10531 Video Game Technologies	Lab. 1-2 - 09/03/2017

Loading and Rendering 2D Meshes in 3D

Supervisor: Abel Gomes   *Scribe: A. Gomes*

In these two lab sessions, students will learn to create their own custom meshes from the loading OBJ, OFF or PLY models. Also, students will learn how to parse a file to read custom mesh vertices, normals, and texture coordinates. In a word, students will learn to build their own mesh loader using a specific format. Students will also learn how to design a standard and complete data structure for handling 2D meshes. All this is the basis of the first project of course.

1   Specific Learning Goals

After completing this worksheet, students should know and be able to:

1. Create a custom mesh given a set of vertices and indexes.

2. Set the color, normals and texture coordinates per vertex of custom created mesh.

3. Parse from a file the vertices, normals, texture coordinates, and indices of custom mesh.

4. Activate/deactivate front and back face culling.

5. Load a mesh file (OBJ, OFF oe PLY) into an edge-based data structure.

6. Basics of materials/color setup.

2   Programming Exercises

Exercise 1

Design and implement in C++ an edge-based data structure (e.g., winged-based data structure). You must use the data structure assigned to your Project #1.

Exercise 2

Design and implement in C++ a mesh loader from an OBJ, OFF, or PLY format file.

Exercise 3

Design and implement a C++ graphics application in OpenGl to render your mesh.

Exercise 4

Add materials and textures (from OBJ, OFF, or PLY format file) to your mesh.

References

[1] OBJ file format: `https://en.wikipedia.org/wiki/Wavefront_.obj_file`.
    OBJ file format: `http://paulbourke.net/dataformats/obj/`.

[2] OFF file format: `https://en.wikipedia.org/wiki/OFF_(file_format)`.
    OFF file format: `http://paulbourke.net/dataformats/ply/`.

[3] PLY file format: `https://en.wikipedia.org/wiki/PLY_(file_format)`.
    PLY file format: `http://paulbourke.net/dataformats/ply/`.