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Project B: Super Reflective Dull Copper, Pearl, and Black Rubber

User's Guide

Goals: My goals kept shifting because I underestimated how much finals work I would have and it was all due within the span of two days. Still, I'm really surprised I was able to complete the required elements besides anti-aliasing and including 3 new shapes in each scene, which was my goal as things got busier down the stretch.

Instructions for interaction:

A and D to strafe left and right respectively, W and S to move forward and backward respectively, mouse drag to aim the camera in the WebGL preview, t to trace, Q and E to strafe up and down respectively. The text boxes allow you to place the light sources anywhere you wish, independently of each other. Be sure to press the submit button, and then trace to see the new image. It's the same deal with the light on/off buttons for both lights as well: click them, trace, and observe the change. The recursive depth button will allow for a depth of 8 and then roll over to 0. It defaults to 1. Finally, the change scene button allows you to look at four distinct scenes of differently sized spheres made of different phong materials in different positions. Sometimes, the program is very slow, so you might want to switch the recursive depth to 0. It also helps to see differences between the dull copper, pearl, and black rubber phong materials

Results

From Figure 1, it is apparent that I have sensible and clear user instructions, as well as 2 view ports– the left with a WebGL preview, and the right with a ray traced image of said preview. Furthermore, the positions of the geometry in each viewport are the exact same, which you will notice in other figures and when trying the program as well. This scene, like all the other scenes, includes 3 differently sized and positioned spheres with different phong materials.

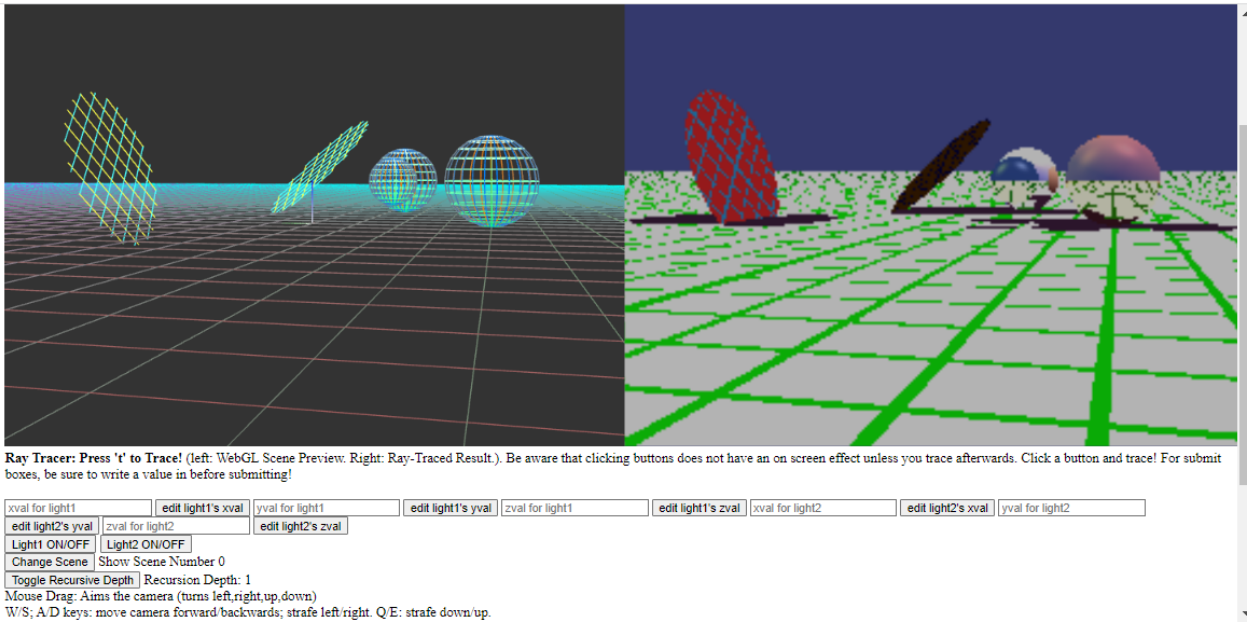

Figure 1: My default scene (0).

In Figure 2, you can see scene 1 with light1 turned off. There is now only one specular term being calculated, which is why only see one shiny spot on the spheres. Notice also that the shadows are in a different spot to Figure 3, since the light sources are on different sides of the spheres. Notice also that the darkest sphere in Figure 2 (which is the black rubber sphere) reflects a dark image of the pearl sphere because of the black rubber's very dark material parameters.

