G – Good Permutations

Memory limit: 1024 MB
Time limit: 3 s

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You are given an array $a_1, \ldots, a_n$ of length n consisting of integers in $\{1, \ldots, n\} \cup \{-1\}$.

A sequence of integers $p_1, \ldots, p_k$ is called *a good permutation* if $\{p_1, \ldots, p_k\} = \{1, \ldots, k\}$ and $p_{i+1} \geq p_i - 1$ holds for all $1 \leq i < k$.

You are to answer q queries. Each query is specified by a pair of integers (l, r). For such a query, check if it is possible to replace all -1s in the subarray $a_l, \ldots, a_r$ with positive integers in such a way that this subarray becomes a good permutation.

Input

The first line of the input contains two integers n and q ($1 \leq n, q \leq 2 \cdot 10^5$), denoting the length of the array and number of queries, respectively.

The second line contains a sequence of n integers $a_1, a_2, \ldots, a_n$ ($-1 \leq a_i \leq n$, $a_i \neq 0$) denoting the elements of the array.

The next q lines describe queries; the i-th line contains two integers l_i and r_i ($1 \leq l_i \leq r_i \leq n$) representing the i-th query.

Output

Output exactly q lines. The i-th line should contain the answer to the i-th query, being a word `YES` or `NO`.

Example

For the input data:

```
5 3
-1 2 1 -1 5
1 5
2 5
2 4
```

the correct result is:

```
YES
NO
YES
```

Explanation: In the first query we can have a good permutation $3, 2, 1, 4, 5$. In the second query, no good permutation of 4 elements can contain the element 5. In the third query we can have a good permutation $2, 1, 3$.

Whereas for the input data:

```
2 2
1 1
1 2
1 1
```

the correct result is:

```
NO
YES
```