A. Alternating Sum

time limit per test: 1 second

memory limit per test: 256 megabytes

input: standard input

output: standard output

You are given two integers a and b. Moreover, you are given a sequence $s_0, s_1, \dots, s_n$. All values in s are integers 1 or −1. It's known that sequence is k-periodic and k divides n + 1. In other words, for each k ≤ i ≤ n it's satisfied that $s_i = s_{i-k}$.

Find out the **non-negative** remainder of division of $n \sum i{=}0 s_i a^{n-i} b^i$ by $10^9 + 9$.

Note that the modulo is unusual!

Input

The first line contains four integers n, a, b and k ($1 \le n \le 10^9$, $1 \le a, b \le 10^9$, $1 \le k \le 10^5$).

The second line contains a sequence of length k consisting of characters '+' and '−'.

If the i-th character (0-indexed) is '+', then $s_i = 1$, otherwise $s_i = -1$.

Note that only the first k members of the sequence are given, the rest can be obtained using the periodicity property.

Output

Output a single integer — value of given expression modulo $10^9 + 9$.

Examples

input

```
2 2 3 3
+-+
```

output

```
7
```

input

```
4 1 5 1
-
```

output

```
999999228
```

Note

In the first example:

$(n \sum i{=}0 s_i a^{n-i} b^i) = 2^2 3^0 - 2^1 3^1 + 2^0 3^2 = 7$

In the second example:

(\sum \limits_{i=0}^{n} s_{i} a^{n - i} b^{i}) = -1^{4} 5^{0} - 1^{3} 5^{1} - 1^{2} 5^{2} - 1^{1} 5^{3} - 1^{0} 5^{4} = -781 \equiv 999999228 \pmod{10^{9} + 9}.