Problem H. Heavy Stones

Input file:	*standard input*
Output file:	*standard output*
Time limit:	2 seconds
Memory limit:	512 mebibytes

After learning *Garsia–Wachs algorithm*, you came up with the following problem.

There are n piles of stones in a line. The i-th pile contains a_i stones. You want to merge all the stones into one pile.

At first, you will select the k-th pile. Then you can do the following operation on the selected pile: Choose the left or right adjacent pile of the selected one, and merge them into one pile. The new pile becomes the selected pile after the operation. After doing this operation $n-1$ times, there will be only one pile left. The cost of each merge operation is the number of stones in the new pile.

You want to know the smallest total cost if you select the k-th pile initially. For $k = 1, 2, \dots, n$, output the answer.

Input

The first line contains an integer n ($1 \le n \le 2 \cdot 10^5$).

The second line contains n integers $a_1, a_2, \dots, a_n$ ($1 \le a_i \le 10^6$).

Output

Output n integers. The k-th number indicates the smallest total cost if you select the k-th pile initially.

Examples

standard input	standard output
5 2 1 3 5 4	35 35 36 43 49
10 18 37 81 6 58 99 87 34 75 9	2637 2637 2657 2657 2695 2949 2995 2905 2880 2880

Note

If you select the 4-th pile initially, the process can go as follows:

$\{2, 1, 3, \mathbf{5}, 4\} \to \{2, 1, \mathbf{8}, 4\} \to \{2, \mathbf{9}, 4\} \to \{\mathbf{11}, 4\} \to \{\mathbf{15}\}$.

The total cost is $8 + 9 + 11 + 15 = 43$.