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 $s_0, s_1, \ldots, s_n$. 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 $k \le i \le n$ it's satisfied that $s_i = s_{i-k}$.

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

Note that the modulo is unusual!

Input

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

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	Copy
2 2 3 3 +-+	

output	Copy
7	

input	Copy
4 1 5 1 -	

output	Copy
999999228	

Note

In the first example:

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

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}.

Processing math: 96%

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++14 6.4.0

Choose file: Choose File No file chosen

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

Submit

→ Last submissions

Submission	Time	Verdict
37407913	Apr/17/2018 18:22	Time limit exceeded on pretest 7
37405514	Apr/17/2018 18:01	Time limit exceeded on pretest 7
37405090	Apr/17/2018 17:57	Time limit exceeded on pretest 7
37404896	Apr/17/2018 17:55	Memory limit exceeded on pretest 1

→ Problem tags

math matrices number theory

No tag edit access

→ Contest materials

- Announcement