Problem H. High Towers

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	256 megabytes

You are given n towers in a row. The height of the i-th tower is h_i.

Towers can communicate with each other if one of them is higher than all the towers between them. More formally, towers i and j ($i < j$) can communicate with each other if and only if $max(h_i, h_j) > max_{k \in [i+1, j-1]} h_k$. Note that adjacent towers always can communicate with each other.

For each tower, we know the value a_i — with how many other towers can i-th tower communicate. Find any possible sequence of heights h_i, $1 \le i \le n$.

It's guaranteed that in all provided tests there exists at least one possible sequence of heights. If there are multiple possible answers output any of them.

Input

The first line contains a single integer n ($2 \le n \le 5 \cdot 10^5$) — the number of towers.

The second line contains n integers $a_1, a_2, \ldots, a_n$ ($0 \le a_i \le n - 1$) — the number of towers that can communicate with i-th tower.

Output

In a single line output n integers h_i ($1 \le h_i \le 10^9$).

It's guaranteed that in all provided tests at least one possible sequence of h_i exists. If there are multiple possible answers output any of them.

Examples

standard input	standard output
6 3 3 4 2 5 1	7 5 7 1 10 4
4 3 3 3 3	3 2 1 4

Note

In the first sample, for $h = [7, 5, 7, 1, 10, 4]$:

- Tower 1 can communicate with towers $2, 3, 5$
- Tower 2 can communicate with towers $1, 3, 5$
- Tower 3 can communicate with towers $1, 2, 4, 5$
- Tower 4 can communicate with towers $3, 5$
- Tower 5 can communicate with towers $1, 2, 3, 4, 6$
- Tower 6 can communicate with tower 5