

# **CROATIAN OLYMPIAD IN INFORMATICS 2015**

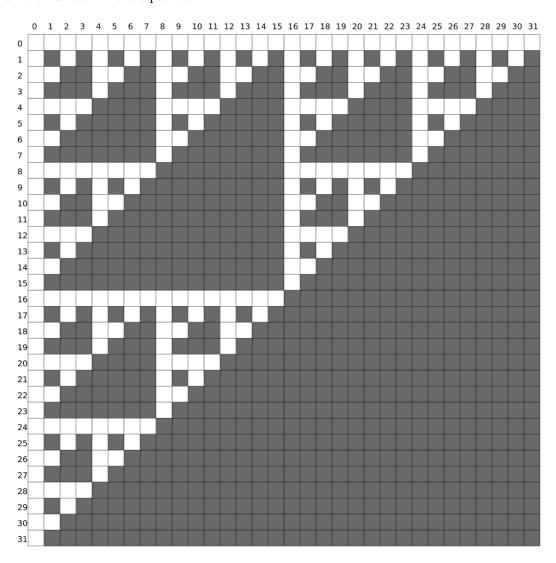
Task ČVENK, 100 ponits Time limit: 3 seconds Memory limit: 512 MB

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A group of Czech tourists is walking in a labyrinth of a strange self-similar shape. The ground plan of the labyrinth is a Sierpinski triangle – a fractal structure named after the Polish mathematician Wacław Sierpiński.

The labyrinth consists of a billion rows numbered from 0 to  $10^9 - 1$  from top to bottom, and a billion columns numbered from 0 to  $10^9 - 1$  from left to right. The fields in the labyrinth can be either free or blocked.

The field in row X and column Y is free if the result of the bitwise 'and' operation on the numbers X and Y is equal to zero, otherwise it is blocked. In other words, a field is blocked if, when X and Y are switched to binary, there is an integer k such that the k<sup>th</sup> digit from the right of the number X and the k<sup>th</sup> digit from the right of the number Y are equal to 1.



The first 32 rows and columns of the labyrinth. The blocked fields are colored in black.

The Czech tourists are tired from a long day of wandering and would like to meet up in a free field and exchange experiences. In each step, one tourist can jump to one of the adjacent free fields (up, down, left or right).

Write a programme that will, based on the current tourists' locations, determine minimum total number of steps necessary in order for all the tourists to meet in the same field.



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### **INPUT**

The first line of input contains an integer N – the number of tourists. Each of the following N lines contains two integers  $R_i$  and  $S_i$  – the row and column of the field where the i<sup>th</sup> tourist is located.

All the tourists are located in free fields, and it is possible that there are multiple tourists in the same field.

### **OUTPUT**

The first and only line of output must contain the required minimum number of steps.

**Please note:** We recommend that you use a 64-bit integer data type (int64 in Pascal, long long in C/C++).

# **SCORING**

subtask	subscore	constraints
1	17	N = 2 $0 \le R_K, S_K < 10^9$
2	21	$ 2 \leqslant N \leqslant 100 \\ 0 \leqslant R_K, S_K < 10^9 $
3	22	$2 \leqslant N \leqslant 10^5$ $0 \leqslant R_K, S_K < 500$
4	40	$2 \leqslant N \leqslant 10^5 \\ 0 \leqslant R_K, S_K < 10^9$

#### SAMPLE TESTS

input	input	]
2	6	
2 1	2 5	
4 3	3 4	
	8 7	
	9 6	
	10 5	
	11 4	
output	output	
output	oucput	
6	50	

Clarification of the first example: One of the fields where the brave Czech tourists could have met is (2,0).

Clarification of the second example: One of the fields where the playful Czech tourists could have met is (8, 4).