PROBLEM 4

Sunday Drive II

Time and memory limits: 1 second, 256 MB

It is once again another bright Sunday morning and you're driving through drowsy suburbia with your windows rolled down, blasting loud music as per usual. As you approach an N kilometre long street, infamous for its grumpy residents, you scramble to turn the volume level down to 0 decibels.

Preparing to drive down the street, you remind yourself that the ith kilometre has a volume limit of V_i decibels. At the start of each kilometre, you may increase the volume by 1, decrease it by 1, or leave it unchanged. However, you may not exceed the volume limit of that kilometre or go below 0 decibels.

Your total enjoyment is the sum of the volume levels throughout your drive. What's the maximum enjoyment you can achieve?

Subtasks and Constraints

Your program will be graded using many secret tests. Every test follows some rules:

- $2 \leq N \leq 200\,000$.
- $0 \leq V_i \leq 10\,000$ for all i.

The secret tests are divided into subtasks. Your program must correctly solve **every test** within a subtask to earn the marks for that subtask:

- For Subtask 1 (20 points), $N \leq 1000$ and $V_i = 10\,000$ for all $1 \leq i \leq N - 1$.
- For Subtask 2 (30 points), $N \leq 1000$ and V_i is either 0 or $10\,000$ for each i.
- For Subtask 3 (20 points), $N \leq 1000$.
- For Subtask 4 (30 points), no special rules apply.

Input

Your solution must read input and print output. We recommend using the solution templates (which you can find on the competition website) to help you with input and output.

The input follows a specific format:

- The 1st line contains the integer N.
- The 2nd line contains N integers $V_1, V_2, \ldots, V_N$, where V_i is the volume limit during the ith kilometre.

Output

Your program must output the maximum sum of volume levels you can achieve over the N kilometres.

Sample Input 1

```
5
3 3 3 3 3
```

Sample Output 1

```
12
```

Sample Input 2

```
5
3 3 3 3 0
```

Sample Output 2

```
6
```

Sample Input 3

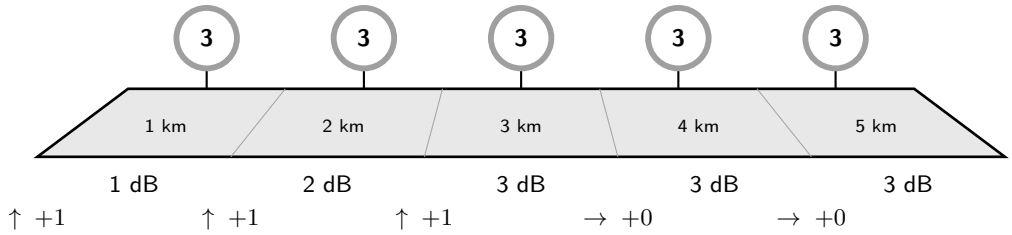
```
5
1 3 2 1 3
```

Sample Output 3

```
8
```

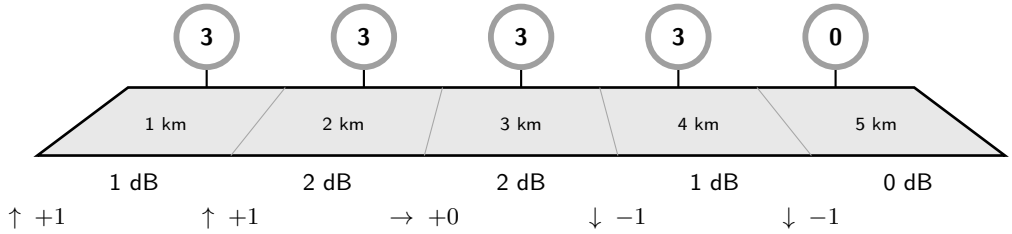
Explanation

- In the 1st sample case, the optimal drive looks like this:



  The total enjoyment is $1 + 2 + 3 + 3 + 3 = 12$, which is the maximum possible.

- In the 2nd sample case, the optimal drive looks like this:



  The total enjoyment is $1 + 2 + 2 + 1 + 0 = 6$, which is the maximum possible.

- In the 3rd sample case, the maximum total enjoyment is $1 + 2 + 2 + 1 + 2 = 8$.