Project C: A Robot in a Wonderland

COMP_SCI 351-1: Intro to Computer Graphics

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1 User Guide

1.1 Keyboard Interactions

1. Arrow keys aim the camera without moving it:
    - "←""→"arrow keys rotate view left/right
    - "↑""↓"arrow keys tilt up/down
2. "WASD" keys move the camera without rotating it:
    - A/D keys 'strafes' camera left/right at current altitude
    - W/S keys move forwards/backwords in direction-of-gaze
3. "QE" keys move the camera up/down along the z-axis of the world coordinate system

1.2 GUI Controls

1. Use the drop-down box 'Lighting Method' to switch between Phong Lighting & Blinn-Phong Lighting.
2. Use the drop-down box 'Shading Method' to switch between Gouraud Shading and Phong Shading.
3. Use 'Sphere Rate' to control the spinning rate of sphere.
4. Use the drop-down box 'Sphere Material' to switch between different materials for sphere.
5. Use the check boxes to switch on/off the whole light source or each light-source component separately.
6. Use the sliders for 'Light Position' to control the light position X, Y, Z.
7. Use the colormaps for 'Light Color' to set RGB values for each light component.

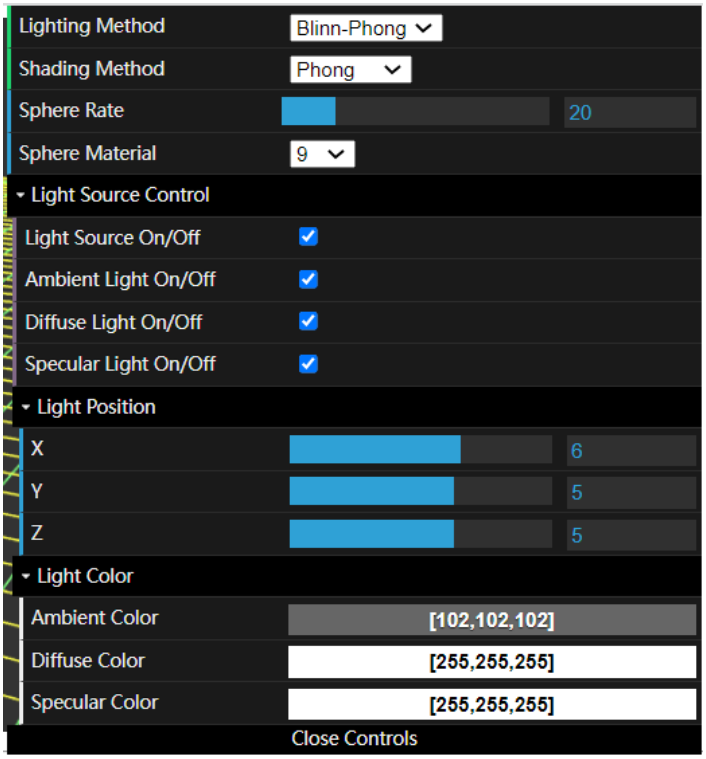

Fig 1 GUI Control Menu

2 Results

There are 4 shapes in total in my project C. A large slowly-spining sphere in the world-space origin and 3 other solide, separate, jointed, continually flexing shapes around it, each consists of different-looking phong materials. In the upper right is the GUI interface. The bottom left is a help guide for user. The viewport fills top 66% of the broswer window which is resizeble with an undistorted image. The camera is a perspectve camera with 30-degree FOV.

