

Stochastic Math Models (550.252)
Case II (Due Friday, December 02, 2011)

General Directions: You must show all work and document any assumptions to receive full credit. As always, when creating a mathematical model, clearly define your variables and label your objective function and constraints. Feel free to use Excel.

Team	Members
1	William, Chris
2	Cat, Tolu
3	Kishore, Ross

1. Review Section 1.5 “Writing Business Reports/Memos”. Prepare a presentation for your assigned case. Your presentation should follow the structure of a business report. Keep in mind that a presentation is NOT a report. Thus, the material you show on the screen should be easy for the viewer to “digest.”
2. Teams MUST contain 2 students. These students should not have worked together on Case I.
3. The presentation should be no more than 15 minutes long. In addition, the presentation should
 - (a) describe the problem your case addresses;
 - (b) explain the mathematical model/approach you are using in words (symbols may be used if you are comfortable with that);
 - (c) answer the questions stated in the case description.
 - (d) Provide description and analysis for at least one *what-if* scenario created by your team.
4. Please turn-in a HARD copy and an electronic copy of your presentation.
5. Please create and submit HARD copy and an electronic copy of your TYPED appendix that includes you mathematical model (if any) and documents any assumptions you made. The appendix should also any Excel files you created for your analysis. (You need not provide hard copies of Excel files.)

Case Description: Each team will analyze Case 8.1 TexMex Foods. In addition to the questions asked the textbook, you are to consider the following scenario.

In 2010, TexMex Foods added frozen guacamole to its product line. The guacamole is made from avocados, onions, garlic, tomatoes, lime, and other seasonings. While guacamole can last, if unopened, up to 2 years in the freezer, the ingredients used are fresh and spoil quickly.

In particular, the shelf-life of avocados is 1 week in a refrigerator.

Each container of guacamole requires two Hass avocados. The demand for this product is variable, and TexMex Foods is uncertain of the underlying probability distribution. The company does know:

- The minimum weekly demand has been for 20,000 containers
- The mode weekly demand is usually around 50,000 containers
- The maximum weekly demand has been for 75,000 containers

Orders for avocados must be placed on Fridays and they arrive on the following Monday. The selling price per container of guacamole is \$3.50. The cost to make one container of guacamole is \$2.00, most of which you may assume is the cost of buying the avocados. Any avocado not used to meet weekly demand can still be used to make guacamole. In this case, the product is not considered fresh and so it sells at a reduced price of \$1.95. There is not enough guacamole in stock, TexMex suffers a customer goodwill cost of \$0.75 per container.

Team 1: Assume that demand follows a Normal distribution with mean = $(\min + \text{mode} + \max)/3$. Experiment with at least 3 different values for the variance. (Be able to explain why you choose these values!) Determine the optimal order quantity of avocados. How many containers of guacamole will be produced each week? What is the expected weekly profit? How does the value of the variance affect your results?

Team 2: Assume that demand follows a Normal distribution with mean = $(\max + \min)/2$. Experiment with at least 3 different values for the variance. (Be able to explain why you choose these values!) Determine the optimal order quantity of avocados. How many containers of guacamole will be produced each week? What is the expected weekly profit? How does the value of the variance affect your results?

Team 3: Assume that demand follows a Normal distribution with mean = $(\min + 4*\text{mode} + \max)/6$. Experiment with at least 3 different values for the variance. (Be able to explain why you choose these values!) Determine the optimal order quantity of avocados. How many containers of guacamole will be produced each week? What is the expected weekly profit? How does the value of the variance affect your results?