Filling a bookshelf (2) P35814_en

Novè Concurs de Programació de la UPC - Semifinal (2011-06-29)

The statement of this problem is almost identical to the problem , with two exceptions: Now, when filling the bookshelf, the relative order of the books in the input can be changed. And b can be as large as 10^5.

I.e., the problem is: Given b books, each one with width w_i and height h_i, use them to fill a bookshelf as much as possible. The second book (if any) must be shorter than the first book, the third book must be taller than the second book, ..., and the last book must be taller than the penultimate book. Note that "short" and "tall" refer to the h_i's, and that the goal is to maximize the sum of the w_i's of the chosen books.

Input

Input consists of several cases. Each case begins with b, followed by b pairs with w_i and h_i. Assume $1 \leq b \leq 10^5$ and $1 \leq w_i, h_i \leq 10^9$. A special case with $b = 0$ marks the end of input.

Output

For every case, print the maximum possible sum of the widths of the chosen books.

Sample input

```
3  900000000 8  700000000 4  800000000 6
2  2 8  3 6
4  8 2  9 3  6 1  7 4
2  5 7  4 7
4  4 20  6 10  3 20  8 10
6  15 3  11 1  12 3  10 2  14 2  15 3
6  15 3  11 1  12 3  10 2  14 3  15 3
6  11 1  15 2  12 2  10 3  14 2  15 2
0
```

Sample output

```
2400000000
3
24
5
15
67
65
41
```

Problem information

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