

CS608 Programming Assignment 9

Binary Search Trees and AVL Trees

This assignment has two parts: Part 9A and Part 9B. If you successfully complete both, you will receive 15 points. If you successfully complete only one (either one), you will receive 10 points.

Programming Assignment 9A:

Write a Java program to read a file, **BSTData.txt**, and create a binary search tree from the data in the file. Assume that the data file contains integers. I will save this file in the same folder as your Java file when I run your program. In your program, just indicate the file name, “BSTData.txt”, DO NOT include c:\.....

Output to contain:

1. Inorder traversal of the BST
 2. The height of the tree
 3. The level order of the tree
 4. The number of nodes in the tree
 5. Print the largest element in the tree
 6. Ask me for an integer for searching. After I input an integer, your program prints if the number was found in the tree or not. Repeat this until I input 0.
-

Programming Assignment 9B:

Write a Java program to read a file, BSTData.txt, and create (1) a binary search tree and (2) an AVL tree from the data in the file. Assume that the data file contains integers. I will save this file in the same folder as your Java file when I run your program. In your program, just indicate the file name, “BSTData.txt”, DO NOT include c:\.....

Output to contain:

1. Inorder traversals: both BST and AVL
2. The height of the tree: both BST and AVL
3. The level order of the tree: both BST and AVL
4. Print the largest element in the tree: both BST and AVL
5. **Important:** Print the time taken (in nanoseconds) for the construction of each tree.
Use Java method, `System.nanoTime()`.
6. Ask me for an integer for searching. After I input an integer, your programs searches both trees and prints if the number was found in the tree or not. Repeat this until I input 0. Each time print time taken for search (in each of BST and AVL). Print the time taken in nanoseconds.

General instructions:

- If your program has several classes, include all of them in the same file and name your Java file
`CS6089Axxxxx.java` (Assignment 9A) and `CS6089Bxxxxx.java` (assignment 9B), where xxxxx is your last name. **Example:** If your name is John Smith, name the file `CS6089Asmith.java` and `CS6089Bsmith.java`. **DO NOT SEND ZIP files.**
- Output must include: **Your name, course number and date (use Date class)**. If any of the above items are missing, you will not receive full credit.
- Send your Java file as email attachment to CS608Assignment@gmail.com. Include your name and assignment number in the email subject.

Note: I will run your programs and grade them. If your programs do not compile (that is, show syntax errors, you will receive 0 for the programming assignment).
