

Welcome to the Front Line!

Time Limit: 2s

Memory Limit: 2GB

You're given two sequences of n non-negative integers, $\{a_1, \dots, a_n\}$ and $\{b_1, \dots, b_n\}$.

You need to choose k items for each sequences, and match them in k pairs.

Each pair of (a_i, b_j) has cost of $|a_i - b_j|$.

You need to minimize the total cost, $\sum_{\text{choose } a_i \text{ and } b_j \text{ in pair}} |a_i - b_j|$.

Give answers for each $k = 1, 2, \dots, n$.

Input Format

The first line contains the single integer n .

The second line contains n integers, which are $a_1, a_2, \dots, a_n$.

The third line contains n integers, which are $b_1, b_2, \dots, b_n$.

Output Format

Output the answer for $k = 1, 2, \dots, n$ in a single line.

Sample 1

input

```
5
16 16 16 17 17
7 16 17 11 13
```

output

```
0 0 3 8 18
```

Sample 2

input

```
10
140 160 180 120 150 196 116 100 182 171
74 40 40 80 22 59 16 130 50 84
```

output

```
10 26 62 108 199 309 440 580 740 920
```

Sample 3 - 8

See the download attachment for details.

It may be easier to use the new feature `pretest` of UOJ in this contest.

Constraints and Limits

For all test cases, it is guaranteed that $1 \leq n \leq 5 \times 10^5, 0 \leq a_i, b_i \leq 10^9$.

Suppose $0 \leq a_i, b_i \leq v$, we have the following table of limits for subtasks.

Subtask ID	$n \leq$	$v =$	Subtask Score
1	5	20	4
2	10	200	4
3	20	200	6
4	50	200	8
5	50	10^9	6
6	100	10^9	4
7	500	10^9	6
8	2000	10^9	6
9	5000	10^9	6
10	50000	10^9	20
11	2×10^5	200	6
12	2×10^5	10^9	12
13	5×10^5	10^9	12