Task Bliskost

At the sunset hour of one warm spring day, two men were to be seen at Patriarch's Ponds. The first was none other than Mikhail Alexandrovich Berlioz, while the younger fellow was a poet often named Bezdomny. Each had his own sequence of N letters with them...

A specialist in black magic, professor Woland, quickly joined them and noted:

- Sirs, you have really interesting sequences of letters, and I can easily tell whether they are close or not!

One move is considered choosing two consecutive letters and cyclically shifting both of them by one. For instance, changing the pair of letters "`ab`" to "`bc`", or the pair "`qz`" to "`ra`". Two sequences of letters are considered *close* if by applying a sequence of operations to both of them we can make them equal.

- Surely, professor, you're speaking in jest. The problem of determining whether two such sequences are close is notoriously difficult.

- Oh no, Mihail Alexandrovich, you are the one that is mistaken, and I shall prove it! Here, I'll tell you right now whether your two sequences are close, and furthermore, you shall change your sequence Q times. After each change I'll tell you whether your sequences are close or not!

- Very brave of you professor, truly brave... well, shall we start?

Input

The first line contains two integers N and Q, the length of the sequences and the number of changes Berlioz will do.

The second line contains a sequence of letters of length N, the sequence belonging to Berlioz.

The third line contains a sequence of letter of length N, the sequence belonging to Bezdomny.

In the i-th of the next Q lines, there is a number p_i and a letter c_i, describing that in the i-th change, Berlioz will change the p_i-th letter to c_i.

Output

In the first line you should output `da` if the sequences are close and `ne` otherwise.

In the i-th of the next Q lines you should output `da` or `ne` depending on if the sequences are close after the i-th change by Berlioz.

Scoring

In all subtasks $1 \leq N \leq 1\,000\,000$ i $0 \leq Q \leq 1\,000\,000$.

Subtask	Points	Constraints
1	7	$Q = 0, N \leq 5$
2	8	$Q = 0, N \leq 1\,000$
3	13	$Q = 0$
4	12	$Q \leq 100\,000, N \leq 5$
5	17	$Q \leq 100\,000, N \leq 1\,000$
6	43	No additional constraints.

Examples

input
3 1
bbc
ced
1 a

output
ne
da

input
6 0
berlio
pjesni

output
da

Clarification of the examples

In the first example, after the first change, the sequences are close due to:

abc → bcc → cdc → dec → dfd

ced → dfd