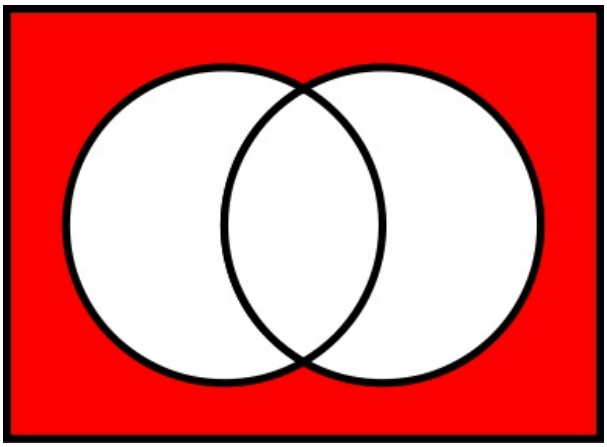
TLE '16 Contest 7 P3 - NOR

The only required knowledge is the NOR operator. All of its possible outputs can be stored concisely in this table.

a	b	$a \text{ NOR } b$
0	0	1
0	1	0
1	0	0
1	1	0



A Venn diagram of $A \text{ NOR } B$ from the Wikimedia Commons.

You are given a sequence A consisting of 0's and 1's. Here, the i^{th} element of A is denoted with A_i. A has length N $(2 \leq N \leq 10^6)$, and is indexed from 1 to N.

There are Q $(1 \leq Q \leq 10^5)$ queries, with each query consisting of integers x and y \((1 \le x

Input Specification

The first line contains one integer, N $(2 \leq N \leq 10^6)$.

The second line contains N space-separated integers. The i^{th} integer is A_i.

The third line contains one integer, Q $(1 \leq Q \leq 10^5)$.

The following Q lines contain two space-separated integers, x and y \((1 \le x

Subtask	Points	Additional Constraints
1	20	$N = 2$, $Q = 1$
2	20	$N \leq 2\,000$, $Q \leq 2\,000$
3	60	No additional constraints.

Output Specification

For each query, output the result of $(A_x \text{ NOR } A_{x+1} \text{ NOR } \ldots \text{ NOR } A_{y-1} \text{ NOR } A_y)$. The operations should be evaluated from left to right.

Sample Input

```
6
0 1 1 0 0 1
5
1 2
2 6
3 5
4 5
5 6
```

Sample Output

```
0
0
1
1
0
```