CMPE 261: Large Scale Programming
Worksheet 5A

Istanbul Bilgi University

Fall 2023

Task

Count the elements in `N` separate arrays, with different threads assigned to each one. You will be using a class called `HashMap`, which is a data structure consisting of key-value pairs, to store element counts. In this case the keys will be the unique elements in the array and values will be the count of the occurences. A simple example for this will be shown in the class.

- Implement a `Counter` class which extends `Thread`.
  - Constructor should take 3 arguments: an array, a `HashMap` and a `ReentrantLock`.
  - In the `run` method, traverse the given array and increment the count of the element in the `HashMap` on every occurence of the element.
  - Create a `main` method and test your `Counter`. When the arrays are large (eg. two arrays containing the value "a" 400 times) what kind of problems do you encounter?
  - Solve the problem using `ReentrantLock`.
  - Test your `Counter` class again, proving that you have solved the problem.

Note: Do not compress your files, submit only java files.
Note: Do not forget to justify your answers with comments.