HW 2 Question 3

The algorithm that takes in a list of IDs and outputs the ID that repeats the most would start with a hashmap that takes in all the IDs and gives them a key representing the amount of times it is shown, assuming there are duplicates, all in a for loop. Next, it inserts all the keys in an array and sorts it using either quicksort or timsort! After, that it would take the key at the end of the array and return the ID value associated with it. Assuming that one ID appears 50% more then the others there wont be any IDs that will appear the same amount of the returned ID. This algorithm would have a runtime of O(nlogn) due to the quicksort & timsort algorithms.

However as a group we realized there is a more efficient algorithm called the Boyer-Moore majority voting algorithm after doing further research on the runtime of specific algorithms. The runtime of the Boyer-Moore majority voting alg would be O(n) since it would only search through the array, and have one counter value, rather than sorting, and using a hash map.