

international collegiate programming contest INDONESIA NATIONAL CONTEST INC 2020



Problem C Instruction Anagram

A robot is placed at the origin of a 2D coordinate plane (i.e. position (0,0)). The robot is given a string S containing S containing S characters in $\{N, E, S, W\}$ as its instructions. For each character from the beginning of the string, the robot has to move 1 unit to the following direction:

- If the character is N, the robot has to move 1 unit to the positive *y*-axis direction.
- If the character is E, the robot has to move 1 unit to the positive x-axis direction.
- If the character is S, the robot has to move 1 unit to the negative *y*-axis direction.
- If the character is W, the robot has to move 1 unit to the negative x-axis direction.

You do not know the string S. However, you know another string P that is an anagram of S (i.e. P has the same number of \mathbb{N} , \mathbb{E} , \mathbb{S} , \mathbb{W} characters as S). You also have M data points: $T_{1...M}$, $X_{1...M}$, and $Y_{1...M}$. For all i, you know that the robot is at position (X_i, Y_i) after moving exactly T_i units.

You want to know the number of possible string S that satisfies all the information you know.

Input

Input begins with a line containing two integers: N M ($1 \le M \le N \le 400\,000$) representing the number of characters in P and the number of data points, respectively. The next line contains a string P containing N characters in the set $\{N, E, S, W\}$. The next M lines each contains three integers: T_i X_i Y_i ($1 \le T_i \le N$; $-T_i \le X_i$, $Y_i \le T_i$) representing the data points. It is guaranteed that $T_i < T_{i+1}$ for all i.

Output

Output in a line an integer representing the number of possible string S that satisfies all the information you know modulo $998\,244\,353$. If there is no possible string S (possibly due to misinformation), output 0.

Sample Input #1



Sample Output #1

4

Explanation for the sample input/output #1

The possible string S that satisfies all the information you know are {NENS, NESN, ENNS, ENSN}.



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Sample Input #2

5 1		
SSSSN		
4 0 -4		

Sample Output #2

1

Explanation for the sample input/output #2

The only possible string ${\cal S}$ that satisfies all the information you know is ${\tt SSSSN}.$

Sample Input #3

7 1 NNNNSSS 4 1 -1

Sample Output #3

0

Explanation for the sample input/output #3

There is no possible string ${\cal S}$ that satisfies all the information you know.