inventory at the beginning of business day as determined by the lead time. The review period (i.e., the period after which the inventory is revised, and an order is placed to fill the inventory to its maximum limit) is denoted by variable N = 2.

- Part 2: Reformulation of the Problem