Report of Project C (EECS351)

Name: Haipeng Lu
NetID: HLF8244

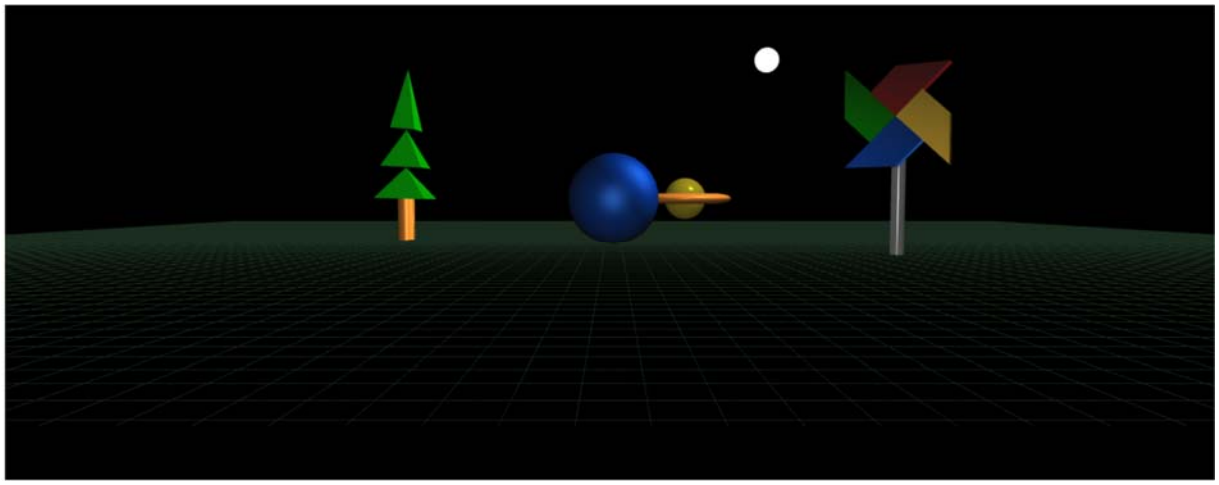
1. Goals and Description

The goal of the project is to practice lighting-shading methods in WebGL, creating more characteristics of user-program interactions and thus improving the user experience. The lively picture includes three jointed objects - a tree in the wind, a windmill and a stellar system. Two light sources are provided – one light source with a user-adjustable 3D world-space position and RGB values of different components, and one headlight co-located at the camera eyepoint. Four lighting-shading models are provided – Phong Lighting and Phong Shading, Blinn-Phong Lighting and Phong Shading, Phong Lighting and Gouraud Shading, and Blinn-Phong Lighting and Gouraud Shading. For user-controllable light effects, please see the following instructions.

