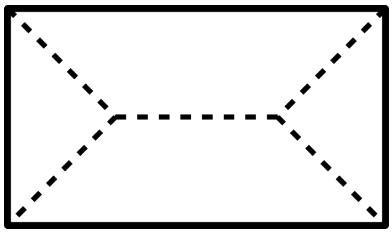
ME/CS558: Homework 4
Due date: April 14, 2011

1 Summary

Your objective for this project will be to compute the medial axis for a simple closed polygon. Recall that the medial axis of a polygon P, is the collection of all points inside the polygon which are equidistant to two or more points on the polygon; as illustrated in the following picture:



The medial axis is shown as a dashed line, while the polygon P is shown as the solid line.

1.1 Input Format

The input to your program will consist of a number $3 \leq n \leq 1000$ representing the number of vertices in the polygon P, which will be followed by a sequence of n pairs of integers representing the vertices, x_i, y_i of the polygon P in counter clockwise order. These will satisfy the constraint that $0 \leq x_i, y_i \leq 1000$, and it is given that P will be a simple polygon.

1.2 Output Format

You should output the length medial axis of P to within at least 0.1 units of accuracy.

1.3 Example Input

```
4
0 0
14 0
14 8
0 8
```

1.4 Example Output

```
28.627417
```

1.5 Performance Requirements

Your program must consume no more than 1GB of memory, and must terminate within 10 seconds.

2 Written Assignment

1. Describe the method you used to resolve the problem.
2. What is the time complexity of your method as a function of n?

3 Grading

You will receive 50% credit for a correct program, and another 50% for a correct analysis and answer to each of the above questions.

4 What to turn in

You should should turn in a gzipped tarball named "*yourname*`.hw4.tar.gz`", where *yourname* is your last name. This archive should contain the following three things:

1. Your source code.
2. A Makefile.
3. A README which contains your answer to the written portion of the assignment.

Email your solution to mikolalysenko@gmail.com with the subject "CS 558 HW4".