January 2023 CSE 208
Online Assignment on Minimum Spanning Tree

Time: 30 minutes

Subsections A1 & B1

There are some islands on the two-dimensional integer Cartesian grid. A flight network needs to be constructed to connect all of them.

But here is a catch. An airplane there can have only three types of moves. It can move freely up and down. It can rotate left and right by 90°. Otherwise, it can only move if it is parallel to either the x-axis or the y-axis.

You have to construct a flight network with a minimum total length. You can use any of your two MST implementations. But choosing the optimal one with respect to memory will have some points.

Input

Take input from a file. The first line will contain an integer n, denoting the number of cities. In each of the following n lines, there will be two integers x, y such that there is a city on point (x, y). Here $0 \leq x, y \leq 1000$.

Output

Print the minimum total length of the desired road network.

Sample I/O

Input File

```
5
0 0
2 2
3 10
5 2
7 0
```

Output

```
20
```

Please note that any usage of the internet is strictly prohibited during the assignment. Usage of any unfair means will be duly punished.

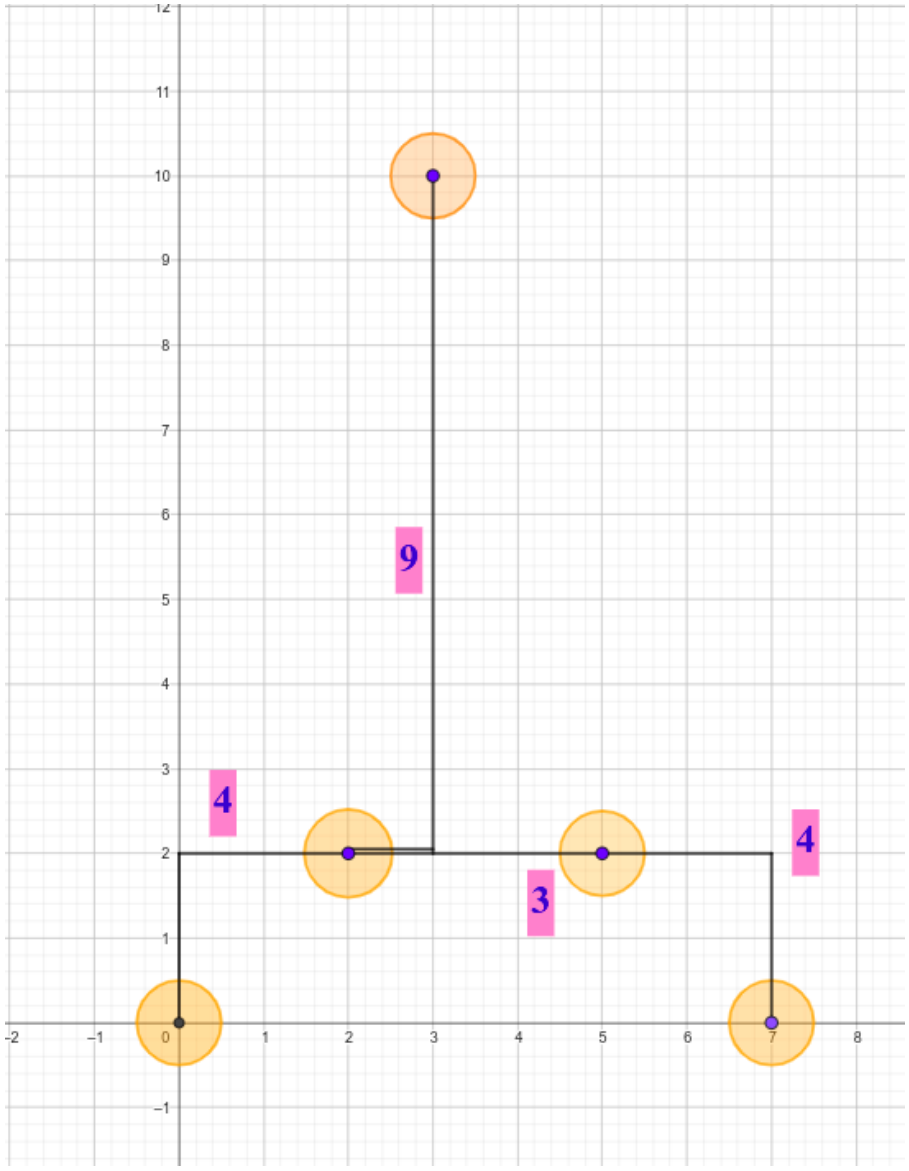

Figure 1: An illustration of the test case