CS351 Computer Graphics Project C Report
A Realistic Shading World

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Goal of this project

The goal of this project is to create realistic interactive lighting and materials in WebGL in a "virtual world". The 3D objects in this virtual world are made from different materials, each with individually-specified emissive, ambient, diffuse, specular parameters. The world also contains user adjustable light sources, each with different position. My program then uses lights, materials, surface-normals and more with several vertex/fragment shader pairs to compute the Phong lighting model in different ways, including 'Gouraud' shading (yields faceted appearance) and 'Phong' shading (for smooth-looking, facet-free surfaces with nicely rounded specular highlights).

User's Guide

1. Use keyboard arrow ← → for strafing
2. Use keyboard arrow ↑ ↓ for navigating forward and backward
3. Use keyboard W A S D for turning the camera around
4. Click the spin button to control the spinning speed of four objects.
5. Click the Run/Stop button to start/stop the spinning of four objects.
6. Check/Uncheck the "World Light" box to switch on/off the world light
7. Check/Uncheck the "Head Light" box to switch on/off the headlight
8. Use 3 bar to control the position(x,y,z) of world light
9. Select "Blinn-Phong lighting" or "Phong lighting" for different lighting method
10. Select "Gouraud shading" or "Phong Shading" for different shading method

Results

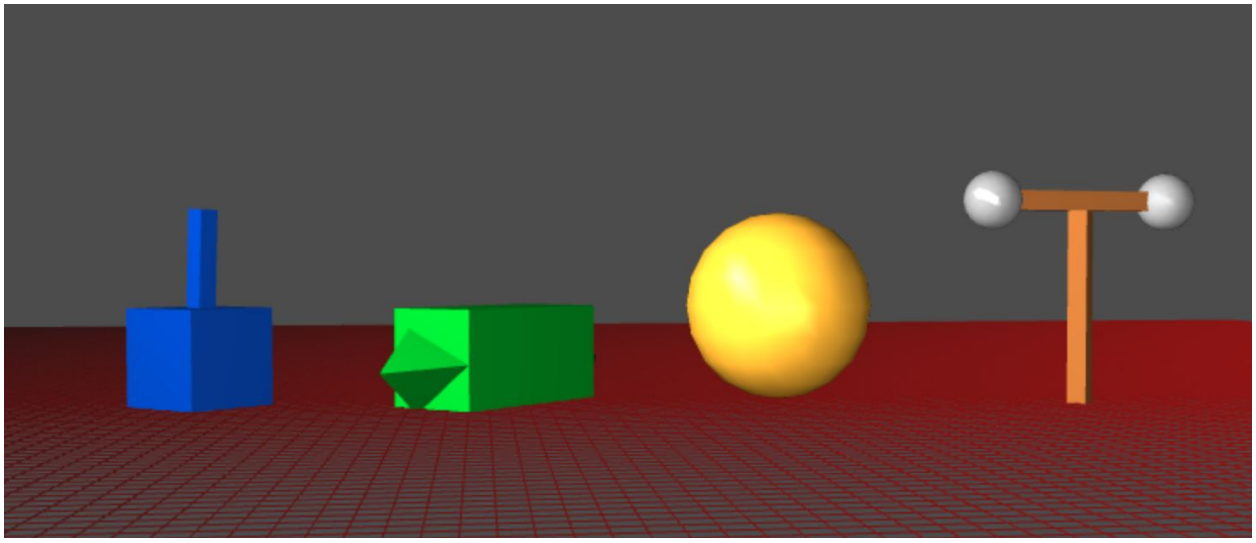


Figure 1. Phong lighting with gouraud shading with both world light and headlight on

