Homework Problem Set 2

Due on Wednesday, January 22, 2014.

From Bertsekas and Tsitsiklis, *Introduction to Probability, 2nd Ed.*

1. (5 pts) Chapter 1 Problem 31.

2. (5 pts) Chapter 1 Problem 34.

3. (5 pts) Schaum's 1.99

4. (5 pts) Schaum's 1.38

5. (5 pts) Chapter 1 Problem 53.

6. (5 pts) Schaum's 1.39

7. (5 pts) Chapter 1 Problem 59. This problem will definitely require a bit of thought to obtain the right answer. You can check the solutions manual online to make sure you get it right.

8. (10 pts) Consider the probabilities associated with a major earthquake hitting the San Francisco Bay Region as determined by the US Geological Survey (http://earthquake.usgs.gov/regional/nca/wg02/results.php). You live in San Jose and are considering building a factory there. Assume that the earthquake events are independent. What is the probability that between 2003-2032 you will get hit with at least one major earthquake along the San Andreas Fault or the Calaveras Fault? What is the probability that between 2003-2032 you do not get hit by an earthquake along the San Andreas Fault nor the Calveras Fault but you do get hit by at least one major earthquake along the Hayward Fault? In reality, is it plausible to assume that these earthquake events are independent?

9. (30 pts) MATLAB Problem. You have been hired by Coin Flips 'R' Us to investigate a possible case of fraud. The company has gotten sequences of coin flips from 6 different outsourced companies. Management suspects that some of the companies aren't actually flipping fair coins but are using some other procedure. The sequences (of varying lengths) are found on the web with the homework. Your quest is to determine which sequences were generated using fair coin flips and which were generated in some other fashion.
Hint: To accomplish the goal, consider the probabilities of getting 1 head, then 2 heads in a row, 3 heads in a row, 4 heads in a row, and 5 heads in a row. Then compute the statistics for each sequence. Develop MATLAB code to compute the statistics for each sequence (there is example code on the website). Turn in your code, the head count statistics for each sequence, and which sequences you suspect are fraudulent.