Task Dirigent

Winter school of informatics ends with a traditional dance. There are n students who participate. Each of them has a unique label between 1 and n.

First, conductor Krešo orders the students to form a circle such that each student holds hands with two other students.

Alenka is wondering if it is possible to break the circle by making exactly one pair of neighbouring students stop holding hands and that the newly formed sequence of students is sorted by their labels. For example, if their order is 3 4 1 2, than the circle can be broken between students with labels 4 and 1, but if their order is 2 1 4 3, than there is no way to break the circle in such way.

During the night Krešo is going to give q instructions. In each of them, he is going to order two students to swap places. After each swap you need to help Alenka answer her question.

Input

The first line contains two integers n and q ($1 \leq n, q \leq 300\,000$), the number of students and the number of swaps.

The second line contains n integers a_i ($1 \leq a_i \leq n$), describing the initial placement of students in the circle.

In each of the next q lines there are two integers x_i, y_i ($1 \leq x_i, y_i \leq n$, $x_i \neq y_i$), that describe Krešo's i-th instruction in which students with labels x_i and y_i swap places.

Output

In the i-th of the q lines outs put the answer to Alenka's question after i swaps have been carried out. If the answer is affirmative output `DA`, otherwise `NE`.

Scoring

Subtask	Points	Constraints
1	15	$n, q \leq 500$
2	20	$n, q \leq 5\,000$
3	35	No additional constraints.

Examples

input

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

output

```
NE
DA
```

input

```
4 2
2 3 1 4
4 2
3 4
```

output

```
NE
DA
```

input

```
6 5
2 1 5 6 3 4
3 1
3 4
3 2
4 5
5 4
```

output

```
NE
NE
DA
NE
DA
```

Clarification of the second example:
Students in the beginning, after the first and after the second swap.