Sorting

Description

For a given permutation of $1 \ldots n$, noting it as P, you need to insert the number in P into a set S one by one, i.e. $P_1, P_2, \ldots, P_{n-1}, P_n$.

After the insertion of each number, you need to find the largest number in S that is smaller than the inserted number and the smallest number in S that is larger than the inserted number.

Initially, two integers $0, n+1$ has **already been inserted into** S so that the results always exist.

Input

The first line contains a positive integer n.

The second line contains n integers, separated by spaces, the i-th integer of which denotes P_i.

Output

Print n lines, each line contains two integers separated by a space, the i-th line of which denotes the result required after the insertion of the i-th number.

The first integer of a result represents the largest number in S that is smaller than the inserted number and the latter one represents the smallest number in S that is larger than the inserted numbser.

Sample Input/Output

Input

```
5
1 5 2 4 3
```

Output

```
0 6
1 6
1 5
2 5
2 4
```

Constraint

$1 \leq n \leq 10^5$.

It is guaranteed that P is a permutation of $1 \ldots n$.

Hint

To find all the results quickly enough, you may think about reverting the whole process.