

CS 770/870

Assignment P4: GLSL Introduction v.2

November 3, 2014

Due: Monday, 11/10 by 23:59:59

Late: 11/11-12 -3

The primary purpose of this assignment is to introduce you to the very basics of GLSL. There is starter code available for Java, GLSL3D. This is a variation of the ThreeD demo that flat shades a cube (Box class). It does this by building a single buffer object that defines the vertices for all 6 faces of the cube as well as colors for each of the vertices. Lighting is **not** enabled in this code. The Sphere class is not implemented in GLSL.

Your tasks are:

1. Create 2 other children of *Object3D* and add them to scenes in the program. One of these classes can be a revision of the existing (not working) *Sphere* class of the demo, but that is not necessary. You may use Angel's sphere generation algorithm from *chap05/example6* or other code you may find as long as you provide appropriate attribution.
2. Use *chap05/example6.cpp* from the Angel/Shreiner demo set to add normals and lighting to the *Box* class.
3. Implement smooth shading for all children of *Object3D*.
4. Provide a checkbox to switch between smooth and flat shading.

Point allocation

- 20 First new *Object3D* child. This one can be "simple" with hard-coded vertices like *Box*.
- 20 Second new *Object3D* child. This should be more interesting with program generated vertices.
- 20 Add lighting. This can be taken (with attribution) from *chap05/example6.cpp*. **You should have 2 different lights that shine from different angles and can be turned on/off independently. You do not need to implement interactive color changes, but do change colors in your scenes as appropriate to better show correct functionality.**
- 10 Add normals to *Box* that are shown to work via lighting.
- 10 Add normals to your first *Object3D* child
- 10 Add normals to your 2nd *Object3D* child.
- 10 **Your scenes should demonstrate clearly that each of your features work correctly.**

Submission:

1. Submit as *P4*. Even though the assignment is *P4*, your class name need not be *P4.java* or *P4.cpp*. If your C++ *main* program is **not** a class, it is ok call it *p4.cpp*, but it should **not** be *P3.cpp*. Class names and only class names should be capitalized.
2. Don't forget to submit:
 - a. The correct *Makefile* (**not** *Makefile.java*, **not** *Makefile.cpp*) **in which you have explicitly set the PROG or MAIN variable to the correct name of your executable C++ file or the main Java class.**
 - b. Your glsl shader program files
3. **Do NOT** submit your Java code as a *package*.
4. **Do NOT do any terminal input!**
5. If you want to add animation because you like it, that is OK, but give us a toggle to turn it on and off **and initialize the toggle to OFF.**
6. All of your files, including your **shader program** files, must be in a single directory