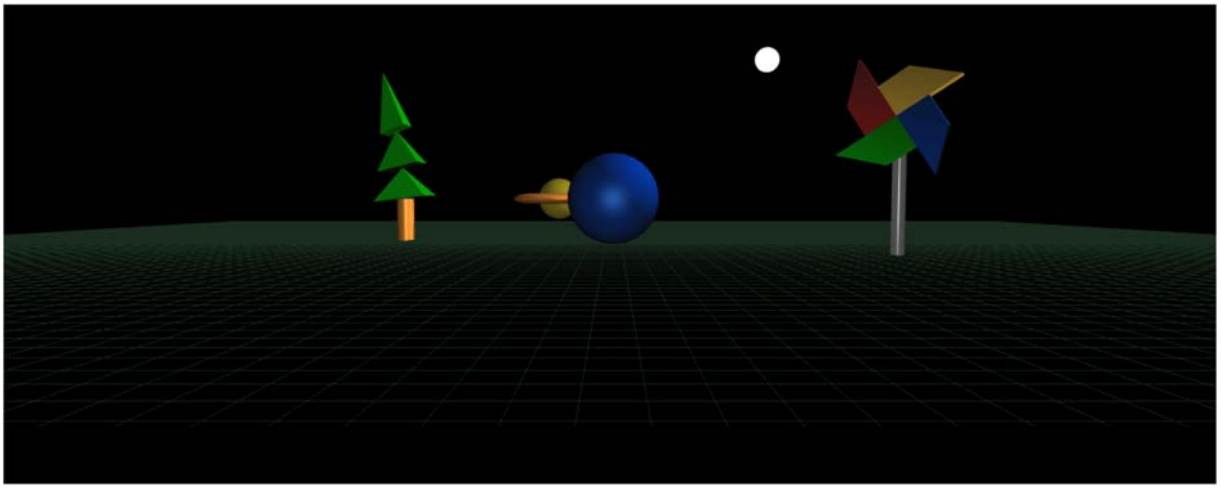
2. User Guide

World Light: user-adjustable light (marked by the silver sphere).
Head Light: co-lcated with the camera.
1. Use "Up/Down/Left/Right" keys to move the camera forward/backward/left/right
2. Use "A/D/W/S" keys to look left/right/up/down
3. Select the lighting-shading mode from the drop-down menu.
4. Use "I/O", "K/L" and "N/M" to move the world light up/down, left/right, and fowward/backward, respectively.
5. Switch the ambient, diffuse, specular components of each light source by checking/unchecking the “Ambient”, “Diffuse”, “Specular” boxes for each light source.
6. Change the RGB values of ambient, diffuse, specular components of world light in the textbox and click "Confirm".

