

You are to find the length of the shortest path from the top to the bottom of a grid covering specified points along the way.

More precisely, you are given an n by n grid, rows $1 \dots n$ and columns $1 \dots n$ ($1 \leq n \leq 20000$). On each row i , two points $L(i)$ and $R(i)$ are given where $1 \leq L(i) \leq R(i) \leq n$. You are to find the shortest distance from position $(1, 1)$, to (n, n) that visits all of the given segments in order. In particular, for each row i , all the points

$$(i, L(i)); (i, L(i) + 1), (i, L(i) + 2), \dots, (i, R(i)),$$

must be visited. Notice that one step is taken when dropping down between consecutive rows. Note that you can only move left, right and down (you cannot move up a level). On finishing the segment on row n , you are to go to position (n, n) , if not already there. The total distance covered is then reported.

Input

Input file contains maximum 10 sets of inputs. The description of each set is given below:

The first line of each set consists of an integer n , the number of rows/columns on the grid. On each of the next n lines, there are two integers $L(i)$ followed by $R(i)$ (where $1 \leq L(i) \leq R(i) \leq n$).

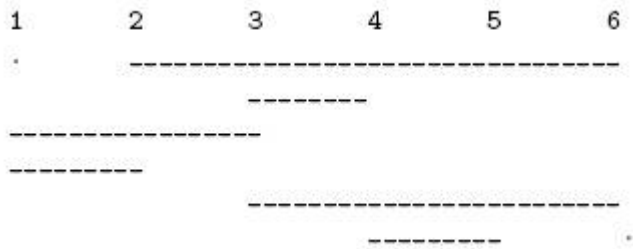
Input is terminated by a set whose value of n is zero. This input should not be processed.

Output

For each set of input output is one integer, which is the length of the (shortest) path from $(1, 1)$ to (n, n) which covers all intervals $L(i), R(i)$.

Explanation of Sample Input/Output

Below is a pictorial representation of the input.



Notice that on the first row, we must traverse 5 units to the right and then drop down one level.

On the second row, we must traverse 3 units to the left and drop down one level.

On the third row, we must traverse 2 units to the left and drop down one level.

On the fourth row, we move 1 unit to the right and then drop down one level.

On the fifth row, we move 4 units to the right and drop down one level.

On the sixth (and final) row, we move 2 units left, then 2 units right.

In total, we have moved $6 + 4 + 3 + 2 + 5 + 4 = 24$ units.

Sample Input

```
6
2 6
3 4
1 3
1 2
3 6
4 5
0
```

Sample Output

```
24
```