APPM 3570: Homework Set 2

Due Wed. Jan. 31, 2018

Note: To help out the LAs, please draw a grading table at the top of the first page of your homework. The table should have five rows and two columns, just like the ones drawn on your graded homework.

1. Chapter 1 in Ross: Problems 9; 15; 19; 28; Theoretical Exercise 8

2. Chapter 2 in Ross: Problems 3; 11

3. For MacBooks, the colors silver, white, black, and pink are in equal demand. If three successive orders are placed, calculate the number of ways that *exactly* two of the orders are for the same color?

4. A system consists of two components. The probability that the second component functions in a satisfactory manner is 0.9, the probability that at least one of the two components does so is 0.96, and the probability that both components do so is 0.75. What is the probability that the first one does so?

5. In the New York State lottery, the player picks m numbers from a sequence of 1 through n. At a lottery drawing, m balls are drawn at random from a box containing n balls numbered 1 to n.

   (a) What is the probability $P(M_k)$ that a player has k matches for $k = 0, 1, \ldots, m$?

   (b) Give an analytical proof of
   $$\sum_{k=0}^{m} P(M_k) = 1.$$

   Hint: You may want to use Theoretical Exercise 8 in Chapter 1 for (b).