E. LIS of Sequence

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

The next "Data Structures and Algorithms" lesson will be about Longest Increasing Subsequence (LIS for short) of a sequence. For better understanding, Nam decided to learn it a few days before the lesson.

Nam created a sequence a consisting of n ($1 \le n \le 10^5$) elements $a_1, a_2, ..., a_n$ ($1 \le a_i \le 10^5$). A subsequence $a_{i_1}, a_{i_2}, ..., a_{i_k}$ where $1 \le i_1 < i_2 < ... < i_k \le n$ is called increasing if $a_{i_1} < a_{i_2} < a_{i_3} < ... < a_{i_k}$. An increasing subsequence is called longest if it has maximum length among all increasing subsequences.

Nam realizes that a sequence may have several longest increasing subsequences. Hence, he divides all indexes i ($1 \le i \le n$), into three groups:

1. group of all i such that a_i belongs to no longest increasing subsequences.
2. group of all i such that a_i belongs to at least one **but not every** longest increasing subsequence.
3. group of all i such that a_i belongs to every longest increasing subsequence.

Since the number of longest increasing subsequences of a may be very large, categorizing process is very difficult. Your task is to help him finish this job.

Input

The first line contains the single integer n ($1 \le n \le 10^5$) denoting the number of elements of sequence a.

The second line contains n space-separated integers $a_1, a_2, ..., a_n$ ($1 \le a_i \le 10^5$).

Output

Print a string consisting of n characters. i-th character should be '1', '2' or '3' depending on which group among listed above index i belongs to.

Examples

input
1 4
output
3

input
4 1 3 2 5
output
3223

input
4 1 5 2 3
output
3133

Note

In the second sample, sequence a consists of 4 elements: $\{a_1, a_2, a_3, a_4\} = \{1, 3, 2, 5\}$. Sequence a has exactly 2 longest increasing subsequences of length 3, they are $\{a_1, a_2, a_4\} = \{1, 3, 5\}$ and $\{a_1, a_3, a_4\} = \{1, 2, 5\}$.

In the third sample, sequence a consists of 4 elements: $\{a_1, a_2, a_3, a_4\} = \{1, 5, 2, 3\}$. Sequence a have exactly 1 longest increasing subsequence of length 3, that is $\{a_1, a_3, a_4\} = \{1, 2, 3\}$.