

Project C: Lighting and Shading

Name: Wenhao Deng

NetId: wda5704

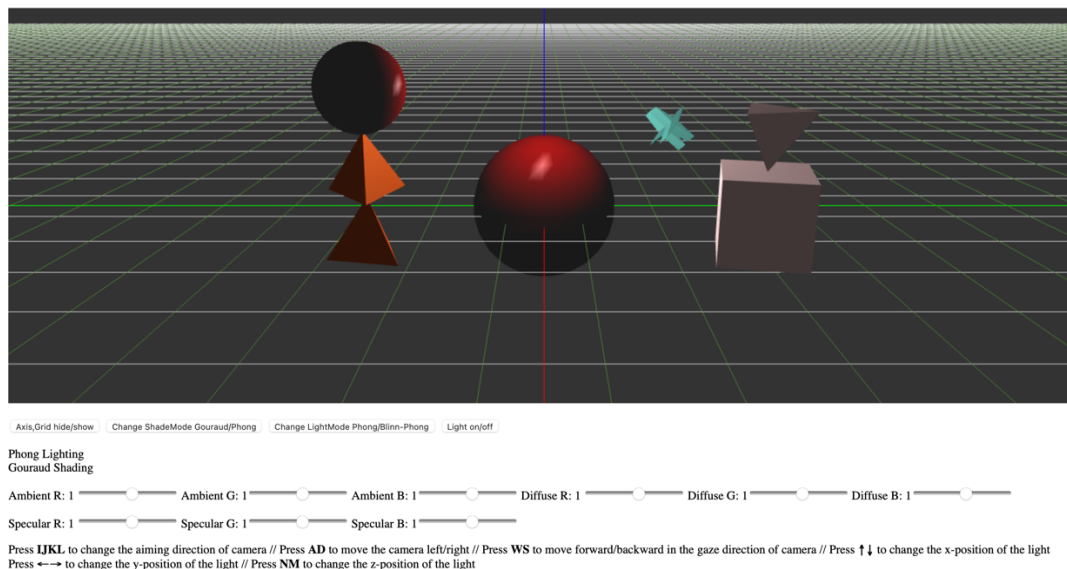
Goal:

My Project has one Perspective Camera's viewport. User can control the camera, the camera is able to aim in any direction, move forward/backward in the gaze direction, and 'strafe' sideways left/right from any 3D position. And there is one light source, which allowed user to change its position, turn it on/off, and set separate R,G,B values for each of the ambient, diffuse, and specular light amounts. The user can also change switch between Gouraud Shading/ Phong Shading, Phong Lighting/ Blinn-Phong Lighting.

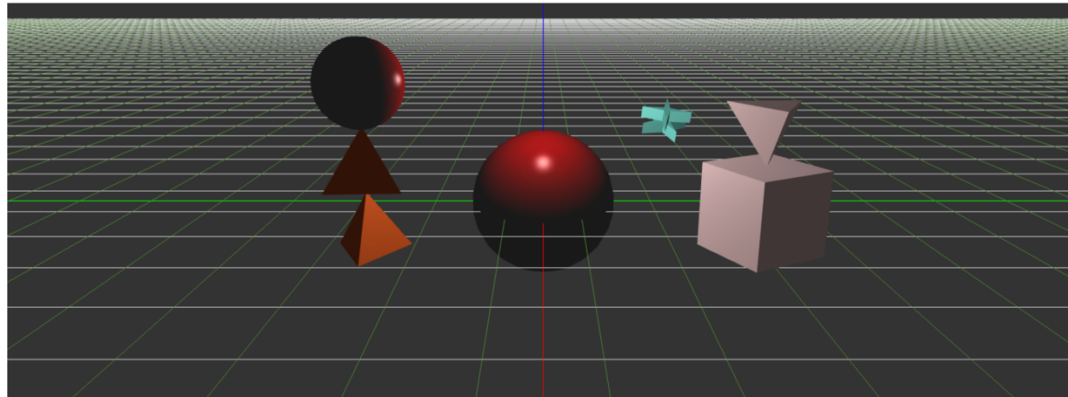
User's Guide:

The keyboard input "IJKL" can change the aiming direction of camera without changing the position of the camera. The keyboard input "AD" can move the camera left/right, and the keyboard input "WS" can move the camera forward/backward in the gaze direction. The keyboard input "ArrowUp/ArrowDown" can change the x-position of the light. The keyboard input "ArrowLeft/ArrowRight" can change the y-position of the light. The keyboard input "NM" can change the z-position of the light. There are also 4 buttons can switch Shading and Lighting mode, turn the light on/off, and hide/show Axis and Grid. There are also 9 range bars which can change the R,G,B values for ambient, diffuse, and specular of the light source.

Result:



Initial view of the project (Gouraud Shading, Phong Lighting).



