

# C

## 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 **100000000** ( $10^9$ ). 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	Output for Sample Input
2	Case 1: 2
3	Case 2: -1
0 0 0	
1 2 1	
2 0 1	
3	
0 0 0	
1 1 1	
2 2 2	

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