

HW1 - Find Your Own Problem

Time limit: 15 seconds

Memory limit: 256 megabytes

Last updated on: March 26, 2025

Problem Description

Xiao Ming, the “Darkin Blade,” is live-streaming a League of Legends session, but he has already lost seven games in a row, and his mental state is completely shattered. The chat floods with messages:

“Why don’t you take a look at your own problems?”

Normally, Xiao Ming would be triggered so hard and rage out, but today, he is feeling particularly introspective. He decides to take a break and find his own problem.

Just as his frustration peaks, a mysterious blue light flashes, and he is suddenly transported to another world—the Judgment Hall of the Champion Balance Council.

Surrounded by champions from every patch and version, he realizes that each champion is characterized by two core attributes: “Control Difficulty (x)” and “Burst Strength (y).”

A smirking game designer steps forward and says:

“Since you’re so unhappy with the game’s balance, why don’t you help us find the two most similar champions? So that we can nerf them together.”

Write a program to help Xiao Ming find the two champions with the smallest distance between them. The similarity distance between two champions is defined as the Euclidean distance between their two attributes.



Figure 1: Xiao Ming, the “Darkin Blade”

Input Format

The input consists of the following:

- The first line contains a single integer, T ($T \leq 10$), indicating the number of test cases.
- For each test case:
 - The first line contains an integer, n ($2 \leq n \leq 100,000$), which represents the number of champions.
 - The next n lines each contain two real numbers, x_i and y_i ($-10,000 \leq x_i, y_i \leq 10,000$), denoting the control difficulty and burst strength of the i -th champion.
 - It is guaranteed that no two champions share the same attributes, meaning that there are no i and j values such that $x_i = x_j$ and $y_i = y_j$. The designers aren't that lazy.

Output Format

For each test case, you should output a single real number, which represents the similarity distance between the two most similar champions. Your answer will be accepted if the absolute error or the relative error is less than 10^{-4} .

Sample Input

```
3
3
0 0
0 1
1 0
4
6 4
9 2
8 7
3 9
5
7.377359 3.113089
8.899004 4.047913
3.929112 9.695250
8.377879 7.799725
5.508218 2.498832
```

Sample Output

```
1.000000
3.605551
1.785861
```

Note

The similarity distance between the 2 champions is defined by $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$, where x_1 and y_1 are the control difficulty and burst strength of the first champion, and x_2 and y_2 are the control difficulty and burst strength of the second champion.

- $n \leq 100$ for 20% of test cases
- $n \leq 1,000$ for 40% of test cases
- $n \leq 10,000$ for 60% of test cases
- $n \leq 100,000$ for 100% of test cases