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HOME CONTESTS GYM PROBLEMSET GROUPS RATING API VK CUP SECTIONS

PROBLEMS SUBMIT CODE MY SUBMISSIONS STATUS HACKS ROOM STANDINGS CUSTOM INVOCATION

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

Codeforces Round #277 (Div. 2)

Finished

Practice

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ACM-ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Practice

You are registered for practice. You can solve problems unofficially. Results can be found in the contest status and in the bottom of standings.

→ Submit?

Language: GNU G++ 5.1.0 ▼

Choose file: Choose File No file chosen

Be careful: there is 50 points penalty for submission which fails the pretests or resubmission (except failure on the first test, denial of judgement or similar verdicts). "Passed pretests" submission verdict doesn't guarantee that the solution is absolutely correct and it will pass system tests.

Submit

→ Last submissions

Submission	Time	Verdict
19669473	Aug/06/2016 15:10	Runtime error on test 5

→ Problem tags

data structures dp greedy hashing math

No tag edit access

```
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 $\{a_1, a_3, a_4\}$ = $\{1, 2, 3\}$.

→ Contest materials

- Announcement
- Tutorial