CS2401 – Catch-up Lab

With this lab assignment, you are given an opportunity to demonstrate your skills in the concepts you have learned this semester. This lab is optional only if you have turned in all your lab work so far this semester and are in good standing to pass the class so far. In all other cases, you have to complete this lab. When in doubt, talk to your TA, Michelle Afravi.

What is the scenario?

This time, there is no scenario. You are the one in charge and you have to design your own scenario. The scenario you come up with should be a problem whose solution requires you to make use of:
- At least one 2D array;
- At least one binary tree (implemented as a linked-list structure);
- At least one stack or one queue (implementation is left up to you but you will need to justify your choice);

And the solution of your problem must involve:
- The use of a sorting algorithm or a search algorithm.
- At least one recursive method.
- The use of unit testing (using JUnit).

So, how will this work? What will you have to do?

As mentioned above, you have to describe a scenario of a problem whose solution requires you to make use of the above data structures and algorithms. Your description has to be clear and relevant: it should be clear from your description why each of the above concepts needs to be used.

Part 1. Description of your problem.
You will describe your scenario / problem in a word document. Your description should be compelling and clear. The use of the above data structures and algorithms should be natural (not just because you have to) and well motivated / justified.

You are expected to provide 5 test cases for your work: these test cases should be presented and justified in the word file. These test cases are meant to check that your code works as expected.

In the word document, you will also provide the structure of your solution, including:
- The types / data structures you need to define; and

- The main algorithms you will need to use.

Your solution needs to be clearly described and all choices (of implementation, of algorithms used) well justified.

Part 2. Java solution of your problem.

You will then proceed and write the java code corresponding to your solution. You are expected to provide at least 5 different test cases for your code.

<u>General Note:</u>

All throughout your lab, you are expected to maintain a high quality of code (consistent indentation, line breaks, variable naming, commenting, methods are grouped by category: setters, getters, etc., multiple files as needed and relevant, etc.). Your code quality will be part of your grade on this lab.

Grading: over 130 pts

Part 1. Description 50 pts

20 pts Compelling problem/scenario and clear description

30 pts Clear justification of the proposed problem w.r.t. the data structures, algorithms, and tasks to be covered in this lab

- 15 pts   Missing test cases

Part 2. Java solution 80 pts

15 pts Code is deemed to be of high quality (see criteria above)

20 pts Demonstrated ease of use of required data structures and algorithms

20 pts Code addresses the stated problem

15 pts Code works

10 pts Code is easy to use

- 15 pts   Missing test cases

Due date: May 8th at 11:59 pm

How to submit?

You are expected to follow your TA's guidelines for submission.

Failing to follow submission instructions and guidelines will result in up to 15 points off your overall grade in this lab. So please pay attention.

Additionally, your word file is expected to be neat and clear. Failing to do so will result in up to 15 points off. On the other hand, extra neat and clear work will be rewarded by up to 5 extra points.