Mesh Editor Report

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Introduction

The mesh editor is able to render complex meshes and allow the user to select and edit vertices on these meshes. Simplification operators are implemented in this project. Different features and examples are shown below in detail.
Related topics: Ray Tracing, Mesh Data Structure

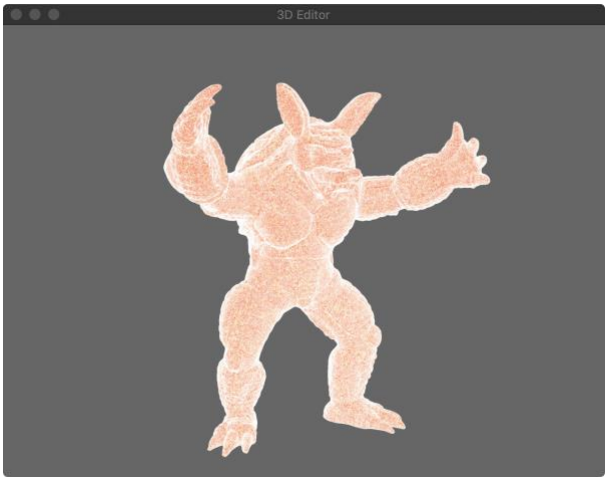

Figure 1 – Armadillo

Complex Mesh Loading

In this project, two meshes with at least 70,000 triangles are used for testing. After loading is finished, the user can press key "2" to generate a monster called "Armadillo" which has 345,944 triangles in total. The model will be rendered in a flat shading way with white wireframe on top of it.

By pressing key "3", a bunny with 69,451 triangles will be generated in the same way.

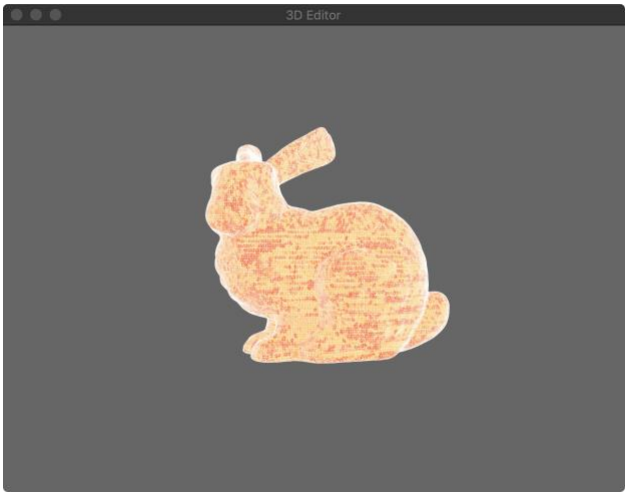

Figure 2 – Bunny

Now the user will be able to modify the vertices on these meshes.

All the meshes I used here are downloaded from *The Stanford 3D Scanning Repository*
http://graphics.stanford.edu/data/3Dscanrep/

Vertex Selection

Press "V" to enter view mode. In this mode, you can press "UP" and "Down" to zoom in/out. Using "WSAD", you can move your camera around while it always points to the origin. When you are close enough to the mesh, you can click on any vertex you want.

Moving Vertex Around

Press "Z" to enter translation mode. After you click on some vertex, keep the mouse button pressed, you will be able to move the vertex around.

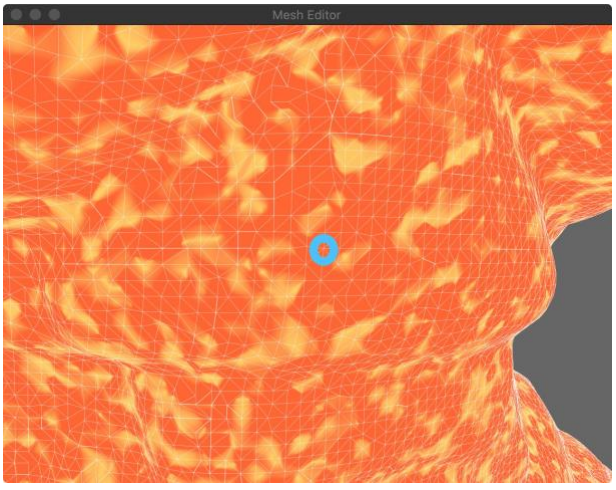

Figure 3 Vertex Selection

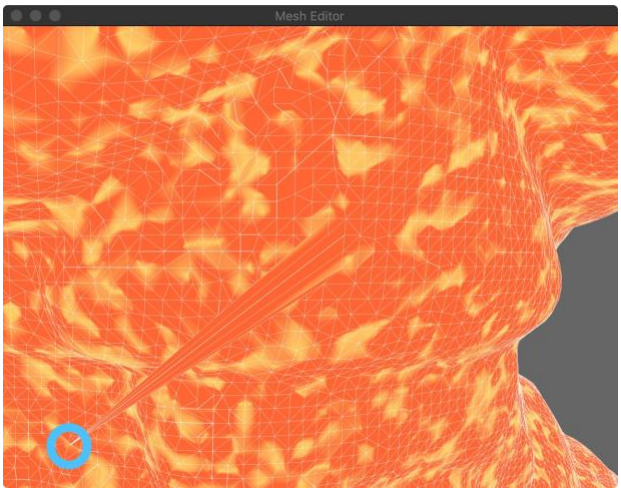

Figure 4 Vertex Translation

Merging Vertices (Edge Collapse)

Press "M" to enter merge mode. The user needs to click on the first vertex first. In the following picture which is the blue point. Choose a vertex (the green point in the example) around the first point, you will find that the first point is merged to the second one.

