IOITC 2022 Practice Contest 1

Point Partition

You are given a set P of n 2-D points $(x_1, y_1), (x_2, y_2), \ldots (x_n, y_n)$. For a non-empty set S of points, define the width as the difference between the maximum and the minimum x coordinates among all points in S, and similarly the height as the difference between the maximum and minimum y coordinates.

You have to partition P into two **non-empty** sets A and B, such that the sum of the width of A and the height of B is minimized, and find this minimum sum.

Input

- The first line contains n, the number of points.
- i-th of the following n lines c ontains two space separated integers, x_i and y_i

Output

Print a single line containing the minimum possible sum of the width of A and the height of B.

Test Data

In all inputs,

- $2 \leq n \leq 2 \times 10^6$
- For each $1 \leq i < n$, $x_i \leq x_{i+1}$
- $0 \leq x_i, y_i \leq 10^8$

Subtask 1 (10 Points): $n \leq 250$

Subtask 2 (10 Points): $n \leq 850$

Subtask 3 (10 Points): $n \leq 1.9 \times 10^4$

Subtask 4 (20 Points): $n \leq 9 \times 10^4$

Subtask 5 (25 Points): $n \leq 6.1 \times 10^5$

Subtask 6 (25 Points): No additional constraints

Sample Input

```
11
1 28
5 24
11 14
13 43
19 29
23 6
28 25
36 51
```

```
39 32
44 29
50 21
```

Sample Output

```
36
```

Explanation

One optimal solution is: points $3, 4, 6, 8$ and 9 in A and the others in B. The width of A is $39 - 11 = 28$, and the height of B is $29 - 21 = 8$. The sum is $28 + 8 = 36$.

Limits

Time: 1 seconds

Memory: 256 MB