ACKNOWLEDGE YOUR SOURCES.

1. [10 marks] **Arrangements.** Let $\mathcal{A}$ be a line arrangement of $n$ lines in the plane. Let $B$ be the union of all the bounded cells of the arrangement. Show that the boundary of $B$ has $O(n)$ edges of the arrangement. (In the figure below $B$ is shaded and its boundary has 9 edges of the arrangement.)

2. [10 marks] **Separating polygons.**

   (a) Consider a set of disjoint convex polygons in the plane and a direction $d$. Prove that the polygons can be separated from each other by translating them one-by-one in direction $d$ while keeping them disjoint.

   (b) Show that the same is NOT true in 3 dimensions.

   (c) Back to two dimensions. Give an algorithm to find the translation order of the polygons in direction $d$. What is the run-time of your algorithm? Your algorithm can given as a very high-level sketch.