Problem D. Bubble Sort !!?

Time limit	1000 ms
Mem limit	262144 kB
OS	Windows

Mohanad likes AtCoder.jp, which is a superior Japanese programming contest site.

One of the factors that make AtCoder.jp a great website is its short problem statements. Therefore, in true AtCoder.jp fashion, this problem statement is as short as possible.

Given a permutation p of length n, let P be an array of permutations that contains all permutations lexicographically greater than or equal to p, sorted by their order. Let A be the concatenation of P.

How many swaps will bubble sort algorithm make to sort A?

The answer may be large, so output it modulo $10^9 + 7$.

(Check out the notes for bubble sort code).

Input

The first line contains n ($2 \leq n \leq 2000$).

The second line contains a permutations p.

Output

The number of swaps the above code will make to sort A modulo $10^9 + 7$.

Sample 1

Input	Output
3 3 1 2	8

Sample 2

Input	Output
6 3 4 2 1 6 5	1355278

Note

In the first test case:

$P = [[3, 1, 2], [3, 2, 1]]$

$A = [3, 1, 2, 3, 2, 1]$

Bubble Sort C++ code:

```
for ( int i = n - 1 ; i >= 0 ; i -- )
{
    for ( int j = 0 ; j <= i - 1 ; j ++ )
    {
        if ( A [j] > A [ j + 1 ] )
            swap ( A [j] , A [ j + 1 ] );
    }
}
```