

Water Station

CITS3001 Advanced Algorithms — Time limit: 3s

The Faculty is installing a single water station somewhere along the (very long, very straight) walkway that links every tutorial room on campus. Room i is at integer position x_i metres along the walkway and holds s_i students. If the station is built at integer position p , the total walking distance is

$$\sum_i s_i \cdot |p - x_i|.$$

Choose p to minimise the total walking distance.

Recall from lectures that a point minimising the total distance to a set of points is a *median* of that set — and here a room of s_i students counts s_i times. Which order statistic of which multiset is that, and how quickly can you find it?

Input

The first line contains an integer n ($1 \leq n \leq 2 \cdot 10^5$), the number of rooms. Each of the next n lines contains two integers x_i and s_i ($0 \leq x_i \leq 10^9$, $1 \leq s_i \leq 10^4$). Rooms are in no particular order; several rooms may share a position.

Output

Output two integers separated by a space: the optimal position p and the minimum total walking distance. If several positions are optimal, output the smallest one.

Sample Input 1

```
3
2 1
10 3
5 2
```

Sample Output 1

```
5 18
```

Sample Input 2

```
2
0 1
100 2
```

Sample Output 2

```
100 100
```