HW1 - Let's go to Kaohsiung

Time limit: 15 second
Memory limit: 256 megabytes
Last updated on: September 28, 2019

Problem Description

Director Han is a well-known director in the world. He is going to make a introduction film for Kaohsiung with "TW ICE", another famous singer in Taiwan.

To show the beauty of Kaohsiung, Director Han chooses some spots, which will appear in the film. However, he doesn't want these spots be too closed to each other, otherwise the visitors will be no need to take transportation and Kaohsiung won't be able to earn more money. Thus, he wants to find the closest distance between 2 spots, but he is a bumbler that he can't do that correctly. Can you help him solve the problem?

Input Format

On the first line there is a single integer T ($T \leq 10$) denoting the number of test cases.

The first line of each test case contains an integer n ($2 \leq n \leq 100,000$) denoting the number of spots.

Then n lines followed, each line containing 2 real numbers x_i, y_i ($-10,000 \leq x_i, y_i \leq 10,000$) denoting the position of i-th spot (x_i, y_i).

There is no 2 spots at same position, which means no i, j satisfy $x_i = x_j$ and $y_i = y_j$.

Output Format

For each test case, output the distance of the closest 2 spots. 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