Assignment 3

Instancing, Lighting and Textures

This assignment builds on the carousel of Assignment 2. You will need to implement several instances of carousels (at least five.) Add a ground surface (flat) on which all of the carousels are located. This instancing should be done using one definition for the carousel model developed in Assignment 2.

Rather than viewing the carousels from several fixed points, or a rotating point, implement a navigation system that allows you to walk through the scene. The navigation should set the eyepoint at a fixed distance above the ground. Navigation should utilize the left and right arrow keys to look to the right and the left. The up and down arrows allow the viewer to look up and down. Pressing the "f" key should move the view point forward in the direction that the viewer is looking, and pressing the "b" key should move the viewer back. When moving forward or backward, the viewer should remain a fixed distance from the ground. This navigation scheme should be based upon the "inside-out" viewing paradigm explained in class. See charts.

Implement lighting in the scene. There should be two light sources: one which is a point spotlight lightsource located at the viewer's position and pointing in the direction that the viewer is looking. The other will be a simple point source used to simulate the sun, and will rise on one side of the scene, move over the scene, and set on the opposite side. At "noon" the sun light should be directly above the scene. It can follow a circular path, and pass under the scene during "night." This rotation of the light source should take several seconds. Both lights should be capable of being turned on or off independently using a pop up menu. Both lights should be white in color.

The coloring of the carousels must be changed to material specifications. For each carousel post, the material color must now be the same on all sides and should be specular grey. The material color of the roof should be blue and yellow as before and should be rough (diffuse). Remember that to use lighting you must define normals to all polygons.

The ground should be covered with a texture that looks like grass. The floor of the carousel should be covered with a texture that looks like boards.

For 5 points extra credit, add "horses" that go up and down as the carousel rotates. The horses should make two complete up and down cycles for one rotation. You don't need to generate a complex model for the horses...a simple extrusion of a horse outline or approximation using the solid models in glut will do.

Assignment 3 will be worth 20 points.

Submittal

Assignment 3 is due **April 10, 2012**. Assignments that are one week late will receive about two thirds credit. Assignments that are two weeks late will receive about one half credit.

Submission of this assignment should be in the form of **well-commented** source code, preferably written in ANSI C. C++ is also acceptable. Well-commented means that I want a comment for every significant step, even if it consists of only one line of code.

For these simple programs, I prefer that you simply email me the source code so that I can build the program on my system. Since these programming examples will be relatively short, I prefer that you include all source code in a single file for ease of compilation. There is no need to submit executable code, or any other files generated by the development environment.

Academic Honesty

I expect all code submitted by students in this course to be **their own**. In exceptional circumstances, it is permissible to borrow appropriate small sections of code from other authors. Whenever this is done, the student must **provide appropriate reference**. Reference must include the author of the code and a location that I can use to check the source. References should take the form of comments *within the code* that delineate exactly what lines were used. In other words, there should be a comment at the beginning and end of the borrowed code. Submissions that include copied but unreferenced code will receive **zero credit** .

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