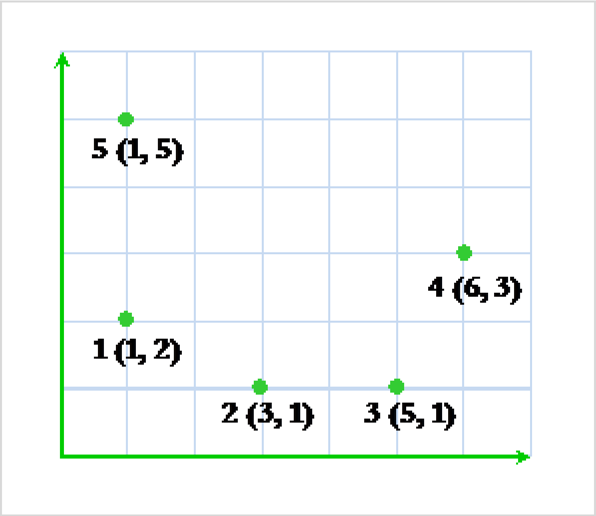
In a 2D plane N persons are standing and each of them has a gun in his hand. The plane is so big that the persons can be considered as points and their locations are given as Cartesian coordinates. Each of the N persons fire the gun in his hand exactly once and no two of them fire at the same or similar time (the sound of two gun shots are never heard at the same time by anyone so no sound is missed due to concurrency). The hearing ability of all these persons is exactly same. That means if one person can hear a sound at distance R_1, so can every other person and if one person cannot hear a sound at distance R_2 the other $N-1$ persons cannot hear a sound at distance R_2 as well.



The N persons are numbered from 1 to N. After all the guns are fired, all of them are asked how many gun shots they have heard (not including their own shot) and they give their verdict. It is not possible for you to determine whether their verdicts are true but it is possible for you to judge if their verdicts are consistent. For example, look at the figure above. There are five persons and their coordinates are (1, 2), (3, 1), (5, 1), (6, 3) and (1, 5) and they are numbered as 1, 2, 3, 4 and 5 respectively. After all five of them have shot their guns, you ask them how many shots each of them have heard. Now if there response is 1, 1, 1, 2 and 1 respectively then you can represent it as (1, 1, 1, 2, 1). But this is an inconsistent verdict because if person 4 hears 2 shots then he must have heard the shot fired by person 2, then obviously person 2 must have heard the shot fired by person 1, 3 and 4 (person 1 and 3 are nearer to person 2 than person 4). But their opinions show that Person 2 says that he has heard only 1 shot. On the other hand (1, 2, 2, 1, 0) is a consistent verdict for this scenario so is (2, 2, 2, 1, 1). In this scenario (5, 5, 5, 4, 4) is not a consistent verdict because a person can hear at most 4 shots.

Given the locations of N persons, your job is to find the total number of different consistent verdicts for that scenario. Two verdicts are different if opinion of at least one person is different.

Input

The first line of input will contain T (≤ 550) denoting the number of cases.

Each case starts with a line containing a positive integer N. Each of the next N lines contains two integers x_i y_i ($0 \leq x_i, y_i \leq 30000$) denoting a co-ordinate of a person. Assume that all the co-ordinates are distinct.

1) For 10 cases, $N = 1000$.
2) For 15 cases, $100 \leq N < 1000$.
3) For others, $N < 100$.

Output

For each case, print the case number and the total number of different consistent verdicts for the given scenario.

Sample Input

```
2
3
1 1
2 2
4 4
2
1 1
5 5
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Sample Output

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Case 1: 4
Case 2: 2
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