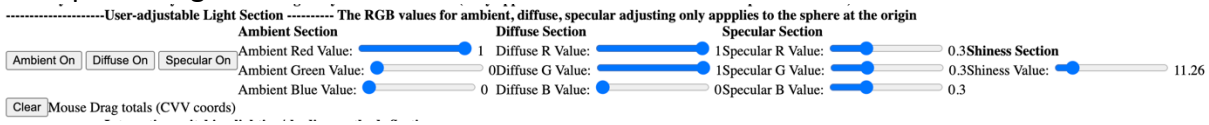
Report

Name: Yuchen Wang
Descriptive title: **ProjectC:** Shinning Sphere and rotating cones

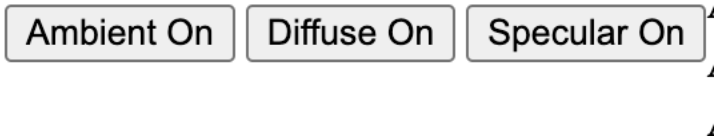
User's Guide

Goals:
The lighting circumstances and different materials should be correctly simulated.
Instructions:

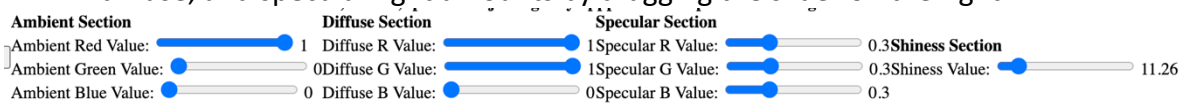
- **Under the canvas there are three sections for user interactions:**
  - **Keyboard Section:**
    - **Arrow key:** You can press the **'->'** key on the keyboard to turn the camera head to right. You can press **'<-'** key on the keyboard to turn the camera head to left. You can press **'up'** key on keyboard to raise the camera head. You can press **'down'** key on keyboard to lower the camera head.
    - **WASD keys:** You can press **'w'** key on keyboard to move the camera forward. You can press **'s'** key on keyboard to move the camera backward. You can press **'a'** key on keyboard to move the camera to the left. You can press **'d'** key on keyboard to move the camera to the right.
    - **'m/M' key:** you can press 'm/M' key to change the materials of the assemblies on the
  - **User-adjustable Light Section:** This section is for user to adjust the light position, switch light on/off, and set separate R,G,B values for each of the ambient, diffuse, and specular light amounts.



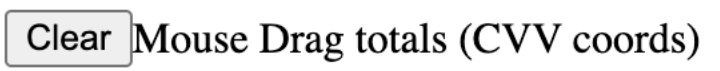
    - You can switch on/off the ambient, diffuse or specular light by clicking the buttons on the left.



    - You can adjust the shiness value and RGB values for each of the ambient, diffuse, and specular light amounts by dragging the slider on the right.



    - You can drag the mouse to change the light position. Click the 'clear' button to reset the light position.



