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Sll411

Project C: Exploration of Shading and Lighting in the Virtual World

Goals

The main goal of this project was to develop more realistic rendering of objects through the use of interactive Phong lighting and shading. This project also brought together past and new concepts such as movement of a camera in 3D space, and the use of individual emissive, ambient, diffuse, and specular parameters to determine objects of different materials.

User's Guide and Interactions

Instructions are printed to the browser's console.

Mouse dragging is capable of rotating Baymax through the use of quaternions.

Arrow Up/Down/Left/Right and 7 and 1 on the keypad change the eye position.

The keypad numbers 8, 4, 6, 2, 9, and 3 change the look-at position.

The keys w, a, s, and z allow camera movement diagonally.

The keys p, l, o, and k allow change in the view frustum by changing near and far.

The onscreen Dat.gui box feature with sliders and inputs on the canvas allow the user to change different parameters of lighting.

Results

Figure 1: The initial setup of the camera view. Baymax the robot, the bird, and the rocket are jointed, animated objects. Baymax's legs simulate a walking movement by moving back and forth, his jointed arm swings back and forth, while his fingers bend with each swing. The bird's leg and toe joints move back and forth and it's beak also moves. The rocket moves up and down, while the boosters and flames are also translated.

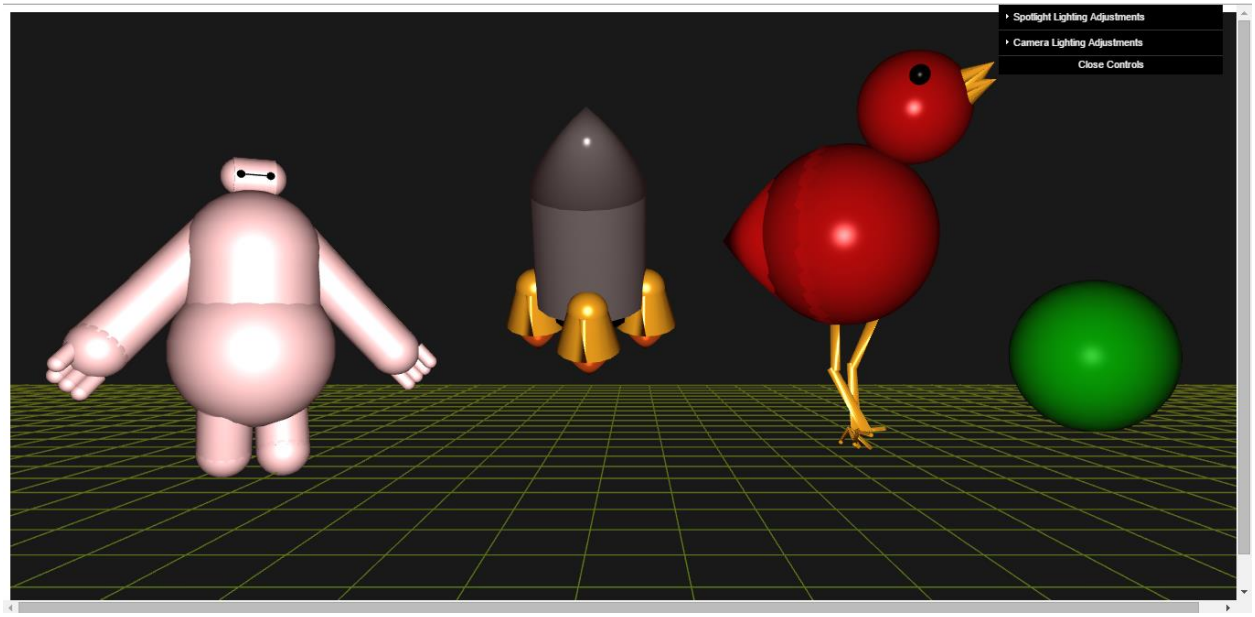

Figure 2: Changing the camera's eye point, will change the lighting on the objects as one lamp is attached to the camera.

