1418 – Trees on My Island

I have bought an island where I want to plant trees in rows and columns. So, the trees will form a rectangular grid and each of them can be thought of having integer coordinates by taking a suitable grid point as the origin.

But, the problem is that the island itself is not rectangular. So, I have identified a simple polygonal area inside the island with vertices on the grid points and have decided to plant trees on grid points lying strictly inside the polygon.

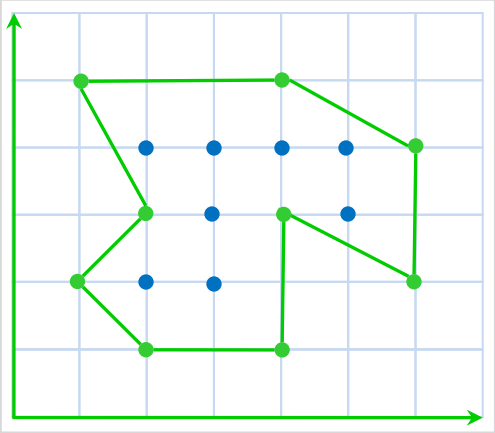

Figure: A sample of my island

For example, in the above figure, the green circles form the polygon, and the blue circles show the position of the trees.

Now, I seek your help for calculating the number of trees that can be planted on my island.

Input

Input starts with an integer **T (≤ 100)**, denoting the number of test cases.

Each case starts with a line containing an integer **N (3 ≤ N ≤ 10000)** denoting the number of vertices of the polygon. Each of the next **N** lines contains two integers $\mathbf{x_i}$ $\mathbf{y_i}$ **($-10^6 \le x_i, y_i \le 10^6$)** denoting the co-ordinate of a vertex. The vertices will be given in clockwise or anti-clockwise order. And they will form a simple polygon.

Output

For each case, print the case number and the total number of trees that can be planted inside the polygon.

Sample Input	Output for Sample Input
1 9 1 2 2 1 4 1 4 3 6 2 6 4 4 5 1 5 2 3	Case 1: 8

Note

Dataset is huge, use faster I/O methods.