Problem C
Castle

Input File: C.in
Output File: standard output
Time Limit: 0.5 seconds (C/C++)
Memory Limit: 256 megabytes

K. has stumbled upon a weird game while playing on his computer. The game consists of an initial string ***S*** of length ***N*** (1 ≤ ***N*** ≤ 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 first line of the input contains two integers: ***N***, the length of the initial string ***S*** and ***E***, the number of events (***E*** ≤ 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

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.

Note: Large input: for C **scanf** and **printf** recommended; for C++, add "`cin.tie(NULL);` `ios::sync_with_stdio(false);`" before reading; for Java use **BufferedReader** and **BufferedWriter**.

Sample input	Sample output	Explanation
1 11 a 2 1 b 1 a 2 2 1 c 1 a 3 1 b 1 a 3	1 2	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").