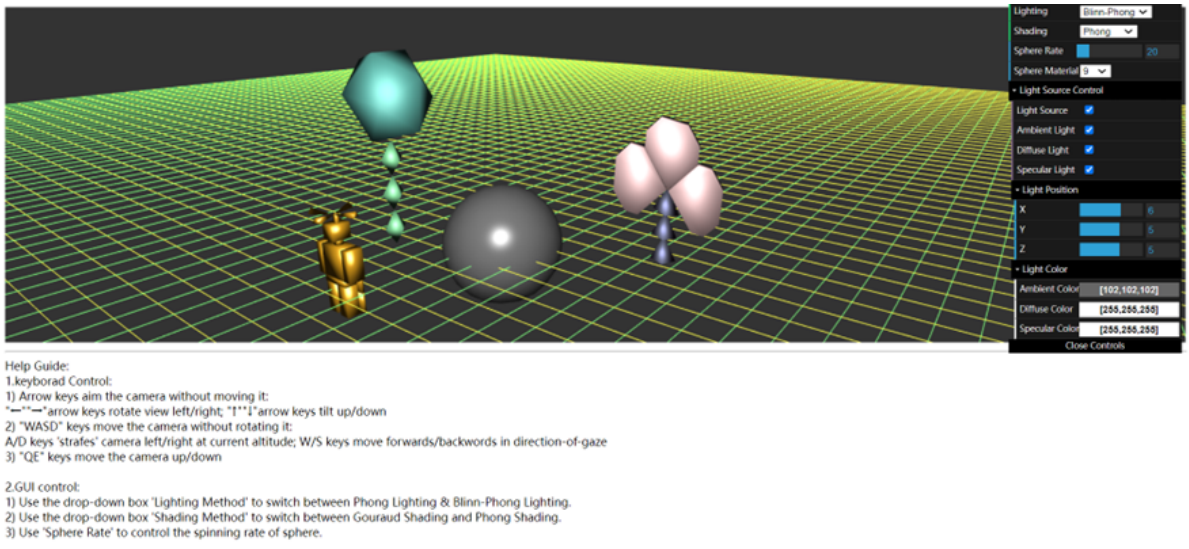

Fig 2 Project Overview

2.1 Lighting and Shading Methods

Fig 3 shows the result of Phong lighting with phong shading.

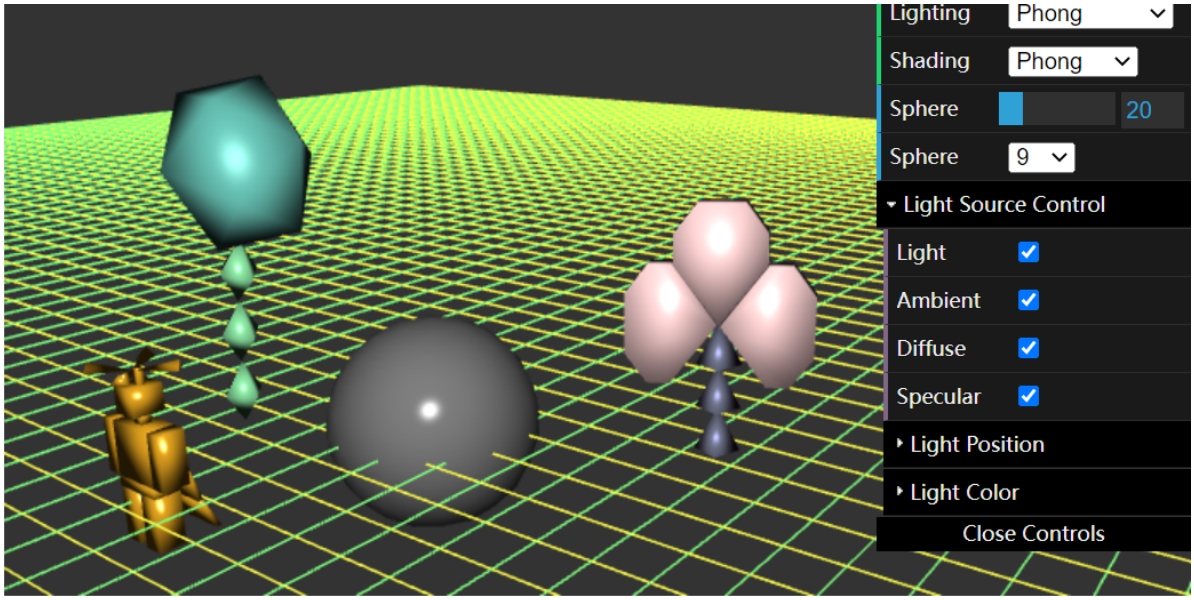

Fig 3 Phong Lighting with phong shading

Fig 4 shows the result of Blinn-Phong lighting with phong shading.

