

Problem 1538: Guess the Majority in a Hidden Array

Problem Information

Difficulty: Medium

Acceptance Rate: 69.27%

Paid Only: Yes

Tags: Array, Math, Interactive

Problem Description

We have an integer array `nums`, where all the integers in `nums` are **0** or **1**. You will not be given direct access to the array, instead, you will have an **API** `ArrayReader` which have the following functions:

* `int query(int a, int b, int c, int d)` : where `0 <= a < b < c < d < ArrayReader.length()`. The function returns the distribution of the value of the 4 elements and returns:
* ***4*** : if the values of the 4 elements are the same (0 or 1).
* ***2*** : if three elements have a value equal to 0 and one element has value equal to 1 or vice versa.
* ***0*** : if two element have a value equal to 0 and two elements have a value equal to 1.
* `int length()` : Returns the size of the array.

You are allowed to call `query()` **2 * n times** at most where n is equal to `ArrayReader.length()` .

Return **any** index of the most frequent value in `nums`, in case of tie, return -1.

Example 1:

Input: nums = [0,0,1,0,1,1,1,1] **Output:** 5 **Explanation:** The following calls to the API reader.length() // returns 8 because there are 8 elements in the hidden array.
reader.query(0,1,2,3) // returns 2 this is a query that compares the elements nums[0], nums[1], nums[2], nums[3] // Three elements have a value equal to 0 and one element has value equal to 1 or viceversa. reader.query(4,5,6,7) // returns 4 because nums[4], nums[5], nums[6], nums[7] have the same value. we can infer that the most frequent value is found in the last 4 elements. Index 2, 4, 6, 7 is also a correct answer.

****Example 2:****

****Input:**** nums = [0,0,1,1,0] ****Output:**** 0

****Example 3:****

****Input:**** nums = [1,0,1,0,1,0,1,0] ****Output:**** -1

****Constraints:****

* `5 <= nums.length <= 105` * `0 <= nums[i] <= 1`

****Follow up:**** What is the minimum number of calls needed to find the majority element?

Code Snippets

C++:

```
/**  
 * // This is the ArrayReader's API interface.  
 * // You should not implement it, or speculate about its implementation  
 * class ArrayReader {  
 * public:  
 * // Compares 4 different elements in the array  
 * // return 4 if the values of the 4 elements are the same (0 or 1).  
 * // return 2 if three elements have a value equal to 0 and one element has  
 * value equal to 1 or vice versa.  
 * // return 0 : if two element have a value equal to 0 and two elements have  
 * a value equal to 1.  
 * int query(int a, int b, int c, int d);  
 *  
 * // Returns the length of the array  
 * int length();  
 * };  
 */  
  
class Solution {  
public:  
int guessMajority(ArrayReader &reader) {
```

```
}
```

```
};
```

Java:

```
/**  
 * // This is the ArrayReader's API interface.  
 * // You should not implement it, or speculate about its implementation  
 * interface ArrayReader {  
 * public:  
 * // Compares 4 different elements in the array  
 * // return 4 if the values of the 4 elements are the same (0 or 1).  
 * // return 2 if three elements have a value equal to 0 and one element has  
 * value equal to 1 or vice versa.  
 * // return 0 : if two element have a value equal to 0 and two elements have  
 * a value equal to 1.  
 * public int query(int a, int b, int c, int d);  
 *  
 * // Returns the length of the array  
 * public int length();  
 * };  
 */  
  
class Solution {  
public int guessMajority(ArrayReader reader) {  
  
}  
}
```

Python3:

```
# """  
# This is the ArrayReader's API interface.  
# You should not implement it, or speculate about its implementation  
# """  
#class ArrayReader(object):  
#    # # Compares 4 different elements in the array  
#    # # return 4 if the values of the 4 elements are the same (0 or 1).  
#    # # return 2 if three elements have a value equal to 0 and one element has  
#    # value equal to 1 or vice versa.  
#    # # return 0 : if two element have a value equal to 0 and two elements have a
```

```
value equal to 1.

# def query(self, a: int, b: int, c: int, d: int) -> int:
#
# # Returns the length of the array
# def length(self) -> int:
#
# class Solution:
def guessMajority(self, reader: 'ArrayReader') -> int:
```