

AVAILABLE
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PAINLESS

Dominator

START

Find an index of an array such that its value occurs at more than half of indices in the array.

Programming language: C++ ▼

Human language: English ▼

A zero-indexed array *A* consisting of *N* integers is given. The *dominator* of array *A* is the value that occurs in more than half of the elements of *A*.

For example, consider array *A* such that

A[0] = 3 A[1] = 4 A[2] = 3
A[3] = 2 A[4] = 3 A[5] = -1
A[6] = 3 A[7] = 3

The dominator of *A* is 3 because it occurs in 5 out of 8 elements of *A* (namely in those with indices 0, 2, 4, 6 and 7) and 5 is more than a half of 8.

Write a function

```
int solution(vector<int> &A);
```

that, given a zero-indexed array *A* consisting of *N* integers, returns index of any element of array *A* in which the dominator of *A* occurs. The function should return -1 if array *A* does not have a dominator.

Assume that:

- *N* is an integer within the range [0..100,000];
- each element of array *A* is an integer within the range [-2,147,483,648..2,147,483,647].

For example, given array *A* such that

A[0] = 3 A[1] = 4 A[2] = 3
A[3] = 2 A[4] = 3 A[5] = -1
A[6] = 3 A[7] = 3

the function may return 0, 2, 4, 6 or 7, as explained above.

Sieve of
Eratosthenes

Lesson 12

Euclidean
algorithm

Lesson 13

Fibonacci
numbers

Lesson 14

Binary search
algorithm

Lesson 15

Caterpillar
method

Lesson 16

Greedy
algorithms

Lesson 17

Dynamic
programming

Lesson 90

Tasks from
Indeed Prime
2016 challenge

Lesson 99

Future training

Complexity:

- expected worst-case time complexity is $O(N)$;
- expected worst-case space complexity is $O(1)$, beyond input storage (not counting the storage required for input arguments).

Elements of input arrays can be modified.

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