Kerry Ojakian's CSI 35 Class
HW #5

General Instructions: Homework is to be handed in at the beginning of class. While you may work with others from class, you may not copy. For details on working with others, see the Class Contract (available at the web page), which you have signed.

The Assignment

1. Wells: Exercise 153.3.4 (number of edges in complete bipartite graph - read about what they are).

2. Wells: Exercise 154.1.4 (note: "full subgraph" is the same thing as "induced subgraph").

3. Finan: Exercise 488

4. Finan: Exercise 489

5. Wells: 157.2.2

6. Wells 157.4.5

7. Wells 157.4.4

8. Wells 159.2.3. Hint: for the harder direction (i.e. no cycles of odd length implies bipartite) pick any vertex in the graph to start your coloring, and describe a coloring with 2 colors based on the distance from this vertex.

9. Finan: Exercise 490

10. Finan: Exercise 491 (Yes, we discussed this in class! So write it out carefully. Similar to Handshaking Lemma, but for directed graphs; consider example from exercise 490).

11. In Sage, using the graph theory package do the following (do all of the following using Sage commands, even if you could do it by hand). Your graph should have at least 10 vertices.

    (a) Create a graph which models some "locations" with edges between "adjacent" places. State what you are modeling.
    (b) Plot your graph and get its adjacency matrix.
    (c) Apply the Sage method to determine if it is connected or not.
    (d) Apply Sage methods to test for a Eulerian circuit and a Hamiltonian circuit. Is having or not having a circuit of each kind significant in your model.