



## Modern Art (squareunion)

Alice decided to create a piece of modern art. She has  $N$  squares, numbered from 0 to  $N - 1$ . She placed them along the  $x$  axis, such that their centers lie on the  $x$  axis. The sides of the squares are parallel to the  $x$  and  $y$  axes. Some squares may overlap.

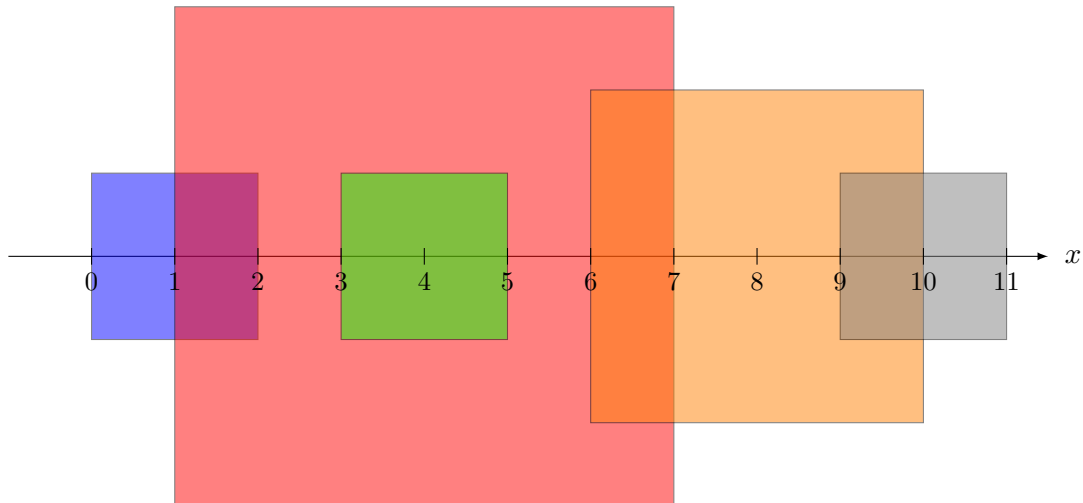


Figure 1: Modern art according to Alice.

For each square  $i$ , Alice tells you the  $x$  coordinate  $X_i$  of its center, and the distance  $R_i$  between its center and its sides. Please note that the side length of square  $i$  is  $2R_i$ . For example, the square with  $X = 4$  and  $R = 3$  is colored in red, and the square with  $X = 8$  and  $R = 2$  is colored in orange in the above figure.

Your task is to compute the total area covered by Alice's  $N$  squares.

📎 Among the attachments of this task you may find a template file `squareunion.*` with a sample incomplete implementation.

## Input

The input file consists of:

- a line containing integer  $N$ : the number of the squares.
- a line containing the  $N$  integers  $X_0, \dots, X_{N-1}$ : the  $x$  coordinates of the centers of the squares.
- a line containing the  $N$  integers  $R_0, \dots, R_{N-1}$ : the distance between the center and the sides of each square.

## Output






The output file must contain a single line consisting of a 64-bit integer: the area of the union of the squares.

## Constraints

- $1 \leq N \leq 100\,000$ .
- $1 \leq X_i \leq 1\,000\,000\,000$  for each  $i = 0 \dots N - 1$ .
- $1 \leq R_i \leq 1\,000\,000$  for each  $i = 0 \dots N - 1$ .

## Scoring

Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases.

- **Subtask 1** (0 points)      Examples.  

- **Subtask 2** (5 points)       $R_i = 1$  and  $X_i$  is odd for each  $i = 0 \dots N - 1$ .  

- **Subtask 3** (15 points)       $N \leq 100$  and  $R_i \leq 100$ ,  $X_i \leq 1000$  for each  $i = 0 \dots N - 1$ .  

- **Subtask 4** (30 points)       $N \leq 1000$  and  $R_i \leq 500$ ,  $X_i \leq 10^6$  for each  $i = 0 \dots N - 1$ .  

- **Subtask 5** (50 points)      No additional limitations.  


## Examples

input	output
5 4 4 10 8 1 3 1 1 2 1	52
5 1 5 9 7 1 1 1 1 1 1	16

## Explanation

The **first sample case** corresponds to the picture in the task description above. The area of the union of the squares is 52.

In the **second sample case** the area is 16. It is displayed in the picture below. Note that the leftmost (blue) area is covered twice, both by square 0 and square 4.

