/200 points

Project 4 due December 9

Write a Java package (multiple Java classes) to do the inventory od a lumber yard and to fill the customer orders.

Analysis and Plans

1. See lectures on 10/27(data collection) and 10/28(P4 Plan)
2. Notes: Do not share your codes (solution of Project 4) to anyone in class. Penalty will be F and a report to VP

I/O Investigation:

1. Input can be a txt file or a String via keyboard. Each line of input is composed of
   - Cross section of studs/beams: example: 2x4 (means 2 inches by 4 inches). The first number can be 2,3,…, 6 while the second one from 3 to 12. Unit is optional.
   - Length can be in multiple format such as 10', 10 ½ ', 10'6",
   - Quantity : an integer greater than 0

   Notes:
   i. Length and quatity are repeated multiple times
   ii. Example of three input lines with quantity in parentheses.
   2x4 8'(125) 12 4/8'(475) 20'6"(127)
   2x6 10'(12) 16'18"(75) 10'(129)
   2x4 8'(125)
2. Output is very similar to input. However, it must be displayed in words all units such as ' becomes ft and " become in. The fraction should be adjusted to be a simplified form such as 2/4 becomes ½ and 7/2 become 3 ½. Furthermore, if the number in inches is greater than 12, it must converted to feet and remainder in inches.
   - Example of output of the above input
   2x4 8ft(250) 12 1/2ft(475) 20ft6in(127)
   2x6 10ft(141) 17ft6in(75)

   Notes:
   1. In case the output is a text file, it can be used as input.
   2. In addition, you should provide more input/output for testing in the Java class Test.

Data Structures:

There are three data structures in this project (You are NOT allow to use other structures without approval of your instructor)

1. Array: It is used to present the cross sections.
   a. It is 2 dimentional array. The row represents the first number, while the column the second number. The row columm pair (0,0) represents 2x3 cross section
   b. Type of Array is NOT integer. It is Self Balance Tree
2. Self Balance Tree : Each node of the tree will store the lengths and quantities

3. Stack for garbage collection: When the quantity is 0, the node is removed out of the tree and stored into Stack. If your project needs a new node, it must use a node in the Stack before it creates.
   Note: There will be only one Stack for all trees.

Project Evaluation

1. Your project should follow the standard etablised in the previous projects.
2. The folder name of your project is YourLastName FirstName P4
3. Instructor will compile your class Test. It is better for you to make sure that a Java class name and its name are IDENTICAL. The benefit is when you compile Test.java, ALL other classes will be compiled automatically.
4. Instructor will foucs on the following tasks:
   a. How do you read/write a text file
   b. How do you parse an input line with the separators.
   c. No S.o.prln in all non-Test classes except for the prompts to users to enter via keyboard for textfile name of the data input line
   d. How do you modify the Java classes that are introduced in the lectures, projects and labs.
      Do not ADD a global variable that acts as an attribute.
   e. How do you test the tree after each insert/update/delete? What are the nodes in the stack?
   f. How do you fill orders intelligently.
   g. How do you print all trees and their stack.
   h. How do you arrange your Java classes to avoid duplcation of codes.
   i. How do you archieve the trees to a text file. (Please beware that the stack is not included) and how to back up this text file.

      <<<More information to be added later for clarification>>>

Reused classes/methods

Here are the Java classes that can be used / modified to support Project 4

1. Imported class Scanner: It is used to read an interger, or a line. Now it can be used to open and close a text file for reading or writing.
2. Parsing techniques via the methods of class String are used to extract the cross section, length and quantity. Please find the suitable separators.
3. Class Fraction can be extended with unit
4. Class STB (provided by your instructor) can be used with a slight modification
5. Class Node needs to have an additional attributes quantity
6. One dimentional array of integers is extended to be two dimensional array od SBT
7. Class Stack to store integers is modified to store the nodes. It is used for garbage collection. When a node in a tree as the quantity zero(0), it will be deleted out of the tree (or equivalently be pushed into Stack). On the other hand when a new node to be inserted to the tree, it should be popped from non-empty Stack before it is created.