CSC263 final project, Summer 2020

July 30, 2020

Please read the entire handout carefully before you begin

In this project you will design, implement, and analyze your own ADT to solve a unique problem. You will have the opportunity to resubmit the first two parts for full credit on the following part's due date, after receiving feedback.

Your individual grade for the project will consist of your group's total grade for parts 1, 2 and 3 *scaled* by your individual grade on the interview. The interview is designed to be easy if you understand every part of your own project.

Updated July 30:

> The project is to be completed in groups of 1 to 3 students, and the size of the group will be considered when determining if the chosen ADT and implementations are suitably complex.
>
> The element of randomness of one of your implementations in part 2 must affect the analysis of the data structure.
>
> All due dates are at 10PM on the dates indicated.
>
> In part 3 you must indicate without justification the best-case and worst-case running time of each method defined for your ADT.
>
> In addition, you must include an expected running-time analysis of some non-trivial method of one of your implementations as well as the worst case analysis for that method. Similarly, you must include an amortized analysis of some non-trivial method of the other implementation, as well as the worst case analysis for that method.
>
> You should cite any sources you use in APA format. Although we won't be strict about format, we will be very strict about trying to pass someone else's work as your own. You should be able to analyze your implementations yourself, and you may be asked about any part of the project during the interview.
>
> You may pick an ADT that has been covered in the course (or appears in the textbook) however your implementations may not be of those covered in the course (or appearing in the textbook).

If your implementations are too similar to another group's both groups will be asked to resubmit part 2. We will take instances of plagiarism very seriously.

Part 1. 10 %

Due July 18, 2020.

Describe a mathematical problem or real life situation, and an ADT to model it. Picking a problem and ADT may require some creativity, research in scholarly sources, or both.

You will be graded on how complex your problem is to model, and how appropriately your ADT models it. You should describe what data your ADT stores, and what operations it performs.

Part 2. 30 %

Due August 7, 2020. Optional: resubmit part 1.

Give two different implementations of your ADT from part 1. One of your implementations must include an element of randomness, and the other will be analyzed using amortization.

You will be graded on the correctness of your implementations, as well as their efficiency, although they need not be optimal.

Part 3. 60 %

Due August 17, 2020. Optional: resubmit part 2.

Analyze the time and space complexity of your implementations in part 2 using the techniques learned in class. In particular one of your analyses must use amortization, and one must consider the expected case of some random event.

You will be graded on the correctness of your analyses, as well as meeting all previous requirements. There will be no interviews at this stage.