Lab Assignment-5
(Generic Programming & Java Collection Framework)
IIIT-Delhi. 30th August 2017. Due by 23:59pm on 31st August 2017

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No extensions will be provided. Any submission after the deadline will not be evaluated. If you see ambiguity or inconsistency in a question, please seek a clarification from the teaching staff.

NOTE: Attendance in the lab is mandatory.

Plagiarism: All submitted homeworks are expected to be the result of your individual effort. You should never misrepresent someone else's work as your own. In case any plagiarism case is detected, it will be dealt as per IIITD policy for plagiarism.

NOTE: You will have to create a "PRIVATE" git repository to manage your code for this lab assignment. This is a part of evaluation criteria and will be checked by TA during the demo. The timestamp on the git log should be before the deadline.

Problem Description:

It is Christmas Day and teacher of Christoval School wishes to give christmas gifts to the students in her class. She brought a box full of small christmas trees. Each tree looks like a binary search tree with round balls hanging on christmas tree as nodes of binary search tree. The round balls have engravings on them which were either a String, an Integer or a Float. Balls on a same tree are having engravings of same type.

She decides to give these christmas trees to the students in a unique way. She ensures that there were as many number of round balls on each tree as there are number of students in the class. The students in her class have roll number starting from 1. She selects each tree one by one and perform following steps.
1. She moves along the nodes of the tree in inorder traversal fashion.
2. Then she asks a question to the student whose roll number is equal to the position of the root of the tree in the traversal order. The question depends on the type of the tree:
    a. *Integer Type*: Sum of all the integer engravings on the tree.
    b. *Float Type:* Sum of all the float values on the tree.
    c. *String Type:* A string formed by concatenating all the engravings on the tree during the traversal.
3. She gives that christmas tree to that student as she knows he/she will be able to give the correct response as all students in her class are smart.

If a student does not get any christmas tree, then the teacher gifts that student a chocolate.

Input:
Input for the trees has to be taken from **.txt** files that has been provided to you herewith in the zip file. If there are x trees in the christmas box, then create x **.txt** files each having the description of a tree. Name of the files should be **1.txt, 2.txt, 3.txt and so on**.

The format of the tree description in **.txt** file is:
First line contains a string which denotes the type of the tree which can be either **String**, **Float**, **Integer**.
Second line contains an integer denoting number of nodes in the tree, say n.
Third line contains n space separated values denoting the engravings on the tree.
Note: The values in the third line will be the insert order for creating BST. Hence first value will be the root of the tree.

From user, following input must be taken:
2 space separated integer denoting number of trees (x) and number of students (n) in the class.
Ensure that number of nodes in the **.txt** files are equal to the number of students.

Output:
Output has to be printed in a .txt file.
If m students got christmas trees, then m lines should be printed. Format of the line should be:
'Roll number of student' Value1 Value2 Value3 and so on.
Here **Value** is the answer that student gave while receiving that tree from the teacher.
(m+1)th line contains number of chocolates that the teacher gave as christmas gift.
Note: m lines should be ordered on the basis of roll number. Order of the values within a line should be in the same order as the order of filename of its corresponding tree.

Notes:
- Use comparable interface for inserting nodes in BST. Left subtree contains node with key less than and equal to node's key. Right subtree contains node with key greater than node's key.
- Remember this lab is about generic programming and Java collection framework. Hence, to get marks in this lab, your program should definitely use these two concepts judiciously.
- A java class is attached which has a method for creating **.txt** files with tree description. Call the method inside the class with parameters as number of students and number of christmas tree.

Bonus Marks
Bonus if generic programming is **used at all the required places** very effectively such that there is no redundant classes.