CPE 202 Winter 2020

Lab5: Binary Search Tree

Implement Binary Search Tree (BST)

Purpose

Learn to implement binary search tree

Understand how binary search tree can be used by implementing MAP ADT with binary search tree

Preparation

Download a zip file containing starter code files.
Read the lecture slides for Week 4

Objective

You are going to build a TreeMap, a kind of MAP ADT, which maps keys to values, and uses Binary Search Tree as its underlining data structure. As an example use case we are going to build a TreeMap of your classmates so that you can lookup your classmate's information by id.

Instruction

- You are required to complete lab5.py and bst.py by following the instructions in the files.
- Open lab5.py and read the code and comments in the file and understand what it is trying to do.
- Open classmate.py and read the code and comments in the file and understand what it is trying to do.
- Open bst.py and implement the BSTNode class and functions required by lab5.py. All functions defined in bst.py are not class methods (do not include them in a class). The BSTNode class should have four attributes: key (any), val (any), left (BSTNode), and right (BSTNode). any means any data type.
- Complete lab5.py so that you can import a tsv file (2202-cpe202-03.tsv or 2202-cpe202-05.tsv) containing the information about your classmates into TreeMap from classmates.tsv and search for a classmate by his or her ID (You are going to insert Classmate objects into your tree with IDs as keys). The IDs are just sequentially assigned integers. If the same key already exists in the tree, update (override) the data associated with the key.
- You can add extra instance variables and helper functions if you need, but make sure it

will not affect our test cases. Do not use inner functions (functions defined within a function) for that will slowdown the execution of your code: inner functions are recreated every time the function that houses the inner functions is called.

- Make sure to implement all three boilerplate methods for all the classes.
- Create lab5_tests.py to test all functions and methods (except for boilerplate methods) in lab5.py as well as bst.py

Submit your work to the grader, then Submit all your files (zip them into one) to PolyLearn