Probabilistic Methods in Combinatorics

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Hints for assignment 9

Problem 1. Take each boolean variable to be true or false with probability 1/2, independently of the other choices, and apply Lovász Local lemma.

Problem 2. First bound, for a given edge e, the probability that the number of blue and red vertices on e differ by more than $\sqrt{6d \log d}$.

Problem 3. Colour each v with a colour taken uniformly at random from $S(v)$, independently of the other choices. Use Lovász Local lemma to show that none of the bad events $B_{u,v,c}$ (where two neighbours u and v get same colour c) happen.