

2026 Canadian Computing Olympiad
Day 2, Problem 3
Walking on a Graph

Time Limit: 5 seconds

Memory Limit: 512 MB

There is a graph with N nodes, numbered from 1 to N . Each node is coloured either black or white. Additionally, it is known that node 1 is black and node 2 is white. For any i and j where $i \neq j$, there exists a directed edge from node i to j that is either red or blue. Its colour is determined using the following logic:

- If $i < j$ and the nodes have the same colour, then it is red.
- If $i < j$ and the nodes have different colours, then it is blue.
- If $i > j$ and the nodes have the same colour, then it is blue.
- If $i > j$ and the nodes have different colours, then it is red.

LoBren's favourite colour is initially blue. He then takes a walk on the graph (note that walks allow for repeated vertices and edges). He uses the following rules when walking:

- If he is currently on node 1, his favourite colour becomes blue.
- Otherwise, if he is currently on node 2, his favourite colour becomes red.
- He then traverses an outgoing edge from his current node with the same colour as his favourite colour. It can be shown that such an edge must exist.
- Finally, he optionally repeats the process.

By writing down the nodes he visits, in order, he gets a list l_1, l_2, \dots, l_L . Find the number of possible lists, mod $10^9 + 7$, that satisfy the following conditions:

- The list starts at node 1 and ends at node 2.
- For all i where $3 \leq i \leq N$, node i appears at most once in the list.
- For all j where $3 \leq j \leq L$, we have $l_{j-2} \neq l_j$.

It is provable that the number of such lists is finite.

It may also be useful to note that “mod” corresponds to the % operator in most programming languages, indicating the remainder after division. For example, $5 \bmod 3 = 2$ and $17 \bmod 4 = 1$.

Input Specification

The first line of input contains a single integer, N .

The next line contains a string of length N , consisting of the characters **B** and **W**. If the i^{th} character is **B**, then node i is black. Otherwise, it is white. It is guaranteed that node 1 is black and node 2 is white.

The following table shows how the 25 available marks are distributed:

Marks Awarded	Bounds on N	Additional Constraints
1 mark	$3 \leq N \leq 8$	None.
3 marks	$3 \leq N \leq 20$	None.
4 marks	$3 \leq N \leq 50$	There exists exactly one black node.
4 marks		There exists an integer i where $2 \leq i \leq N$, such that every node in the range $[2, i]$ is white, and every other node is black.
6 marks		There exist at most 5 black nodes.
7 marks		None.

Output Specification

On a single line, output the number of possible lists, modulo $10^9 + 7$.

Sample Input 1

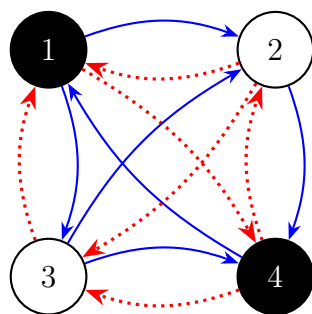
4
BWBB

Output for Sample Input 1

4

Explanation of Output for Sample Input 1

The graph looks like:



The solid lines represent blue edges, while the dashed lines represent red edges. The possible paths are:

- $1 \rightarrow \underline{2}$
- $1 \rightarrow 3 \rightarrow \underline{2}$
- $1 \rightarrow 3 \rightarrow 4 \rightarrow \underline{2}$
- $1 \rightarrow \underline{2} \dashrightarrow \underline{3} \dashrightarrow 1 \rightarrow \underline{2}$

The favourite colour is red at the underlined nodes, and blue otherwise.

Sample Input 2

12

BWBWBBBWBBW

Output for Sample Input 2

3377552