Axis,Grid hide/show Change ShadeMode Gouraud/Phong Change LightMode Phong/Blinn-Phong Light on/off

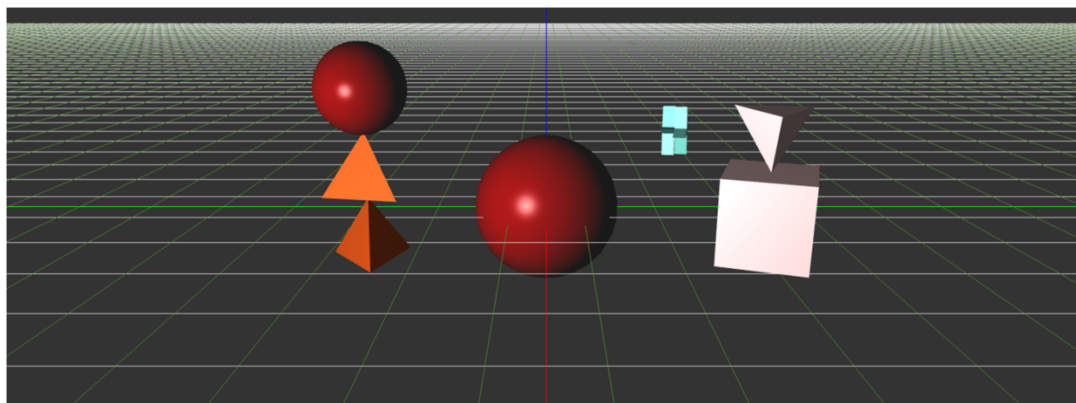
Blinn-Phong Lighting
Phong Shading

Ambient R: 1 Ambient G: 1 Ambient B: 1 Diffuse R: 1 Diffuse G: 1 Diffuse B: 1

Specular R: 1 Specular G: 1 Specular B: 1

Press **IJKL** to change the aiming direction of camera // Press **AD** to move the camera left/right // Press **WS** to move forward/backward in the gaze direction of camera // Press **↑↓** to change the x-position of the light
Press **←→** to change the y-position of the light // Press **NM** to change the z-position of the light

Change the Shading and Lighting mode to Phong Shading and Blinn-Phong Lighting.



Axis,Grid hide/show Change ShadeMode Gouraud/Phong Change LightMode Phong/Blinn-Phong Light on/off

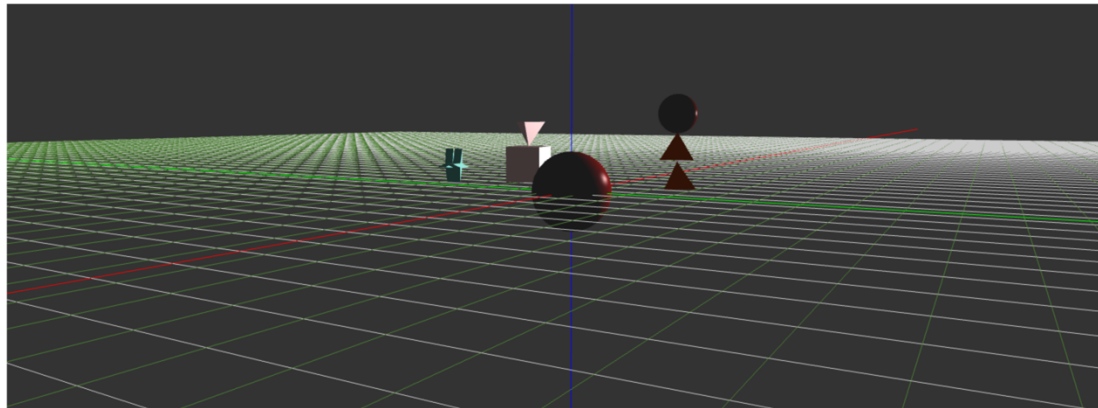
Blinn-Phong Lighting
Phong Shading

Ambient R: 1 Ambient G: 1 Ambient B: 1 Diffuse R: 1 Diffuse G: 1 Diffuse B: 1

Specular R: 1 Specular G: 1 Specular B: 1

Press **IJKL** to change the aiming direction of camera // Press **AD** to move the camera left/right // Press **WS** to move forward/backward in the gaze direction of camera // Press **↑↓** to change the x-position of the light
Press **←→** to change the y-position of the light // Press **NM** to change the z-position of the light

Change the position of the light source (Phong Shading, Blinn-Phong Lighting).



