Problem B. Tower

Time limit	1000 ms
Memory limit	256MB

Problem Description

Bill's game company has developed a tower-conquering game. At the beginning of the game, players are randomly teleported to one of the floors. Each floor may have **up to two** teleportation portals:

- A **downward portal** leading to a lower floor.
- An **upward portal** leading to a higher floor.

To add some fun, some portals might be **unavailable**. The game imposes specific movement constraints:

- If you are on floor i and choose the downward portal, there will be no portal available that can teleport you to any floor higher than i in subsequent moves.
- Conversely, if you choose the upward portal from floor i, there will be no portal available that can teleport you to any floor lower than i thereafter.

Additionally, the game guarantees that for any floor i, there is **at most one** portal from another floor that leads directly to floor i.

Ian and Bill are testers for this game, tasked with recording strategies to conquer the tower. They are granted the ability to backtrack to previous floors. Both start from the same initial floor.

Ian's Strategy:

1. Whenever he arrives at a floor (including the initial floor), he records its floor number.
2. If a downward portal is available, he chooses it first.
3. Otherwise, if an upward portal is available, he chooses it.
4. If all available portals from the current floor have been used, he backtracks to the floor from which he first arrived at the current floor. If he cannot backtrack, he stops.

Bill's Strategy:

1. If an **downward** portal is available, he chooses it first.
2. Otherwise, if a **upward** portal is available, he chooses it.
3. If all available portals from the current floor have been used, he records its floor number.
4. Then backtracks to the floor from which he first arrived at the current floor. If he cannot backtrack, he stops.

Because Bill is highly familiar with the game, he can deduce his own sequence solely from Ian's record without playing the game himself.

As Bill's friend, you're curious about how he accomplishes this. Given Ian's recorded sequence, write a program to generate Bill's recorded sequence.

Input format

The first line contains an integer N ($1 \le N \le 2 \times 10^5$), the length of Ian's record.

The second line contains N integers $a_1, a_2, \ldots, a_N$ ($1 \le a_i \le 10^9$), representing Ian's recorded sequence.

Output format

If Ian's record is valid, output N integers $b_1, b_2, \ldots, b_N$, representing Bill's recorded sequence.

Otherwise, output -1.

Subtask score

Subtask	Score	Additional Constraints
1	30	Portals only lead to adjacent floors: From floor i, the downward portal (if available) leads to floor $i-1$. The upward portal (if available) leads to floor $i+1$.
2	30	All floor numbers satisfy $1 \le a_i \le 5000$
3	40	No constraints

Sample

Sample Input 1

```
6
3 2 1 5 4 6
```

Sample Output 1

```
1 2 4 6 5 3
```

Sample Input 2

```
6
4 3 2 1 5 6
```

Sample Output 2

```
1 2 3 6 5 4
```

Notes

Suppose $\{i, x, y\}$ represents that on floor i:

- The downward portal leads to floor x.
- The upward portal leads to floor y.
- If a portal is unavailable, it is denoted by @.

Example: Consider a tower with six floors:

1. $\{1, @, @\}$ (Floor 1: no portals)

2. $\{2, 1, @\}$ (Floor 2: downward to 1)
3. $\{3, 2, 5\}$ (Floor 3: downward to 2, upward to 5)
4. $\{4, @, @\}$ (Floor 4: no portals)
5. $\{5, 4, 6\}$ (Floor 5: downward to 4, upward to 6)
6. $\{6, @, @\}$ (Floor 6: no portals)

Both Ian and Bill start on floor 3.

- **Ian's recorded sequence:** $\{3, 2, 1, 5, 4, 6\}$
- **Bill's recorded sequence:** $\{1, 2, 4, 6, 5, 3\}$