

Project C: The Bending & the Smooth

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User's Guide

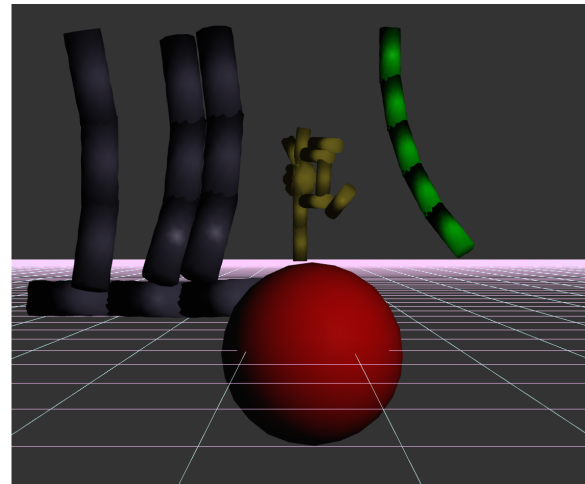
Goals

The goal of this project is to create a 3D environment that showcases multiple shading & lighting modes, namely Gouraud Shading, Phong Shading, Phong Lighting, and Blinn-Phong Lighting. The user should be able to select which lighting mode or shader they want and the world should update without any other noticeable change. With this, lighting and materials are also showcased in an animated setting.

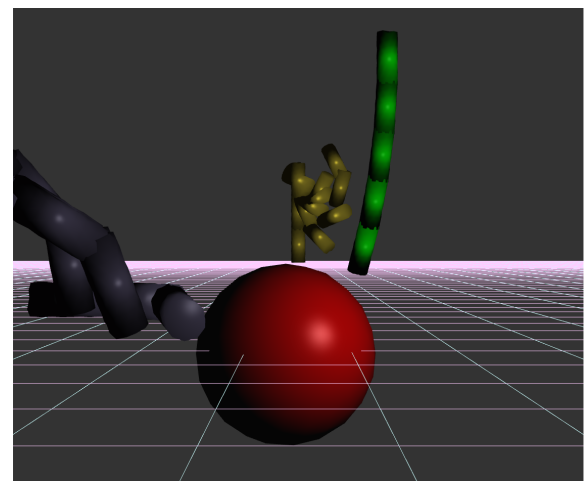
Instructions

- To move around the world, use WASD.
- To rotate the camera, use the Arrow Keys.
- To turn the Light on and off, check or uncheck the "Light On" checkbox.
- To select lighting and shading, click the "Gouraud Shading" or "Phong Lighting" dropdown menu and select your desired method.
- To edit the Light properties, move the sliders located at the bottom of the screen or enter your desired value manually at the entry box to the right of the slider.
- To select a sphere material, click the "Red Plastic" dropdown menu and select your desired material.

Results



Above is the scene without any changed values in the instructions. The background shapes are moving and flexing continuously.

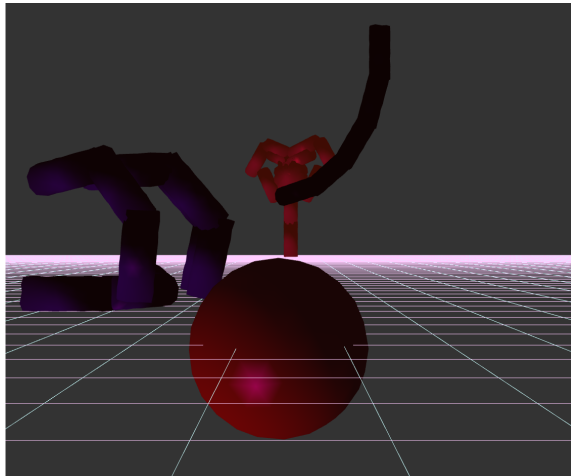


Above is the scene with Phong Shading and Blinn-Phong lighting, with no other changes made to the other settings.

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INSTRUCTIONS: Use WASD to move around. Use the arrow keys to rotate the camera.
Select lighting and shading: Select Sphere Material:

Light

☒ Light On

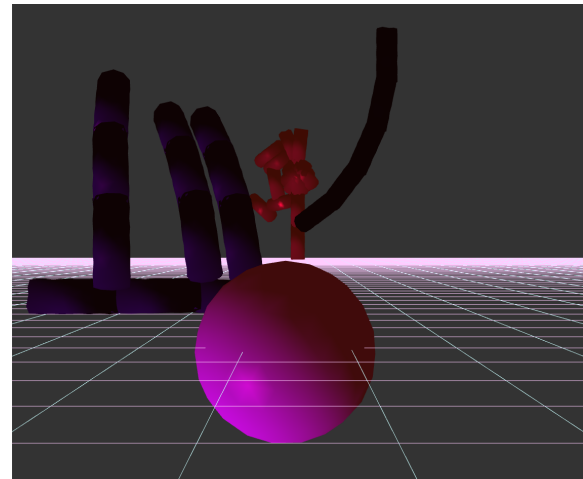
Position		Ambient		Diffuse		Specular	
X	4.4	R	1	R	0.53	R	1
Y	-9.6	G	0.2	G	0	G	0
Z	-10	B	0.2	B	1.0	B	1

This is an extreme example of the changes to the lighting parameters. The light was moved towards -Y & -Z, the Red ambient term was set to 1, the Red diffuse term was set to 0.53 and the Green diffuse term was set to 0. The Red & Blue Specular terms were set to 1 and the Green diffuse term was set to 0.

