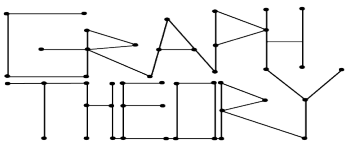


MATH 3330: Applied Graph Theory

ASSIGNMENT #7

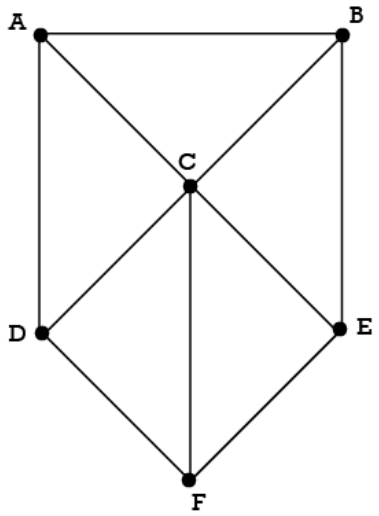
Due Fri. Mar. 26 by 3pm

1. For the following, either draw a graph meeting the specifications or explain why no such graph exists:

   a) A connected graph with 11 vertices and 10 edges and no cut-vertices.
   b) A 3-connected graph with exactly one cut-edge.
   c) A graph for which $\kappa_v(G)=\kappa_e(G)<\delta_{min}(G)$.

2. Determine the vertex- and edge-connectivity of the following graphs:

   a)



   b) Complete bipartite graph $K_{4,7}$.

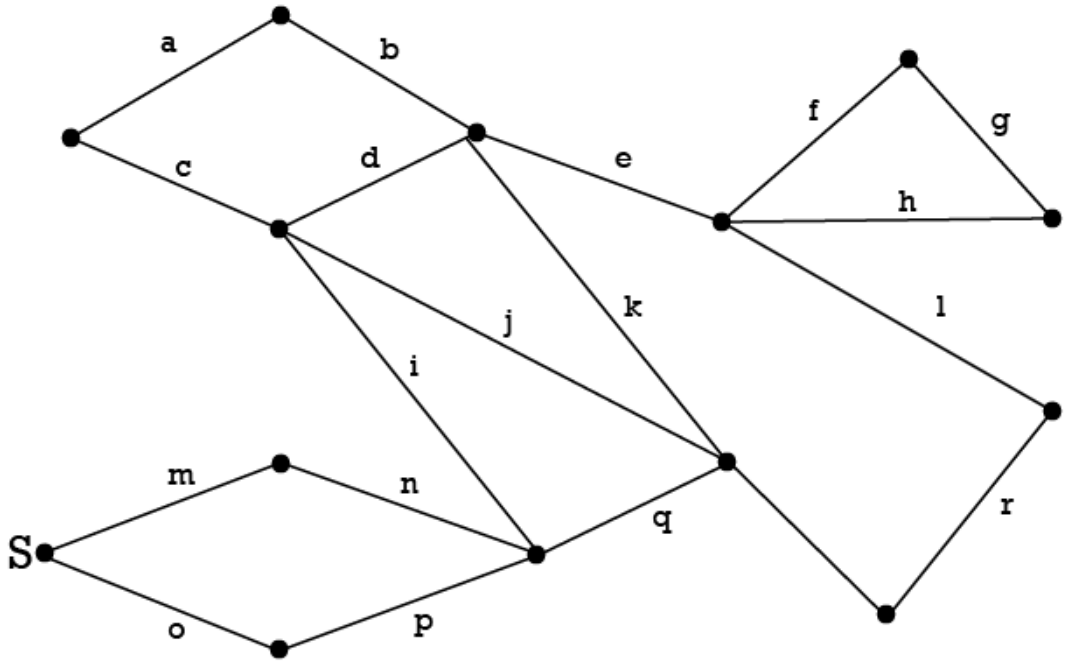
3. Prove that there exists no 3-connected simple graph with exactly 7 edges.

4. Draw the following Harary graphs and give their edge-connectivity:

   a) $H_{4,7}$
   b) $H_{5,7}$

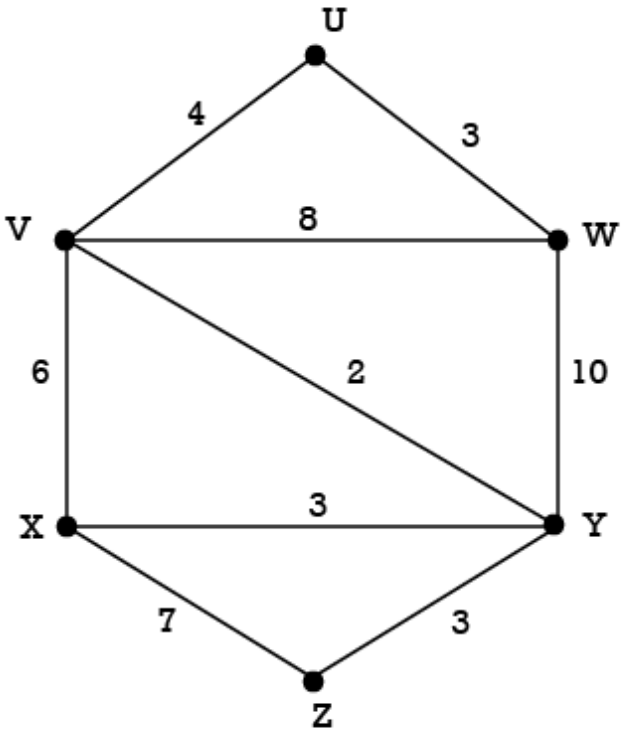
5. Determine which graphs in the family of complete bipartite graphs $K_{m,n}$ are eulerian.

6. Apply Algorithm 6.1.1 to construct an eulerian tour of the graph below, beginning at vertex S:



7. Draw the (2,3)-deBruijn digraph and use it to construct tow different deBruijn sequences.

8. Apply Algorithm 6.2.2 to find a minimum-weight postman tour for the given weighted graph. Determine whether the solution is unique. Give the tour as a vertex sequence starting at vertex U.



9. Either draw or prove that the following does not exist: a 6-vertex simple graph that is not hamiltonian.

10. Prove that a bipartite graph that is hamiltonian must have an even number of vertices.