Computer Science 341
Discrete Mathematics

Problem Session 9
Mon, Nov 25, 2002

Problem 1

Draw an arbitrary number of lines in the plane so that no three of them are concurrent. One can obtain a planar graph G by representing the points of intersection of the lines by vertices of G, and the segments between neighboring intersections as edges of G. Show that $\chi(G) \leq 3$.

Problem 2

Let A be a set of $2n$ points in the plane, no three of which are collinear. Suppose that n of them are colored red and the remaining n blue. Prove or disprove: there are n straight line segments, no two of which intersect, such that the endpoints of each line segment are points of A having different colors.

Problem 3

Show that a graph G with at most two odd-length circuits is 3-colorable.