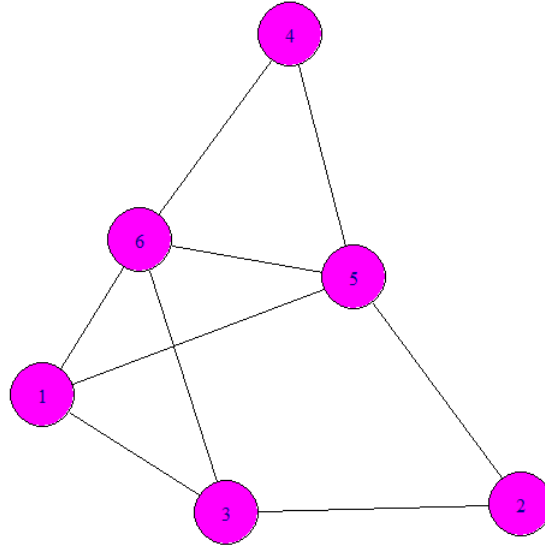


Math 17 - Graded Homework 2 (HW 8)

Assigned 12/2/18 - due Friday 12/7/18

1. Consider the following graph.



- (a) How many vertices and edges are there?
 - (b) Represent the graph as an edgelist.
 - (c) List a path of length 5 from vertex 2 to vertex 4.
 - (d) List a circuit. Is this graph a tree?
 - (e) List the degree of each vertex. Is there an Euler Circuit or Euler Path? If so, find one. *Hint:* If Euler's Path Theorem holds true then an Euler Path can be found starting at one odd vertex and ending at the other.
 - (f) Calculate the diameter of the graph by listing out the lengths of the shortest path from each vertex X to each vertex Y .
 - (g) Calculate the redundancy of the graph and find one possible spanning tree.
2. Consider the graph represented by the edgelist

$$\{AC, AF, BC, BD, BF, CE, DE, EF\}.$$

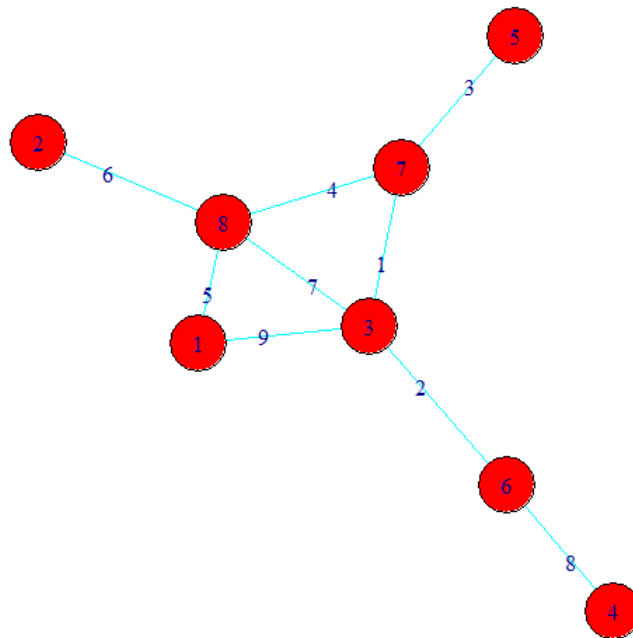
- (a) Draw the graph.
- (b) List the degree of each vertex. Is there an Euler Circuit or Euler Path? If so, find one.
- (c) Calculate the diameter of the graph – at this point you might be able to see what the longest shortest-path is without listing all of them.
- (d) Are there any cliques (of size greater than 2) in this graph?

3. Consider the graph represented by the adjacency matrix

$$\begin{bmatrix} 0 & 1 & 1 & 1 & 1 \\ 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 1 & 0 \\ 1 & 1 & 1 & 0 & 1 \\ 1 & 0 & 0 & 1 & 0 \end{bmatrix}$$

- (a) Draw the graph.
- (b) Find a spanning tree of this graph.
- (c) For the spanning tree you found above, write it as an adjacency matrix.

4. Consider the graph



- (a) Calculate the redundancy.
- (b) Use Kruskal's algorithm to find the Minimum Spanning Tree.