Recitation 6
March 2, 2006

1. Problem 2.32, page 127 in the text. **D. Bernoulli's problem of joint lives.**
   Consider $2m$ persons forming m couples who live together at a given time. Suppose that at some later time, the probability of each person being alive is p, independently of other persons. At that later time, let A be the number of persons that are alive and let S be the number of couples in which both partners are alive. For any number of total surviving persons a, find $\mathbf{E}[S|A = a]$.

2. Problem 2.38, page 132 in the text.
   Alice passes through four traffic lights on her way to work, and each light is equally likely to be green or red, independently of the others.

   (a) What are the PMF, the mean, and the variance of the number of red lights that Alice encounters?

   (b) Suppose that each red light delays Alice by exactly two minutes. What is the variance of Alice's commuting time?

3. Problem 2.40, page 132 in the text.
   A particular professor is known for his arbitrary grading policies. Each paper receives a grade from the set $\{A, A-, B+, B, B-, C+\}$, with equal probability, independently of other papers. How many papers do you expect to hand in before you receive each possible grade at least once?