Modelling-Viewing Pipeline : Modelling

CS475 / CS675: Computer Graphics - Assignment 1

Due Date: 29/8/2015

1   Introduction

This is the first part of a two part assignment on exploring the modelling-viewing pipeline. This part deals with modelling.

2   To do

1. Make models of any three objects that you own. You must make the models from scratch. You cannot use any external modelling tools. The model must be made up of triangles, and must be coloured. OpenGL 4 has to be used.

2. Your program must have a modelling mode (activated by pressing 'M') and an inspection mode (activated by pressing 'I'). Print the current mode active in the terminal.

3. In the modelling mode, left clicking the mouse should add a point to your model and shift+left clicking the mouse should remove the last added point. While modelling you can create polygons of any shape and later subdivide them into triangles, before saving the model.

4. Store the co-ordinates of the vertices of the triangles that form your model and the vertex colours in a file. The file can be called 'file-name.raw' and each line can contain 6 values, one each for X,Y,Z,R,G,B. Every three successive vertices should form a triangle. The saving can be activated by pressing the 'K' key and entering the filename on the terminal. You should also be able to load a '.raw' file by pressing the 'L' key and entering the filename from the terminal.

5. Used VBOs and VAOs for your models with at least a separate VBO used for a separate model.

6. In the inspection mode, the left/right arrows should allow the model to be rotated about the Y-Axis, the up/down arrows about the X-axis and PgUp/PgDn about the Z-axis. The pivot for all these rotations

should be the centroid of the model. Pressing the 'R' key should move the origin to the centroid of the model.

7. In the inspection mode, the W,S,A,D,Z,X key should allow translation along +ve and -ve Y,X and Z axis respectively.

8. The navigation keys can be made available in the modelling mode too, but implementing them to work in the inspection mode is must

3 Marking

The assignment will be marked as follows:

1. Implementing the modelling mode correctly

   - Point Add: 10 marks
   - Point Remove: 10 marks
   - Form Triangle/Polygon: 10 marks

2. Implementing the inspection mode correctly

   - Rotation controls: 15 marks
   - Translation controls: 15 marks
   - Re-center to centroid: 5 marks

3. Saving and Loading to/from files: 20 marks

4. Using VBOs and VAOs correctly: 25 marks

5. 3 Coloured models with correct shaders: 30 marks

6. HTML Report : 10 marks

7. Total : 150

Also, note:

- Late submission will follow a policy of graceful degradation with a 25% penalty for each day's delay (i.e., zero marks if the assignment is more than three days late after the due date.)

- It is **ok** to submit a partially done assignment if you cannot complete it. You will get partial credits.

- Please do not plagiarise source code.

4   To Submit

1. A Tar-Gzipped archive of the complete source code and the created .raw models. It should compile using a Makefile on any Ubuntu system.

2. Include a README file in the .tgz archive containing a link to a html report page on the assignment that should contain some details about what you implemented and images of the results that you generated.

3. The exact mode of submission will be announced later in the lecture.