Homework 3 CS 275 Discrete Mathematics Fall 2006

Problem 1

The nine members of a coed intramural volleyball team are to be randomly selected from nine college men and ten college women. To be classified as coed the team must include at least one player of each gender. What is the probability that the selected team includes more women than men?

Problem 2

Ceilia tosses a fair coin five times. What is the probability she gets three heads, if the first toss results in (a) a head; (b) a tail?

Problem 3

A coin is loaded so that Pr(Heads)=2/3 and Pr(Tails)=1/3. Todd tosses this coin twice. Let A, B be the events
A: The first toss is a tail.
B: Both tosses are the same.
Are A, B independent events?

Problem 4

A company involved in the integration of personal computers gets its graphics cards from three sources. The first source provides 20% of the cards, the second source 35%, and the third source 45%. Past experience has shown that 5% of the cards from the first source are found to be defective, while those from the second and third sources are found to be defective 3% and 2%, respectively of the time.
a) What percentage of the company's graphics cards are defective?
b) If a graphics card is selected and found to be defective, what is the probability it was provided by the third source?

Problem 5

What is the minimum number of times we must toss a fair coin so that the probability that we get at least two heads is at least 0.95?

Problem 6

Suppose that X is a discrete random variable defined on a sample space U and that *a*, *b* are constants. Show that (a) $E(aX+b)=aE(X)+b$ and (b) $Var(aX+b)=a^2Var(X)$.

Problem 7

An assembly comprises three electrical components that operate independently. The probabilities that these components function according to specifications are 0.95, 0.9, and 0.88. If the random variable X counts the number of components that function according to specifications, determine (a) the probability distribution for X; (b) $\Pr(X \geq 2 \mid X \geq 1)$; (c) $E(X)$; (d) $Var(X)$.