

# Function Query

Input file:            **standard input**  
Output file:           **standard output**  
Time limit:            **2 seconds**  
Memory limit:         **256 megabytes**

Given  $n$  integers  $x_1, x_2, \dots, x_n$ . There are  $q$  queries, each query gives a function  $f(x) = (a \oplus x) - b$ , please determine if there exists  $1 \leq i < n$  such that  $f(x_i) \cdot f(x_{i+1}) \leq 0$ , if so, output a satisfying  $i$ , otherwise output  $-1$ .

$a \oplus b$  represents the bitwise XOR operation between  $a$  and  $b$ .

## Input

The first line contains two integers  $n, q$  ( $2 \leq n \leq 3 \cdot 10^5, 1 \leq q \leq 3 \cdot 10^5$ ).

The second line contains  $n$  integers  $x_1, x_2, \dots, x_n$  ( $0 \leq x_i \leq 10^9$ ).

Following are  $q$  lines, each line contains two integers  $a, b$  ( $0 \leq a, b \leq 10^9$ ).

## Output

Output  $q$  lines, representing the answer for each query.

## Example

standard input	standard output
5 6	2
3 5 1 2 4	3
0 2	2
1 1	1
2 3	4
3 2	-1
4 2	
5 8	