CS133 - Winter 2002 - Quiz 2 - Solutions

1. Define the convex hull of n points on a plane.

   See definitions in Section 3.1.

2. Describe the Quickhull algorithm for finding the convex hull of n points on the plane.

   Algorithm 3.4 in Section 3.4.

3. What is the worst case running time for the Quickhull algorithm? What is the best case? Give examples and explain.

   The worst case is quadratic. This happens when each division is as skewed as possible (section 3.4).

   The best case is linear. This can happen if all other points are in the interior of a triangle made up by three points.

4. Give a polygon with 2 reflex vertices that cannot be partitioned into 2 convex pieces.

   Can you give a polygon with 2 reflex vertices that cannot be partitioned into 3 convex pieces?

   A fat Z shaped polygon with 6 vertices cannot be partitioned into 2 convex pieces.

   By Theorem 2.5.1, any polygon with 2 reflex vertices can be partitioned into 3 convex pieces.