Quiz 2 Information

MATH 261 Computational Geometry

The next quiz will be Tuesday, January 14. To prepare for this quiz, you should study the material in Sections 1.4 to 2.6 of the text. Focus on the *definitions*, *examples*, *theorems*, and *algorithms* in the text.

In particular, you should be able to do the following:

1. Be able to state precise definitions of the following terms and give examples of them:

- dissection (of a polygon or polyhedron), scissors congruent, dihedral angle
- convex region, convex hull, hull vertices
- algorithm, computational complexity, upper/lower bound on complexity
- general position, degenerate cases
- recursion

2. Be able to give precise answers to the following questions:

- Are every two rectangles of the same area scissors congruent? Why or why not?
- Are every two polygons of the same area scissors congruent? What steps are involved in the proof of this?
- Are every two polyhedra of the same volume scissors congruent? What technique is involved in this proof?
- How does the *incremental algorithm* compute the convex hull of a set of points? What is the computational complexity of this algorithm?
- How does the *gift wrapping algorithm* compute the convex hull of a set of points? What is the computational complexity of this algorithm?
- How does the *Graham scan algorithm* compute the convex hull of a set of points? What is the computational complexity of this algorithm?
- How does the *divide-and-conquer* algorithm compute the convex hull of a set of points? What is the computational complexity of this algorithm?
- What does it mean if an algorithm is $O(n^2)$? What does it mean if an algorithm is $O(n \log n)$?
- In what sense is an $O(n \log n)$ algorithm "better "than a $O(n^2)$ algorithm?