COCI '15 Contest 7 #3 Ozljeda

Time limit: 1.0s **Memory limit:** 64M

Due to the frantic usage of the racket to kill flies, Marin has sustained a serious bodily injury known to the medical community as *epicondylitis lateralis humeri*. His grandma has advised smearing rakija over it, the doctor has prescribed a strong painkiller, but Marin has ignored every single advice and decided to look for the answer in integer sequences.

He has discovered a previously undiscovered sequence of integers and called it the *xorbonacci* sequence.

The n^{th} element in the sequence is denoted with x_n. The sequence is defined recursively in the following way:

$$\begin{aligned} x_1 &= a_1 \\ x_2 &= a_2 \\ &\vdots \\ x_k &= a_k \\ x_n &= x_{n-1} \oplus x_{n-2} \oplus \cdots \oplus x_{n-k}, n > k \end{aligned}$$

Because of a reason only known to Marin, he determined that all his sorrows will go away if you answer his Q queries defined with numbers l and r. The answer to the query is represented with the value $x_l \oplus x_{l+1} \oplus \cdots \oplus x_{r-1} \oplus x_r$.

Help Marin and answer his queries.

Please note: The operation $\oplus$ is the operation of binary **XOR**.

Input

The first line of input contains the integer K $(1 \leq K \leq 100\,000)$ from the task.

The following line contains K integers that represent the first K elements in the xorbonacci sequence.

All numbers are smaller than 10^{18}.

The following line contains the integer Q $(1 \leq Q \leq 10^6)$ from the task.

The i^{th} of the following Q lines contains two integers l_i and r_i $(1 \leq l_i \leq r_i \leq 10^{18})$ that represent Marin's i^{th} query.

Output

Each of the following Q lines of output must contain the answers to Marin's queries, the order being the same as the input.

Sample Input 1

```
4
1 3 5 7
3
2 2
2 5
1 5
```

Sample Output 1

```
3
1
0
```

Sample Input 2

```
5
3 3 4 3 2
4
1 2
1 3
5 6
7 9
```

Sample Output 2

```
0
4
7
4
```