Suppose that A is a list of n numbers $\{A_1, A_2, A_3, \ldots, A_n\}$ and $B = \{B_1, B_2, B_3, .., B_n\}$ is a permutation of these numbers, we say B is *K-Manipulative* if and only if:

$M(B) = minimum(B_1 \oplus B_2, B_2 \oplus B_3, B_3 \oplus B_4, \ldots, B_{n-1} \oplus B_n, B_n \oplus B_1)$ is not less than 2^K, where $\oplus$ represents the *XOR* operator.

You are given A. Find the largest K such that there exists a *K-manipulative* permutation B.

Input:

The first line is an integer N. The second line contains N space separated integers - $A_1\ A_2\ \ldots\ A_n$.

Output:
The largest possible K, or -1 if there is no solution.

Constraints:

- $1 < n <= 100$
- $0 \leq A_i \leq 10^9, where\ i \in [1, n]$

Sample Input 0

```
3
13 3 10
```

Sample Output 0

```
2
```

Explanation 0

Here the list A is $\{13, 3, 10\}$. One possible permutation $B = \{10, 3, 13\}$. Here
$M(B) = minimum\{B_1 \oplus B_2, B_2 \oplus B_3, B_3 \oplus B_1\} =$
$minimum\{10 \oplus 3, 3 \oplus 13, 13 \oplus 10\} = minimum\{9, 14, 7\} = 7$.
So there exists a permutation B of A such that $M(B)$ is not less than $4 = 2^2$. However there does not exist any permutation B of A such that $M(B)$ is not less than $8 = 2^3$. So the maximum possible value of K is 2.

Sample Input 1

```
4
1 2 3 4
```

Sample Output 1

```
1
```

Explanation 1

Here the list A is $\{1, 2, 3, 4\}$. One possible permutation $B = \{1, 2, 4, 3\}$. Here
$M(B) = minimum\{B_1 \oplus B_2, B_2 \oplus B_3, B_3 \oplus B_4\ B_4 \oplus B_1\} =$
$minimum\{1 \oplus 2, 2 \oplus 4, 4 \oplus 3\ 3 \oplus 1\} = minimum\{3, 6, 7, 2\} = 2$.
So there exists a permutation B of A such that $M(B)$ is not less than $2 = 2^1$. However there does not exist any permutation B of A such that $M(B)$ is not less than $4 = 2^2$. So the maximum possible value of K is 1.