CS 371 – Fall 2020
Project 4

100 Points **Due: Friday, 12/18/20 at 11:59PM in Canvas**

To complete this assignment, you will need to render multiple objects, apply a lighting model and a texture model to them, and then allow the camera to observe the scene from various viewpoints. Here are the specific requirements:

1. **Modeling**: Model a scene of composed of at least 2 different 3D objects:
    a. Another object must be generated from a parametric representation or a complex object downloaded from a mesh file.
    b. The other object can be a simple object, derived from a parametric representation or downloaded from a mesh file.

    You are free to decide what these objects are and how they are placed in the scene. You must also decide the colors of the objects.

2. **Textures:** Two of your objects should have a (different) texture applied to each of them. One texture must be downloaded from a file; the other can be downloaded from a file or generated as an image in your program.

3. **Lighting**: You should provide a point light source in the scene that illuminates the objects. Your lighting model should be either the Phong model or the Phong-Blinn model, but it must use all three components – diffuse, specular and ambient. You will need to decide the material properties of each object in the scene. Ensure that you have a range of values for the shininess properties so we can see some interesting effects.

4. **Viewing**: You should allow the camera coordinates to be progressively changed so I can view the entire scene from different viewpoints. You may decide the interface to do this – buttons, arrow keys, etc. as long as a reasonably wide range of motion is allowed. Note that the light source is part of the scene. You will need to ensure that the clipping volume is appropriately set for the range of motion you are permitting.

This project specification gives a considerable amount of freedom to you, as long as you meet the above requirements. If you are concerned about whether your interpretation makes the problem too simple, or too difficult, or you need further clarification on specific requirements, please do clarify with me!

Note:

- **Because this project involves a texture file, it will need to run from a webserver.** You may assume I will drop your project folder inside another folder that already contains the `Common` folder and is web accessible. For your testing, you will need to use a simple webserver such as that provided by python (that was demonstrated in class).
- Your program must have a substantial introductory documentation block. By reading that I should learn:
    - **How you modeled each object**
    - **How you generated (or from where you downloaded) the textures and how you applied them to the object**
    - **What the material properties of each object are trying to capture**

    - **What specific lighting model you used, and how you computed the normal vectors for objects**
    - **Where the initial position of light and camera are**
    - **How, and to what extent, the camera can be moved**
- As usual, you should modularize your code using other methods.
- Each method in your program should have an introductory documentation block that clearly and accurately describes its role in the program
- Make sure that your program's internal logic is self-documenting through the judicious use of meaningful variable names and indentation. Use underscores or a mix of upper and lower case to achieve this self-documenting style, e.g., `sweep_angle` or `sweepAngle`
- Please indent your code correctly

Submission

To complete this assignment, simply submit your HTML and Javascript files (including all texture files), zipped up in a single folder, to the Canvas submission folder **Project 4** by the deadline specified. The `Common` files should not be submitted; instead, expect them to be in a sibling directory to your unzipped folder.