PROBLEM 4

Beautiful Buildings

Input File: `buildin.txt`
Output File: `buildout.txt`

Time and Memory Limits: 1 second, 1 GB

There are N buildings in a row, numbered 1 to N from left to right. The ith building has height H_i, and you believe that adjacent buildings of a similar height look beautiful.

The *ugliness* of the buildings is the sum of the absolute differences[1] of the heights of adjacent buildings.

The ugliness can be expressed as $|H_1 - H_2| + |H_2 - H_3| + \cdots + |H_{N-1} - H_N|$.

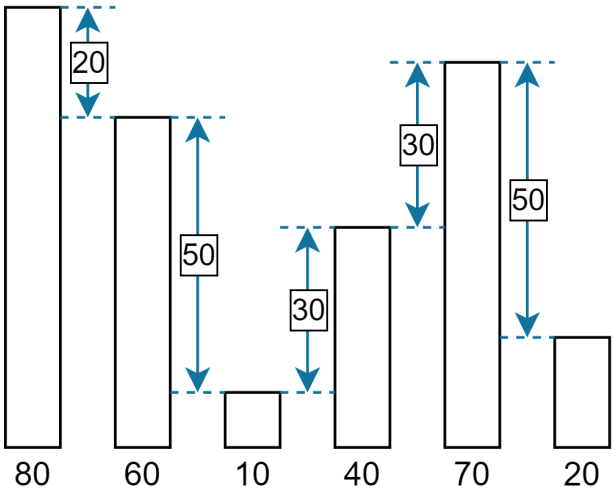

Figure 1: The blue arrows represent the absolute differences between the heights of adjacent buildings. Their values sum to 180: the initial ugliness of the buildings in the test case.

You may change the height of up to one building. What is the minimum ugliness you can achieve?

Input

- The first line of input contains the integer N.
- The second line of input contains N integers describing the heights of the buildings. They are $H_1, H_2, \ldots, H_N$.

Output

Your program must output one integer: the minimum ugliness you can achieve.

[1] The absolute value of a real number (denoted by vertical bars) is equivalent to its distance from 0. For example, $|2| = |-2| = 2$. The absolute difference between two numbers is equivalent to the distance between them. For example, $|5 - 10| = |-5| = 5$.

Sample Input 1

```
6
80 60 10 40 70 20
```

Sample Input 2

```
3
5 10 15
```

Sample Input 3

```
4
2 2 2 2
```

Sample Output 1

```
120
```

Sample Output 2

```
5
```

Sample Output 3

```
0
```

Explanation

In the first sample case, you can achieve an ugliness of 120 by changing the height of the third building to 50.

- The initial ugliness is $|80-60|+|60-10|+|10-40|+|40-70|+|70-20|=180$.
- The modified ugliness is $|80-60|+|60-50|+|50-40|+|40-70|+|70-20|=120$.

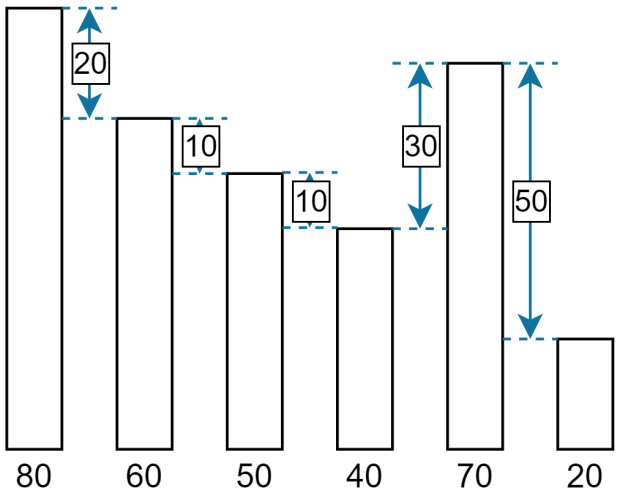

Figure 2: Sample Input 1 after modification.

In the second sample case, you can achieve an ugliness of 5 by changing the height of the first building to 10.

- The initial ugliness is $|5-10|+|10-15|=10$.
- The modified ugliness is $|10-10|+|10-15|=5$.

In the third sample case, you can achieve an ugliness of 0 by choosing not to change the height of any buildings.

- The initial ugliness is $|2-2|+|2-2|+|2-2|=0$.

Subtasks & Constraints

For all subtasks:

- $2 \leq N \leq 100\,000$.
- $1 \leq H_i \leq 10\,000$ for all i.

Additionally:

- For Subtask 1 (25 marks), $H_i \leq H_{i+1}$ for all i. That is, the heights are non-decreasing.
- For Subtask 2 (20 marks), $N \leq 100$ and $H_i \leq 100$ for all i.
- For Subtask 3 (20 marks), $N \leq 1000$ and $H_i \leq 1000$ for all i.
- For Subtask 4 (35 marks), no special constraints apply.