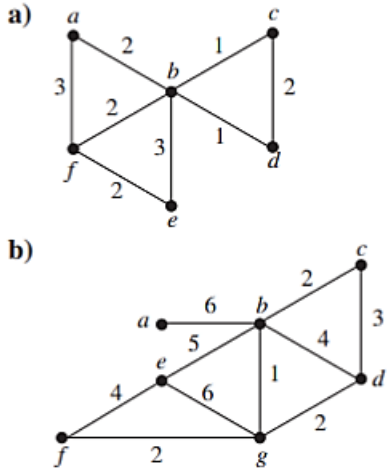
Assignment 11

1.Proof:A full m-ary tree with
(ii) i internal vertices has $n = mi + 1$ vertices and $l = (m-1)i + 1$ leaves,
(iii) l leaves has $n = (ml-1)/(\mathrm{m}-1)$ vertices and $i = (l-1)/(m-1)$ internal vertices.

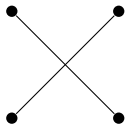
2. Find a minimum spanning tree of each of these graphs where the degree of each vertex in the spanning tree does not exceed 2 .



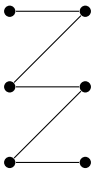
Chapter 11—Test 1

1. Which of the following graphs are trees? Explain your answers.

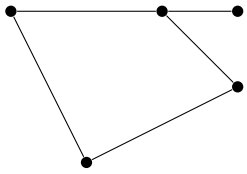
a)



b)



c)



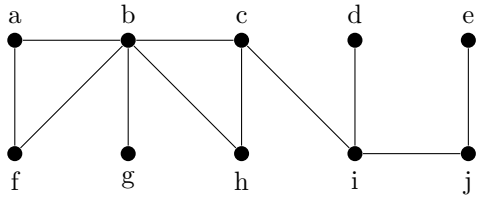
2. A tree has 99 edges. How many vertices does it have?

3. Form a binary search tree from the words of the sentence *This test is not so difficult*, using alphabetical order, inserting words in the order they appear in the sentence.

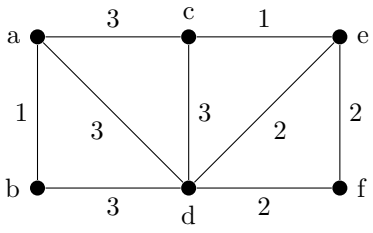
4. Is the code A: 11, B: 10, C: 0 a prefix code?

5. Construct an expression tree for $(3 + x) - 5 \cdot y$ and write this expression is prefix form and postfix form.

6. Use a depth-first search to find a spanning tree of the following graph. Start at the vertex a, and use alphabetical order.



7. Use Prim's algorithm to find a minimum spanning tree for the following weighted graph. Use alphabetical order to break ties.



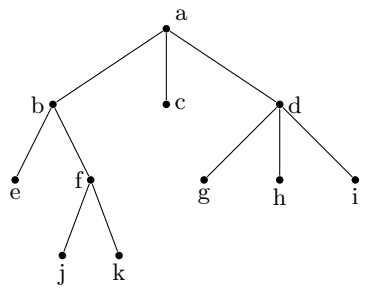
Chapter 11—Test 2

1. (a) Suppose that a full 3-ary tree has 100 internal vertices. How many leaves does it have?
(b) Suppose that a full 4-ary tree has 100 leaves. How many internal vertices does it have?

2. How many nonisomorphic trees are there with four vertices? Draw them.

3. Is the code A: 111, B: 101, C: 011, D: 010, E: 10, F: 1101 a prefix code?

4. Perform a preorder, inorder, and postorder traversal of the rooted tree below.



5. Use backtracking to find a sum of integers in the set $\{18, 19, 23, 25, 31\}$ that equals 44.

6. Find a minimum spanning tree in the following weighted graph using Prim's algorithm.