Cheapest triangulation P65751_en

Given a simple polygon with n vertices, there is always at least one way to decompose it in triangles by adding $n - 3$ diagonals. For instance, these are three of the many triangulations of the same polygon:

Define the cost of a triangulation as the sum of the lengths of the diagonals that have been added. Given a *convex* polygon, what is the cost of its cheapest triangulation?

Input

Input consists of several cases. Every case begins with n. Follow n pairs of real numbers x y giving the coordinates of the points of the polygon, either in clockwise or in anticlockwise order. Assume $3 \leq n \leq 100$.

Output

For every given polygon, print the cost of its cheapest triangulation with four digits after the decimal point. The input cases have no precision issues.

Sample input 1

```
3   0 0  0 1  1 0
4   0 0  2 0  2 2  0 1
5   -1.2 3  0 4  1 2.7  1 -1  0 -0.5
```

Sample output 1

```
0.0000
2.2361
5.5730
```

Problem information

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