Generated String

Input file:	`standard input`
Output file:	`standard output`
Time limit:	3 seconds
Memory limit:	1024 megabytes

You are given a template string $S = s_1 s_2 \cdots s_n$ of length n. A generated string is a string formed by concatenating several substrings of S. Formally, each generated string $T = f(k, \{l_i\}_{i=1}^k, \{r_i\}_{i=1}^k)$ is described by a positive integer k and k pairs of integers (l_i, r_i), where $T = s[l_1 : r_1] + s[l_2 : r_2] + \cdots + s[l_k : r_k]$. Here $s[l : r]$ denotes the substring $s_l s_{l+1} \cdots s_r$, and $+$ denotes string concatenation.

Your task is to maintain a multiset $\mathbb{A}$ of strings, supporting the following three types of operations:

- `+` $k\ l_1\ r_1\ l_2\ r_2\ \cdots\ l_k\ r_k$: Insert $f(k, \{l_i\}_{i=1}^k, \{r_i\}_{i=1}^k)$ into the multiset $\mathbb{A}$.
- `-` t: Erase the string inserted in the t-th operation from the multiset $\mathbb{A}$. It is guaranteed that the t-th operation is an inserting operation and the inserted string is not erased at this time.
- `?` $k\ l_1\ r_1\ l_2\ r_2\ \cdots\ l_k\ r_k\ m\ u_1\ v_1\ u_2\ v_2\ \cdots u_m\ v_m$: Answer the number of strings in the multiset $\mathbb{A}$ that begin with string $f(k, \{l_i\}_{i=1}^k, \{r_i\}_{i=1}^k)$ and end with $f(m, \{u_i\}_{i=1}^m, \{v_i\}_{i=1}^m)$.

Input

There is only one test case in each test file.

The first line contains two integers n and q ($1 \le n, q \le 10^5$), indicating the length of S and the number of operations.

The second line contains a string $s_1 s_2 \cdots s_n$ consisting of lower-cased English letters, indicating the template string.

For the following q lines, the i-th line contains an operation in the format described above. It is guaranteed that $1 \le l_i \le r_i \le n$, $1 \le u_i \le v_i \le n$. It's also guaranteed that the sum of k in all operations of type `+`, plus the sum of k in all operations of type `?`, plus the sum of m in all operations of type `?`, will not exceed 3×10^5.

Output

For each operation of type `?`, output one line containing one integer indicating the answer.

Example

standard input	standard output
8 7 abcaabbc + 3 1 3 2 4 3 8 + 2 1 4 1 8 + 1 2 4 ? 1 5 6 1 7 8 - 3 + 1 2 5 ? 1 2 3 1 5 5	2 1