Jiraiya and Rasengan Attacks

Max. Marks: 100

Naruto has started training from Jiraiya to develop the most powerful *Rasengan* attack. Jiraiya as always uses weird training exercises.

Jiraiya has brought a permutation P of $1, 2..N$ integers. He tells Naruto to sort the permutation using *minimum* number of *Rasengan* attacks. In one *Rasengan* attack Naruto can choose any pair of consecutive elements of the permutation and swap it.

To make the task a little difficult, he chooses a subsegment of the permutation *uniformly* at random $P_L, P_{L+1}, \ldots, P_R$ (L ≤ R) and reverses it to make $P_1, P_2, \ldots, P_{L-1}, P_R, \ldots, P_{L+1}, P_L, P_{R+1}, \ldots, P_N$. Now he asks Naruto to tell the expected number of *Rasengan* attacks he need to sort the permutation.

INPUT
The first line contains the integer N.
The next line contains N integers denoting the permutation P.

OUTPUT
Print $(A * B^{-1}) \bmod 10^9 + 7$ where $\frac{A}{B}$ is the **Expected value** of number of *Rasengan* attacks he need to sort P (expressed as an irreducible fraction)

CONSTRAINTS
$2 \le N \le 10^5$

SAMPLE INPUT

3
1 2 3

SAMPLE OUTPUT

833333340

Explanation

The 6 ways of reversing a subarray is

- 1,1 -> 1,2,3. *Rasengan* attacks = 0
- 2,2 -> 1,2,3. *Rasengan* attacks = 0
- 3,3 -> 1,2,3. *Rasengan* attacks = 0
- 1,2 -> 2,1,3. *Rasengan* attacks = 1
- 2,3 -> 1,3,2. *Rasengan* attacks = 1
- 1,3 -> 3,2,1. *Rasengan* attacks = 3

Probability of getting *Rasengan* attacks = 0 is $\frac{3}{6}$

Probability of getting *Rasengan* attacks = 1 is $\frac{2}{6}$

Probability of getting *Rasengan* attacks = 3 is $\frac{1}{6}$

Expected value of *Rasengan* attacks = $\frac{3}{6} * 0 + \frac{2}{6} * 1 + \frac{1}{6} * 3 = \frac{5}{6} \equiv 833333340 \bmod 10^9 + 7$