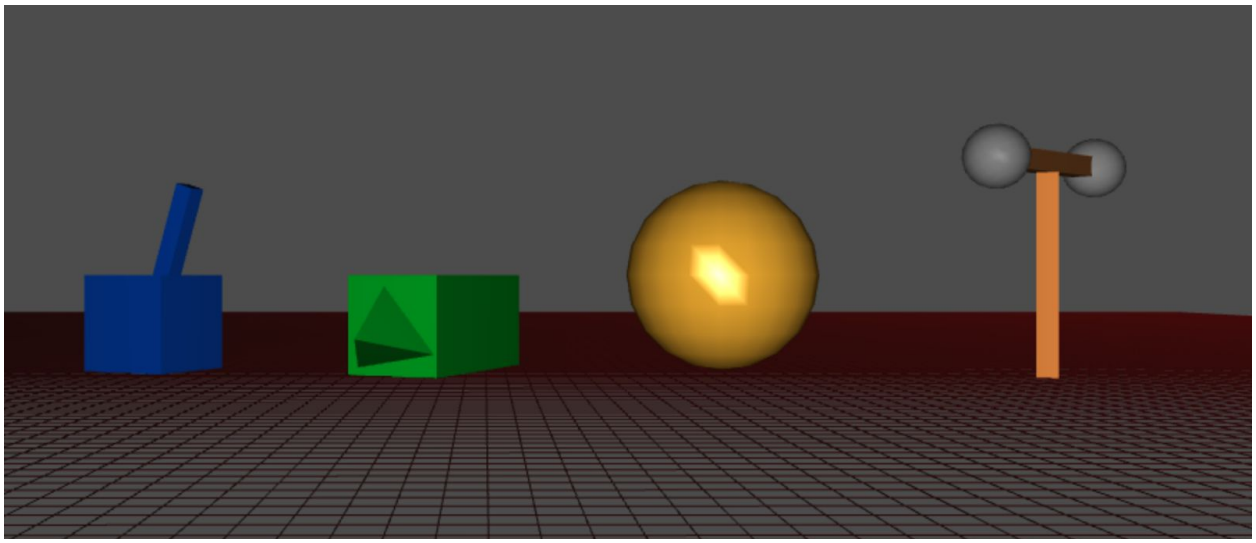


Figure 2. Phong lighting with gouraud shading with only headlight on

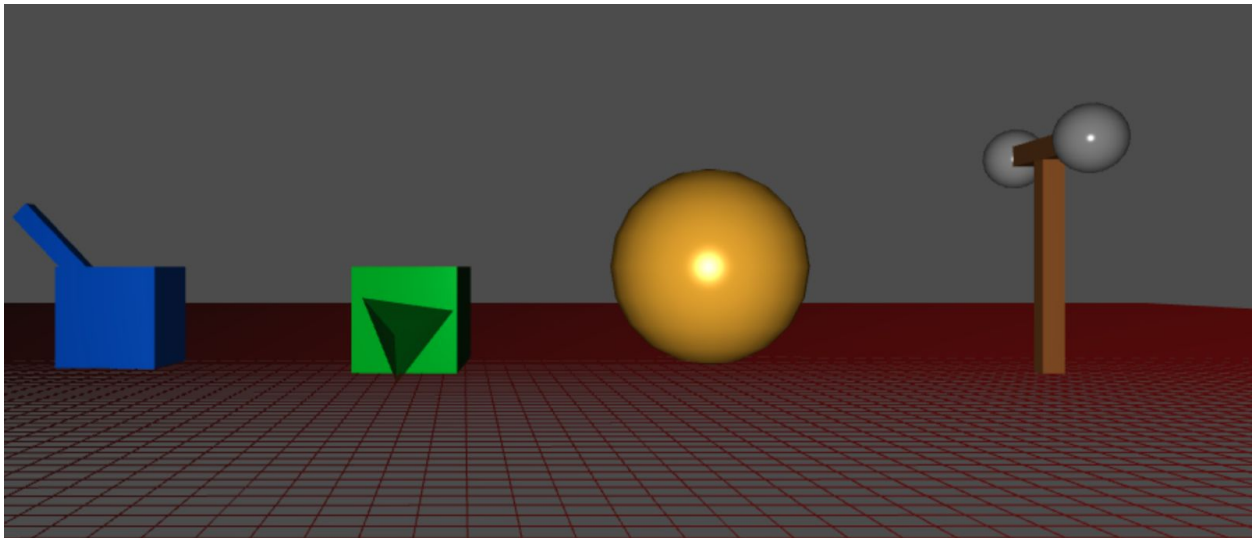


Figure 3.Phong lighting with phong shading with only headlight on

