Homework 4

Recitation problems for Wednesday, 2/22/06

1. The Bipartite Ramsey number $BR(k)$ is the smallest n such that any 2-coloring of the edges of the complete bipartite graph $K_{n,n}$ results in a monochromatic complete bipartite subgraph $K_{k,k}$. Find a lower bound for $BR(k)$ and explore the asymptotics.

2. Problems 4, 7, p. 11 of Alon and Spencer.

3. Show $R(3,t) > t^{3/2+o(1)}$ using the deletion method. What happens using the first moment method?

4. Problems 2, 3, p. 21 of Alon and Spencer.

5. Find $m = m(n)$ as large as you can so that the following holds: Let $A_1, \ldots, A_m \subseteq \{1, \ldots, 4n\}$ with all $|A_i| = n$. Then there exists a two coloring of $\{1, \ldots, 4n\}$ such that none of the A_i are monochromatic. Use a random equicoloring of $\{1, \ldots, 4n\}$ (i.e., $2n$ of each color). Express your answer as an asymptotic function of n.