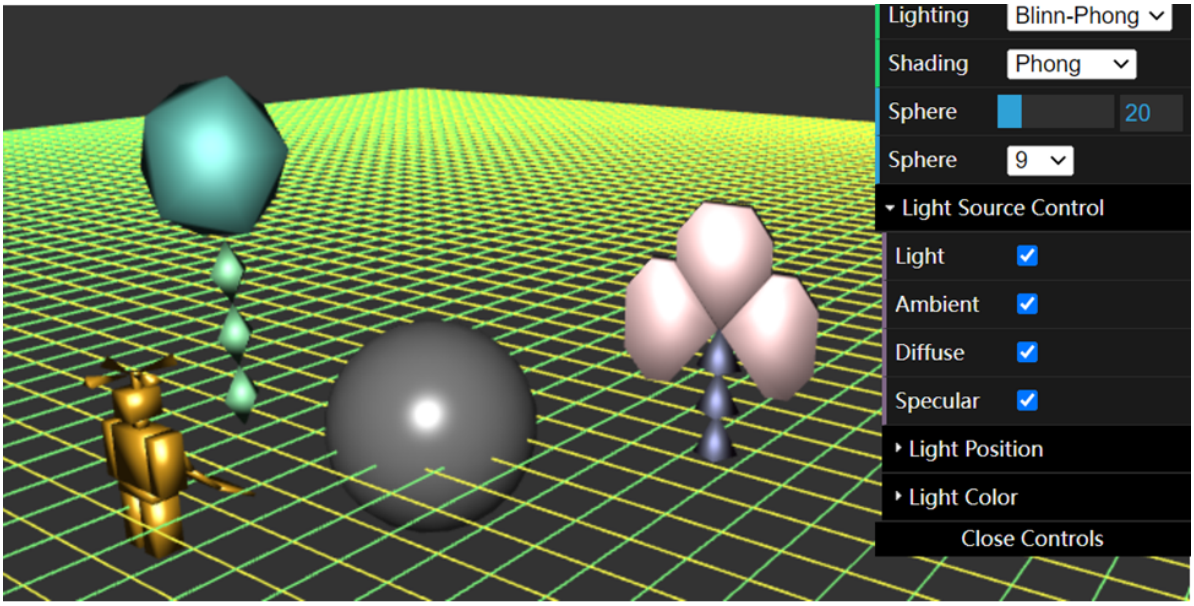

Fig 4 Blinn-Phong Lighting with phong shading

Fig 5 shows the result of Phong lighting with gouraud shading.

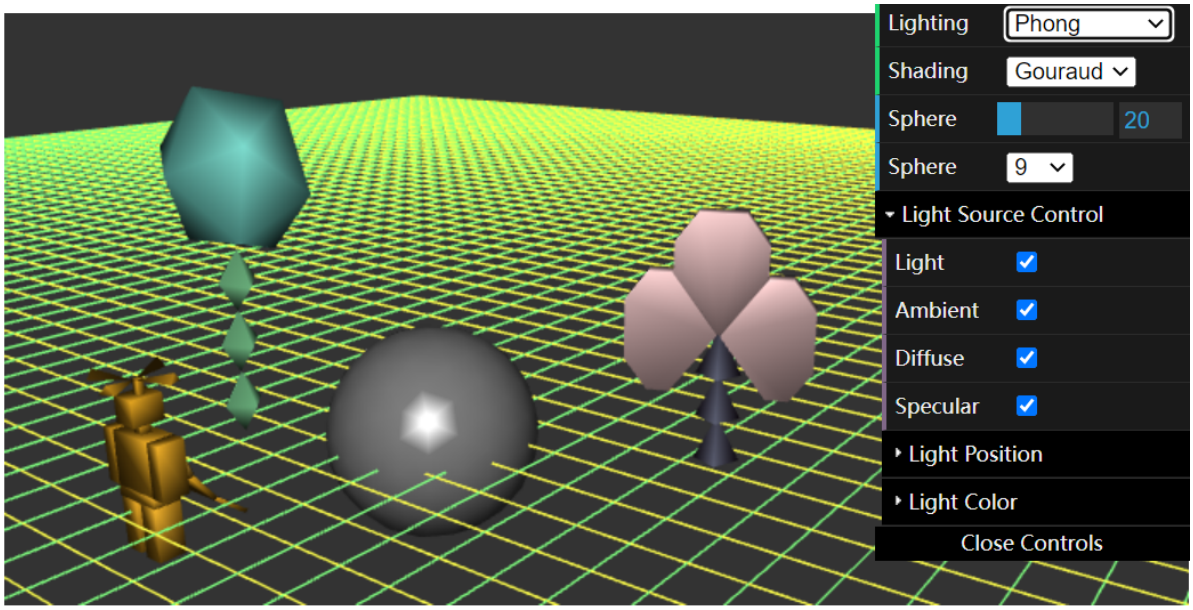

Fig 5 Phong Lighting with Gouraud shading

Fig 6 shows the result of Phong lighting with gouraud shading.

