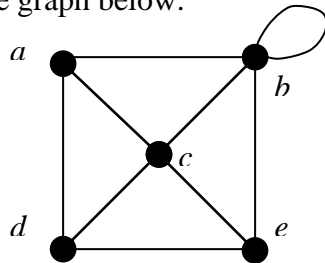


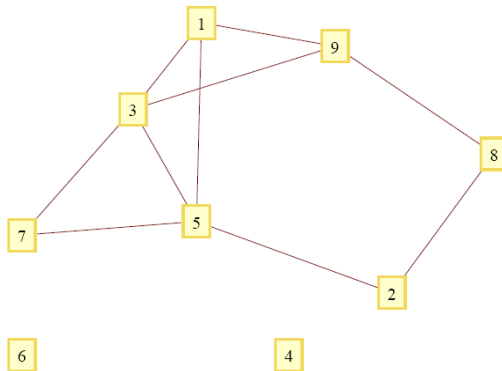
TMA1201 Tutorial 8 - T6 Graph and tree

1. Consider the graph below:



Determine whether each of the given walks is (a) a trail (b) a path, (c) a circuit, or (d) a simple circuit:

- (a, b, c, d, e)
 - (a, d, c, d, e, b)
 - (b, a, c, e, b, b)
2. Draw a graph having the given properties or explain why no such graph exists:
- Five vertices, four vertices have degree 3 and one vertex has degree four.
 - Four vertices, having degrees 1, 2, 3 and 4
3. Given the graph:

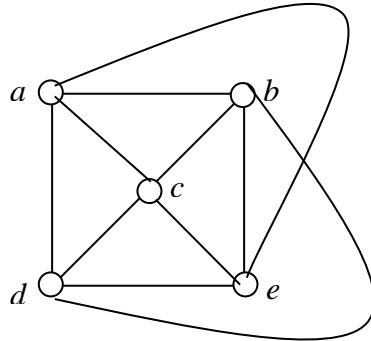


Find the number of vertices, the number of edges, and the degree of each vertex. Verify that Handshaking Lemma is true for this graph.

4. Draw the graph corresponding to the following adjacency matrix:

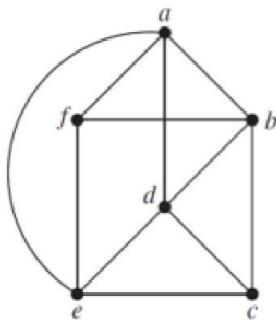
$$A = \begin{bmatrix} 0 & 2 & 1 & 0 \\ 2 & 0 & 1 & 2 \\ 1 & 1 & 1 & 1 \\ 0 & 2 & 1 & 1 \end{bmatrix}$$

5. Find the degree of each vertex in the graph below. Decide whether there is (a) an Euler circuit and (b) a Hamiltonian circuit. If no, explain why. If yes, exhibit one.

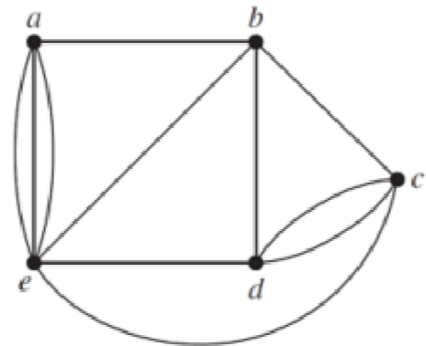


6. For each graph, find the degree of each vertex. Determine whether the graph has (a) an Euler circuit (b) an Euler trail. If yes exhibit one. Otherwise, explain why it doesn't have one.

a)

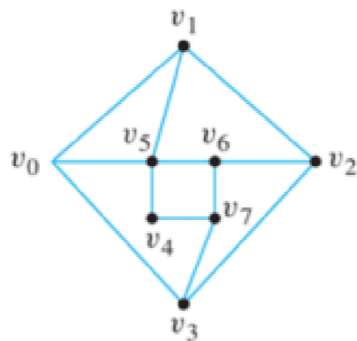


b)

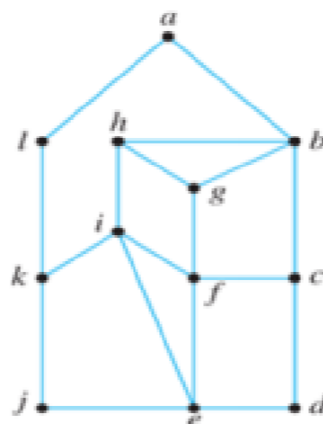


7. For each below, find a Hamiltonian circuit if the graph has it. Otherwise, explain why it doesn't have one.

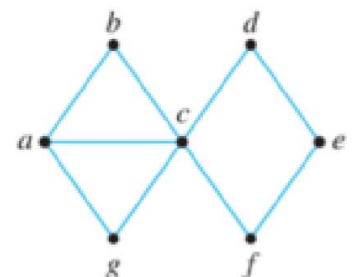
a)



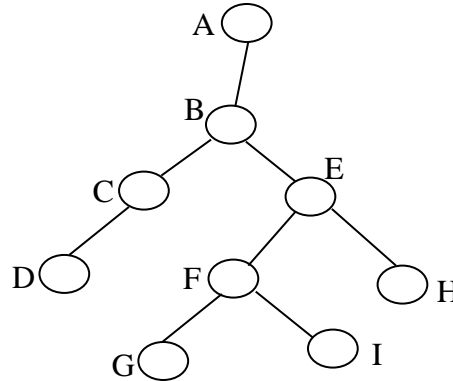
b)



c)



8. For the following tree, list the order in which the vertices are processed using
- Pre-order traversal
 - In-order traversal
 - Post-order traversal



9. Find a spanning tree for the graph below using
- Depth-first search,
 - Breadth-first search.

Assume that vertex L is the root and the selection of neighboring vertex in each iteration is based on the vertex with lowest alphabetical order.

