

Problem C. How Many Strings Are Less

Time limit: 2 seconds
Memory limit: 512 megabytes

You are given a set D of n strings and a string s . You need to find the number of strings in the set D that are lexicographically less than s .

The given string s is modified q times. Each modification is defined by a pair of an integer k_i and a character c_i . Modification (k_i, c_i) means that all characters of the string s , starting from k_i and up to the end of the string, are replaced by the character c_i .

For example, let the initial string s be “**anatoly**”, then the queries $(5, o)$, $(3, b)$, $(7, x)$ change the string as follows:

“**anatoly**” \rightarrow “**anatooo**” \rightarrow “**anbbbb**” \rightarrow “**anbbbbx**”

After each modification of the string s , you need to output the number of strings of the set D that are lexicographically less than s .

Note

String a is lexicographically less than string b if $a \neq b$ and one of two conditions is satisfied:

- a is a prefix of the string b ;
- for some i , the first i characters of the string a are equal to the corresponding characters of the string b , and $a_{i+1} < b_{i+1}$.

Input

The first line contains two integers n and q — the number of strings of the set D and the number of modifications ($1 \leq n, q \leq 10^6$).

The second line contains a string s consisting of no more than 10^6 lowercase Latin letters.

The following n lines contain the strings of the set D . Each string consists of lowercase Latin letters. The total length of the strings in D does not exceed 10^6 .

The following q lines contain descriptions of modifications. The description consists of the integer k_i and the lowercase letter of the English alphabet c_i , separated by a space ($1 \leq k_i \leq |s|$).

Output

The first line of output must contain the number of strings of the set D that are lexicographically less than the initial string s .

Then output q lines. In the i -th line, print the answer after the i -th modification.

Examples

standard input	standard output
4 3 anatoly boris anatooo anbbbbu anba	0 0 2 3
5 o 3 b 7 x	
5 5 abcde buz ababa build a aba 1 b 3 z 2 u 4 z 1 a	3 3 3 4 4 1

Note

In the first sample test, the string changes as follows:

“anatoly” → “anatooo” → “anbbbbb” → “anbbbbx”.

- Initial string “**anatoly**” is lexicographically less than all the strings of the set, so the answer to the problem is 0.
- After the first modification, the string becomes “**anatooo**” and there is an equal string in the set, but the answer to the problem is still 0, since it is not less than the current one.
- Then the string becomes “**anbbbbb**”, which is lexicographically greater than “**anatooo**” and “**anba**”, but less than “**anbbbbu**” and “**boris**”, so the answer is 2.
- After the last modification, the line will become “**anbbbbx**”, which is lexicographically greater than “**anatooo**”, “**anba**” and “**anbbbbu**”, the answer is 3.