Problem E. Egma Game

Input file:	stdin
Output file:	stdout
Time limit:	2 seconds
Memory limit:	256 MB

As we all know, **TiChuot97** is *one of* the greatest professional gamers of all time. And, similar to other great gamers, he loves games, especially nim games. Today, he just found out an online nim game - Egma. As other nim games, Egma requires proficiency in computing mex values in order to master it. **TiChuot97** understands that, just like millions of other games he mastered, Egma requires practicing. This is where his best friend, **tourist** , comes in to help.

tourist has prepared a drill for **TiChuot97** 's practice. Initially, **TiChuot97** is given an array of size n of nonnegative integers $a_1, a_2, ..., a_n$. Then, **tourist** will give **TiChuot97** q queries each consists of two numbers l, r $(1 \le l \le r \le n)$ asking for the mex of $\{a_l, a_{l+1}, ..., a_r\}$. Of course, **TiChuot97** finished this drill easily. However, he thinks that this challenge can improve, not only his mex-computing skill, but also his programming skill. Do you also want to give this challenge a try?

Note: Mex value of a set of nonnegative integers is defined to be the minimum nonnegative integer that does not belong to the set.

Input

The first line contains an integer n $(1 \le n \le 5 \times 10^5)$, the length of the initial array. The second line contains n integers $a_1, a_2, ..., a_n$ $(0 \le a_i \le 10^9)$. The third line contains an integers q $(1 \le q \le 5 \times 10^5)$, the number of queries. Each of the next q lines contain a pair l, r $(1 \le l \le r \le n)$ describing a query.

Output

For each query, output on one line the answer to such query.

Examples

stdin	stdout
5 1 2 3 0 5 2 1 3 1 4	0 4