

Maximize Dharmicity

Assignment 2

Data Structures & Algorithms

Due date: xx February, 2020

Problem Statement: Being a very dharmic person, Pari offers her prayers to several idols of Gods and Goddesses by giving them laddoos. She is quite meticulous about the pooja and always aims to maximize the dharmicity of her prayers. The pooja goes on in following manner:

There are n idols in a line. She goes to each one and offers them some number of laddoos. Dharmic value of the pooja is defined as difference between the maximum and the minimum number of laddoos given to an idol.

She gives this task to his bae, Chunnu. Let us assume she offers a_i laddoos to i th idol. So, this can be considered as a sequence of n integers. Being MLL ka hero as Chunnu is, he wants to calculate the sum of dharmic value of all possible subarrays to impress her. He asks for your help.

Input

First line contains n - Number of Gods

Second line contains n integers $a_1, a_2 \dots a_n$ - Number of laddoos given to each God

Constraints

$$1 \leq n \leq 10^6$$

$$1 \leq a_i \leq 10^6$$

Output

Print a single integer - Value returned by Chunnu

Time Limit: 1 sec

Memory Limit: 256 MB

Sample Test Case

Input	Output
3 2 3 1	5

Explanation

Considering all subarrays and their dharmic values

$$2 - \text{dharmic value} = 2 - 2 = 0$$

$$3 - \text{dharmic value} = 3 - 3 = 0$$

$$1 - \text{dharmic value} = 1 - 1 = 0$$

$$2\ 3 - \text{dharmic value} = 3 - 2 = 1$$

$$3\ 1 - \text{dharmic value} = 3 - 1 = 2$$

$$2\ 3\ 1 - \text{dharmic value} = 3 - 1 = 2$$

$$\text{Their sum} = 5$$