Please work on these problems and be prepared to share your solutions with classmates in class. Assignments will **not** be collected for grading. (These problems come from Computational Geometry: Algorithms and Applications, Chapter 8.)

1. Use Euler’s formula to show that the maximum number of faces is $\frac{n^2}{2} + \frac{n}{2} + 1$ for an arrangement with $\frac{n(n-1)}{2}$ vertices and $n^2$ edges.

2. Let $L$ be a set of $n$ lines in the plane. Give an $O(n \log n)$ time algorithm to compute an axis-parallel rectangle that contains all the vertices of $A(L)$ in its interior.

3. Let $P$ be a set of $n$ points in the plane. Let $p \in P$ be one of these points. Give a randomized algorithm that can decide in $O(n)$ expected time whether $p$ is a vertex of the convex hull of $P$. 