

CS2402: Lab assignment #2, skeleton of a report

1 Introduction

In the introduction, you need to clearly explain what is the problem you address by doing this lab assignment. What is the problem? What is the objective? Make sure that you explain it in a very clear way. It must be understood by anyone, who have never heard about this problem before.

At the end of the introduction, you present the outline of your report.

2 Methodology to solve the problem

2.1 Presentation of the problem from a more technical point of view

Explain what are the steps you will have to follow:

- read the problem in a file: explain how this text file is structured.
- store the information provided in the file in data structures: explain which data structures, and why? explain what the number you read in the file stand for. Explain how you will index the walls, and which values you will assign them (0 or 1), etc.
- run DFS: why is it an appropriate method?
- and then consider another version of DFS in which you integrate constraints: why?

2.2 DFS algorithm to solve the museum problem

Here provide the pseudocode of DFS.

2.3 DFS+constraints

Explain the changes that you have to make in the former algorithm to integrate the constraints. Describe the methods to check for the consistency of the assignments of the walls, given the matrix describing the museum.

2.4 Global algorithm

Explain how the formerly presented algorithms are integrated in the overall algorithm that is in charge of:

- read a text file containing the description of the problem;
- output an array that is a solution.

3 Theoretical study of DFS

3.1 Description of DFS

Here you provide the pseudocode of DFS (adapted to this specific problem, i.e., you integrate the method find-index for instance), or refer to a previous section where you've already presented it.

3.2 Complexity analysis of DFS

Provide the running time function and big-oh of DFS. Justify your answer.

4 Experimental results and analysis

4.1 Testing

Here you explain which test cases you consider to put your algorithm to the test, in all situations. Justify why you consider these test cases rather than others. What makes them so interesting?

You are expected to provide 5 test cases at least.

4.2 Report of the results

Here you should have a table summarizing all your experimental tests. Since we don't want to use the inner clock of the computer to determine the time it needs to run to completion, you have to provide the number of steps that are performed. Counters must therefore be integrated in your code, so that you can retrieve this information at the end of your tests.

Basically, the table of your results should look like that:

Test #	n=2	n=3	n=4	n=5	n=6	n=7	solution
test1							
test2							
test3							
test4							
test5							
test6							

Where tests 1 to 5 may be the test cases described before, and test6 may be just another randomly generated test case.

Note that since you want to discuss the performance of your algorithm, you need to run experiments for different sizes of problems. In particular, given the same kind of problem, you have n increase and observe the performance of your algorithm. Then you will discuss the performance of your algorithm in the next subsection.

4.3 Analysis of experimental results

Here you analyse you results: in particular, you can discuss the performance of your algorithm based on the results obtained when n increases.

In the specific case of lab2, this is the place in your report where you have to speak about the comparison between DFS+constraints and plain DFS.

Given n the size of the problems tested, and your theoretical result about DFS, draw conclusion about the number of steps DFS would have required, when compared to the number of step actually performed (measured during the experimental tests) when running DFS+constraints.

5 Conclusion

In the conclusion, you have to:

- briefly summarized what you've just done (!!!! this must not be a copy and paste from your report);
- explain what you learnt by working on this assignment, how this enriched you;
- discuss what you would do if you were given more time, how to further enhance your program: at this point you must be critical about your work, and provide directions for future work.

6 References (optional)

If you've used interesting articles, books, etc. in order to do this assignment, and you want to share them, you can cite them in this section.