

Hard to Miss

time limit per test: 2 seconds (6 seconds for Python)

memory limit per test: 1 gigabyte

input: standard input

output: standard output

points: 100 · problem code: hardtomiss · author: duckcrumbs

Matt is watching the shooting finals.

There are n marksmen standing next to each other along the shooting range, numbered from 1 to n from left to right. A formation of k targets moves across the range from left to right, with the same spacing as the marksmen. Hitting target j adds b_j points to a marksman's score.

Initially, target j is directly in front of marksman j . Each second, every marksman with a target directly in front of them fires exactly once, and all shots are simultaneous. Every shot hits, and targets remain in the formation after being hit. If marksman n has fired, the round ends; otherwise, the formation moves one position to the right before the next second.

Formally, let c_i be the score of marksman i , initially 0 for every $1 \leq i \leq n$. For each second $i = 1, 2, \dots, n - k + 1$ in order, the following happens:

$c_{i+j-1} \leftarrow c_{i+j-1} + b_j$ for every $1 \leq j \leq k$.

Unfortunately, Matt is short-sighted and cannot see the targets. He can only see the final scoreboard $a_1, a_2, \dots, a_n$, where a_i is the score of marksman i .

Find a possible number of targets k and their point values $b_1, b_2, \dots, b_k$ that produce the given final scoreboard.

If there are several valid formations, output any of them. If none exists, output `-1`.

Input

The first line contains an integer n ($1 \leq n \leq 2 \times 10^5$), the number of marksmen.

The second line contains n integers $a_1, a_2, \dots, a_n$ ($1 \leq a_i \leq 10^{18}$), their final scores.

Output

If no valid formation exists, print `-1` on a single line.

Otherwise, print an integer k ($1 \leq k \leq n$), the number of targets, on the first line. On the second line, print k space-separated integers $b_1, b_2, \dots, b_k$ ($1 \leq b_j \leq 10^{18}$), the targets' point values in their initial left-to-right order.

Example 1

Input

```
3
2 5 3
```

Output

```
2
2 3
```

Explanation

The formation has $k = 2$ targets, worth 2 and 3 points.

- Second 1: marksman 1 hits target 1 for 2 points, marksman 2 hits target 2 for 3 points. The scoreboard reads $[2, 3, 0]$.
- Second 2: the formation moves right by one position, so marksman 2 hits target 1 for 2 points and marksman 3 hits target 2 for 3 points. The scoreboard reads $[2, 5, 3]$. Since the rightmost marksman has hit a target, the round ends.

Example 2

Input

```
5
2 7 10 8 3
```

Output

```
4
2 5 5 3
```

Explanation

The formation has $k = 4$ targets, worth 2, 5, 5 and 3 points.

- Second 1: the targets are in front of marksmen 1 to 4, and the scoreboard reads [2, 5, 5, 3, 0].
- Second 2: the formation has moved right by one position, so the targets are in front of marksmen 2 to 5. After they shoot, the scoreboard reads [2, 7, 10, 8, 3]. Since the rightmost marksman has hit a target, the round ends.

Another formation that is consistent with this scoreboard is [2, 5, 3], which will also be accepted.

Example 3

Input

```
1
7
```

Output

```
1
7
```

Explanation

There is only one marksman, so the formation has one target and the round ends after one shot. The target must be worth exactly 7 points.