

Contest Duration: 2025-11-01(Sat) 23:00 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20251101T2100&p1=248>) - 2025-11-02(Sun) 00:40 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20251101T2240&p1=248>) (local time) (100 minutes)

[Back to Home \(/home\)](#)

[Top \(/contests/abc430\)](#)

[Tasks \(/contests/abc430/tasks\)](#)

[Clarifications \(/contests/abc430/clarifications\)](#) [Results ▾](#)

[Standings \(/contests/abc430/standings\)](#)

[Virtual Standings \(/contests/abc430/standings/virtual\)](#) [Editorial \(/contests/abc430/editorial\)](#)

[Discuss \(<https://codeforces.com/blog/entry/147960>\)](#)



D - Neighbor Distance

[Editorial \(/contests/abc430/tasks/abc430_d/editorial\)](#)



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, ..., N will arrive in this order and stand on the number line.

Person i stands at coordinate X_i. Here, X_i ≥ 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, ..., 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 = $\min_{\substack{0 \leq j \leq r, j \neq i \\ r}} |X_i - X_j|$.
- Find the sum of this d, that is, $\sum_{i=0}^r d_i$.

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 $i \neq j$.

Input

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

```
N  
X1 X2 ... XN
```

Output

Print N lines.

The i -th line ($1 \leq i \leq N$) 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
```

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Sample Output 1

[Copy](#)

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

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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 $2 + 2 + 1 + 1 + 2 = 8$.

[Rule \(/contests/abc430/rules\)](#) [Glossary \(/contests/abc430/glossary\)](#)

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