Farmer John's cows have decided to offer a programming contest for the cows on Farmer Nhoj's farm. In order to make the problems as fun as possible, they have spent considerable time coming up with challenging input cases. For one problem in particular, "Haybales", the cows need your help devising challenging inputs. This involve solving the following somewhat intriguing problem:

There is an array of sorted integers $x_1 \leq x_2 \leq \cdots \leq x_N$ ($1 \leq N \leq 10^5$), and an integer K. You don't know the array or K, but you do know for each index i, the largest index j_i such that $x_{j_i} \leq x_i + K$. It is guaranteed that $i \leq j_i$ and $j_1 \leq j_2 \leq \cdots \leq j_N \leq N$.

Given this information, Farmer John's cows need to construct any array along with some integer K that matches that information. The construction needs to satisfy $0 \leq x_i \leq 10^{18}$ for all i and $1 \leq K \leq 10^{18}$.

It can be proven that this is always possible. Help Farmer John's cows solve this problem!

INPUT FORMAT (input arrives from the terminal / stdin):

The first line of input contains N. The next line contains $j_1, j_2, \ldots, j_N$.

OUTPUT FORMAT (print output to the terminal / stdout):

Print K, then $x_1, \ldots, x_N$ on separate lines. Any valid output will be accepted.

SAMPLE INPUT:

```
6
2 2 4 5 6 6
```

SAMPLE OUTPUT:

```
6
1
6
17
22
27
32
```

The sample output is the array $a = [1, 6, 17, 22, 27, 32]$ with $K = 6$. $j_1 = 2$ is satisfied because $a_2 = 6 \leq 1 + 6 = a_1 + K$ but $a_3 = 17 > 1 + 6 = a_1 + K$, so a_2 is the largest element that is at most a_1. Similarly,

- $j_2 = 2$ is satisfied because $a_2 = 6 \leq 6 + 6$ but $a_3 = 17 > 6 + 6$
- $j_3 = 4$ is satisfied because $a_4 = 22 \leq 17 + 6$ but $a_5 = 27 > 17 + 6$
- $j_4 = 5$ is satisfied because $a_5 = 27 \leq 22 + 6$ but $a_5 = 32 > 22 + 6$
- $j_5 = 6$ is satisfied because $a_6 = 32 \leq 27 + 6$ and a_6 is the last element of the array
- $j_6 = 6$ is satisfied because $a_6 = 32 \leq 32 + 6$ and a_6 is the last element of the array

This is not the only possible correct output for the sample input. For example, you could instead output the array $[1, 2, 4, 5, 6, 7]$ with $K = 1$.

SCORING:

- For 50% of all inputs, $N \leq 5000$
- For the remaining inputs, there are no additional constraints.

Problem credits: Danny Mittal