

# Subarray Majority

Input file:            **standard input**  
Output file:           **standard output**  
Time limit:            3 seconds  
Memory limit:         256 megabytes

A majority element of a sequence of positive integers is a number equal to at least half of its elements.

Call a sequence good if all of its nonempty contiguous segments have at least one majority element. For example,  $[1, 2, 1, 1, 3]$  is good, since segments such as  $[1, 1, 3]$ ,  $[1, 2]$ , and  $[2, 1, 1, 3]$  all have majority elements, but  $[1, 2, 1, 3]$  is not good because  $[2, 1, 3]$  does not have a majority element.

Given a string consisting of 1, 2, 3, and ?, count the number of ways to form a good sequence of 1, 2, and 3's by changing each ? to one of 1, 2, and 3. Output the answer modulo  $10^9 + 7$ .

## Input

The first line contains an integer  $N$  ( $3 \leq N \leq 200$ ), the length of the string.

The second line contains a string of length  $N$ , consisting of 1, 2, 3, and ?.

## Output

Output the remainder when the answer is divided by  $10^9 + 7$ .

## Scoring

- (10 points)  $N \leq 10$ , the input contains only ?'s.
- (20 points)  $N \leq 25$ , the input contains only ?'s.
- (40 points)  $N \leq 60$ .
- (30 points) No additional constraints.

## Examples

standard input	standard output
3 ???	21
3 12?	2
4 1?11	3
5 12213	0
10 ???1??????	1735

## Note

For the first sample, the only arrays (out of  $3^3 = 27$  possible ones) that are not good are  $[1, 2, 3]$  and its permutations, so the answer is  $27 - 3! = 21$ .

For the second sample,  $[1, 2, 1]$  and  $[1, 2, 2]$  are good, but not  $[1, 2, 3]$ .

For the third sample,  $[1, 1, 1, 1]$ ,  $[1, 2, 1, 1]$ , and  $[1, 3, 1, 1]$  are all good.

For the fourth sample, since  $[1, 2, 2, 1, 3]$  is not good, the answer is zero.