So Close!

Given a set of points in the Euclidean space, find the distance between the closest pair of points.

Input

The first line of input will be the number of test cases. Each case start with a number N the number of points (1 <= N <= 100), The next N lines each has two numbers X and Y (-1000 <= X, Y <= 1000) representing the points coordinates.

Output

For each test case print "Case C: The shortest distance is X" without quotes where C is the case number starting with 1 and X is the distance between the closest pair of points in the points set. Show only and exactly 3 decimal numbers.

Example

Input:
2
6
1 3
3 5
8 7
5 6
2 0
7 5
3
329 56
363 147
376 387

Output:
Case 1: The shortest distance is 2.236
Case 2: The shortest distance is 97.144