CS 201 - Data Structures and Discrete Mathematics I – Fall 2005
Homework 3

General Information

Deadline: 11:59pm, December 1, 2005

The purpose of this homework is to practice Tree and traverse algorithm. You are required to use Java. The homework is not a group project and everybody should work on it individually. We will run your programs with MOSS, which gives us an indication whether two programs are too close to have been written independently.

Problems (100 points)

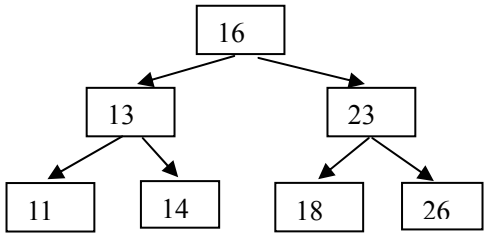
(1) Write a binary tree class named **my_Tree** as the basic data structure.

(2) Write a class named **my_SortedTree** with three methods.

(i) Given a sequence of numbers (total number of numbers will be the full tree size 2^n-1), sort them in an increasing order.

(ii) Store the sorted sequence in a full binary tree so that use the "in order" traverse algorithm can print them in an increasing order. Note that your tree MUST be a full tree.

For example, given "14 23 13 18 11 26 16" as input, your program should sort them first, so that the sequence is "11 13 14 16 18 23 26", then insert those seven numbers into tree structure one by one, it should be



(iii) Use the level-order traverse algorithm to print all of them.

In the main method, you should call those three methods one by one to show all of them work well. You can assume that all numbers in sequence are different. You can assume that we will provide enough numbers to fill a full tree.

Sample Run:

Please Enter Numbers:
14 23 13 18 11 26 16

After sorting them, you will get:
11 13 14 16 18 23 26

Tree has been constructed!

Do you want to print them?
y

Level-order traverse:
16 13 23 11 14 18 26

What to turn in

You should turn in a java file named **my_SortedTree.java**. You should write main within **my_SortedTree.java**.

How to turn in

login to oscar.cs.uic.edu, go to your working directory and run **turnin**.

"turnin -c cs201 -p project2 my_SortedTree.java "

You may run **turnin** as many times as you want (only the last copy is saved).

You can use "turnin -c cs201 -p project2 –v" to check whether you have turned in successfully.

For more help, you can type

turnin -h
or
man turnin

Note

1. You MUST make sure that your program can compile using "javac" and run using "java" on oscar.cs.uic.edu.
2. You use an IDE, such as Jbuilder, to code and to debug, but you must make sure that your code can be compiled and run on oscar.cs.uic.edu without any additional packages.
3. Remember to comment your code.