HW1 - SupaFist
Time limit: 15 seconds
Memory limit: 256 megabytes
Last updated on: March 11, 2024

Problem Description

SupaPie, the culinary sensation of Taiwan, wields his SupaFist—a sashimi donburi with a secret sauce—like a flavor-infused weapon. It's a dish so explosive that foodies from every corner of the globe flock to Taiwan just to experience its seismic impact.

Those who've dared to taste it emerge with wide eyes and a **pounding feeling**—not from the punch, mind you, but from the sheer culinary delight. It's as if their taste buds have been **knocked out of the park!**

But alas, trouble brews in SupaPie's kitchen. Ungrateful customers, perhaps lacking taste buds themselves, have dared to criticize his masterpiece. Their complaint? The vinegar rice could use some fine-tuning. Can you imagine? It's like telling Picasso to adjust the shade of blue in his "Starry Night."

And so, SupaPie faces a culinary conundrum. His restaurants are hemorrhaging customers faster than a leaky soy sauce bottle. In a desperate bid to regain his culinary mojo, he's decided to shut down two neighboring restaurants. But which ones?

Enter you—the culinary compass, the gastronomic GPS. Your mission: calculate the nearest two restaurants for closure. SupaPie dreams of a new restaurant sprouting like a wasabi plant right in the middle of the two doomed ones.

So, my friend, grab your spatula, dust off your abacus, and let's find the sweet spot for SupaPie's next culinary adventure.

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 restaurants.
  - 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 positions of the i-th restaurant as coordinates (x_i, y_i).
  - It is guaranteed that no two restaurants share the same position, meaning that there are no i and j values such that $x_i = x_j$ and $y_i = y_j$.

Output Format

For each test case, you should output a single real number, which represents the distance between the two closest restaurant locations. 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 distance between 2 points (x_1, y_1) and (x_2, y_2) is defined by $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$.

- $n \leq 100$ 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