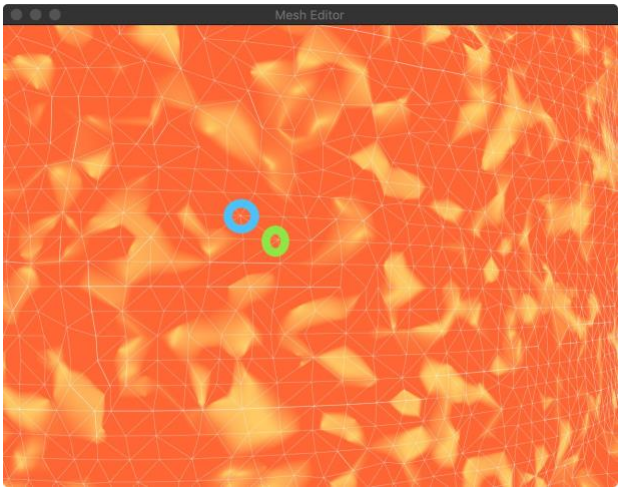

Figure 5 Select two vertices to merge

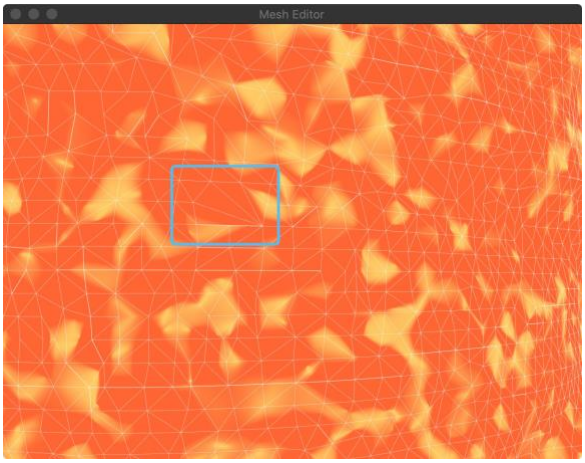

Figure 6 Merged

Vertex Deletion

Press “X” to enter deletion mode, then click on the vertex you would like to delete. An example is shown

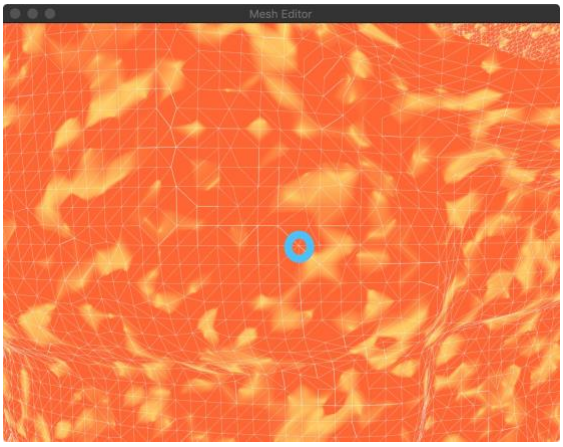

Figure 7 Vertex Deletion Before

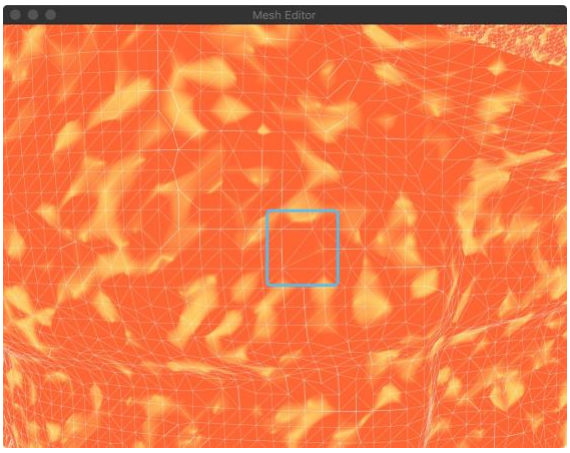

Figure 8 Vertex Deletion After

Usage

No external libraries are used other than those we used in the previous assignment. After extracting the archive, create a new directory “build”.

cd build -> cmake ../ -> make -> open MeshEditor_bin

If you are not able read the target off files, please try put the data directory to your user directory and change the file path in the main.cpp

../data/cube.off -> data/cube.off

../data/Armadillo.off ->

data/Armadillo.off

../data/happy_vrip.off ->

data/happy_vrip.off