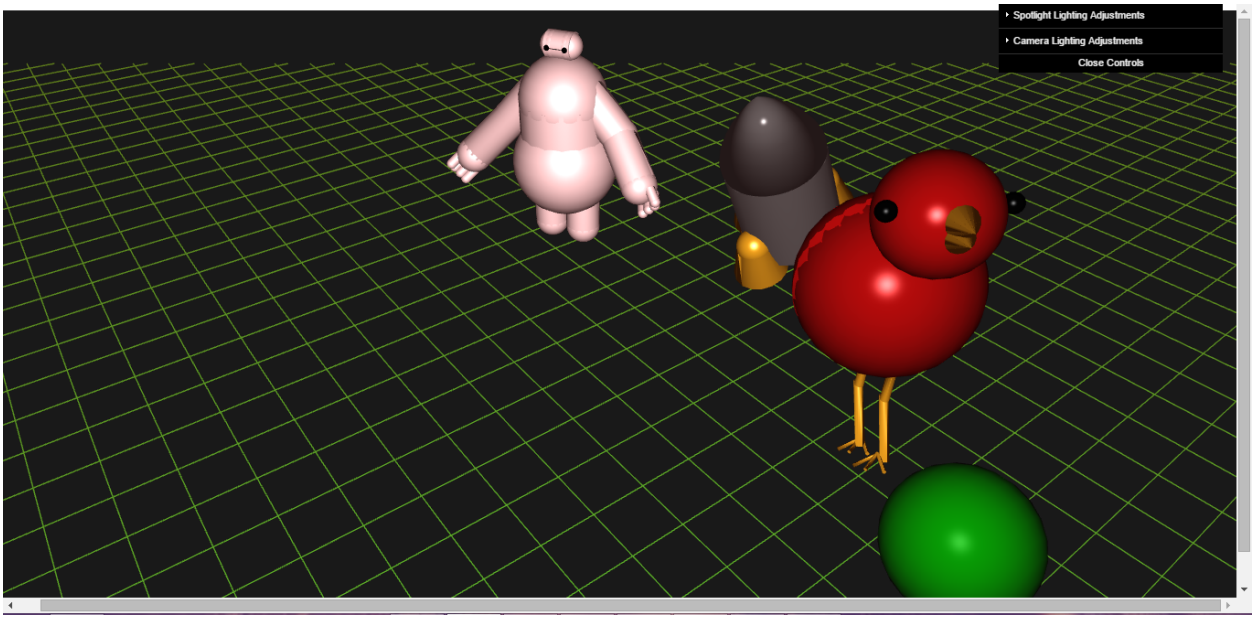

Figure 3: The Dat.gui console allows the user to change lighting parameters for the camera light.

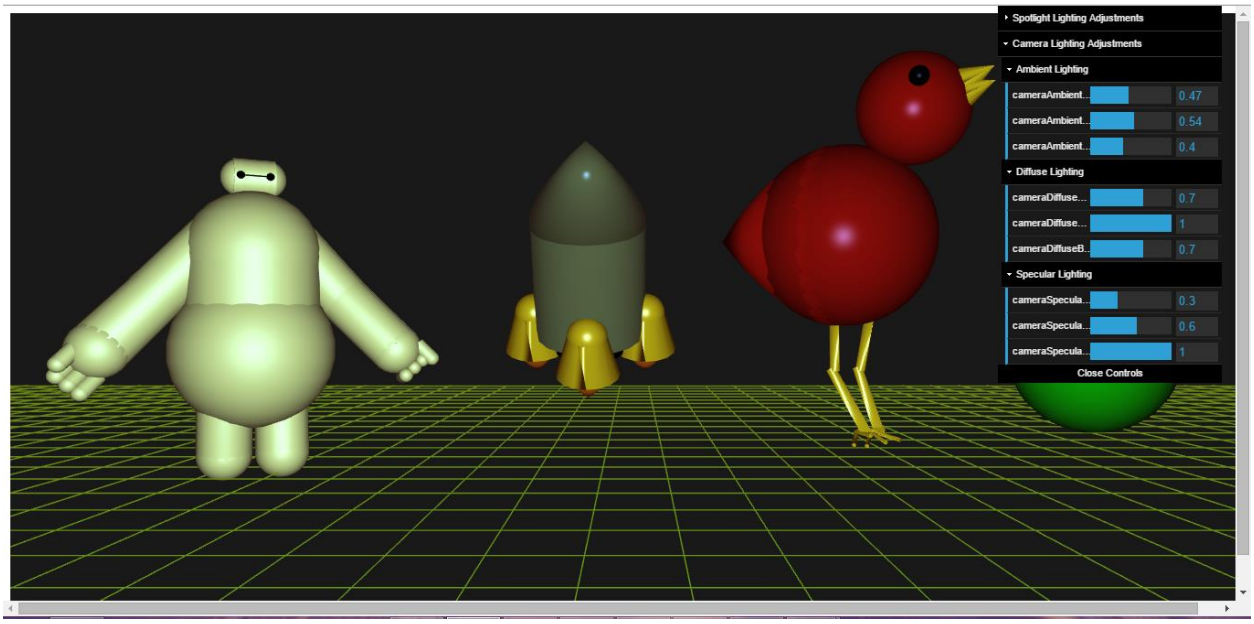

Figure 4: There exists an additional spotlight. The lamp position, the focus it's pointing at, and its lighting properties are user-adjustable by the dat.gui console. The two light sources are visible in the illustration below.