

Advance Graphics — Homework #3

Global Illuminations

Due 4/8/03

Please choose from the following two projects:

1 Project 1 — Voronoi diagram

Write a program that reads a set of n points (denoted as *cites*) from a files, and compute their L_∞ Voronoi diagram. All cites are given as pairs of coordnates, x and y , both integers are in the range 0..600. After reading the cites, your program should read a set of points from the user, and after each point read, should report the cite closest to the point (under the L_∞ norm).

Your program must use z -buffer, in the way describe in class.

2 Project 2 — Global Illumination — The Tetrah-dron world

Bonus 20 points for this project

Your program should compute global illuminations for the following scene.

A *tetrahedron* is a 3D object, which is describe as the convex hull of 3D world. (e.g. pyramid).

Your program should read a collection of tetrahedron $d_1 \dots d_n$, each given by the location of its vertices, each with its reflection properties (see below) and k sources of lights. $k \ll n$. Each tetrahedron reflect lights in a diffuse manner. Also given the location of the viewer. The tetrahedra are disjoint. Your program should

1. Use Z -buffer to find the region seen from each source of light.
2. Store the Irradiance on each face of each tetrahedron, that arrives directly from one of the sources of lights.

3. Use distributed ray tracing to create the view to the user, where considered only path of type LDDE.

Pay attention to the method you use to store the Irradiance on each facets.

File formats: