# Magic Slime

**Time and memory limits:** $2$ seconds, $512$ 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 $7$.