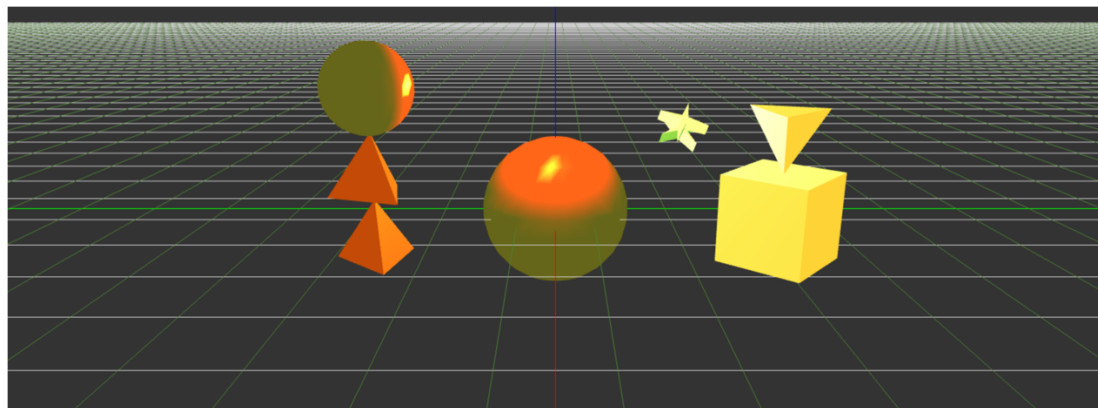
Axis,Grid hide/show Change ShadeMode Gouraud/Phong Change LightMode Phong/Blinn-Phong Light on/off

Blinn-Phong Lighting
Phong Shading

Ambient R: 1 Ambient G: 1 Ambient B: 1 Diffuse R: 1 Diffuse G: 1 Diffuse B: 1
Specular R: 1 Specular G: 1 Specular B: 1

Press **IJKL** to change the aiming direction of camera // Press **AD** to move the camera left/right // Press **WS** to move forward/backward in the gaze direction of camera // Press **↑↓** to change the x-position of the light
Press **←→** to change the y-position of the light // Press **NM** to change the z-position of the light

Change the Camera position. (Phong Shading, Blinn-Phong Lighting)



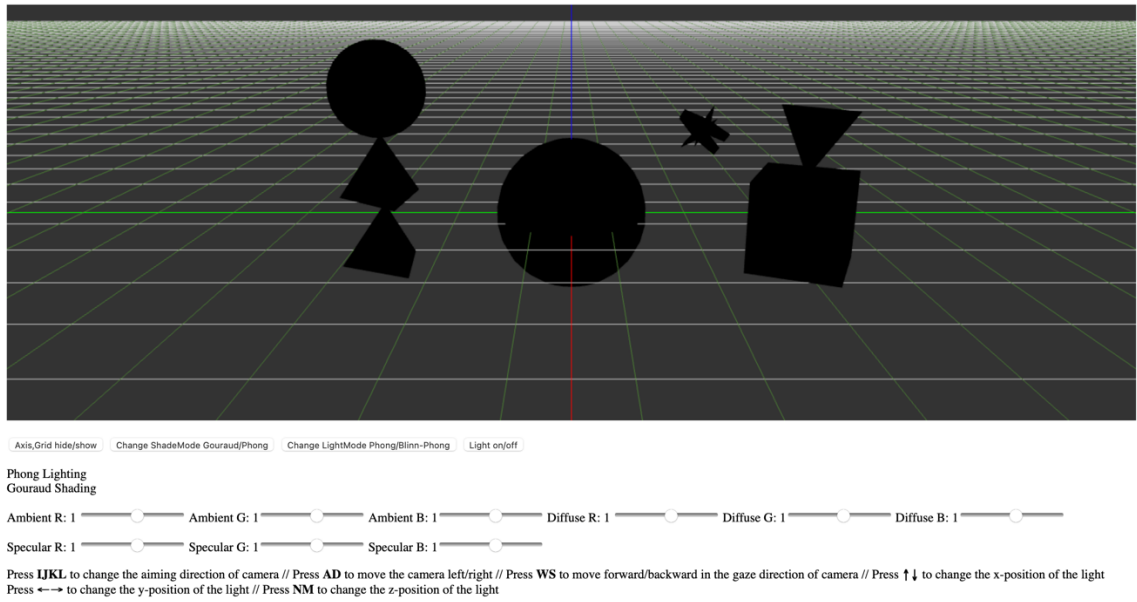
Axis,Grid hide/show Change ShadeMode Gouraud/Phong Change LightMode Phong/Blinn-Phong Light on/off

Phong Lighting
Gouraud Shading

Ambient R: 4 Ambient G: 1 Ambient B: 4 Diffuse R: 3 Diffuse G: 1 Diffuse B: 1
Specular R: 4 Specular G: 1 Specular B: 5

Press **IJKL** to change the aiming direction of camera // Press **AD** to move the camera left/right // Press **WS** to move forward/backward in the gaze direction of camera // Press **↑↓** to change the x-position of the light
Press **←→** to change the y-position of the light // Press **NM** to change the z-position of the light

Change the R,G,B values of the ambient, diffuse, and specular of the light source. (Gouraud Shading, Phong Lighting)



Turn off the light.

Scene Graph:

