C Swap

You are given a sequence of n numbers $x_1, x_2, \ldots, x_n$. Each number $1, 2, \ldots, n$ appears exactly once in the sequence.

You can modify the sequence using swaps. There are $n-1$ consecutive turns numbered $k = 2, 3, \ldots, n$. On turn k you can either swap values x_k and $x_{\lfloor k/2 \rfloor}$ in the sequence or do nothing.

Sequence $a_1, a_2, \ldots, a_n$ is lexicographically smaller than sequence $b_1, b_2, \ldots, b_n$ if there exists an index j ($1 \leq j \leq n$) such that $a_k = b_k$ for all $k < j$ and $a_j < b_j$.

What is the lexicographically minimal sequence you can obtain?

Input

The first input line contains an integer n.

The second input line contains n integers: the numbers in the sequence.

Output

You should output n integers: the lexicographically minimal sequence.

Example

Input:
```
5
3 4 2 5 1
```

Output:
```
2 1 3 4 5
```

Subtask 1 (10 points)

- $1 \leq n \leq 20$

Subtask 2 (11 points)

- $1 \leq n \leq 40$

Subtask 3 (27 points)

- $1 \leq n \leq 1000$

Subtask 4 (20 points)

- $1 \leq n \leq 5 \cdot 10^4$

Subtask 5 (32 points)

- $1 \leq n \leq 2 \cdot 10^5$