Ivancho is exploring very long string. The string is the K-th element of recurrent sequence. In this sequence it is guaranteed that each element of the sequence is created from the previous two. The initial two strings are A and B. A is the first element of the sequence, B is the second. He is wondering what is the number of occurrences of string C in the K-th element of the sequence. As this string can be very long Ivancho can’t find this number manually. You want to help him so you have to write the program **string**, that by given A, B and C, recurrent sequence and К – finds the occurrences of C in the K-th element of the sequence.

Each element of the sequence depends only on the last two. It is guaranteed that both of them are used in the generation of each element. The only operation that is performed between the both strings is concatenation. The N-th element of the sequence is described with the string R. It consists of capital letters X and Y denoting the N-2 th element and N-1 element.

**Input**

From the first 2 rows of the output file string.in are entered 2 strings - A and B. On the next row is given R. On the 4-th row is placed C and on the 5-th row is entered К – the number of the element of the sequence that Ivancho is

**Output**

On the single row of the output file string.out you must output the number of occurrences of C.

The answer must be printed by modulus 1 000 000 009 (109).

**Constrains**

1 <= |C|, K <= 1 000 000

1 <= |A| <= |B| <= 1 000 000

2 <= |R| <= 100

It is guaranteed that R contains the symbols ‘X’ and ‘Y’ at least once.

**Example**

|  |  |
| --- | --- |
| **Input (string.in)** | **Output (string.out)** |
| aabbra  cadabracadbrac  XYX  raca  4 | 7 |

**Explanation of the example**

These are the elements of the sequence:

1: aabbra

2: cadabracadbrac

3: aabbracadabracadbracaabbra

4: cadabracadbracaabbracadabracadbracaabbracadabracadbrac

Obviously, raca is encountered 7 times in the fourth element.