Problem K
K-query

You are given an array of balls. Each ball is either black or white. Initially, the array has n balls. You are about to proceed q queries one by one. In each query, let m be the number of balls in the array before the query happens and number the balls from 1 to m (inclusive). Each query is in one of the following forms:

- `I x k c` ($0 \le x \le m$, $1 \le k \le 10^9$, c is `B` or `W`): insert k balls of color c to the array, right after the x-th ball. More precisely:
  - If $x = 0$, balls are inserted at the beginning of the array.
  - If $1 \le x < m$, balls are inserted between the x-th and the $x + 1$-th ball of the array.
  - If $x = m$, balls are inserted at the end of the array.
  - If c equals `B`, all inserted balls are black.
  - If c equals `W`, all inserted balls are white.
- `D x k` ($1 \le x \le m$, $1 \le k \le m - x + 1$): Delete k consecutive balls from the array, starting at the x-th one.
- `F x k` ($1 \le x \le m$, $1 \le k \le m - x + 1$): Flip the color of k consecutive balls of the array starting at the x-th one. In other words, replace every black ball with a white one at the same position, and vice versa.
- `Q x k` ($1 \le x \le m$, $1 \le k \le m-x+1$): Consider only k consecutive balls of the array starting at the x-th one, divide them into a minimum number of segments so that every segment contains consecutive balls of the same color, and let $l_1, l_2, \dots, l_t$ be the lengths of these segments. Compute and print the value $l_1^2 + l_2^2 + \dots + l_t^2$. Note that the way to divide the balls is always unique.

Input

- The first line contains two integers n and q ($1 \le n, q \le 200\,000$).
- The second line contains n characters `B` and `W`, denoting the color of the balls in the initial array.
- For the last q lines, each line contains a query as described above.

Output

For each query of the form `Q x k`, output its result in a line. As the result can be rather large, output it modulo $998\,244\,353$.

Explanation of the samples

For the first sample, the array is static:

- In the first query, the considered balls are `WW`. There is only one segment, the result is $2^2 = 4$.
- In the second query, the considered balls are `WWBBWW`. We devide these balls into three segments: 2 white balls, 2 black balls and 2 white balls. Hence, the result is $2^2+2^2+2^2 = 12$.

For the second sample:

- Initially, the array is `BBWBB`.
- In the first query, the considered balls are `BWB`. We divide these balls into three segments of one ball each. Hence, the result is $1^2 + 1^2 + 1^2 = 3$.
- After the second query, the array is `BBBBBWBB`.
- In the third query, the considered balls are `BBBW`. We divide these balls into two segments: the first one contains 3 black balls and the second one contains one white ball. Hence, the result is $3^2 + 1^2 = 10$.
- After the forth query, the array is `BBBWWBBB`.
- In the fifth query, the considered balls are `WW`. Since all balls are white, we can put them into one segment. Hence, the result is $2^2 = 4$.
- After the sixth query, the array is `BBBBBB`.
- In the seventh query, we consider the whole array. Since all balls are black, we can put them into one segment. Hence, the result is $6^2 = 36$.

Sample Input 1	Sample Output 1
8 2 WWWBBWWW Q 1 2 Q 2 6	4 12

Sample Input 2	Sample Output 2
5 7 BBWBB Q 2 3 I 0 3 B Q 3 4 F 4 3 Q 4 2 D 4 2 Q 1 6	3 10 4 36