12612   Cube Killer

The world is facing a great crisis. The ancient prophecy is true. The Giant Cube is on its way to destroy earth. As a brilliant programmer, you have to develop a small module for the Cube-Killer Super Computer. This problem describes the task of that module.

For this problem, you will be given a list of three dimensional points with **integer** coordinates. You have to calculate the **side-length of the smallest cube** such that, the cube is **axis parallel** and all of the given points lie **on its surface**.

Notes:

- A cube is a solid shape, bounded by six equal squares, the angle between any two adjacent faces being a right angle.

- A point lies on the surface of a cube if the point doesn't lie strictly inside the cube and the distance from the point to at least one of the faces of the cube is zero.

Input

The first line contains an integer T ($T < 101$) that denotes the number of test cases. The first line of each test case contains N ($2 \leq N \leq 20000$), the number of points to be processed. Each of the following N lines contains three space separated integers x y z denoting the co-ordinates of a point in three dimensions. The absolute value of x, y and z doesn't exceed 1000000000 (10^9). All the points will be distinct.

Input file is huge please use faster input and output methods (e.g. printf and scanf in C++).

Output

For each input, print the output in the format, 'Case X: Y' (here, X is the serial of the input and Y is the answer). If there is no cube such that all of the given points lie on its surface then print '-1', otherwise print the side length of the smallest such cube.

Sample Input

```
2
3
0 0 0
1 2 1
2 0 1
3
0 0 0
1 1 1
2 2 2
```

Sample Output

```
Case 1: 2
Case 2: -1
```