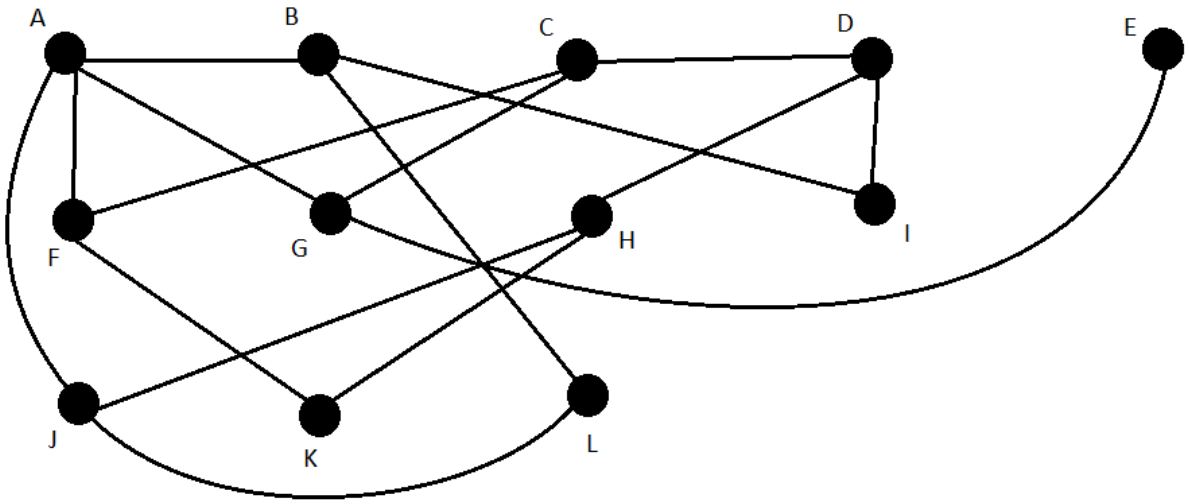
Math 210, Fall 2015, Collected Homework Assignment #10 – due Friday, Dec. 11

Write all work and answers on a separate sheet(s) of paper.

For #1-3, refer to the non-directed graph shown in the diagram below.



1. Find the degree of each vertex. What is the sum of the degrees of all of the vertices?

2. Find the edge set of the graph. (Hint: a few elements of this set will be AB, AF, AG, and AJ.) How many edges did you find? Explain why this corresponds to your answer to #1. (Or, if it doesn't correspond, then go back and find the error.)

3. Use the Spanning Tree Algorithm to generate a spanning tree for G. For each step of the algorithm, write down the edge and vertex that you are adding to the tree. Draw a diagram of your spanning tree.

For #4-6: Let W be a non-directed weighted graph, with at most one edge connecting any pair of vertices, with the following cost matrix:

$$\begin{bmatrix} \infty & 4 & 5 & \infty & 2 & 2 \\ 4 & \infty & 5 & 4 & \infty & \infty \\ 5 & 5 & \infty & 2 & 1 & \infty \\ \infty & 4 & 2 & \infty & 3 & \infty \\ 2 & \infty & 1 & 3 & \infty & 4 \\ 2 & \infty & \infty & \infty & 4 & \infty \end{bmatrix}$$

4. Draw a diagram for W.

5. Use Prim's algorithm to find a minimal spanning tree for W. As in #3 above, write down the edge and vertex you are adding at each step of the algorithm, and then draw a diagram of your spanning tree.

6. Solve the "Traveling Salesman Problem" for W – that is, find a Hamiltonian cycle of minimal weight.