Tutorial 3 SCSI1013: Discrete Structure [2018/2019 - Semester 1]

Submission date: 3rd December 2018; before 4 P.M

1. State which of graphs shown in Figure 1 are:

   i. Simple graph
   ii. Regular graph

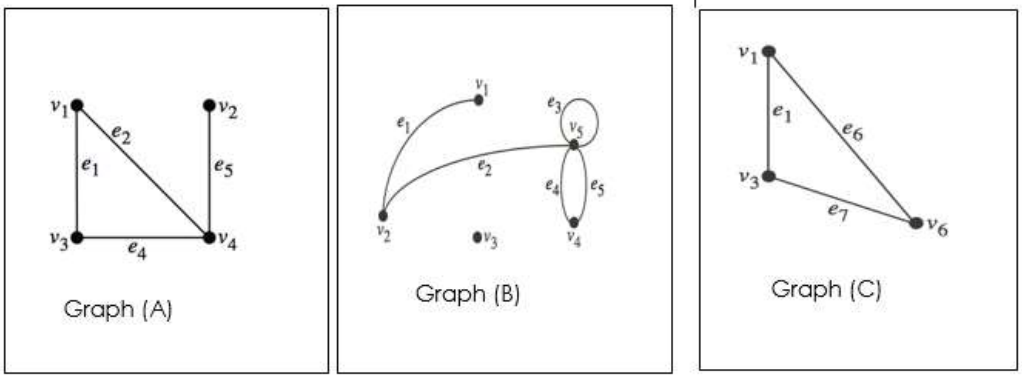

Figure 1

2. Determine whether the given alternating vertices and edges is a walk, trail, path or circuit for the graph shown in Figure 2.

   a) $v_2, e_7, v_5, e_6, v_4, e_3, v_3$
   b) $v_2, e_7, v_5, e_8, v_1, e_8, v_5, e_6, v_4, e_5, v_4, e_4, v_4$
   c) $v_1, e_8, v_5, e_9, v_1, e_1, v_2, e_7, v_5, e_6, v_4, e_4, v_4$
   d) $v_2, e_7, v_5, e_6, v_4, e_3, v_3, e_2, v_2$

