King Fahd University of Petroleum & Minerals
College of Computer Science and Engineering
Information and Computer Science Department
ICS 202 – Data Structures

Binary Trees

Objectives

The objective of this lab is to design, implement and use binary trees.

Outcomes

After completing this Lab, students are expected to:
- Understand classes for binary trees.
- Implement methods for binary trees.
- Traverse binary trees (breadth-first, depth-first)
- Insert into and delete from binary trees.

Notes

For the purpose of this lab, you may download the attached programs. Note that the code refers to binary search trees.

Lab Exercises

1. Write a method **public int count()** to count the number of nodes in a binary tree.

2. Write a method **public boolean isLeaf(BSTNode<T> node)** to determine if a given node is a leaf or not.

3. Write a method **public int countLeaves()** to count the number of leaves in a binary tree.

4. Write a method **public int isAtLevel(BSTNode<T> node)** that finds and prints the level of a given node.

5. Write a method **public int height()** to find the height of a binary tree.

6. Write a program that creates a binary tree with random keys, traverses it using the breadth-first and depth-first (preorder, inorder, and postorder) and prints the results. It also tests the above methods. For example, for the following tree:
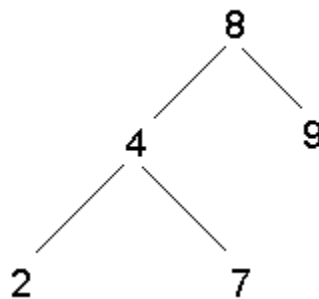
Breadth-First traversal prints: 8 4 9 2 7

Preorder Depth First Traversal prints: 8 4 2 7 9

Inorder Depth First Traversal prints: 2 4 7 8 9

Post Order Depth First Traversal prints: 2 7 4 9 8