Problem E
Extremums and Extremals

Time Limit: 2 seconds

Memory Limit: 1024 megabytes

Consider an integer sequence $a_1, a_2, a_3, \ldots, a_N$, and an element a_i. Phidang gives you some definitions:

- a_i is called a *local maximum* if $a_i > a_{i-1}$ and $a_i > a_{i+1}$
- a_i is called a *local minimum* if $a_i < a_{i-1}$ and $a_i < a_{i+1}$
- a_i is called a *local extremum* if a_i is either a *local maximum* or *local minimum*
- A sequence $p_1, p_2, \ldots, p_N$ is called a *permutation* of integer from 1 to N if each of the integers appears in the sequence exactly once.
- A permutation is called *extremal* if each element (except the first and the last) is a local extremum.

Now, you are given an extremal permutation of $1, \ldots, N$. Phidang asks you to find the following one in the lexicographical order of all extremal permutations of these elements.

Noted that, in the lexicographical order of a sequence $x_1, x_2, \ldots, x_k$ comes before a sequence $y_1, y_2, \ldots, y_k$ if and only if the first x_i, which is different from y_i, is less than y_i. In addition, if the given extremal permutation is the last one in the lexicographical order, you have to provide the lexicographically first one.

Input

The first line contains the integer N $(1 \leq N \leq 100{,}000)$ and the second line contains N integers: the values of $p_1, p_2, \ldots, p_N$.

Output

The only line of the output file should contain N integers: the values $q_1, q_2, \ldots, q_N$ such that $q_1, q_2, \ldots, q_N$ if the permutation immediately following the permutation $p_1, p_2, \ldots, p_N$ in the lexicographical order of all extremal permutations of $1, \ldots, N$. If the input contains the lexicographically last extremal permutation, print the lexicographically first one as the output.

Sample Input   Sample Output

Sample Input	Sample Output
3 2 3 1	3 1 2
3 3 1 2	1 3 2