ASSIGNMENT 4

1. A literature search question.
   (i) What is the best algorithm to compute the Voronoi diagram of line segments in the plane? You do not need to explain algorithms, just describe the approach in a sentence or two and quote the run time, and list the appropriate reference(s).
   (ii) What is a practical solution? i.e. if you had to actually implement something, what would you use?

   Your sources should be reliable and first-hand. By "first-hand" I mean that if you refer to a paper, it must be one you have looked at (rather than just one that some other source refers to). "Reliable" is a judgement call, but research papers in respectable journals are better than wikipedia or course notes you find on the web or queries on StackExchange. Give your reference list the way research papers in CS do. Latex and Bibtex are great for this task, although you are not required to use them.

   [I do not expect a long answer here, just a brief outline. The point is for you to search out the information. I don't expect you to read technical details, or to understand how the solutions work.]

2. Suppose you have a finite set X of points in the plane, and a disc of radius r centered at each point of X. Let U_r be the union of all the discs. Prove that as r increases, the area of U_r strictly increases. Hint: It seems very hard to analyze the overlapping discs. But suppose you partition U_r by the Voronoi diagram of X. Show that if a point $p \in U_r$ is in the Voronoi region of some $x \in X$ then p is in the ball of radius r centered at x. Proceed from there.