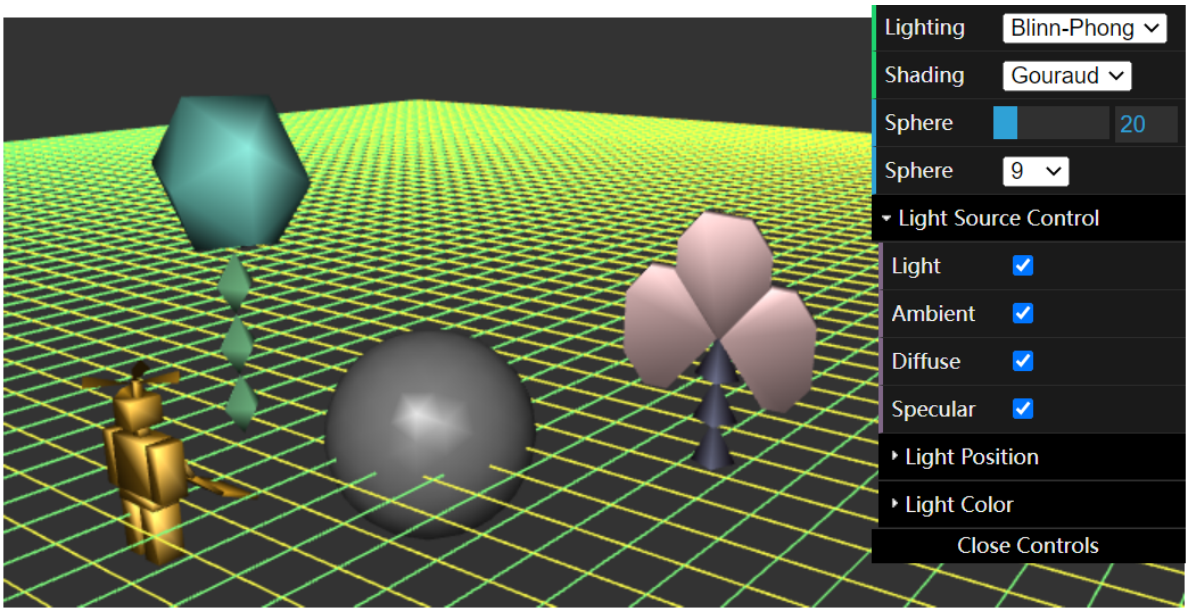

Fig 6 Blinn-Phong Lighting with Gouraud shading

2.2 USer Adjustable Light source

Through GUI control menu, user can iteractively adjust the light source (position, on/off and RGB value of each component). Fig 7 is a example of changing light position.

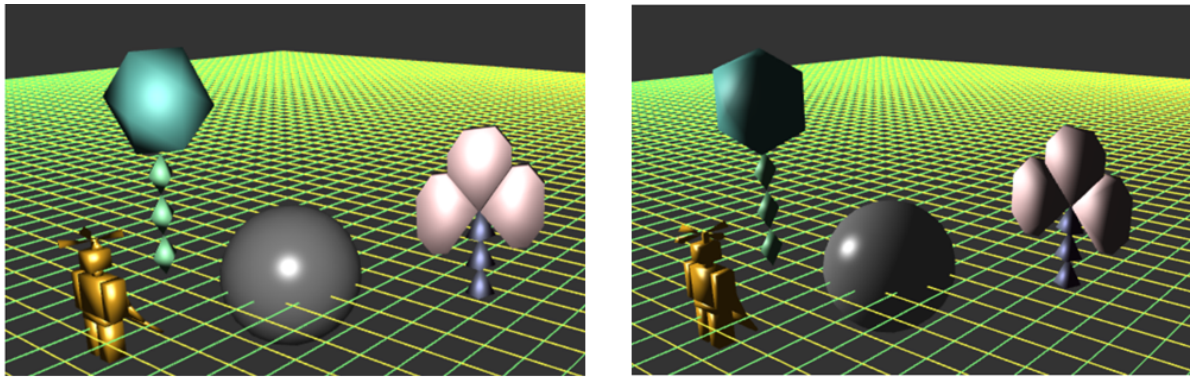

Fig 7 Example of changing light position

Fig 8 is a example of changing the color of light component.

