Problem Negotiable

Input file	`stdin`
Output file	`stdout`

(a) Past (b) Present (c) Future

The tarot reading of the problem *Negotiable*

Task

We denote by MEX of a sequence of numbers the smallest non-negative integer that does not belong to the sequence. For example, $\text{MEX}(0, 4, 4, 1, 2) = 3$ and $\text{MEX}(1, 2, 3) = 0$.

We call a sequence b of numbers $b_1, b_2, \ldots, b_K$ *x-negotiable* if and only if $\text{MEX}(b_1, b_2, \ldots, b_K) \leq x$.

For a given sequence b of length K, consider a sequence of indices $1 \leq i_1 < i_2 < \ldots < i_s \leq K$. This sequence determines a division of b into $s + 1$ consecutive subsequences: $(b_1, b_2, \ldots, b_{i_1})$, $(b_{i_1+1}, b_{i_1+2}, \ldots, b_{i_2}), \ldots, (b_{i_s+1}, b_{i_s+2}, \ldots, b_K)$. We call this division an *x-malleable partition* if and only if each of the $s + 1$ subsequences is x-negotiable. We define the *size* of the partition as the number of subsequences, that is, $s + 1$.

You are given a sequence a of N non-negative integers. Determine, for each value of x from 1 to N, the minimum size of an x-malleable partition of sequence a.

Input Data

The first line contains the integer N. The second line contains N integers — the elements of sequence A.

Output data

Print N integers, separated by spaces, representing the answer for each x.

Constraints

- $1 \leq N \leq 1\,000\,000$.
- $0 \leq a_i \leq N$.

#	Points	Constraints
1	13	$1 \leq N \leq 10$
2	19	There are at most 50 local minima or maxima.
3	23	$1 \leq a_i \leq 10$
4	19	$1 \leq N \leq 5000$
5	12	$1 \leq N \leq 100\,000$
6	14	No additional restrictions.

Examples

stdin	stdout	Explanations
5 0 1 2 3 0	3 2 2 1 1	For $x = 1$, an optimal partition is $[1, 1], [2, 3], [4, 5]$. For $x = 2$, an optimal partition is $[1, 2], [3, 5]$. For $x = 3$, an optimal partition is $[1, 3], [4, 5]$. For $x = 4$, an optimal partition is $[1, 5]$. For $x = 5$, an optimal partition is $[1, 5]$.