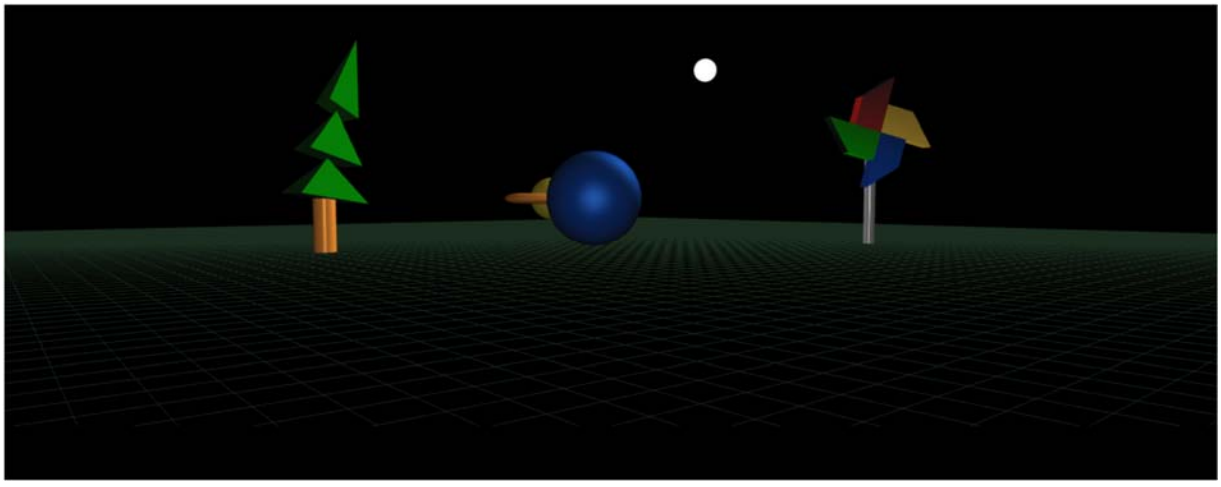
3. Result



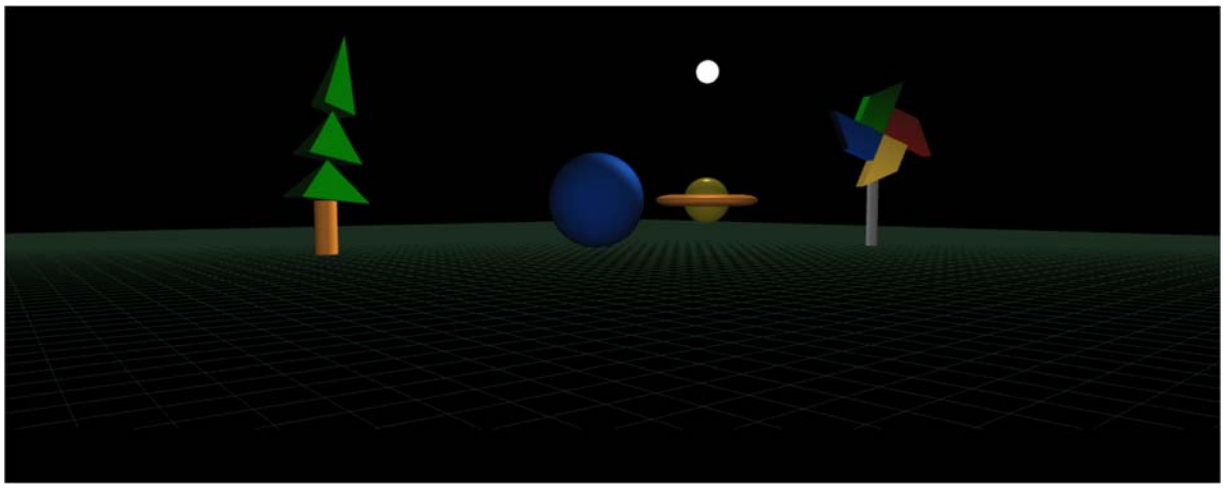
Original (Phong Lighting – Phong Shading)



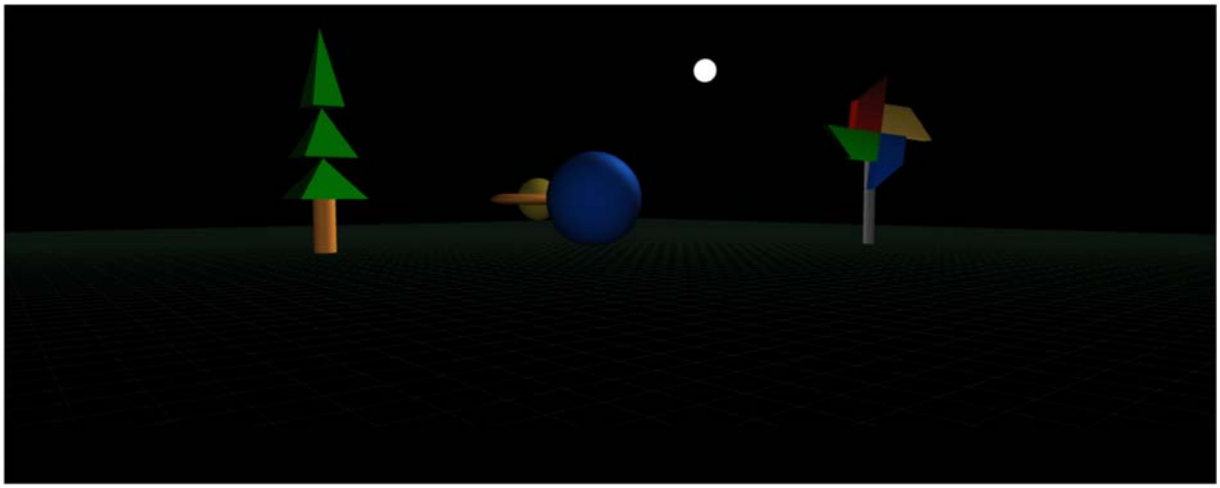
Close specular component of the world light
(marked by the silver sphere under the blue sphere)



