

CS2351 DATA STRUCTURES

Homework 5

Due: 11:59 pm, June 15, 2011

In this assignment, you are asked to write a program to implement the AVL tree. You should submit the source code of your program to the iLMS system (<http://lms.nthu.edu.tw/>) before the deadline. To grade your assignment, we will arrange a 15-minute session with you for a demonstration of your program, at General Building II Room 734 on either June 16 or June 17. Please make sure that the source code can be compiled without any error. Late submission will get at most 60% for the grade.

Your Task

Write a program to implement the AVL tree that supports the following functions:

- *insert*(x): Insert the element x into the tree;
- *search*(x): Report YES if x is in the tree, and NO otherwise;
- *print*: Print the elements in the tree by pre-order traversal.

Your program should read the input from the file named `input.txt` and output the results to the file named `output.txt`. The following is an example of the input file. Each line contains a command that describes the operation to be performed. Each element in the tree is always an unsigned 32-bit integer, and we will never print an empty tree. The output file contains the corresponding output for each *search* or *print* operation. For printing a tree, each element should be separated with its adjacent elements by a white space. See the following for an example.

Example Input:

```
insert 5
insert 3
print
insert 1
print
search 4
search 3
insert 7
insert 2
print
```

Example Output:

```
5 3
3 1 5
NO
YES
3 1 2 5 7
```

Bonus

A 20% bonus will be given if your AVL tree can also support *delete* correctly. For further questions, please consult with our tutors during the tutorial.