

# Hamming Distance



You are given a string  $S$ , consisting of  $N$  small latin letters 'a' and 'b'. You are also given  $M$  queries to process. The queries are as follows:

- C  $l$   $r$   $ch$ : all the symbols in the string, starting at the  $l^{th}$ , ending at the  $r^{th}$  become equal to  $ch$ ;
- S  $l_1$   $r_1$   $l_2$   $r_2$ : swap two consecutive fragments of the string, where the first is denoted by a substring starting from  $l_1$  ending at  $r_1$  and the second is denoted by a substring starting at  $l_2$  ending at  $r_2$ ;
- R  $l$   $r$ : reverse the fragment of the string that starts at the  $l^{th}$  symbol and ends at the  $r^{th}$  one;
- W  $l$   $r$ : output the substring of the string that starts at the  $l^{th}$  symbol and ends at the  $r^{th}$  one;
- H  $l_1$   $l_2$   $len$ : output the *Hamming distance* between the consecutive substrings that starts at  $l_1$  and  $l_2$  respectively and have the length of  $len$ .

Everything is 1-indexed here.

## Input Format

The first line of input contains a single integer  $N$  — the length of the string.  
The second line contains the initial string  $S$  itself.  
The third line of input contains a single integer  $M$  — the number of queries.  
Then, there are  $M$  lines, each denotes a query of one of the types above.

## Constraints

$$1 \leq N \leq 50000$$

$$1 \leq M \leq 75000$$

Total number of characters printed in W-type queries will not exceed  $2 \cdot 10^6$

For C-type, R-type, W-type queries:  $1 \leq l \leq r \leq N$ ;  $ch$  equals either 'a', or 'b'

For S-type queries:  $1 \leq l_1 \leq r_1 < l_2 \leq r_2 \leq N$

For H-type queries:  $1 \leq l_1, l_2 \leq N$ ;  $l_i + len - 1 \leq N$ ;  $1 \leq len \leq N$ .

## Output Format

For each query of the type W or the type H output an answer on the separate line of output.

## Sample Input

```
10
aabbabbab
10
R 1 5
W 3 8
C 4 4 a
H 2 1 9
S 5 9 10 10
H 1 2 9
C 3 3 b
H 7 8 2
C 2 9 a
S 7 9 10 10
```

## Sample Output

```
baaabb
4
5
1
```

