

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,

- 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.

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

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```
0
```

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All people start at the same square.

Sample Input 3

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

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Sample Output 3

[Copy](#)

```
44
```

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```
'#telegram)
```

```
:url=https%3A%2F%2Fatcoder.jp%2Fcontests%2Fabc419%2Ftasks%2Fabc419_c%3Flang%3Den&title=C%20-
```

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