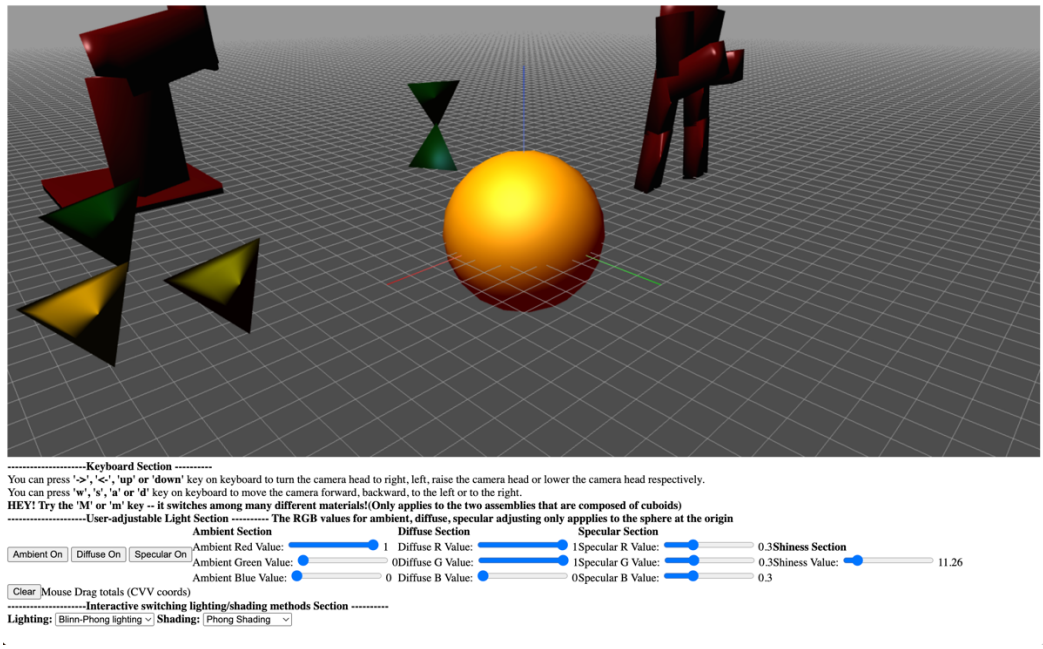
- **Interactive switching lighting/shading methods Section:**
  You can switch between two light methods and two shading methods by using the selection boxes. For lighting methods, you can select between Blinn-Phong lighting and Phong light. For shading methods, you can select between Phong Shading and Gouraud shading.

  ----------Interactive switching lighting/shading methods Section ----------

  Lighting: Blinn-Phong lighting **Shading:** Phong Shading

Results

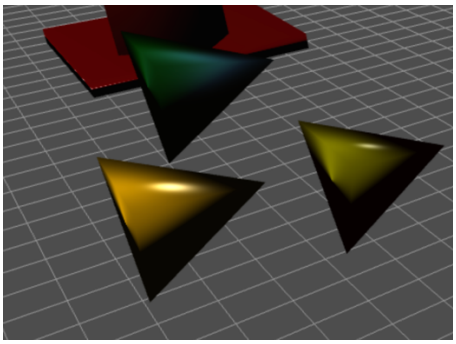
This is what should be like on the screen:



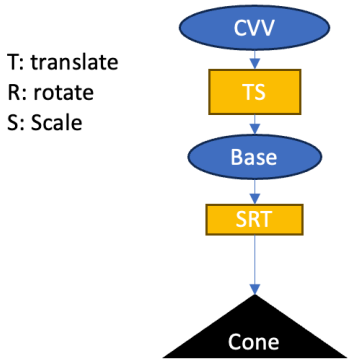
There is a ground grid, every object is placed/ travelling on the ground grid here.

1. Object:
   a. 3 Rotating Cones:

There are 3 rotating cones on the left of the screen. They have different materials with different RGB values of ambient, diffuse and specular light amounts.

