ASSIGNMENT: Shading & Illumination

Due May 8 by 10pm   **Points** 60   **Submitting** a text entry box or a website url
Available Apr 25 at 8:15am - May 8 at 10pm 14 days

This assignment was locked May 8 at 10pm.

Assignment 3

3D Shading & Illumination

Task

Implement the standard computer graphics illumination model using both Gouraud and Phong shading. You will use HTML's WebGL2 API.

Illumination and Shading (to earn a C: 45 pts)

- Implement Gouraud shading: **20 pts**
  - Shaders: gouraud_color.vert / gouraud_color.frag
  - Only need to handle first point light source
- Implement Phong shading: **20 pts**
  - Shaders: phong_color.vert / phong_color.frag
  - Only need to handle first point light source
- Create your own custom model type (beyond the provided plane, cube, and sphere): **5 pts**

Additional features (to earn a B or A)

- Implement texture mapping: **10 pts**
  - Allow for tiling textures
  - Usable with both Gouraud and Phong shading
  - Custom model should include texture coordinates
- Enable multiple point lights to illuminate a scene: **5 pts**
  - Maximum of 10 lights - will need to change the light in the shaders to an array of lights (with size = 10)
  - Make sure to cap color intensity at 1.0

Scene

Scenes will be defined as a JavaScript object. The scene will contain camera parameters, a description of the models, and a description of the light sources.

background: [red, green, blue]

camera:

- position
- target
- up

models (array):

- type (plane / cube / sphere / custom)
- shader (color / texture)
- material
  - color [red, green, blue]
  - specular [red, green, blue]
  - shininess
- texture (only present if shader is 'texture')
  - url
  - scale [u, v]
- center (x, y, z)
- size (width, height, depth)
- rotate_x (degrees)
- rotate_y (degrees)
- rotate_z (degrees)

light:

- ambient [red, green, blue]
- point_lights (array)
  - position (x, y, z)
  - color (red, green, blue)

*Note: sample models can be found in the starter code.

Starter Code

Starter code is available on GitHub: **cg-illuminationshading** **(https://github.com/tmarrinan/cg-illuminationshading)**. Please **fork** your own version of the code, then enable GitHub Pages in the project's settings (change *Source* from *None* to *master branch*).

Groups

Section 01

• Ben F. • Peter S.	• John G. • Terence L.	• Tucker J. • Patrick R.	• Joe H. • Zak N.
• Zack H. • James S.	• Alina K. • Emma T.	• Nathan S. • Kevin S.	

Section 02

• Matt W. • Ben M.	• Mackenzie M. • Jessica O.	• Sarah C. • Siere J.	• Mike T. • Noah P.
• Ryan S. • Cole P.	• Jackson G. • Kong Pheng T.	• Tanya H. • Tianzhi C.	• Joe S. • Sam S. • Nate R.
• Hieu L. • Tseng Y.	• Nolan F. • Michael F.	• Peter M. • Erik A.	• Kim N. • Owen X.

Submission

Code should be saved in a repository on GitHub while working on the project. In order to submit, ONE group member should enter the the project's live website URL for the assignment (in Canvas).

ALL group members should also submit a checklist of what you feel you have accomplished from the rubric above (including who worked on what), and include your total expected score. This can be made as a comment once you submit the URL.

Deadline

This assignment is due Sunday, May 8 at 10:00pm.

Demonstrations

Demonstrations will be given Monday, May 9. Each group will have 2-5 minutes to present their project.

For the demonstration, you should create at least 2 example scenes that not only showcase the features you've implemented, but serve as a "realistic" environment that a user can explore.