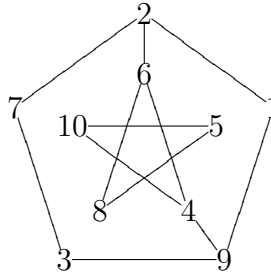
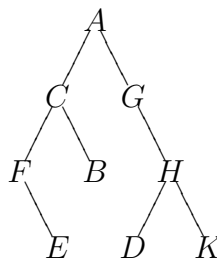


1. (2 points) Draw (a) rooted and (b) unrooted spanning tree of the given labeled graph using Breadth-First Search (BFS) algorithm starting at vertex 1



2. (2 points) Repeat Problem 1 using Depth-First Search (DFS).

3. (3 points) Write the output using (a) pre-order (b) in-order (c) post-order algorithm on the given labeled binary tree.



4. (1 point) Given the incidence matrix Z of a graph, find the distance matrix D .

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

5. (1 point) Which graph has diameter larger than 2? (Circle one answer.)

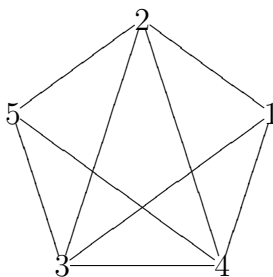
(A) $K_{5,5}$

(B) K_5

(C) C_5

(D) none of these

6. (3 points) Use adjacency matrix to compute the number of triangles in the given labeled graph.



7. (1 point) Which graph has an Euler walk? (Circle one answer.)

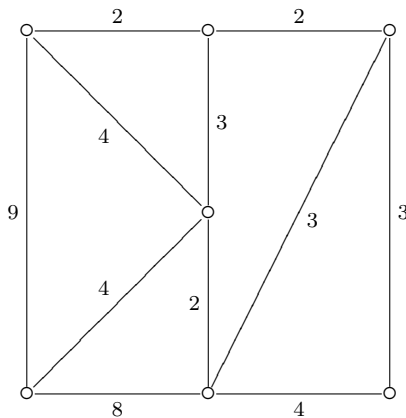
(A) $K_{7,2}$

(B) $K_{3,3}$

(C) $K_{5,4}$

(D) none of these

8. (3 points) Solve the Chinese postman problem (CPP) for the given weighted graph.



9. (1 point) Which graph is a Hamilton graph? (Circle one answer.)

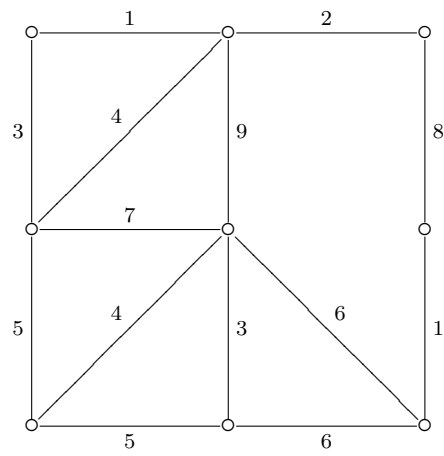
(A) $K_{5,4}$

(B) $K_{5,5}$

(C) $K_{5,6}$

(D) all of these

10. (3 points) Solve the traveling salesman problem (TSP) for the given weighted graph.



-Amin Witno