There are some notable things displayed in the new scene:

1. Setting the green diffuse and specular values to 0 has rendered the green pendulum string on the right completely black.
2. The extremely red ambient value has added a visibly red tint to the formerly yellow structure in the center-back.
3. The booted red and blue diffuse values with the green diffuse value set to 0 has rendered the gray structure on the left a dark purple.
4. The change in lighting position is reflected on the sphere.

5. The specular reflections on the sphere are pink representing the high Red and Blue values.



INSTRUCTIONS: Use WASD to move around. Use the arrow keys to rotate the camera.

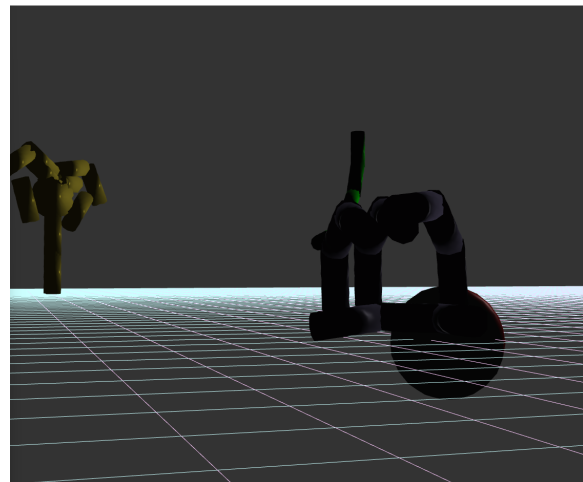
Select lighting and shading: Select Sphere Material:

Light

☒ Light On

Position		Ambient		Diffuse		Specular	
X	4.4	R	1	R	0.53	R	1
Y	-9.6	G	0.2	G	0	G	0
Z	-10	B	0.2	B	1	B	1

As seen above, setting the sphere material to "Pearl" brightens its shadow and distorts itself from the original much more. The values have remained the same from the previous image.

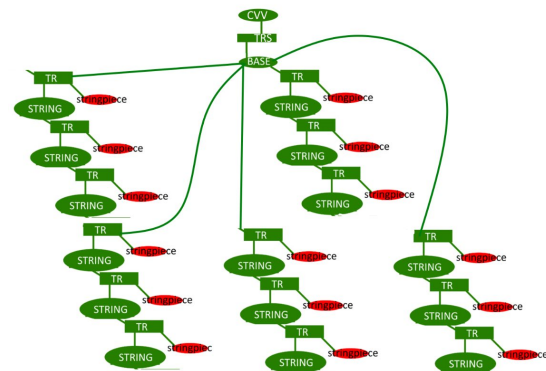
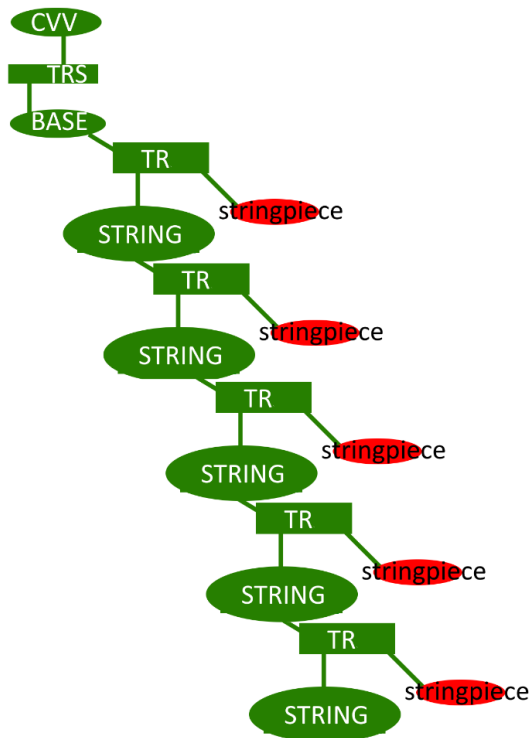


Another angle of the 3D world using Phong lighting and shading.

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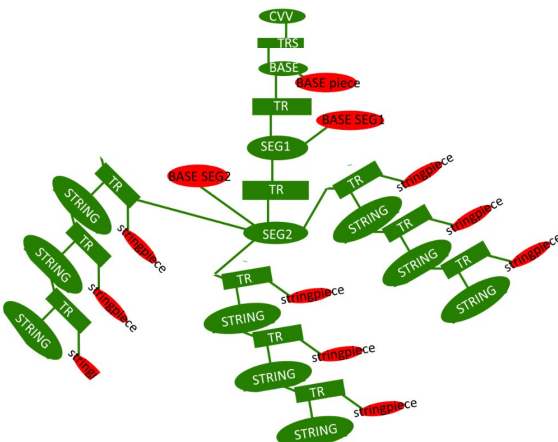
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Above is the scene graph for the yellow rotating creature seen in the center of the world.

Above is the scene graph for the green flexing "string" on the right of the screen.



Above is the scene graph for the gray flexing "creature" on the left of the screen.