

Lab 2 – CSC 572

Due 2/5/11 to be demoed in lab

This project is to be worked on in pairs or individually (any pairs you'd like)

Objective: Understand the QEM and how it works with mesh simplification on a toy example (without having to modify a mesh data structure).

You will be modifying a mesh program in order to compute the QEM for one edge in a toy mesh data structure (see below for more information). The mesh can be downloaded from:

<http://www.csc.calpoly.edu/~zwood/teaching/csc471/data/>

The particular file you will be working with is called test1.m. This is a very simple file with 14 faces. Please see the drawing below for the details on the vertex numbering. You need to compute the QEM for the simplifying the edge between vertex 9 and vertex 10. You will need to compute the QEM for both vertices, merge them and invert the matrix to find the optimal position for the simplified vertex. You will then use the simplified mesh (found at the same location as listed above, but name: test_simpl.m. You will re-position vertex number 9 with the optimal position computed from the QEM created above. See image on the next page.

Create a mode that allows your program to toggle views between the pre-simplified mesh, the simplified mesh, the simplified mesh with the vertex at the optimal position.

You may use another resource (such as matlab) to invert the matrix.

Please use one of the following code bases to help you start your program (these files all parse the input and include varying degrees of mesh data structures and display support):

- i. A C style file is called MeshParser_release3.cpp
- ii. A C++ style parser and mesh data structure (called BasicModel) in NewMeshParser.tar (includes headers and other needed classes)
- iii. A C++ style parser and mesh data structure with much more connectivity information, useful for more complex operations like mesh simplification, called meshSimp.tar (includes headers and other needed classes)

Any of these can be downloaded from:

<http://www.csc.calpoly.edu/~zwood/teaching/csc476/material/>

Example mesh files (of this format) can be found at:

<http://www.csc.calpoly.edu/~zwood/teaching/csc471/data/>

