Math 4990 Problem Set 3

Due Tuesday, Sep 29, 2015 in class

Please refer to previous problem sets for instructions, including but not limited to the collaboration policy.

Assignment

Liberally peruse **pages 13–25** of [DO].

Read (and understand) Lemma 1.18 (and its proof). Do **Exercise 1.30**, changing as few words as possible.

Do **Exercise 1.31** about guards that cover the boundary but not the interior.

Review the (beautiful) proof of the Art Gallery Theorem, then do **Exercise 1.35** and **Exercise 1.36** about galleries with polygonal holes.

Theorem 1.38 has a typographical error. The guards should be stationed on the boundary of the fortress. Namely, it should read: "To cover the *exterior* of polygons with n vertices, $\lceil n/2 \rceil$ boundary guards are needed for some polygons, and sufficient for all of them." Here a guard x can see a point y in the exterior of a polygon P if the line segment xy does not intersect the interior of P. Obviously, when covering the exterior, a guard in the interior is pointless (covers no points); therefore a guard should be stationed on the boundary or in the exterior. Do **Exercise 1.39**, where the guards are stationed on the boundary; these boundary guards should cover the infinite exterior, not just the boundary (otherwise the exercise would be quite trivial). Do **Exercise 1.40**, where the guards can be placed in the exterior of P as well.

Next Assignment

Exercise 1.47 and **Exercise 1.51** will be assigned next week. Feel free to start thinking about them, but do not turn these in this week.

You may use the notation $P \sim Q$ to denote scissors congruence. The symbol is `\sim` in LaTeX.