CMPSCI-182L Data Structures and Program Design: Lab

Programming Project 5 - Binary Search Trees

30 points total

Due on 12/8/2022

Write a program that maintains the names and birthdays of your friends and relatives and thus serves as a birthday list. The program should be able to enter, delete, modify the birthday data of any record in the list. You should assume that the names are unique and cannot be modified once a name has been added. This is to say that ONLY the birthday of a friend in the list can be changed.

To start on the project, create a Java project named Project5. In the Source Packages folder of Project5, create a source code package named **birthdaybook**. Download my TreeNode class below and save it into your **birthdaybook** source code package:

TreeNode.java

Write **your** name in the universal comment header of my TreeNode class. **It is important for you to remember that I am giving everyone a working TreeNode class, so use it. If, when I evaluate your Project 5 solution, I see that you've used another TreeNode class, I will stop my evaluation at that point and you will not receive points for this project.**

To complete the project, you will have to write two classes:

ADTBinarySearchTree.java (20 points)

ADTBinarySearchTree.java is a Binary Search Tree ADT, meaning that this class should include the following:

- A single TreeNode-type reference variable named root. Make sure that this variable is private.

- A no-arg constructor which creates an empty ADTBinarySearchTree object (root = null;).
- A ADTBinarySearchTree constructor with **newName** and **newBirthday** parameters. This constructor should insert a TreeNode containing the given **newName** and **newBirthday** into the Binary Search Tree.
- A preorder traversal method which displays the name and birthday data fields of every TreeNode in the Binary Search Tree.
- An inorder traversal method which displays the name and birthday data fields of every TreeNode in the Binary Search Tree.
- A postorder traversal method which displays the name and birthday data fields of every TreeNode in the Binary Search Tree.
- Methods which allow a client program to insert and delete records (TreeNodes containing name and birthday data) into this Binary Search Tree or modify the birthday data of any record (TreeNode) in the Binary Search Tree.

BirthdayBook.java (10 points)

BirthdayBook.java is a main class (which contains a main() method). The program in this class will be the User Interface (UI) for the ADTBinarySearchTree. **This program must demonstrate that all of the methods in the ADTBinarySearchTree work the way that they are supposed to.** I recommend that you write this program to display a menu from which the user can choose to insert, delete and edit records in the Binary Search Tree. The menu should also contain options to display the data in the records stored in the Binary Search Tree in inorder, preorder and postorder traversals.