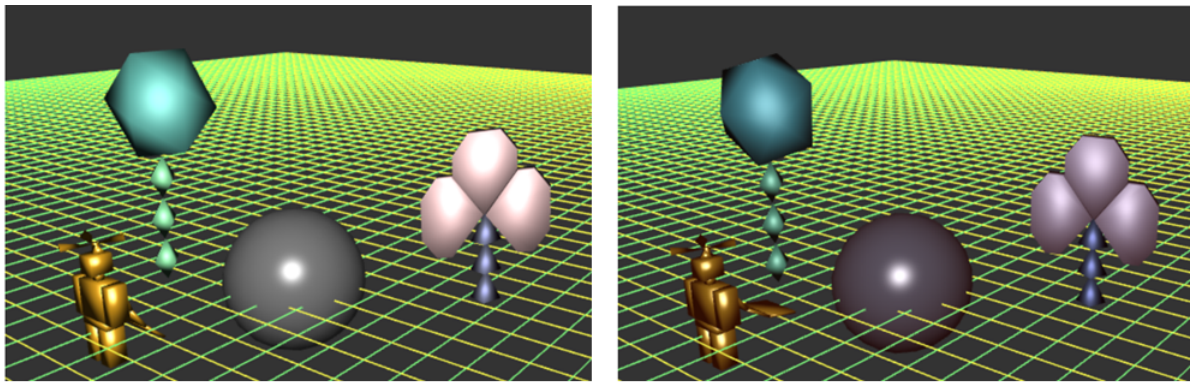

Fig 8 Example of changing the color of light components

3 Scene Graph

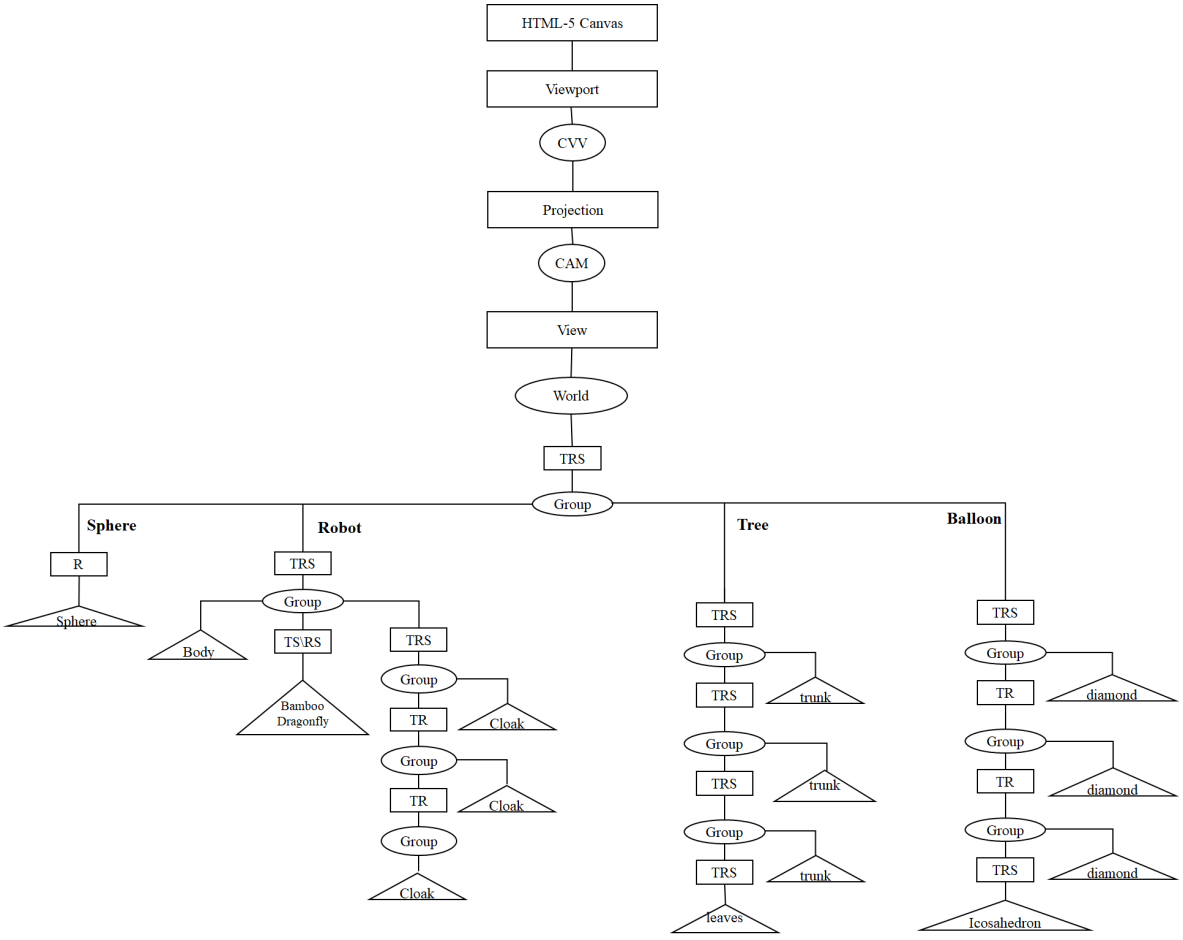

Fig 9 Scene Graph