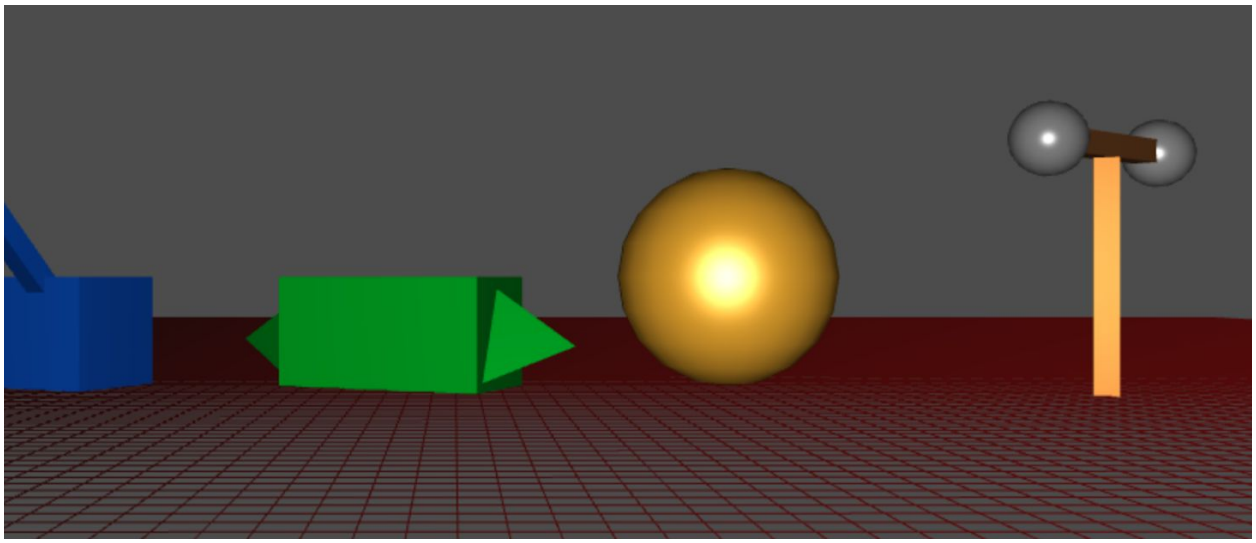


Figure 4. Bling Phong Lighting with phong shading with only headlight on

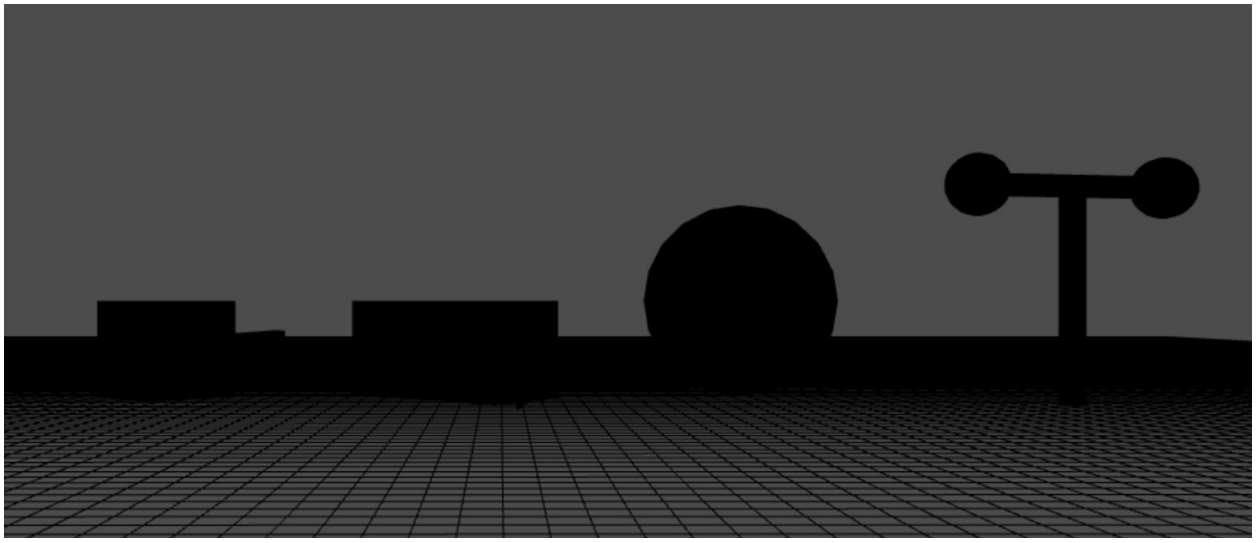


Figure 5. Both headlight and world light are turned off

