

Data Structures (CS201)

Lab Assignment 6 (Ungraded)

September 18, 2021

Instructor: Anil Shukla

Due: September 19, 10 am (Morning)

Note: Ungraded means the marks will not be counted for the final grading. Place proper comments in your source code. Write in C only. C++ is not allowed.

Note: Plagiarism is strictly prohibited. An appropriate disciplinary action will be taken if you are found to be involved in plagiarism.

Note: The instructions for submitting the assignment is mentioned in the google classroom. Carefully read the same and follow the instructions.

Note: At the end, find some test cases.

- (1) Implement the data structure AVL tree. To begin with your program should enter integers $0, 1, \dots, 24$ in an empty AVL tree in this order. In addition, your program should support the following operations. Also, provide the user to choose various operations. Refer test input cases for the details.

insertion User should choose **i** for insertion: this operation insert the integer, entered by user in the AVL tree. Note, we assume that user is going to insert only distinct integers,

search User should choose **s** for search: search the integer, entered by the user, in the AVL tree. If the element is not present, print: not present. Otherwise, print present, along with the balance factor and the height of the searched element in the AVL tree.

print User should choose **p** to print the preorder and the inorder traversals of the AVL tree.

Quit User should choose **q** to quit the program.

Test Cases

Input:

AVL tree constructed by inserting 0 to 24 elements

i) Insert :

s) search :

p) Print Preorder and Inorder in Separate lines:

q) Quit:

Enter Your Choice: p

Preorder sequence:

15 7 3 1 0 2 5 4 6 11 9 8 10 13 12 14 19 17 16 18 21 20 23 22 24
Inorder sequence:
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

- i) Insert :
- s) search :
- p) Print Preorder and Inorder in Separate lines:
- q) Quit:

Enter Your Choice: s
Enter data you want to search: 15
present
Balance factor of 15 is 0
Height of 15 in the AVL tree is 4

- i) Insert :
- s) search :
- p) Print Preorder and Inorder in Separate lines:
- q) Quit:

Enter Your Choice: i
Enter a data to insert: 25

- i) Insert :
- s) search :
- p) Print Preorder and Inorder in Separate lines:
- q) Quit:

Enter Your Choice: p
Preorder sequence:
15 7 3 1 0 2 5 4 6 11 9 8 10 13 12 14 19 17 16 18 23 21 20 22 24 25
Inorder sequence:
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25

- i) Insert :
- s) search :
- p) Print Preorder and Inorder in Separate lines:
- q) Quit:

Enter Your Choice: s
Enter data you want to search: 7
present
Balance factor of 7 is 0
Height of 7 in the AVL tree is 3

- i) Insert :

- s) search :
- p) Print Preorder and Inorder in Separate lines:
- q) Quit:

Enter Your Choice: s
Enter data you want to search: 100
Not present

- i) Insert :
- s) search :
- p) Print Preorder and Inorder in Separate lines:
- q) Quit:

Enter Your Choice: q