

Asistent

You are given a permutation of first N natural numbers on which you are to perform K operations of following type: given integers A and B , your task is to swap elements on positions A and B in permutation and then output permutation rank modulo $1000\ 000\ 007$.

Note: Difference from original task is that elements remain swapped after query.

Input

On first line of standard input you are given two integers ($2 \leq N \leq 50\ 000$, $1 \leq K \leq 30\ 000$), length of permutation and number of operations.

On the next line there is permutation of first N natural numbers.

In next K lines there are two integers A, B ($1 \leq A, B \leq N$).

Output

Output permutation rank after applying each of K operations.

Example

Input:

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

Output:

```
91
77
90
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