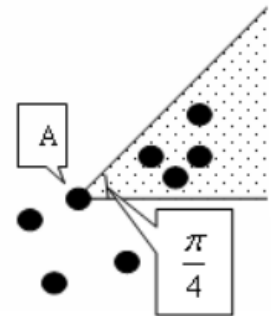


3662 Another Minimum Spanning Tree

For a given point set $P = \{(x_i, y_i) : 1 \leq i \leq n\}$, then construct a complete graph $G = (V, E, W)$ with n vertexes. The weight function for any two vertexes is $w(v_i, v_j) = |x_i - x_j| + |y_i - y_j|$. Please calculate the minimum spanning tree of G .

Hint

For the graph on the right, there exists a minimum spanning tree in which there is at most one vertex connected with A in the shadow area. You can extend this property to solve the problem.



Input

Input contains several cases.

Each cases begins with an integer n , $1 \leq n \leq 100,000$, to indicate the size of the point set. The points in the point set have serial numbers from 1 to n .

Each line of the following n lines contains two non-negative integers (x_i, y_i) (no more than 10^7) to describe the coordinate for each point. Any two points' coordinates are different.

The last case is followed by a line containing a zero.

Output

For each case, output the case's serial number and the weighted sum of all minimum spanning tree edges in the following format.

Sample Input

```
3
0 0
2 0
0 3
0
```

Sample Output

```
Case 1: Total Weight = 5
```