Math 4990 Problem Set 1

DUE TUESDAY, SEP 9, 2014 IN CLASS

INSTRUCTIONS

Write your solutions neatly and clearly, with complete justification (i.e., proof). Please don’t submit scratchwork. Consider using \LaTeX. Draw figures (possibly by hand) whenever suitable.

Collaboration is encouraged, as long as you

(1) understand your solutions,
(2) write your solutions in your own words without copying, and
(3) indicate the names of your collaborators.

Unless otherwise specified, all numberings refer to the textbook [DO].

ASSIGNMENT

Liberally peruse pages 1–10 of [DO].

In the sketch of Theorem 1.1, “a ray through a vertex is not counted as crossing \( \partial P \)” is incorrect. Recall that we discussed this in detail during class. Fix this and then flesh out the details. That is, do Exercise 1.2.

Do Exercise 1.5 and Exercise 1.14 about polygons with holes.

Read (and understand) Corollary 1.9 (and the definitions of ear and tip above, the proof below). Do Exercise 1.10. It may be helpful to prove the following stronger statement: “Every polygon with more than three vertices has at least two ears with non-adjacent tips.”

Make sure you know how to do Exercises 1.11 and 1.12 (no need to turn in), and then do Exercise 1.13 about mouths.

Read the relevant parts in Section 1.1 and do Exercise 1.6 and Exercise 1.7.

Do Exercise 1.17 regarding uniqueness of triangulations.

Optionally, for no credit, do Exercise 1.15.