

7702 Castle

K. has stumbled upon a weird game while playing on his computer. The game consists of an initial string S of length N ($1 \leq N \leq 1000$) and an empty set T . The following events might occur during the game:

- a character is added at the end of S , thus increasing its length by 1
- the string S is added to the set T
- the game master inquires: “How many strings in T are suffixes of S ?”. A suffix of S is a substring which can start at any position in S , but must finish on the last position of S .

Because K. wants to go visit a famous castle near his hometown, you must help him deal with the game as quickly as possible.

Input

The input file contains several test cases, each of them as described below.

The first line of the input contains two integers: N , the length of the initial string S and E , the number of events ($E \leq 1200000$).

The second line describes the string S ; the string consists only of lowercase Roman alphabet (a..z).

The following E lines describe the events. Each of these lines contains an integer p , describing the event type.

- If p is 1, then it is followed by a character (a-z), which will be added at the end of S .
- If p is 2, then the string S is added in T .
- If p is 3, then you must respond to the query “How many strings in T are suffixes of the current S ?”

Output

For each test case, the output must follow the description below.

The output should consist of a line containing an integer for each type 3 event in the input, which represents the answer to the query. **Note:** T is a set, so it doesn't contain duplicates.

Explanation for the sample:

Initially S is ‘a’.

After the first event T becomes {a}.

After the second and third event S becomes ‘aba’.

After the fourth event T becomes {a, aba}.

After the fifth event T becomes {a, aba}.

After the sixth and seventh event S becomes ‘abaca’.

The result of the query is 1 (‘a’).

After the ninth and tenth event S becomes ‘abacaba’.

The result of the query is 2 (‘a’ and ‘aba’).

Sample Input

```
1 11
a
2
1 b
1 a
2
2
1 c
1 a
3
1 b
1 a
3
```

Sample Output

```
1
2
```