COS 341, October 20, 1999
Due: October 27, 1999

Homework Set 5

Reading Assignments Finish reading Chapter 7.

Written Assignments

Do exercises 2, 12 and 22 in Section 7.8.

Do the following problems:

Special Problem 1 (to be counted as 2 exercises) In the Math Casino Problem, suppose $N = t^5$ where $t > 0$ is an integer. The new rule is that a random $0 \leq n < N$ will be a winner for you if $\lfloor n^{1/5} \rfloor$ divides n. What is p, the probability that a random n is a winner? Give the answer as a closed-form expression involving t.

Special Problem 2 (to be counted as 2 exercises) In the National Basketball Association finals, the format is for the two teams to play a *best-of-seven* series. That is, the series stops whenever one team has accumulated 4 wins. Assume that the outcome of each game is like a random fair coin toss, i.e. each team has a 50% chance of winning that game, independent of what has happened so far in the series. Questions:
(a) What is the probability of a series going into the seventh game?
(b) Let X denote the random variable corresponding to the number of games played in the series. What is $E(X)$? What is $Var(X)$?
(c) Let n be any odd positive integer. What is the probability of a best-of-n series going into the n-th game? (We again assume that the outcome of each game is like a random fair coin toss.)