DMOPC '17 Contest 5 P5 - XOR Bridges

In a distant land, there are N islands. Each island has a value of accessibility denoted by v_i. You are a bridge building contractor that has been given the task of trying to connect the islands by building bridges. However, because you want to save resources, you have decided to only build bridges such that the **XOR** of the accessibilities of the islands you connect with a bridge, is less than or equal to M. That is, you will build a bridge between island i and j if and only if $v_i \oplus v_j \leq M$. Now, your boss has given you Q queries, each asking if islands p_i and q_i will be connected by the bridges.

Constraints

For all subtasks:
$1 \leq N, Q \leq 200\,000$
$0 \leq M, v_i \leq 10^9$
$1 \leq p_i, q_i \leq N$

Subtask 1 [5%]

$1 \leq N, Q \leq 100$
$0 \leq M, v_i \leq 100$

Subtask 2 [5%]

$1 \leq N, Q \leq 5\,000$
$0 \leq M \leq 5\,000$

Subtask 3 [10%]

$M = 2^k - 1$ for some non-negative integer k and $0 \leq M \leq 10^9$

Subtask 4 [80%]

No additional constraints.

Input Specification

The first line contains three space-separated integers N, M, Q.
The second line contains N space-separated integers, v_i, denoting the accessibility of island i.
The next Q lines contain two space-separated integers p_i and q_i, a query asking if islands p_i and q_i are connected by a set of bridges.

Output Specification

For each of the queries, print `YES` if the islands are connected, or `NO` otherwise.

Sample Input

```
4 5 4
1 2 3 10
1 4
2 3
3 4
1 2
```

Sample Output

```
NO
YES
NO
YES
```