C. 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 $k \leq i \leq n$ it's satisfied that $s_{i} = s_{i - k}$.

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

Note that the modulo is unusual!

Input

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

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:

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

In the second example:

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