CS 371 – Assignment 5

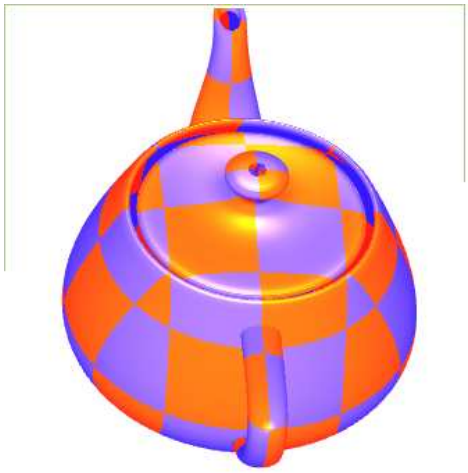
A Totally Titillating Tremendous Teapot

Due: 11:59pm, Sunday, November 26 (end of Thanksgiving break)

Your starting point for this assignment is teapot displayed with Phong rendering built into the vertex and fragment shader (see notes from October 27). The four files you will need for your work in enhancing this rendering are in assign5-starter-code.zip on D2L:

- assignment5.html
- assignment5.js
- vertices.js
- patches.js

Presently the rendering includes a button indicating that the user can switch between a checkerboard procedural texture and an even better procedural texture developed using whatever creative artistic ability you can muster. Unfortunately nothing currently happens when that button is clicked because neither of those procedural textures presently exist. Your task in this assignment is to code both of the procedural textures into the existing vertex and fragment shaders and then, in the JavaScript file, add event-listening code that will actually let the viewer toggle between seeing the two textures in action. Beyond figuring our how to handle that event-listening in your JavaScript code, the rest of your work will be done in developing your procedural textures in the shaders. As you do this, a requirement is that you blend the textures with the existing lighting and material characteristics so I still see specular highlights in addition to your textures. In other words, *do not* completely clobber the lighting effects with colors taken from your texture. So for the checkerboard texture, the viewer would see something like:



Start your work by first developing that checkerboard texture. We discussed some pointers for doing this in class on November 10. You may also want to consult Section 7.3.3 of the Eck book, in which he discusses procedural mapping. However, if you do that, make sure you are aware that, in this assignment, you are implementing the technique that produced the green and gold torus he displays in that section, not the technique that produced the pink and blue torus.

You are free to choose the colors you want for your checkerboard, but just remember to adhere to the requirement that you do not clobber the specular highlights in implementing your textures.

Once you've got the checkerboard texture working, get your imagination going to create that additional texture. In case your imagination is lacking, google "3-D procedural textures". You'll consequently find lots of information on this topic and no doubt will learn about something that improves upon the checkerboard. Many of the cool techniques involve *noise*, which usually requires random numbers to generate. Be forewarned that GLSL does not have a random number generator, but more googling will lead you to lots of GLSL tricks that you can use to generate random numbers.

If you complete the two tasks above in satisfactory fashion, you will receive 90% on the assignment. What to do for those GGW points? Do an an outstanding job of documenting at the beginning of your JS code or on your HTML page exactly why your second procedural shader is so cool. This documentation should describe completely any research you did to come up with the second shader and/or what artistic goals your second shader is based on. In other words, convince the reader of your documentation that you didn't come up with the second texture by "throwing stuff at the wall until something stuck".

What to submit?

Create a zip archive with the new enhanced version of the four files you picked up to start the assignment and submit that zip file to the Assignment 5 dropbox on D2L.