Homework 3

1. There are N applicants for an open job. Assume that the applicants can be ranked from best to worst. The interviewer sees the N applicants sequentially, one after the other, in a random order. She must accept or reject each applicant on the spot without a chance to go back and reverse her decisions. She uses the following strategy: she lets k applicants walk away and after that she chooses the first one who is better than all the previous applicants. If there is no such applicant then she has to hire the last applicant. What is the probability that with the k-strategy she hires the best applicant? [Treat N and k to be fixed and given numbers]

2. Problem 3.47 of textbook.

3. Problem 3.82 of textbook

4. Theoretical exercise 3.9 of textbook

5. Die A has four red and two white faces, whereas die B has two red and four white faces. A fair coin is flipped once. If it falls heads, the game continues by throwing die A alone; if it falls tails, die B is to be used.

   (a) Show that the probability of red at any throw is $1/2$.
   (b) If the first two throws resulted in red, what is the probability of red at the third throw?
   (c) If red turns up at the first n throws, what is the probability that die A is being used?