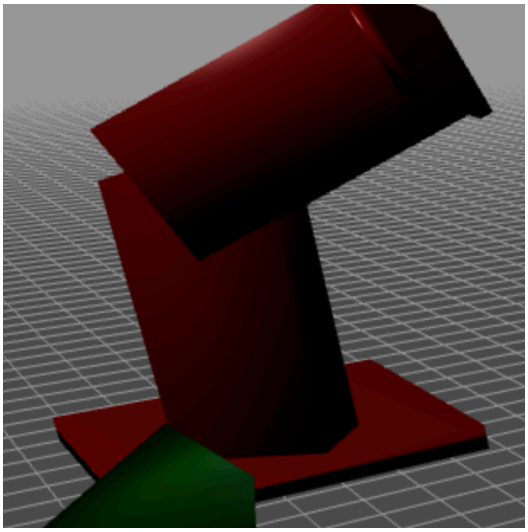


Objects

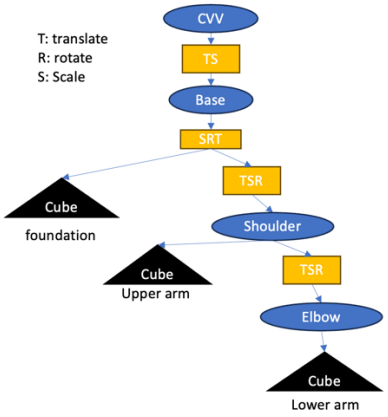


scene graph

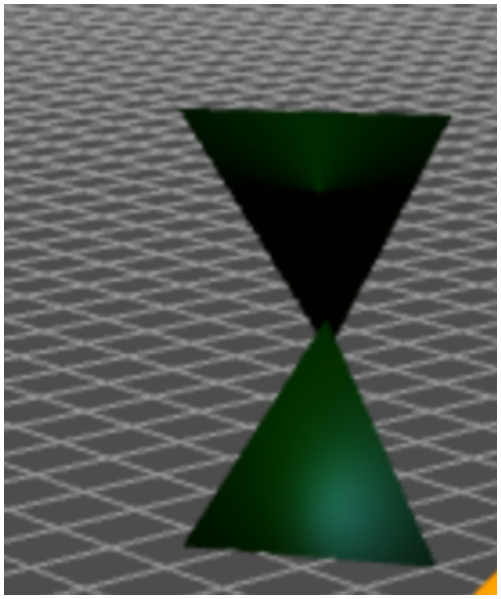
b. 3 jointed assemblies:



