**HW3 document**

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I tested my program in Zoolab before submitting and my program accomplishes everything exactly and correctly required by HW3. Please click the “GLSLExperiment.sln” which should open Visual Studio, and then run the program (Ctrl + F5).

I started HW3 on base of the starting codes given by Professor, which contains GLEW/GLUT as well as some starting header files and source files that I need. I have a folder named "data" which contains 7 .ply files. My main program is in example1.cpp, and I have a vertex shader (vshader1.glsl) and a fragment shader (fshader1.glsl). I also added helper.h and help.cpp file where I defined my structs as well as matrix and stack operations.

My sculpture consists of 7 unique meshes with 7 different colors and 3 levels of hierarchy just as the example given on HW3 webpage. All meshes rotate counter-clockwise about their own Y axis. The arm of Level 1 of the hierarchy rotates clockwise, the arm of level 2 of the hierarchy rotates counter-clockwise, and the arm of level 3 rotates clockwise.

Program starts at main() in example1.cpp. It first initializes basic settings and creates a window. Then in myInit(), it reads in all data as well as sets up shaders and GPU buffer. Then it registers callback functions – display, keyboard and idle. Finally it enters the drawing loop glutMainLoop().

To deal with the performance issues, I read in all data at the beginning once, such as points and normal, and store them on GPU via VBO, thus completely avoid unnecessary re-initialization, buffer copying or file reopening that could slow down my program considerably. In display (), it sets up projection matricies, light, and hierarchy transformations. In keyboard(), it switches to different modes or actions based on the key pressed. When there is no event, program enters idle(). In idle(), I define frame rate as 30 FPS and animate my model at that speed.

My programs can do everything exactly the way required by HW3 on course website. It can draw extent box and/or do sinusoidal movements as toggle. It can increase and decrease spotlight. And it can switch between smooth shading and flat shading.

PLEASE NOTE:

1. When program starts, it uses smooth shading as default, you can switch with keyboard.
2. For spotlight (p and P), my dropoff rate is a little slow, so you need to press the button p or P many times to see the effects.