1018 – Brush (IV)

Mubashwir returned home from the contest and got angry after seeing his room dusty. Who likes to see a dusty room after a brain storming programming contest? After checking a bit he found an old toothbrush in his room. Since the dusts are scattered everywhere, he is a bit confused what to do. So, he called Shakib. Shkib said that, 'Use the brush recursively and clean all the dust, I am cleaning my dust in this way!'

So, Mubashwir got a bit confused, because it's just a tooth brush. So, he will move the brush in a straight line and remove all the dust. Assume that the tooth brush only removes the dusts which lie on the line. But since he has a tooth brush so, he can move the brush in any direction. So, he counts a move as driving the tooth brush in a straight line and removing the dusts in the line.

Now he wants to find the maximum number of moves to remove all dusts. You can assume that dusts are defined as **2D** points, and if the brush touches a point, it's cleaned. Since he already had a contest, his head is messy. That's why he wants your help.

Input

Input starts with an integer **T (≤ 1000)**, denoting the number of test cases.

Each case starts with a blank line. The next line contains three integers **N (1 ≤ N ≤ 16)**. **N** means that there are **N** dust points. Each of the next **N** lines will contain two integers $\mathbf{x_i}$ $\mathbf{y_i}$ denoting the coordinate of a dust unit. You can assume that **(-1000 ≤ $\mathbf{x_i}$, $\mathbf{y_i}$ ≤ 1000)** and all points are distinct.

Output

For each case print the case number and the minimum number of moves.

Sample Input	Output for Sample Input
2 3 0 0 1 1 2 2 3 0 0 1 1 2 3	Case 1: 1 Case 2: 2