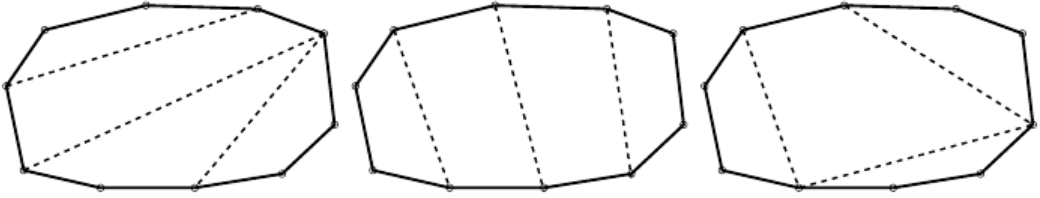


Every convex polygon, with  $2N$  vertices, can be decomposed into  $N - 1$  quadrilaterals, by making  $N - 2$  straight line cuts between certain pairs of vertices. The figure below shows three different decompositions of the same polygon with  $N = 5$ . The *weight* of the decomposition is the sum of the lengths of its  $N - 2$  cuts. Your program should compute the weight of a minimum weight decomposition!



## Input

The input contains several test cases. The first line of a test case contains one integer  $N$  ( $2 \leq N \leq 100$ ). The following  $2N$  lines contain, each one, two real numbers  $X$  and  $Y$  ( $0 \leq X, Y \leq 10000$ ), with precision of 4 decimal digits: the coordinates of the  $2N$  points, in counterclockwise order, of the convex polygon.

## Output

For each test case in the input your program must output one line containing a real number, with 4 decimal digits precision. The number should be the weight of a minimum weight decomposition of the given polygon.

## Sample Input

```
4
5715.7584 3278.6962
3870.5535 4086.7950
3823.2104 4080.7543
3574.4323 170.2905
4521.4796 144.9156
4984.6486 306.2896
5063.1061 347.1661
6099.9959 2095.9358
2
6044.4737 2567.9978
5752.5635 3226.5140
5148.8242 3802.9292
4598.8042 4036.8000
```

## Sample Output

```
4519.6176
0.0000
```