Data Structures Assignment-4

D) Bitonic subsequences

A bitonic subsequence is a sequence which is first non-decreasing and then non-increasing.

You are given an array of size N. You need to find the number of bitonic subsequences.

As the number can be very large, output it modulo $10^9 + 7$.

Input

First line contains a single integer N, the size of array

The next line contains N integers, the elements of the array.

Output

Output number of bitonic subsequences modulo $10^9 + 7$.

Constraints

$1 \leq N \leq 100000$, size of array
$1 \leq A[i] \leq 10^9$

Sample Input 1

```
3
1 2 3
```

Sample Output 1

```
7
```

Sample Explanation 1

All 7 subsequences are bitonic

Sample Input 2

```
5
1 2 5 4 1
```

Sample Output 2

```
31
```

Sample Explanation 1

All 31 subsequences are bitonic

Limits

Time: 2 second

Memory: 256 MB