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## Filling a bookshelf (2)

P35814\_en

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

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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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Generation : 2013-09-02 15:43:53

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