

Discrete Mathematical Modeling HW #7

This homework will involve modifying the Mathematica code for Monte Carlo simulations of store inventories and sales we discussed in class. The idea of this assignment is to take a simple model and to incrementally make it better by adding features.

Submit your work via Canvas as four separate Mathematica files, one for each of the four problems below. Each file should be named “LastFirstX.nb” where Last is your last name, First is your first name, and X is the problem number. For example, “MusselmanClark3.nb” would be my solution to problem 3. Use text cells to add commentary in answering the questions posed below.

1. Modify the existing methods so that the each simulation can be run many times (call this number of times *numSim*) and have the program report the average results taken over all simulations.
2. Assuming a profit of \$10 is made for each item sold, a loss of \$2 is incurred for every lost sale, and a loss of \$0.50 per day per number of items in stock greater than 2, modify the existing code for both methods to report the net profit (or loss) at the end of the simulation.
3. Create a hybrid of the two ordering strategies in which in which an item is ordered when the stock is depleted and there is a standing order for a stock item to arrive once a week. Compare this model to the previous two models and comment on which strategy seems best in terms of net profit.
4. One problem with a standing order is that it may allow too much stock to build up. Implement a mechanism in the code the prevents the stock from growing greater than some fixed value named *maxStock* by not placing an order (either the standing order or the order that comes after a sale) when the stock level is already at *maxStock*.