Computer Graphics - OpenGL Assignment (25%)

Due Date: 01/05/2015

In this assignment you will need to build on the House object you have created in previous labs. So make sure you have a working version of this. There are essentially two parts to this assignment. The first part is to enable texture mapping and map some textures to the facets of the house.

The second part is to gain an appreciation of the transformation pipeline by adding a door to one of the walls of the house that can open and close on the press of a key (the door will open when the user presses the 'o' key and will close when they press the 'c' key) . You need to make sure that the whole house does not rotate, just the door. You should also make sure the door opens/closes slowly so the user can see the animation (by having a small rotation angle).

You should also have a file menu on the Frame called "Options" that has the following options:

- Turn Lighting on/off
- Turn Texturing on/off
- Turn Viewer/Camera rotation on/off

Here is a list of functions your application should have:

1) Rotate, Translate, Scale House on keypress as before with GL functions(Lab3)
2) Rotate viewer (camera) around the house object (about the Y axis)
3) Turn lights on/off (you need to have specified material properties as in lab 4).
4) Turn texturing on/off (see sample code)
5) Open the door of the house when the 'o' key is pressed with GL functions.
6) Close the door of the house when the 'c' key is pressed with GL functions.

The textures images for the house walls, roof and door are on moodle along with some sample code on texture mapping. You can also create your own texture images if you want or find some on the internet. The dimension of them should be a power of 2, e.g. 256 and use PNG as the file format. You should look at the code and the comments to understand what is happening in the code.

For the opening/closing of the door you should to use glPushMatrix() and glPopmatrix(). What these functions allow you to do is save the current state of the MODEL_VIEW matrix. So you can call glPushMatrix() to save the state and then start opening/closing of the door by rotating the door polygon a small amount each time and then call glPopMatrix() to go back to the old MODEL_VIEW matrix so you can render the rest of the house. Be careful about the order that you call the GL transformation functions (translate, rotate, scale), the last one called is the first one applied. There is also a sample program on moodle showing these functions in action.