Math 135: Discrete Mathematics, Fall 2012
Homework 10

This homework is optional; you may submit it on the last day of class. If you do so, it will replace your lowest (non-drop) score on a homework, assuming your score on this homework is better.

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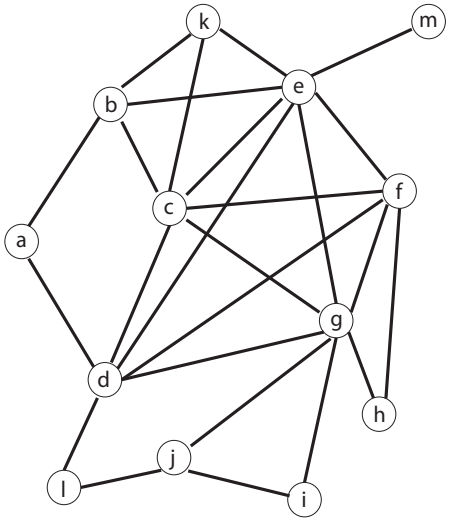
1. Consider the following graph:



   (a) Is this graph bipartite? Justify your answer.
   (b) What is the size of the largest independent set?
   (c) What is the size of the largest clique?
   (d) Does this graph have an Eulerian circuit? Justify your answer.

2. (a) For which values of n is the graph W_n bipartite?
   (b) For which values of m and n is the graph $K_{m,n}$ Eulerian?
   (c) For which values of m and n is the graph $K_{m,n}$ a tree?

3. Prove or disprove the following:

   (a) A graph is connected if and only if some vertex is connected to every other vertex.
   (b) A graph is connected if and only if it has a cut edge.

4. (a) Let G be a graph with n vertices and m edges. Prove that the average degree of the vertices in G is $2m/n$.
   (b) Use part (a) to prove that every planar graph has a vertex of degree at most 5.