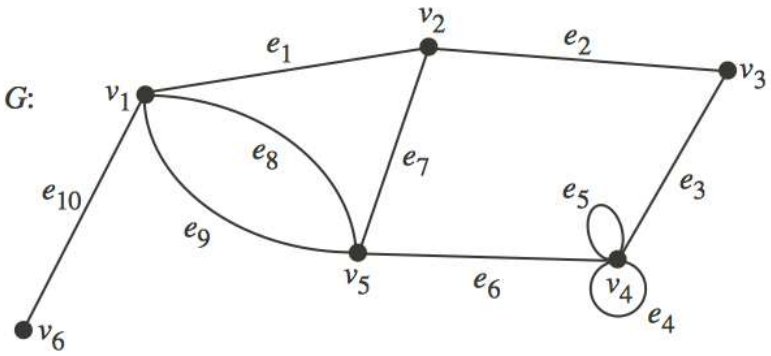

Figure 2

3. Find the adjacency matric for the graph shown in Figure 3.

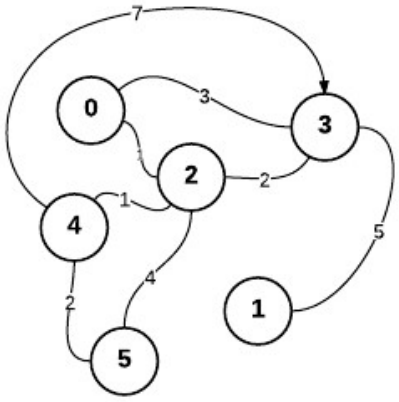

Figure 3

4. Draw the graph for the following incidence matric.

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

5. Determine whether the four graphs in Figure 4 are Hamiltonian Path or Hamiltonian circuit?

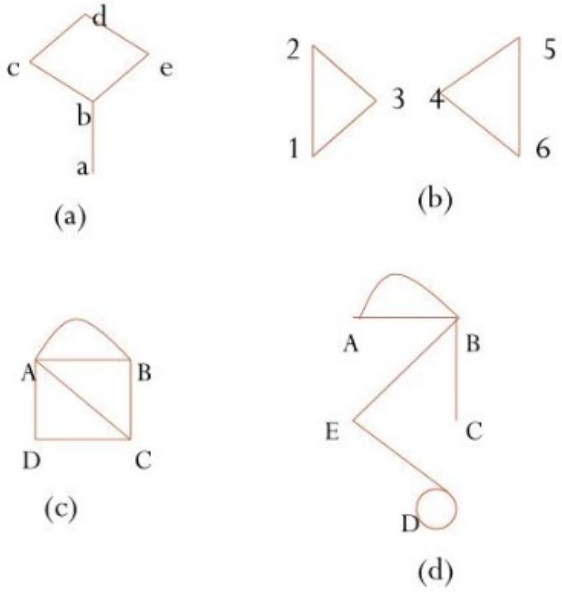

Figure 4

6. Determine and justify whether there is Isomorphic for the graphs in Figure 5?

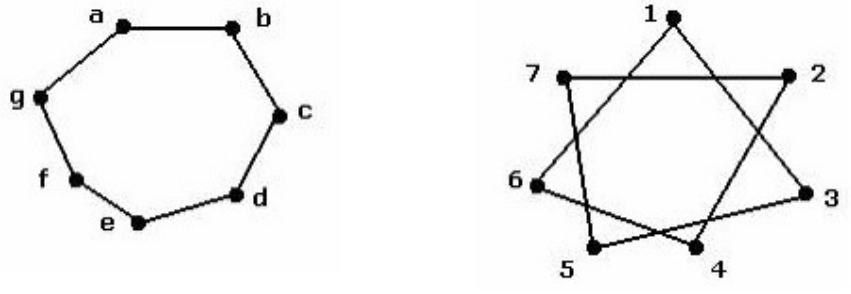

Figure 5

7. The weighted graphs in the Figures 6 shows the fares between eight cities. Find a least expensive route regardless of the number of connections from San Francisco to Boston.

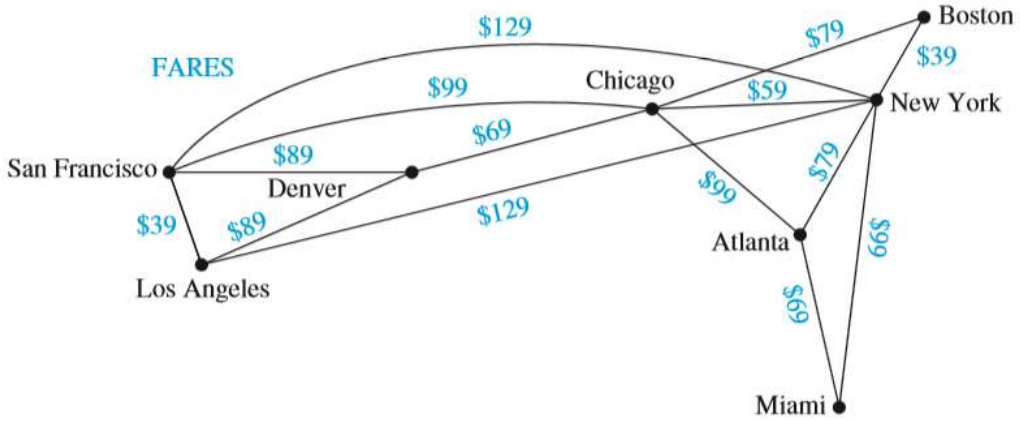

Figure 6

8. The Futsal Tournament follows a single-elimination format in which a team is eliminated after one loss. Suppose the results of the tournament are represented in a binary tree. If the tournament is limit only to 5 rounds of games to determine the winner, how many teams can be registered for the tournament and how many matches need to schedule by the organizer?

9. Find the result of performing an inorder traversal of the tree shown in Figure 7

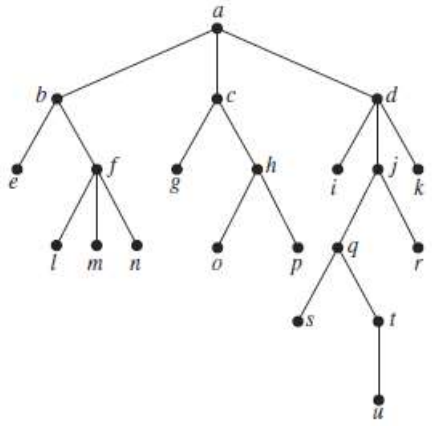

Figure 7

10. Draw the binary tree with nine vertices whose postorder traversal vertex listing is the string SEARCHING if the universal address of letter S is 1.1.1

11. Draw 3 different spanning trees for the connected graph shown in Figure 8.

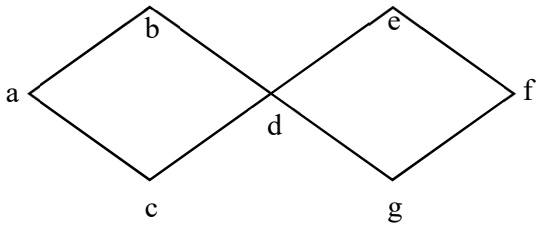

Figure 8

12. Degree-constrained spanning trees are useful in models of transportation systems where the number of roads at an intersection is limited. Use Kruskal's algorithm to find a minimum spanning tree for the weighted graph shown in Figure 9 where the degree of each vertex in the spanning tree does not exceed 2.

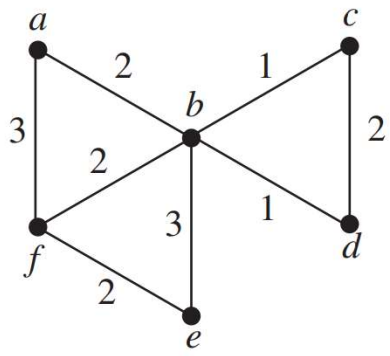

Figure 9