

Practice Problem PC

Permutation Construction

You are challenged to construct a permutation of integers from 1 to N (inclusive) that satisfies the following requirements. Suppose that your permutation is denoted as P . There are N requirements, numbered from 1 to N . Requirement i is represented by A_i , which can be one of the followings:

- if $A_i = -1$, then there is no x that satisfy $x > i$ and $P_x > P_i$; or
- if $i < A_i \leq N$, then A_i is the smallest index larger than i that satisfy $P_{A_i} > P_i$.

Construct any permutation that satisfies all of the requirements, or determine if it is impossible to construct such a permutation.

Note that a permutation of integers from 1 to N (inclusive) is a sequence where each integer from 1 to N appears in the sequence exactly once.

Input

Input begins with an integer N ($1 \leq N \leq 100\,000$). The next line contains N integers A_i ($A_i = -1$ or $i < A_i \leq N$) representing the given requirements.

Output

If at least one permutation that satisfies all the requirements can be found, output N space-separated integers in a single line representing the permutation. If there are several permutations that satisfy all of the requirements, output any of them.

If there is no permutation that satisfies all the requirements, output -1 in a single line.

Sample Input #1

```
5
4 3 4 -1 -1
```

Sample Output #1

```
4 1 3 5 2
```

Sample Input #2

```
5
-1 -1 5 -1 -1
```

Sample Output #2

```
-1
```