Name: .....

ISyE 3103 Introduction to Supply Chain Modeling: Logistics
Summer 2016
Quiz 1
June 16, 2016

Instructions

1. There are 2 pages and 23 points.
2. Do your own work.
3. Show all calculations.
4. No notes, books, calculators, cell phones, or any other electronic equipment allowed.

Question 1 (9 points)

1.1 Name 3 types of bar code reader in increasing order of price. (3)
Answer: (1) Wand bar code scanners. (2) Charged Couple Devices. (3) Laser bar code scanners.

1.2 What is the defining difference between active and passive radio frequency identification tags? (2)
Answer: Active tags have their own power source whereas passive tags get all their power from the radio waves transmitted to them.

1.3 In the articles, "The Robust Beauty of Improper Linear Models in Decision Making" by Robyn M. Dawes "The Superiority of Simple Alternatives to Regression for Social Science Predictions" by Jason Dana and Robyn M. Dawes, the authors compare the accuracy of improper linear models with the accuracy of proper linear models and judgmental forecasts. Explain what are "improper linear models", and what did they conclude? (4)
Answer: Proper linear models have optimal parameters (for example, determined by the least squares criterion), and improper linear models have simpler parameters, for example, equal weights after scaling of explanatory variables. When the goodness-of-fit R is low, improper linear models produce more robust forecasts than proper linear models.

Question 2 (14 points)

2.1 What is the "bullwhip effect"? (2)
Answer: Variability in orders increases as you move up the supply chain.

2.2 Name the 4 primary causes of the bullwhip effect discussed in class. (4)
Answer: (1) Demand forecast updating or propagation up the supply chain. (2) Order batching. (3) Sales promotions. (4) Rationing and shortage gaming.

2.3 Describe 3 causes of the bullwhip effect described in the Barilla case. You must describe specifically how these causes came about in the Barilla case. (6)

Answer: (1) Demand forecast updating or propagation up the supply chain: Barilla's demand was the orders placed by the distributors, which were contaminated by the noise of the distributors' forecasting errors. (2) Order batching: Barilla provided incentives to the distributors to order larger quantities, such as truckload quantities. (3) Sales promotions: Regular sales promotions, 12 times per year, were traditional. The problem was that customers expected these recurring sales promotions, and stocked up when a promotion was offered, and bought less than average when a promotion was not offered. Thereby sales promotions causes increases in demand variability.

2.4 Describe the "hockey stick phenomenon" and its causes. (2)

Answer: Because of periodic evaluation of sales targets, promotions are run toward the end of the periods for which the sales targets were specified, increasing sales toward the end of each of these periods and decreasing sales at the beginning of the next period. The periodic spike and decline in sales creates a hockey stick shaped pattern.