IOI Training Camp 2018 Final Test 3

Increasing Means

You are given an array $A = A_1, A_2, \ldots, A_N$ with positive integers. You should partition the array into some contiguous subsegments $([L_1, R_1], [L_2, R_2], \ldots, [L_k, R_k])$ which satisfy these properties:

- $L_1 = 1$
- $L_i \leq R_i$
- $L_i = R_{i-1} + 1$, for all $2 \leq i \leq k$
- $R_k = N$
- Consider the means of each segment: $M_i = \frac{\sum_{j=L_i}^{j=R_i} A_j}{R_i - L_i + 1}$. These should form a non-decreasing sequence. That is, $M_1 \leq M_2 \leq \ldots \leq M_k$.

Note that k is not fixed. You can choose to partition it into as many segments as you want.

Among all the partitions which satisfy the above properties, find a partition which has the lexicographically smallest $(M_1, M_2, \ldots, M_k)$.

Note: If a sequence S is a prefix of another sequence T, then S is lexicographically smaller than T. For eg. $(4, 2, 3, 6)$ is lexicographically smaller than $(4, 2, 3, 6, 1)$.

Input

The first line of the input contains a single integer, N, which is the size of the array.
The next line contains N integers: $A_1, A_2, \ldots, A_N$.

Output

The first line should contain a single integer: k, denoting the number of segments that you are partitioning into.
The i-th of the next k lines should contain two integers: L_i and R_i.
If there are multiple partitions which give the same lexicographically smallest sequence of means, then you can print any one of them.

General Constraints

Unless otherwise mentioned, the following constraints are met throughout all subtasks:

- $1 \leq N \leq 10^5$
- $1 \leq A_i \leq 10^6$

Subtasks

Subtask 1 (17 Points):

- $1 \leq N \leq 10^3$

Subtask 2 (83 Points):

- No further constraints.

Sample Input 1

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4
1 2 1 6
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Sample Output 1

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3
1 1
2 3
4 4
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Explanation

$M_1 = \frac{1}{1} = 1$

$M_2 = \frac{2+1}{2} = 1.5$

$M_3 = \frac{6}{1} = 6$

As this is a non-decreasing sequence, this is a valid partitioning. And you can check that you cannot achieve anything lexicographically smaller than (1, 1.5, 6).

Limits

Time: 1 seconds

Memory: 128 MB