FEPE-PH

Where Is the Key?
Time limit: 2 seconds

In the FuPaPa town, the streets have magic power. Each door has a magic symbol and a mysterious number. Townspeople can move to other address via these magic symbol. The movement rule is as follows. Assume that you stand in front of the house with address i. If you want to move to the house with address j. You can teleport to the house with address $\lfloor (i+j)/2 \rfloor$ immediately.

Kenny Lin is a freelance musician living in FuPaPa town, he likes to sing and play guitar in the street. He always has some drink after his performance. However, Kenny Lin always drops his key when he got drunk. As a big fan of Kenny Lin, you gave an AirTag as present for him. The AirTag will help Kenny Lin to find his key.

The AirTag can send a signal to Kenny Lin's cellphone. Then, Kenny Lin will know where is his key. The signal contains the mysterious number indicating where the key is. If Kenny Lin has the mysterious number, he can find his key via the magic symbols. When he arrives a house in the streets, he can compare the mysterious numbers. If these two mysterious numbers are the same, Kenny Lin find his key. Otherwise, he should keep teleporting himself via these magic symbols to find his key. However, if Kenny Lin cannot find where the key is, that means there is something wrong with the AirTag. You should fix the AirTag, otherwise, Kenny Lin will sleep on the street.

Assume that Kenny Lin lives in the middle of the street. Please write a program to help Kenny Lin to determine how many times of teleport for finding his key.

Input Format

There are several test cases. Each case contains two lines. The first line contains N non-duplicate numbers, which separated by blanks, indicating the mysterious numbers for the doors. The second line contains a number indicating the mysterious number where the key is. You should assume the mysterious numbers are list in increase order.

Output Format

For each test case, output the minimum times of teleport for Kenny Lin to find his key. If the AirTag is not work, output '-1'.

Technical Specification

- $1 \le n \le 10^5$
- $0 \le$ mysterious number $\le 2^{31} - 1$

Sample Input

```
1 2 3 4 5 6
3
1 2 3 4 5 6
5
40 141 143 147 151 154 155 156 157 162 163
823
```

Sample Output

```
0
1
-1
```