**Loyola University Chicago**
**Department of Computer Science**
**COMP 272: Data Structures II (Spring 2024)**

**Assignment # 5**

This is an individual assignment.
Deadline: Tuesday**, March 26th 2024, 11:55PM.**
You need to submit your solutions in Repl.it.

**Hash Table (20 points)**

Given two arrays *A* and *B,* return whether array B is a subset of array A.

Input: [1,50,55,80,90], [55,90]

Output: true

Input: [1,50,55,80,90], [55,90, 99]

Output: false

**Priority Queue 1 (20 points)**

Given an array *A* and integer *k*, return the *k*-th maximum element in the array.

Input: [1,7,3,10,34,5,8], 4

Output: 7

**Priority Queue 2 (20 points)**

Given two arrays *A* and *B* with *n* and *m* integers respectively, print all the elements in sorted order.

Input: [4,1,5], [3,2]

Output: 1 2 3 4 5

**Bloom Filter Hash Map (20 points)**

Implement the following methods:

- **contains**

  Complete the *contains()* method. The method will check the bits in the bloom filter map for each of the 'k' hash codes based on the passed in parameter. It returns false if not in the set, else true if most probably in the set.

**Cuckoo Hash Map – (20 points)**

Implement the following methods:

- **put**

  Complete the *put()* method. This method should add a key-value pair to the table by means of cuckoo hashing.

**Note:**

- For the cuckoo hashing, the goal is to intentionally have you study the existing code in order to write the *put*() routine. Do not wait till the last minute to work on this routine, factor in **time management.**
- **If you make a reasonable attempt, will give some credit. If no attempt, highest grade is 80%.**

**Submission**:

**1)** Before submission, **make sure your code passes all the JUnit tests**. Keep in mind, however, that passing the test cases does not guarantee that your code is correct or efficient. Your assignment will be graded considering test results, correctness, and efficiency.

**2)** The submission should be completed in Replit.

***3)*** Include your name and class number as comments at the top of each submitted Java file.