# Manipulative Numbers

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 $1$.