MATH 159: Discrete probabilistic methods

Homework Problems

You may submit up to two problems from this list per week. This list will grow over the quarter.

THE BASIC METHOD (submit at most 4 over the quarter)

Textbook problems: Any from chapter 1

Problem 1: Prove that every set of 10 points in the plane can be covered by a union of disjoint unit disks

LINEARITY OF EXPECTATION (submit at most 4 over the quarter, starting with the second homework deadline)

Textbook problems: Any from chapter 2

Problem 2: Let $G$ be a graph with $m$ edges. Prove that $G$ has a bipartite subgraph with $m/2 + c\sqrt{m}$ edges, for some constant $c > 0$. For some different constant $c' > 0$, find examples of graphs with $m$ edges but no bipartite subgraph with more than $m/2 + c'\sqrt{m}$ edges, for some infinite sequence of values $m$. 