

Homework 8

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Collaborators

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1 Instructions

- The solutions **should be typed**, using proper mathematical notation. We cannot accept hand-written solutions. Here's a short intro to \LaTeX .
- You should submit your work through the **class OAKS page** only. Please submit one PDF file, compiled using this \LaTeX template.
- You may not need a full page for your solutions; pagebreaks are there to help with grading. Even if you do not attempt every problem, please submit this document with no fewer pages than the blank template.
- You are welcome and encouraged to collaborate with your classmates, as well as consult outside resources. You must **cite your sources in this document**. **Copying from any source is an Honor Code violation. Furthermore, all submissions must be in your own words and reflect your understanding of the material.** If there is any confusion about this policy, it is your responsibility to clarify before the due date.
- Posting to **any** service including, but not limited to Chegg, Reddit, StackExchange, etc., for help on an assignment is a violation of the Honor Code.
- You **must** virtually sign the Honor Code (see Section 2). Failure to do so will result in your assignment not being graded.

2 Honor Code (Make Sure to Virtually Sign the Honor Code)

Problem 1. On my honor, my submission reflects the following:

- My submission is in my own words and reflects my understanding of the syllabus.
- Any collaborations and external sources have been clearly cited in this document.
- I have not posted to external services including, but not limited to Chegg, Reddit, StackExchange, etc.
- I have neither copied nor provided others solutions they can copy.

In the specified region below, clearly indicate that you have upheld the Honor Code. Then type your name.

Honor Code Agreement. Oscar Jiang

□

3 Problem 1: One Trivial Method

Problem 2.

The trivial method I will explain is the add method. To start the add method, we will check if the element is less than or equal to zero first. If it is, it should throw an exception stating that cannot be passed. Otherwise, it start the adding process and will meet the next check. This next condition checks if the hash table is filled up halfway. If it is, it will go through the resize method where the internal array's length is doubled and the prime number increased to the biggest prime number before the length of the array. After the possible resize, the element will be placed inside the array. Before entering the loop that handles the placement, the hash function is called to find the place for the element and set to a variable which we will call hashPos. Finally, the while loop starts and ends when the element at hashPos is 0. If it is not zero, hashPos will increment by one and modded by internal.length so it is able to loop back to the first index if all the indices after its initial hashPos is occupied. When the while loop ends, size is incremented and hashPos should be an index that is unoccupied and the elem will be placed there.

4 Problem 1: Something I learned

Problem 3.

One thing I learned from this is how hashtables and hashmaps can access and search for elements within a list quicker than linear searches or binary searches via a function. Beforehand, I already had a notion of what hashmaps were, but this really helped cement that idea.