

7656 Shooting a Smart Dart

In a dart game, before a game begins, players randomly shot many darts onto the dart board. No two darts share a same position. When the game begins, the game rule is that in each round after a player shoots a new dart, say onto position (x, y) . The two old darts that are already on the dart board and closest to the new dart at (x, y) are used to help determine the score of the round. Let the positions of the two closest old darts be (x_1, y_1) and (x_2, y_2) . The score is

$$\sqrt{(x - x_1)^2 + (y - y_1)^2} + \sqrt{(x - x_2)^2 + (y - y_2)^2},$$

that is, the sum of Euclidean distances from (x, y) to the two closest old darts. To win the game, you need to minimize the score in each round.

Given the positions of old darts before the game, please compute the minimum score a player can get in the round.

Input

The first line of input contains an integer N , which is the number of test cases. For each test case, the first line contains an integer D , ($2 \leq D \leq 5000$), which is the number of old darts on a dart board. Then for the next D lines, each line gives the position of an old dart on the dart board, (xy) , where x and y are integers and separated by a whitespace, $0 \leq x, y \leq 2^{24}$. No two darts have the same position on the dart board.

Output

For each test case, please output the minimum score, truncated to the second decimal place. For example, 3.412 and 3.419 both would truncate to 3.41.

Sample Input

```
2
5
1 0
2 0
4 0
1 2
3 2
5
1 1
4 1
2 3
5 2
3 6
```

Sample Output

```
1.00
1.41
```