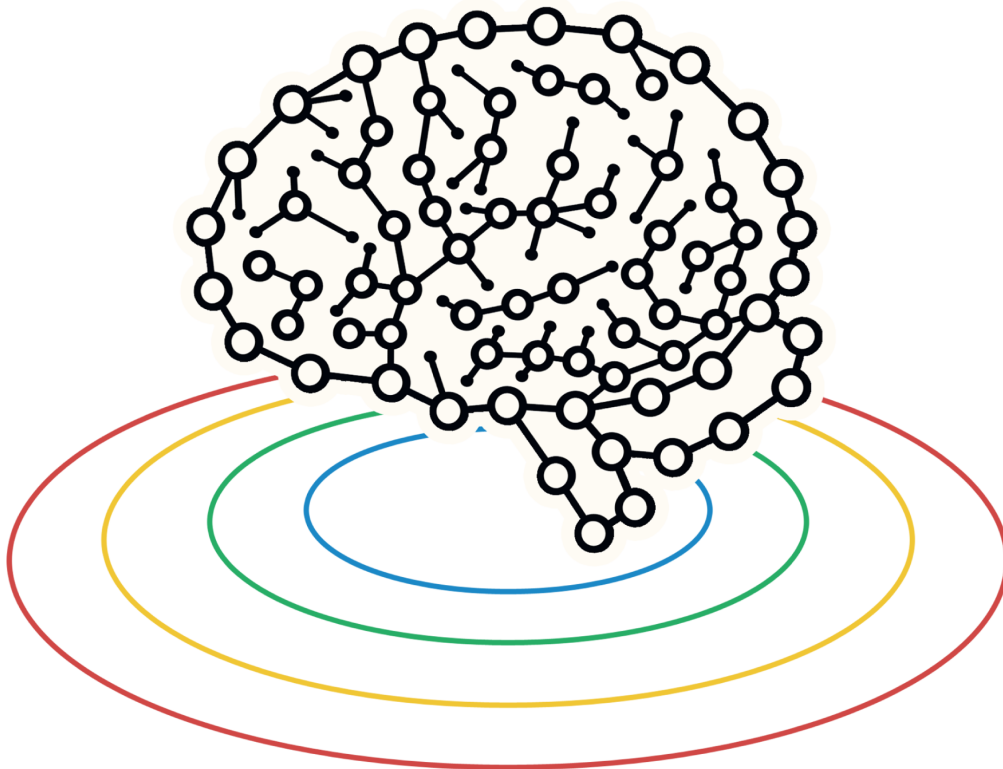




Association for Computing Machinery  
University of the Philippines Diliman Student Chapter, Inc.



# ALGOLYMPICS 2021

UP ACM PROGRAMMING COMPETITION

## PRACTICE PROBLEMS

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## Sample Problem

### Alien Defense

Time Limit: 2 seconds

The Alien Committee for Monitoring (ACM) has discovered a planned alien invasion on Algolympia! It is up to you, brave programmer, to help the citizens of Algolympia defend against this dastardly alien threat.

Through their incredible hacking skills, ACM has found the potential attack zones that the aliens plan to invade. For some strange reason unknown to us, the aliens have decided to attack  $N$  rectangle-shaped zones in Algolympia. Furthermore, all of those rectangles have sides that are parallel to either the south border of Algolympia, or the east border of Algolympia (Algolympia is shaped like a big square). Some of these zones overlap with each other.

Furthermore, ACM has found that the aliens have planned two stages of attack: in the first stage, the aliens plan to attack the part of Algolympia common to all of the attack zones with a devastating ion cannon. In the second stage, the aliens plan to attack every attack zone with massive nuclear bombs.

Your task is simple. You must find the area of Algolympia that is under threat of the ion cannon attack, and the area of Algolympia that is under threat of the nuclear bomb attack. Act with haste, for the future of Algolympia is in your hands!

#### Input Format

The first line contains a single integer,  $N$ , which is the number of attack zones the aliens plan to invade.

The first line is followed by exactly  $N$  lines. Each line contains exactly 4 integers,  $X_i$ ,  $Y_i$ ,  $W_i$ ,  $H_i$ , separated from each other by single spaces.  $X_i$  and  $Y_i$  are the  $x$ - and  $y$ - coordinates of the bottom-left corner of the  $i$ th attack zone, and  $W_i$  and  $H_i$  are the width and height of the  $i$ th attack zone, respectively.

No other lines follow.

#### Constraints

- $1 \leq N \leq 1000$
- $1 \leq i \leq N$
- $-10^6 \leq X_i \leq 10^6$
- $-10^6 \leq Y_i \leq 10^6$
- $1 \leq W_i \leq 10^6$
- $1 \leq H_i \leq 10^6$

## Output Format

Output a single line containing exactly two integers,  $A$  and  $B$ , separated by a single space, where  $A$  is the area under threat of the ion cannon attack, and  $B$  is the area under threat of the nuclear bomb attack.

### Sample Input 1

```
1
1 1 1 1
```

### Sample Output 1

```
1 1
```

### Sample Input 2

```
2
0 0 3 3
1 -1 5 5
```

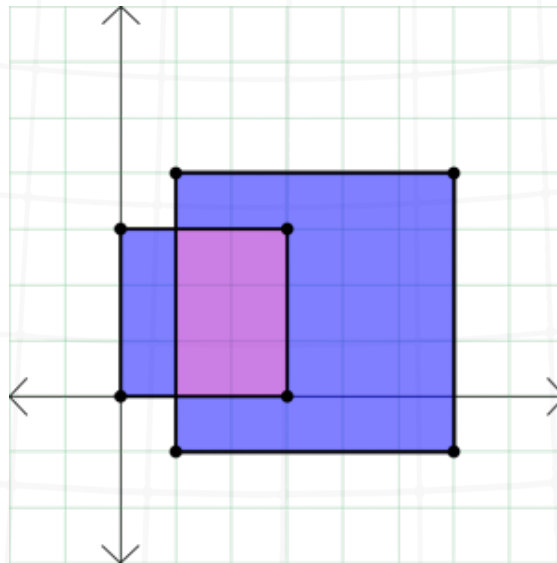
### Sample Output 2

```
6 28
```

## Explanation

In the first test case, there is only one attack zone, so the aliens will attack it with the ion cannon, then with nuclear bombs. It has area 1.

In the second test case, see the following figure:



The ion cannon will hit the common area (violet) of 6, and then the nuclear bombs will hit the total area (violet and blue) of 28.

This problem was adapted from NOI.PH (<https://noi.ph/past-problems/>)