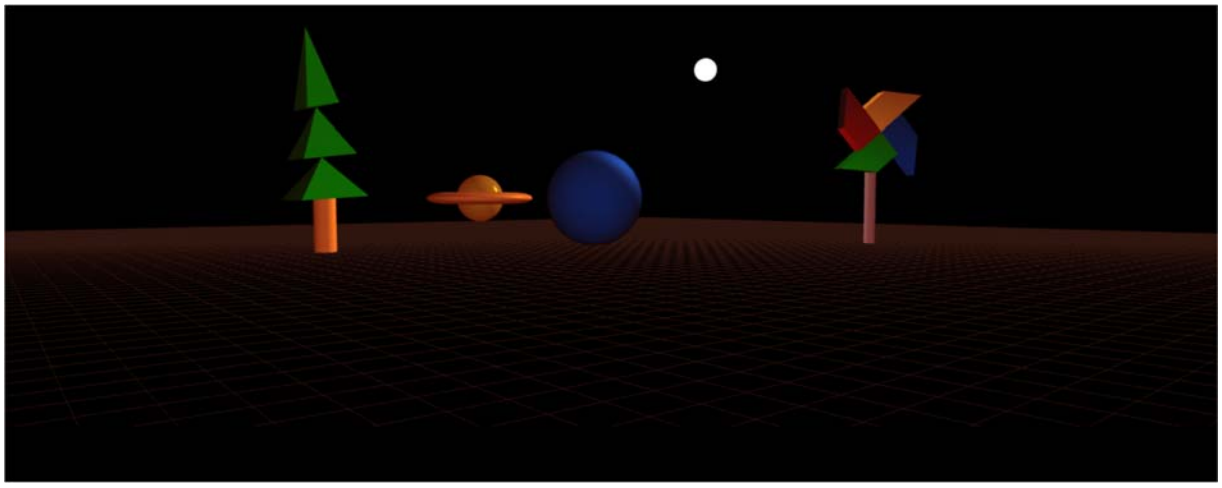
Change the camera position



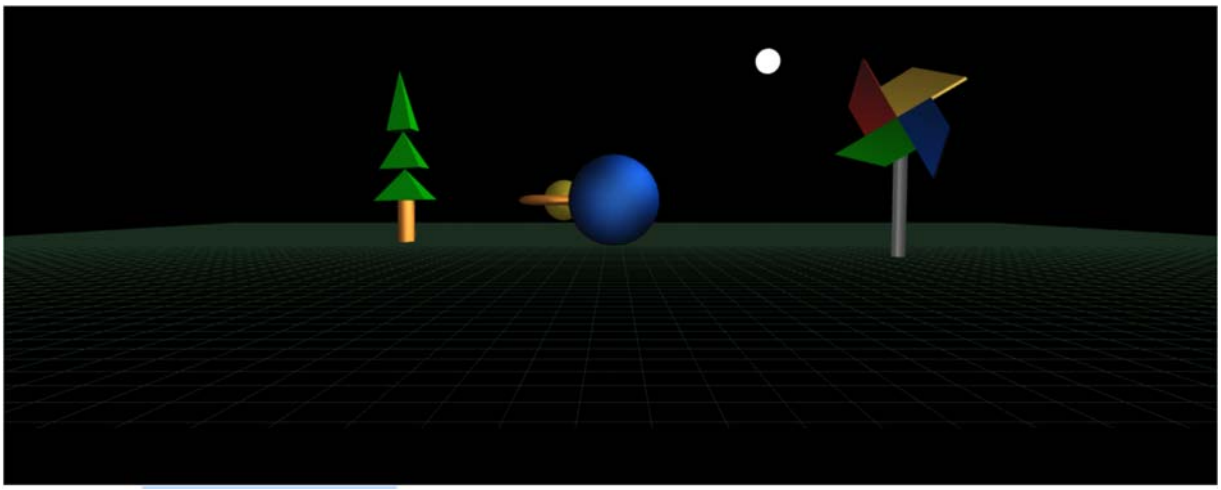
Close the specular component of the camera light



