D - Neighbor Distance   Editorial (/contests/abc430/tasks/abc430_d/editorial)

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Time Limit: 4 sec / Memory Limit: 1024 MiB

Score : 400 points

Problem Statement

There is a number line, and initially person 0 is standing alone at coordinate 0.

From now on, persons $1, 2, \ldots, N$ will arrive in this order and stand on the number line. Person i stands at coordinate X_i. Here, $X_i \geq 1$, and X_i is distinct for all persons.

Each time a person arrives, answer the following question.

- Suppose that currently $r + 1$ persons $0, 1, \ldots, r$ are standing on the number line.
- Here, define d_i as the distance to the nearest other person from person i.
  - More formally, $d_i = \min\limits_{0 \leq j \leq r, j \neq i} |X_i - X_j|$.
- Find the sum of this d, that is, $\sum\limits_{i=0}^{r} d_i$.

Constraints

- All input values are integers.
- $1 \leq N \leq 5 \times 10^5$
- $1 \leq X_i \leq 10^9$
- $X_i \neq X_j$ if $i \neq j$.

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Input

The input is given from Standard Input in the following format:

$$N$$
$$X_1 \quad X_2 \quad \ldots \quad X_N$$

Output

Print N lines.

The i-th line ($1 \le i \le N$) should contain the answer to the question when person i arrives.

Sample Input 1   Copy

```
10
5 2 7 4 108728325 390529120 597713292 322456626 845148281 812604915
```
Copy

Sample Output 1   Copy

```
10
7
8
8
108728326
390529121
523096670
452057486
699492475
517144218
```
Copy

In this input, 10 persons arrive.

The first four persons are explained below.

- When person 1 arrives, there are persons at coordinates $0, 5$.
    - The required value is $5 + 5 = 10$.
- When person 2 arrives, there are persons at coordinates $0, 2, 5$.
    - The required value is $2 + 2 + 3 = 7$.
- When person 3 arrives, there are persons at coordinates $0, 2, 5, 7$.
    - The required value is $2 + 2 + 2 + 2 = 8$.
- When person 4 arrives, there are persons at coordinates $0, 2, 4, 5, 7$.
    - The required value is $2 + 2 + 1 + 1 + 2 = 8$.

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