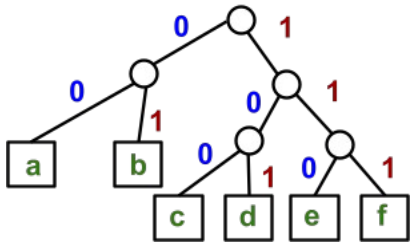
CSI 35
Test 4 Chapter 14
ample Questions

1. Draw all non-isomorphic free trees with four vertices.
Do not label the vertices of the graph. You should not include two trees that are isomorphic.

Some help:
Two graphs are said to be ***isomorphic*** if there is a correspondence between the vertex sets of each graph such that there is an edge between two vertices of one graph if and only if there is an edge between the corresponding vertices of the second graph.

A ***tree*** is an undirected simple graph that is connected and has no cycles.

2. Consider the following tree for a prefix code:



(a) Use the tree to encode the word “abc”

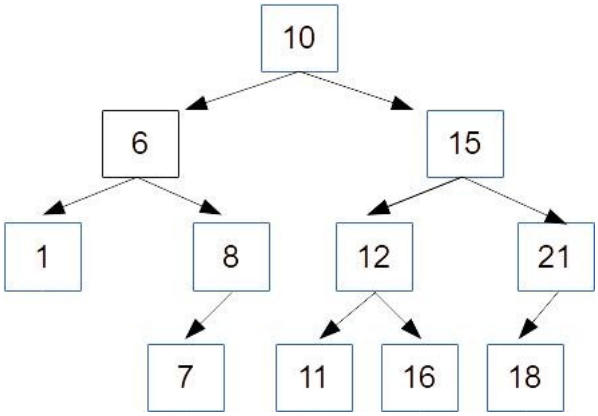
(b) Use the tree to decode “101110110101”

3. How many vertices are in a tree with 29 edges?

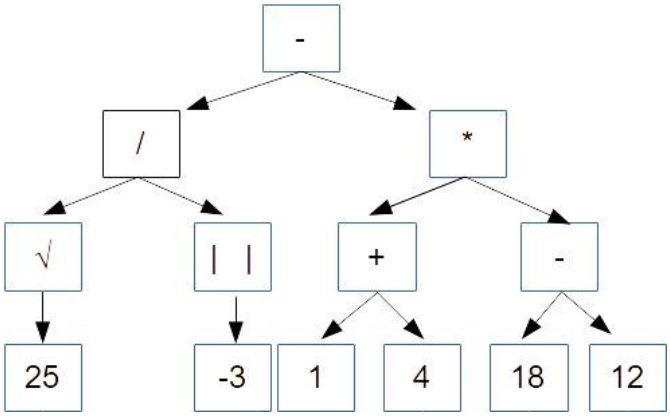
4. We know that if a graph is a tree with n vertices has n – 1 edges. Is the converse true?
That is, if a graph has n vertices and n - 1 edges, can we conclude that it is a tree? Justify your answer.

5. Draw a tree with six vertices that has the most number of leaves possible.

6. Is the tree below a ***binary search tree***?



7. Given the tree:



a) Give the order in which the vertices of the tree are visited in a pre-order traversal.

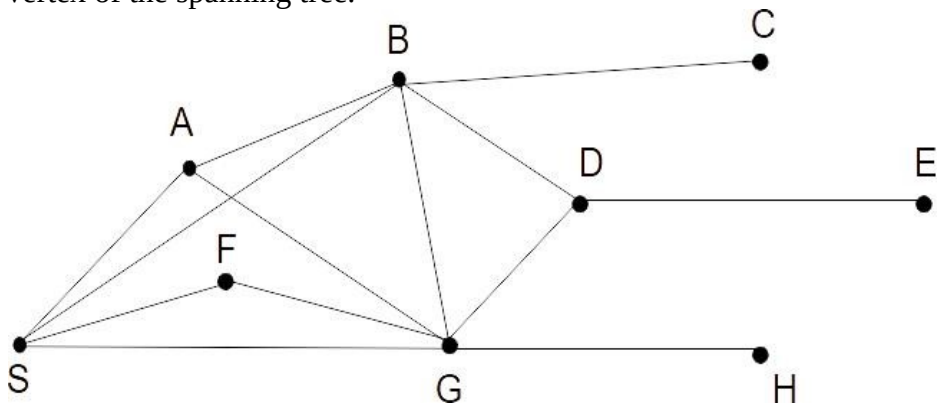
b) Give the order in which the vertices of the tree are visited in an in-order traversal.

c) Give the order in which the vertices of the tree are visited in a post-order traversal.

8. Evaluate the postfix expression:

20 6 - 2 ÷ 3 × 4 18 6 ÷ + ÷ 2 +

9. Use breadth-first-search (BFS) algorithm to produce a spanning tree for the graph. Use vertex s as the root/source vertex of the spanning tree.



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10. Find minimum spanning trees using Prim's and Kruskal's algorithms. Assume vertex ordering is A, B, C, D, E, and F.