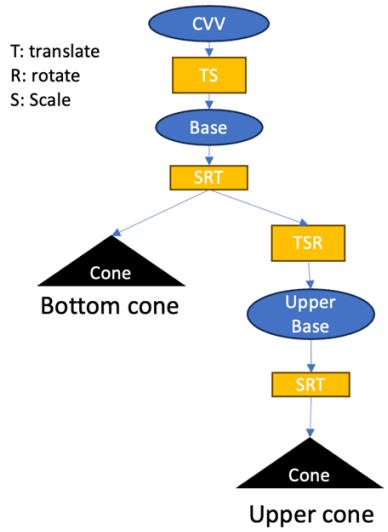
assembly



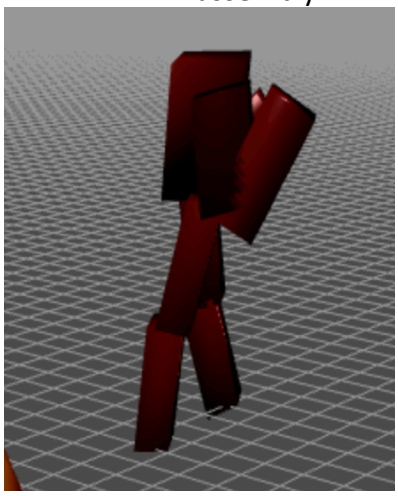
scene graph



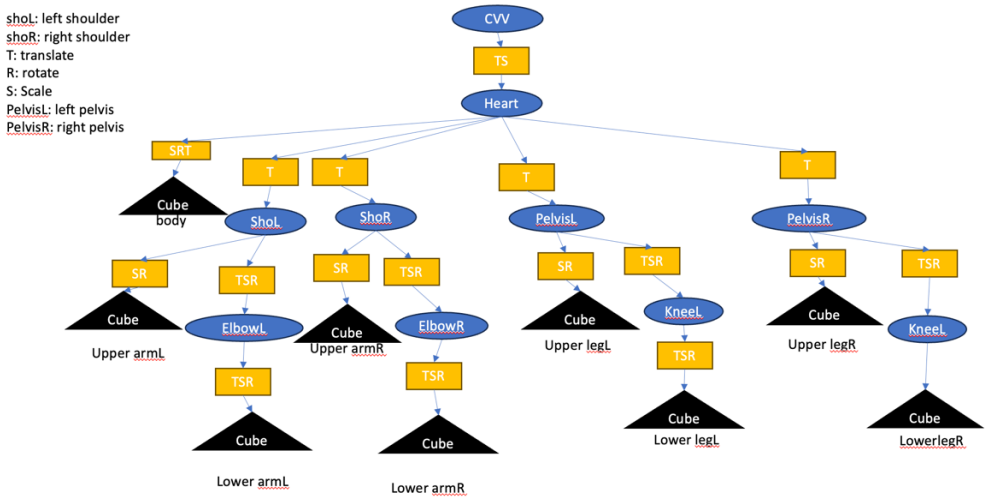
assembly



scene graph



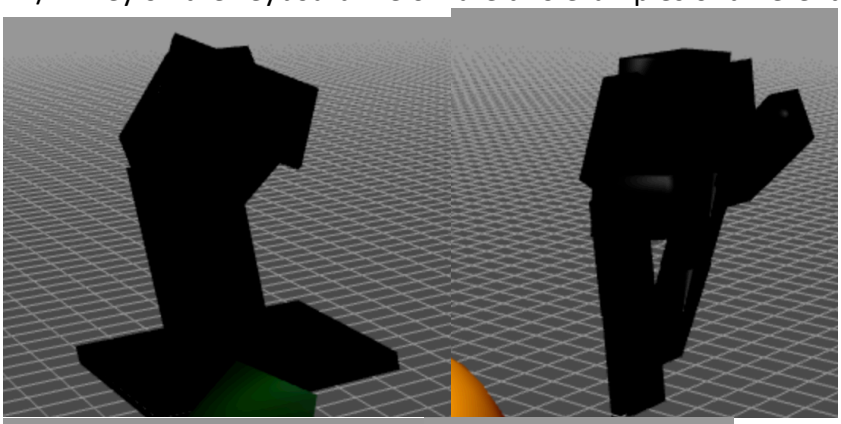
assembly

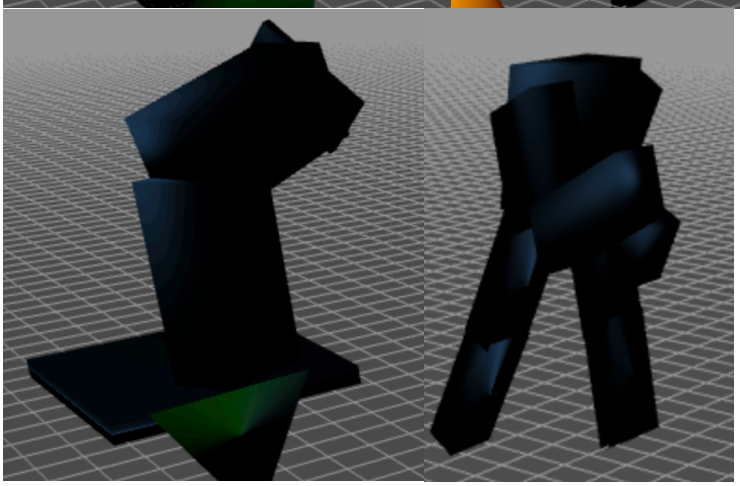


Scene graph

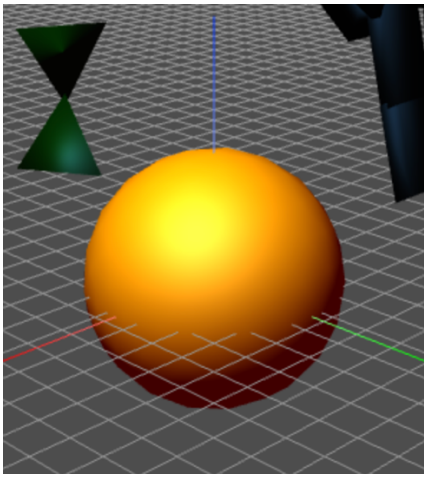
scene graph

The two assemblies composed of cuboid can change material when user click the ‘m/M’ key on the keyboard. Below are two examples of different materials:

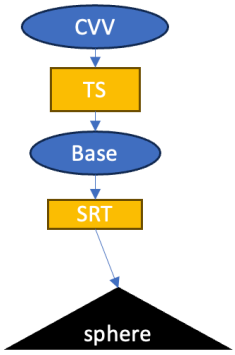




c. The Sphere:



T: translate
R: rotate
S: Scale

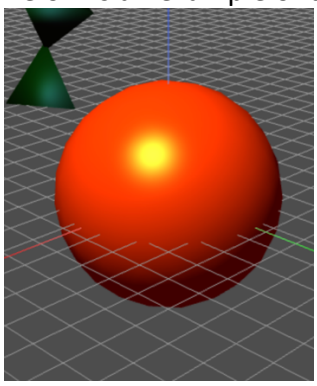


ambient: (1,0,0), diffuse: (1,1,0) specular(0.3, 0.3, 0.3), shiness:11.26

The rotating sphere is at the origin.

