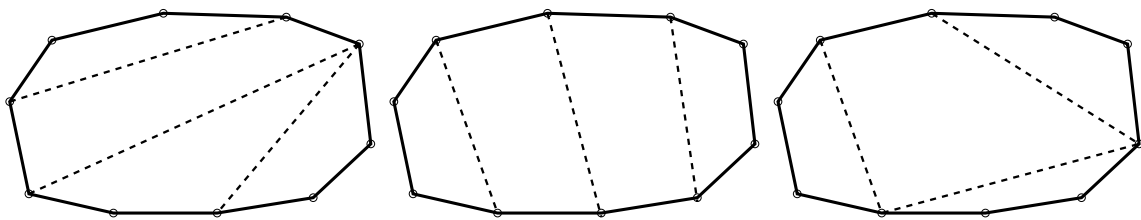


Problem J

Cut

File: corte.[c|cpp|java]

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.

Example

Input	Output
4	4519.6176
5715.7584 3278.6962	0.0000
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	