

Contest Duration: 2025-08-16(Sat) 22:00 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250816T2100&p1=248>) - 2025-08-16(Sat) 23:40 (<http://www.timeanddate.com/worldclock/fixedtime.html?iso=20250816T2240&p1=248>) (local time) (100 minutes)

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## C - King's Summit

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Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 300 points

### Problem Statement

There is a grid with  $10^9$  rows and  $10^9$  columns. Let  $(i, j)$  denote the square at the  $i$ -th row from the top and  $j$ -th column from the left.

There are  $N$  people on the grid. Initially, the  $i$ -th person is at square  $(R_i, C_i)$ .

The time starts at 0. Each person can do the following move at times  $1, 2, 3, 4, \dots$

- Stay at the current position, or move to an 8-adjacent square. It is forbidden to leave the grid. Formally, let square  $(i, j)$  be the current square, and move to one of the squares  $(i - 1, j - 1), (i - 1, j), (i - 1, j + 1), (i, j - 1), (i, j), (i, j + 1), (i + 1, j - 1), (i + 1, j), (i + 1, j + 1)$  that exists. Assume that the move takes no time.

Find the minimum possible time when the  $N$  people are at the same square.

### Constraints

- $1 \leq N \leq 2 \times 10^5$
- $1 \leq R_i, C_i \leq 10^9$
- All input values are integers.

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# Input

The input is given from Standard Input in the following format:

```
N
R1 C1
R2 C2
⋮
RN CN
```

# Output

Output the answer.

## Sample Input 1

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```
3
2 3
5 1
8 1
```

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## Sample Output 1

[Copy](#)

```
3
```

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All people will be at square (5, 4) at time 3 if each person moves as follows.

- At time 1, the 1st person moves to square (3, 4), the 2nd person moves to square (6, 2), and the 3rd person moves to square (7, 2).
- At time 2, the 1st person moves to square (4, 4), the 2nd person moves to square (5, 3), and the 3rd person moves to square (6, 3).
- At time 3, the 1st person moves to square (5, 4), the 2nd person moves to square (5, 4), and the 3rd person moves to square (5, 4).

## Sample Input 2

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```
5
6 7
6 7
6 7
6 7
6 7
```

## Sample Output 2

[Copy](#)

```
0
```

[Copy](#)

All people start at the same square.

## Sample Input 3

[Copy](#)

```
6
91 999999986
53 999999997
32 999999932
14 999999909
49 999999985
28 999999926
```

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## Sample Output 3

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```
44
```

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'#telegram)

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