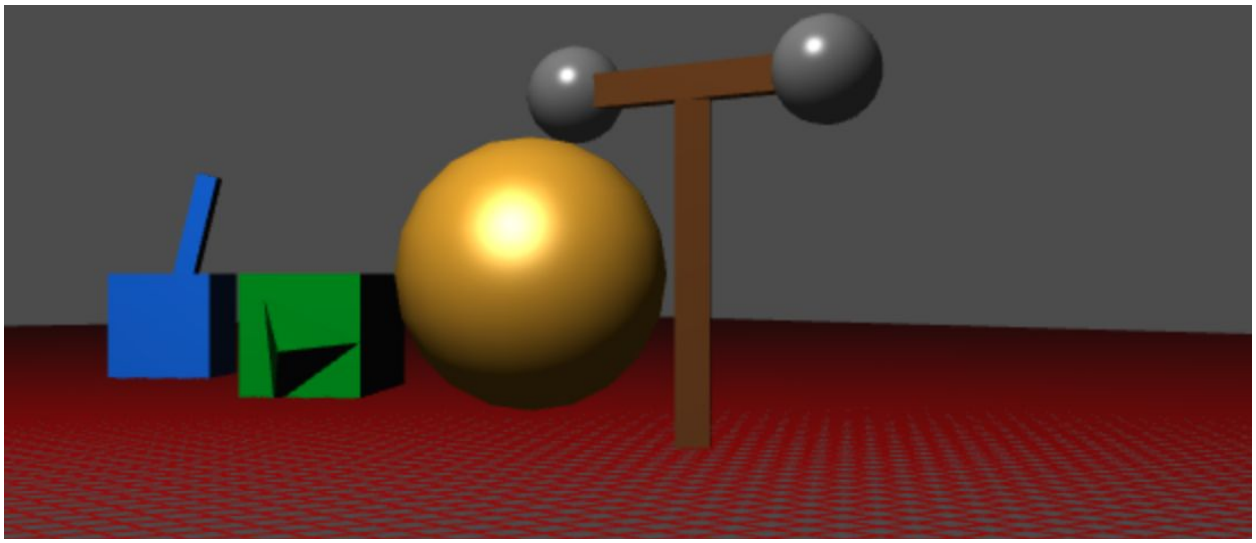
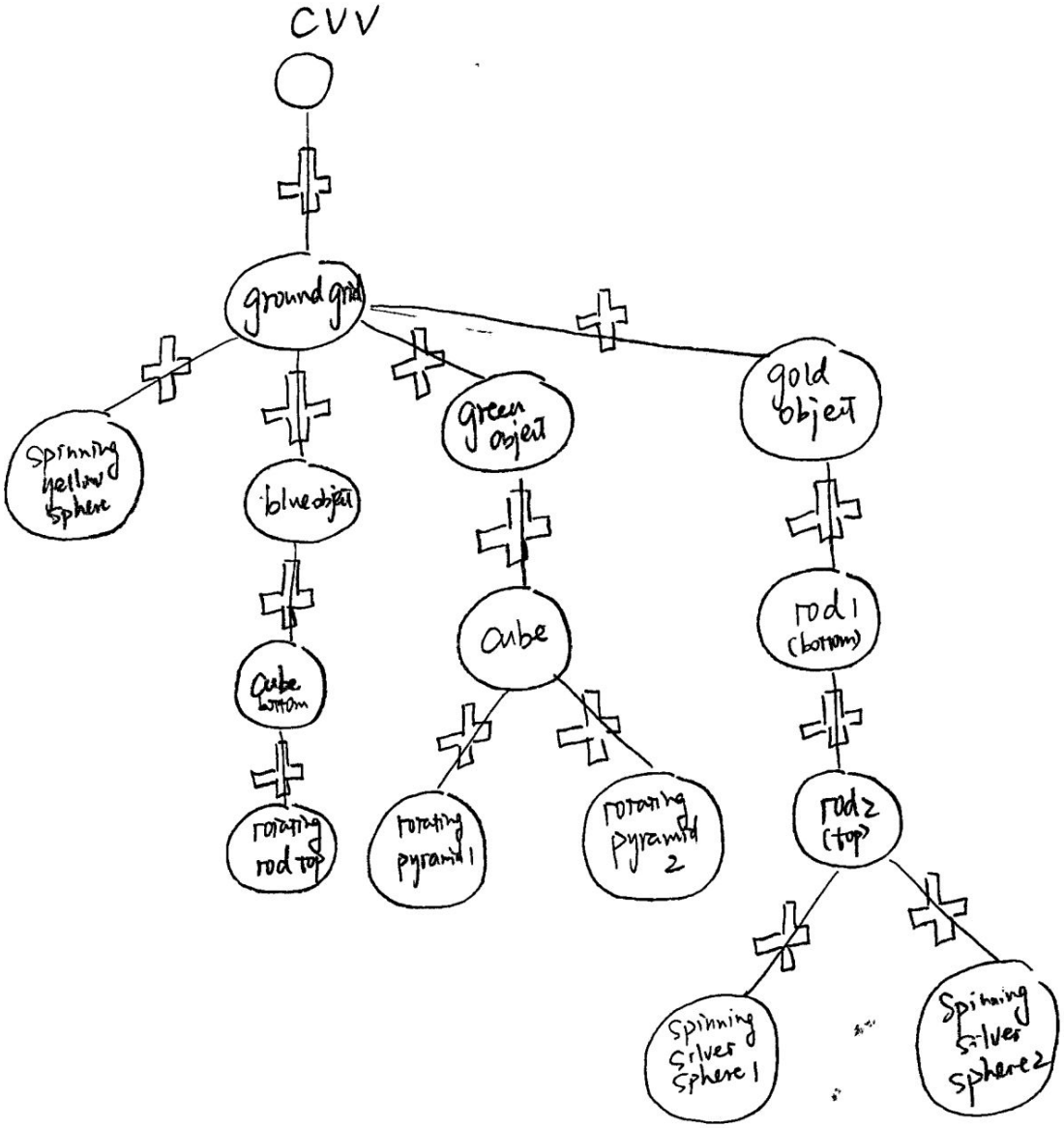


Figure 6. World light on, navigate to a different location, and change the position of world light

Scene Graph for this project (At the end)


CVV
ground grid
spinning yellow sphere
blue object
green object
gold object
cube bottom
cube
rod 1 (bottom)
rotating rod top
rotating pyramid 1
rotating pyramid 2
rod 2 (top)
spinning silver sphere 1
spinning silver sphere 2