

Magic Slime

Time and memory limits: 1 second, 256 MB

You are an aspiring wizard with a collection of N slimes. Slime i has size A_i and magic S_i .

You can fuse any two slimes of the same size into one larger slime. If both slimes have size a , the resulting slime has size $a + 1$ and magic equal to the sum of their magic. The two original slimes disappear.

You may perform any number of fusions, including none. Slimes created by a fusion can be used in later fusions.

What is the largest possible **size** of a slime you can obtain? Among all slimes of this size that you can obtain, what is the greatest possible magic?

Subtasks and constraints

Your program will be graded using many secret tests. Every test follows some rules:

- $1 \leq N \leq 1\,000\,000$.
- $1 \leq A_i \leq 1\,000\,000$ for all i .
- $1 \leq S_i \leq 1000$ for all i .

The secret tests are divided into subtasks. Your program must correctly solve **every test** within a subtask to earn the marks for that subtask:

- For Subtask 1 (10 marks), $N \leq 3$.
- For Subtask 2 (15 marks), $A_i = 1$ for all i .
- For Subtask 3 (15 marks), $A_i \in \{1, 2\}$ for all i .
- For Subtask 4 (20 marks), $N \leq 2000$.
- For Subtask 5 (40 marks), no special rules apply.

Input

Your solution must read input and print output.

The input follows a specific format:

- The 1st line contains the integer N .
- The next N lines describe the slimes. The i th of these contains the integers A_i and S_i .

Output

Your program must output two integers on one line: the largest possible size, followed by the greatest possible magic of a slime of that size.

Sample input 1

3
1 3
1 8
1 5

Sample output 1

2 13

Sample input 2

5
1 10
1 9
1 2
1 1
2 100

Sample output 2

3 119

Sample input 3

3
1 1000
4 2
4 3

Sample output 3

5 5

Sample input 4

1
3 7

Sample output 4

3 7

Explanation

- In the 1st sample case, fuse the slimes with magic 8 and 5. The resulting slime has size 2 and magic 13. The remaining slime of size 1 cannot fuse with it.
- In the 2nd sample case, fuse the slimes of size 1 with magic 10 and 9, then fuse their result with the original slime of size 2. This creates a slime of size 3 with magic 119. No slime of size 4 can be created.
- In the 3rd sample case, fuse the two slimes of size 4 to create a slime of size 5 with magic 5. The slime of size 1 cannot participate in a fusion, even though it has greater magic.
- In the 4th sample case, there is only one slime, so no fusions are possible. Keep this slime, which has size 3 and magic 7.