CMPUT 274 - Tangible Computing **Fall 2017**
Morning Problem: Manhattan Distances

Description

In your assignment, you must compute the **Manhattan distance** between two points.

More specifically, given two points (x_1, y_1) and (x_2, y_2) the Manhattan distance between these points is $|x_1 - x_2| + |y_1 - y_2|$ where $|\cdot|$ is the absolute value function.

In this problem, you will compute Manhattan distances between a given point and a collection of other points.

Input

The first line of input will consist of a single integer $1 \leq m \leq 1000$. The next m lines describe m points, one per line. The i'th such line contains two integers x_i and y_i, the coordinates of the i'th point.

Finally, one additional line follows containing two integers x and y describing one final point. All coordinates will have a value at least -10^6 and at most 10^6. Thus, there will be a total of $m+2$ lines in each input file (the first line for m, the next m lines for the points themselves, and finally the last line for the point.)

Output

Output m integers on a single line, the i-th integer being the Manhattan distance from the i-th point (x_i, y_i) point to the last point (x, y). These integers should be separated by a single space and the line should end with a newline.

If you print a space after the last integer, the Test Centre will give a `hard fail` message. We will accept this (as long as there are no `soft fail` errors in any case), but try to clean up your solution so it only prints a newline after the last integer if you have time.

Sample Input 1

```
3
1 1
2 2
3 3
0 0
```

Sample Output

```
2 4 6
```

Explanation: The point $(0, 0)$ has Manhattan distance $|0 - 1| + |0 - 1| = 2$ from $(1, 1)$, Manhattan distance 4 from $(2, 2)$, and Manhattan distance 6 from $(3, 3)$.

Sample Input 2

```
3
1 0
0 1
-5 0
4 0
```

Sample Output

```
3 5 9
```

Explanation: The point $(4, 0)$ has Manhattan distance 3 from $(1, 0)$, Manhattan distance 5 from $(0, 1)$, and Manhattan distance 9 from $(-5, 0)$.

Sample Input 3

```
1
10 -10
-10 -10
```

Sample Output

```
20
```

Explanation: The point $(-10, -10)$ has Manhattan distance 20 from the point $(10, -10)$.