Friendly Sequences

I give you a permutation p of N integers.

Define the friendliness of an index i to be the number of indices $j \neq i$ that exist in all longest increasing subsequences that include index i.

For all i from 1 to N, output the friendliness of i!

Subtasks and Constraints

For all subtasks, you are guaranteed that $1 \leq N \leq 250000$.

- For Subtask 1 (15 points), $N \leq 100$.
- For Subtask 2 (25 points), $N \leq 2000$.
- For Subtask 3 (60 points), no further constraints.

Input

The first line of input contains the integer N.

The second line of input contains the integers $p_1 ... p_N$.

Output

Output N integers, the ith of which should be the friendliness of index i.

Sample Input

```
9
1 2 3 6 5 4 7 8 9
```

Sample Output

```
5 5 5 6 6 6 5 5 5
```