CS 860, Fall 2004 due Friday November 12

A. Lubiw

ASSIGNMENT 2

1. Guibas and Yao proved in 1983 that for any set of convex polygons in the plane and any direction the polygons can be separated from each other by translating them one-by-one parallel to that direction vector.
   (i) Show that the same is NOT true in 3 dimensions.
   (ii) Prove or disprove that a collection of disjoint spheres in three dimensions may be separated one at a time by translations parallel to any given direction.

2. Given a collection of disjoint polyhedra, is there a point in space (outside all the polyhedra) from which they are all visible?
   (i) Try to design an algorithm for this.
   (ii) Prove that such a point always exists for two polyhedra, but not for three.
   (iii) What is the smallest number of convex polyhedra you can find that are not all visible from a point?