

CMSC 427 Computer Graphics

Written Assignment 3: Questions about Starter Code for Programming Assignment #4

Due Date: Tuesday, April 18, 2017

The following questions focus on the start code in programming assignment #4. Please write or type up your answers and submit in class on Tuesday, April 18, 2017. The questions will be graded out of a total of 32 points. Please be as clear as possible so we can assign partial credit.

Questions:

(3 points) The Wavefront .OBJ format allows for vertices, faces, and normal to be grouped using the “g tag” Explain how `Mesh::load_obj()` keeps track of which group a mesh face belongs.

(3 points) The Wavefront .OBJ format also keeps track of materials, Phong shading parameters, that determine how different triangles appear. Explain how `Mesh::load_obj()` keeps track of which material parameters should be used to a draw a particular mesh face.

(15 points) The member function `Mesh::storeVBO_groups()` stores the triangle meshes organized by group and by material. Draw a diagram illustrating the how the shading parameters, vertices, vertex normal vectors, and texture UV coordinates are stored in memory buffers or in structs. Be as detailed as possible.

(3 points) Explain how you might modify `GLview::paintGL()` to apply a translation transformation to a single group of triangles with a particular group id (e.g. `object__12`) ? Explain how you might modify `GLview::paintGL()` to apply a transformation to a single material e.g the tyre material?

(8 points) The coordinates of the wheel spoke are in the coordinate frame of the mesh model. If you would like the wheel to rotate about its center, what transformation(s) might be necessary so that it appears the wheel spoke rotates correctly? Please explain with text and a diagram. Where might you apply, in the code, this transformation?