Moo Decomposition

Time Limit: 2.0s
Memory Limit: 256MB
Input: stdin
Output: stdout

When submitting, please check that the problem listed (on the Submission page where you upload your solution) matches the problem you intend to submit.

You have a long string S of Ms and Os and an integer $K \geq 1$. Count the number of ways of ways to decompose S into subsequences such that each subsequence is MOOOO....O (with exactly K Os), modulo $10^9 + 7$.

Since the string is very long, you are not given it explicitly. Instead, you are given an integer L ($1 \leq L \leq 10^{18}$), and a string T of length N ($1 \leq N \leq 10^5$). The string S is the concatenation of L copies of the string T.

INPUT FORMAT (pipe stdin):

The first line contains K, N, and L.

The second line contains the string T of length N. Every character is either an M or an O.

OUTPUT FORMAT (pipe stdout):

The number of decompositions of string S, modulo $10^9 + 7$. It is guaranteed that the number of decompositions is nonzero.

Input	Output
2 6 1 MOOMOO	1

Only way to decompose is to let the first three characters form a MOO and the last three characters form another MOO.

Input	Output
2 6 1 MMOOOO	6

There are six distinct ways to decompose the string into subsequences (uppercase letters form one moo, lowercase letters form another):

- MmOOoo
- MmOoOo
- MmOooO
- MmoOOo
- MmoOoO
- MmooOO

Input	Output
1 4 2 MMOO	4

Input	Output
1 4 100 MMOO	976371285

Make sure to take the answer modulo $10^9 + 7$.

SCORING:

- For 20% of points, it holds that $K = 1$ and $L = 1$.
- For 20% of points, it holds that $K = 2$, $N \leq 1000$, $L = 1$.
- For 20% of points, it holds that $K = 1$.
- For 20% of points, it holds that $L = 1$.
- For 20% of points, there are no additional constraints.

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