JP's students

Problem

JP was tasked with organizing national camp. He is currently conducting an activity where he arranges the N students in a circle, with N even. He gives a value a_i to each student, such that for any two adjacent students in the circle a_i and a_{i+1} (indices are taken modulo N), it holds that $|a_i - a_{i+1}| = 1$. Sebas wants to know if there are two students, in diametrically opposed positions, with the same value. That is, if there exists an integer i such that $a_i = a_{i+\frac{N}{2}}$. In order to find out, Sebas may ask any student their number. But this too easy for him, so he challenged you to solve his problem in at most 60 queries.

Implementation Details

You must implement the function *Reto_Sebas()*. This function receives an integer N, the number of students. The function should return a value i that satisfies $a_i = a_{i+\frac{N}{2}}$, or, if no such value exists, return -1. During your program, you can call the function *valor()*, which receives an integer $0 \leq i \leq N-1$ and returns the value of a_i. To carry out the interaction, you must include the library *"alumnos.h"* with the command *#include "alumnos.h"*. An example of how the program would look is as follows:

```
#include "alumnos.h"
#include <bits/stdc++.h>
using namespace std;

int Reto_Sebas(int N) {
    // Implement this function.
}
```

The grader will call the function **multiple** times for each case.

Example

Example 1:

- The grader calls the function

Reto_Sebas(8)

- In this case, the array of students is the following {*0, 1, 2, 3, 2, 1, 0, -1*}.
- An example of the interaction could be as follows:

Function called	Response
valor(0)	0
valor(1)	1
valor(2)	2
valor(3)	3
valor(4)	2
valor(5)	1
valor(6)	0
valor(7)	-1

- And returning 1 would give an accepted veredict, since $a_1 = a_5$.

Constraints

- $1 \leq N \leq 10^5$.
- For all $0 \leq i \leq N-1$, it holds that $-10^9 \leq a[i] \leq 10^9$.
- For all $0 \leq i \leq N-1$, it holds that $|a[i] - a[(i+1)\,\%N]| = 1$.
- If you call the function *valor()* more than 60 times during the function *Reto_Sebas()*, you will receive 0 points for that case.
- Let S_N be the sum of all values of N over each call to the function in a testcase. It is guaranteed that $S_N \leq 10^5$.

Subtasks

- (5 points) $N \leq 60$.
- (20 points) It is guaranteed that the array a is increasing and then decreasing.
- (35 points) It is guaranteed that there is always an answer.
- (40 points) No additional constraints.