EECS 455: Applied Graph Theory
Homework 10
Due Monday, September 28 at the start of class

Homework rules: You are welcome to work with others to solve these problems. If you do get help from someone else (or from some other resource), please indicate that on your homework.

The next subject we will cover is plane graphs. The questions below cover Euler's Formula and duals of plane graphs. Also take a look at Kuratowski's Theorem.

Problem 1: Prove Euler's Formula using induction on the number of vertices and edges of G. (The Diestel book gives an induction only on edges.)

Problem 2: Prove that every connected plane graph has a vertex with degree less than 6.

Problem 3: Prove that a set of edges in a connected plane graph G forms a spanning tree of G if and only if the duals of the remaining edges form a spanning tree of G^*.

Problem 4: Let G and G^* be mutually dual plane graphs. Prove that if G is 2-connected then G^* is 2-connected.