Problem H. AND = OR

Input file:	standard input
Output file:	standard output
Time limit:	3 seconds
Memory limit:	1024 megabytes

Let's call an array of integers $[b_1, b_2, \ldots, b_m]$ **good**, if we can partition **all** of its elements into 2 **non-empty** groups, such that the bitwise `AND` of the elements in the first group is equal to the bitwise `OR` of the elements in the second group. For example, the array $[1, 7, 3, 11]$ is **good**, as we can partition it into $[1, 3]$ and $[7, 11]$, where 1 `OR` $3 = 3$, and 7 `AND` $11 = 3$.

You are given an array $[a_1, a_2, \ldots, a_n]$, and have to answer q queries of form: is subarray $[a_l, a_{l+1}, \ldots, a_r]$ **good**?

Input

The first line of the input contains two integer n, q ($1 \le n \le 10^5$, $1 \le q \le 10^5$) — the length of the array and the number of the associated queries.

The second line of the input contains n integers $a_1, a_2, \ldots, a_n$ ($0 \le a_i \le 2^{30} - 1$) — the elements of the array.

The i-th of the next q lines contains 2 integers l_i, r_i ($1 \le l_i \le r_i \le n$) — describing the i-th query.

Output

For each query, output `YES`, if the correspondent subarray is good, and `NO`, if it's not.

Example

standard input	standard output
5 15 0 1 1 3 2 1 1 1 2 1 3 1 4 1 5 2 2 2 3 2 4 2 5 3 3 3 4 3 5 4 4 4 5 5 5	NO NO YES YES YES NO YES YES YES NO NO YES NO NO NO