Discrete Mathematics 21-228: Summer II 2000
Homework 4
Due Tuesday, 7/25

July 21, 2000

You may discuss the problems in groups of at most 3 people, but each person must write her own homework. Please list the members of your group. You may not use any sources other than the notes and texts listed on the course page.

In each of the questions you must clearly define **(i) the probability space under consideration** and **(ii) the subset describing the event**.

Coloring without Crayola

n balls are independently colored red, blue, or green with equal probability. What is the probability that there are as many red balls as blue balls?

(i) if the balls are distinguishable

(ii) if the balls are identical

A Proposition

Let's say there're 7 channels predicting tomorrow's weather (you have cable), and the weatherperson on each channel has only a 75% chance of correctly predicting tomorrow's weather, independently of each other. Being the nuts that we are, our discrete math class decides to air our own weather broadcast which claims a whopping 92% accuracy at the cost of airing a minute later than the last of the 7 broadcasts. Devise a way for us to meet our claim, or prepare for sack-beatings from angry viewers. [Hint: majority rules]

Revenge

Your beloved discrete math instructor stands one step back from the edge of a swimming pool, holding a bag containing n red and $n+k$ blue balls. He draws a ball out one at a time and discards it. If he draws a blue ball he takes one step back, and if he draws a red one he takes one step forward (each step is the same size). Show one of the following depending on how you feel about your instructor:

(i) The probability your instructor remains dry is $\frac{k+1}{n+k+1}$.

(ii) Ther probability your instructor gets wet is $\frac{n}{n+k+1}$.

[Hint: think monotone paths on a grid...]