COMP770 HOMEWORK 1, JAN. 30, 2009

Due Date: Friday, Feb. 16

There are two parts for this homework. The first part aims at helping you to get familiar with OpenGL basics, and the second part expects you to experiment with the view-frustum and backface culling algorithms in OpenGL.

Part 1. OpenGL basics

- Set up your IDE for OpenGL and GLUT
- Draw some simple colored primitives (e.g. triangles, quadrilateral, cubes etc.)
- Create a simple user interface to allow user mouse and keyboard input. You can try GLUI if you hope to have buttons, scroll bars etc. Refer to, `http://www.cs.unc.edu/~rademach/glui/`, for GLUI information.
- Allow users to rotate, translate and scale the primitives with keyboard/mouse input.

Part 2. Backface and view-frustum culling

- Load complicated models and draw them with OpenGL. An OBJ loader written by Nate Robins and a simple example use of the loader can be found here, `http://www.cs.unc.edu/~zren/ObjLoader.zip`. In the ZIP file, there are also two OBJ models, dragon.obj and bunny.obj. If you wish to try more complicated models than these, you can find the original scanned models of the famous Stanford bunny, dragon, happy buddha and other complicated models here, `http://www-graphics.stanford.edu/data/3Dscanrep/`. You can also try the powerplant model, `http://www.cs.unc.edu/~geom/Powerplant/`. But these models are all in PLY format. You will either need to convert them to OBJ format (I used Blender for the conversion) if you want to load them with the OBJ loader provided, or you will have to have a PLY loader.
- Try the backface culling feature in OpenGL on the complicated models. Record the frame count per second, experiment with the feature and briefly show how backface culling affects the rendering speed.
- Implement your own view-frustum culling algorithm. Change the view frustum (the look-from, look-at, up direction, clipping distance, view frustum volumn) and briefly show how your view-frustum culling affects the rendering speed.