Close the ambient component of the world light

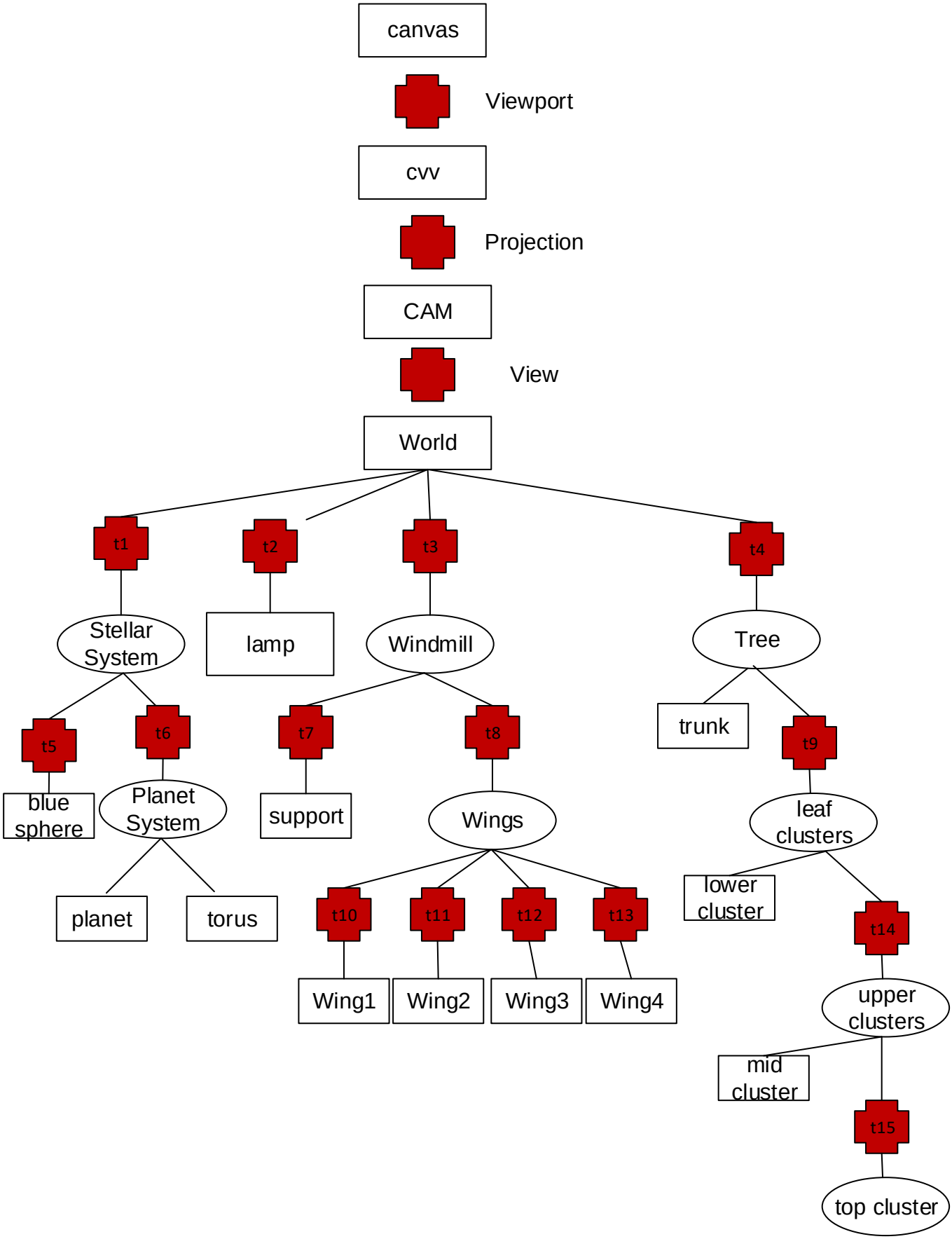


Change the RGB values of the ambient component of the world light



Blinn-Phong Lighting – Gouraud Shading

4. Scene Graph


canvas
Viewport
cvv
Projection
CAM
View
World
t1
t2
t3
t4
Stellar System
lamp
Windmill
Tree
t5
t6
t7
t8
trunk
t9
blue sphere
Planet System
support
Wings
leaf clusters
lower cluster
t14
planet
torus
t10
t11
t12
t13
Wing1
Wing2
Wing3
Wing4
upper clusters
mid cluster
t15
top cluster