

Loyola University Chicago

Department of Computer Science

COMP 272: Data Structures II (Fall 2025)

Assignment #3

(Originally created by Dr. William O'Connell)

This is an individual assignment.

Deadline: Tuesday, October 24, 2025, 11:55 PM.

Submission instructions

You need to submit your work through **Sakai** by uploading the edited source files: **HashingProblems.java** and **myHashMap.java**.

Part 1 — Hash Map Object Implementation using Separate Chaining (50 points)

Complete the methods `remove(K)`, `replace(K,V)`, and `replace(K,V,V)`. Full documentation is provided in the source code file **myHashMap.java**.

The `myHashMap` object provided to you represents a simplified version of Java's built-in `HashMap` implementation. It uses the **Separate Chaining** hashing approach. Your task is to enhance this simplified implementation so that its behavior matches that of the Java Collections Framework class.

Scoring:

- Passing the `remove(K)` tests — 25 points
- Passing `replace(K,V)` and `replace(K,V,V)` tests — 25 points

Part 2 — Hashing Problems (50 points)

While the previous problem focuses on implementing a `HashMap`, these exercises use the Java library's `HashMap` object. Implement the following methods in **HashingProblems.java**:

1. getAverage (15 points)

Compute the average of the values corresponding to all keys that appear both in the array and in the `HashMap`.

2. odd (10 points)

Return an `ArrayList` containing the values associated with odd keys in the `HashMap`.

3. twoSums (25 points)

Given an integer array and an integer `k`, count how many pairs of elements have a difference `k`.

Implement this with time complexity $O(n)$ using a HashMap or HashSet.

Additional Notes

1. Before submitting, ensure your code passes all tests in Main.java. Note that additional hidden tests may be used for grading.
2. Include your **name and course section number** as comments at the top of both files.