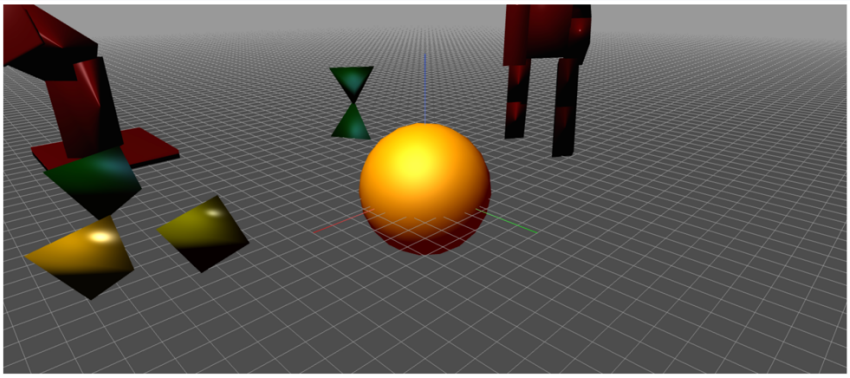
You can change the shiness values and RGB values of ambient, diffuse and specular light amounts.

Below is an example of the sphere with different parameters:

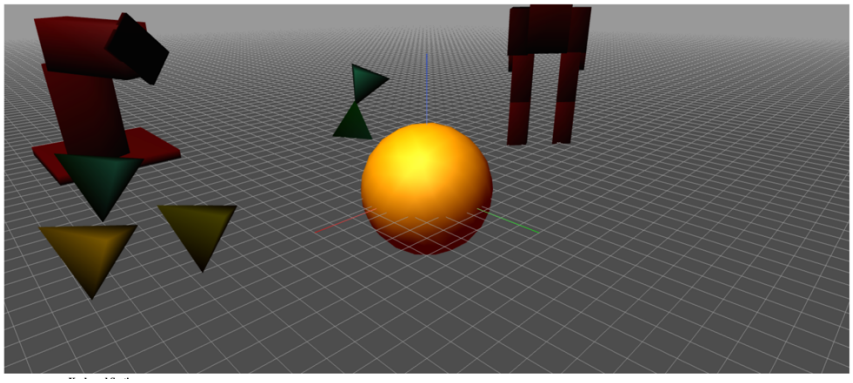


ambient: (1,0,0), diffuse: (1,0.35,0) specular(0.3, 0.91, 0.3), shiness:48.67

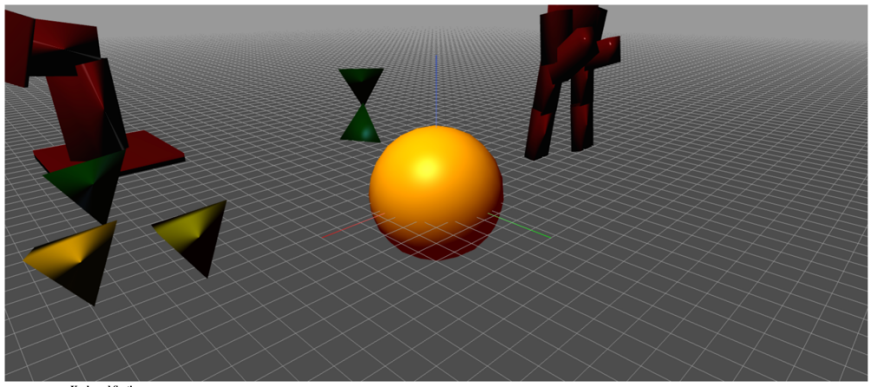
2. Different lighting and shading methods:
    a. Blinn-Phong Lighting+ Phong Shading:



    b. Blinn-Phong lighting + Gouraud Shading:



c. Phong lighting + Phong shading:



d. Phong lighting + Gouraud Shading: