Recitation 5

ENEE324: Engineering Probability

Spring, 2018

The following problems are from the textbook.

Problem 2.5.26.
On a given day, your golf score takes values from the range 101 to 100 with probability 0.1, independent of other days. Determined to improve your score, you decide to play on three different days and declare as your score the minimum X of the scores X_1, X_2, and X_3 on the different days.

1. Calculate the PMF of X
2. By how much has your expected score improved as a result of playing on three days?

Problem 2.5.28.
Consider a quiz contest where a person is given a list of n questions and can answer these questions in any order he or she chooses. Question i will be answered correctly with probability p_i, and the person will then receive a reward v_i. At the first incorrect answer, the quiz terminates and the person is allowed to keep his or her previous rewards. The problem is to choose the ordering of questions so as to maximize the expected value of the total reward obtained. Show that it is optimal to answer questions in a nonincreasing order of $\frac{p_i v_i}{(1-p_i)}$

Problem 2.6.32.
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, independent 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 survivor number a, find $\mathbf{E}[S|A = a]$.

Problem 2.7.40.
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, independent of other papers. How many papers do you expect to hand in before you receive each possible grade at least once?

Problem 2.7.43.
Suppose that X and Y are independent, identically distributed, geometric random variables with parameter p. Show that

$$P\left(X = i|X + Y = n\right) = \frac{1}{n-1}, \text{i = 1, ..., n-1.}$$