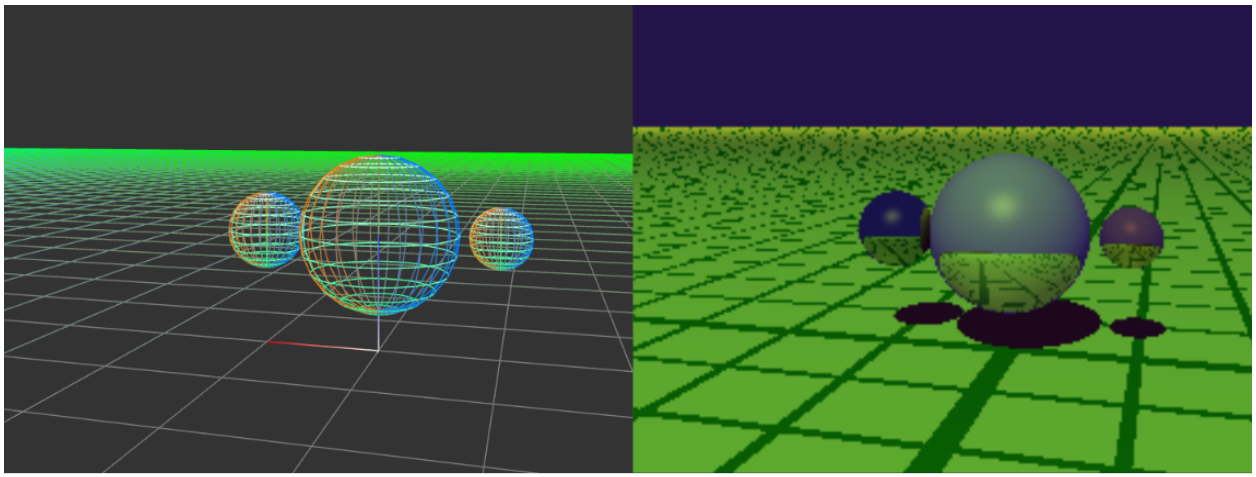

Figure 2: Scene 1 with light1 off.

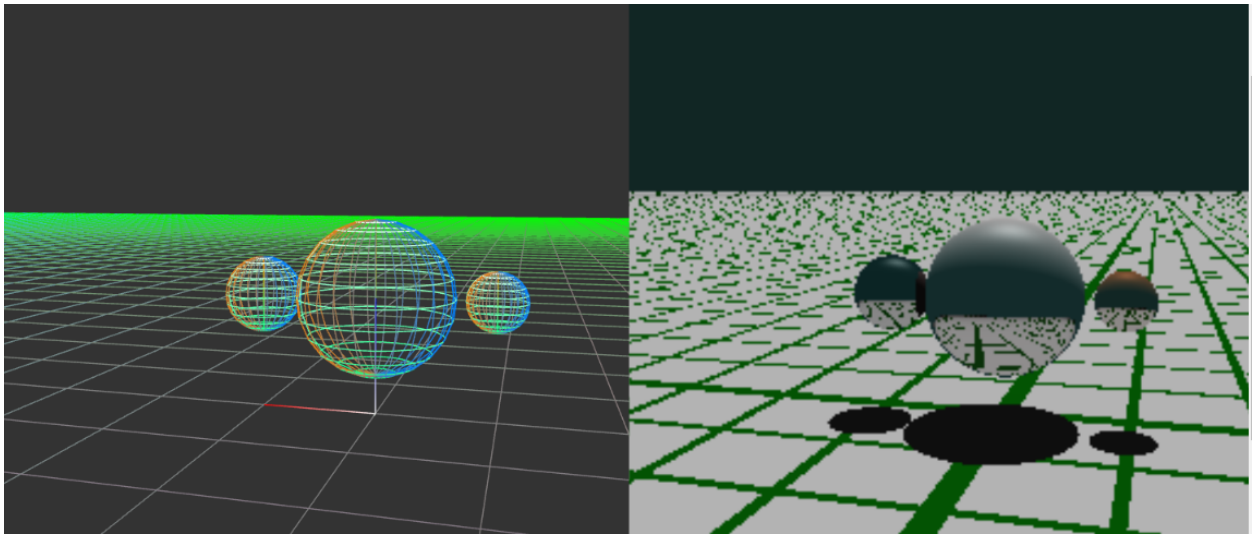

Figure 3: Scene 1 with light2 off.

In figure 4, you can see the phong materials a little more nakedly since reflections are off. In figure 5, you can see how the image looks with recursion depth at 8, which makes the dull copper sphere in particular gain a lot of reflective images.

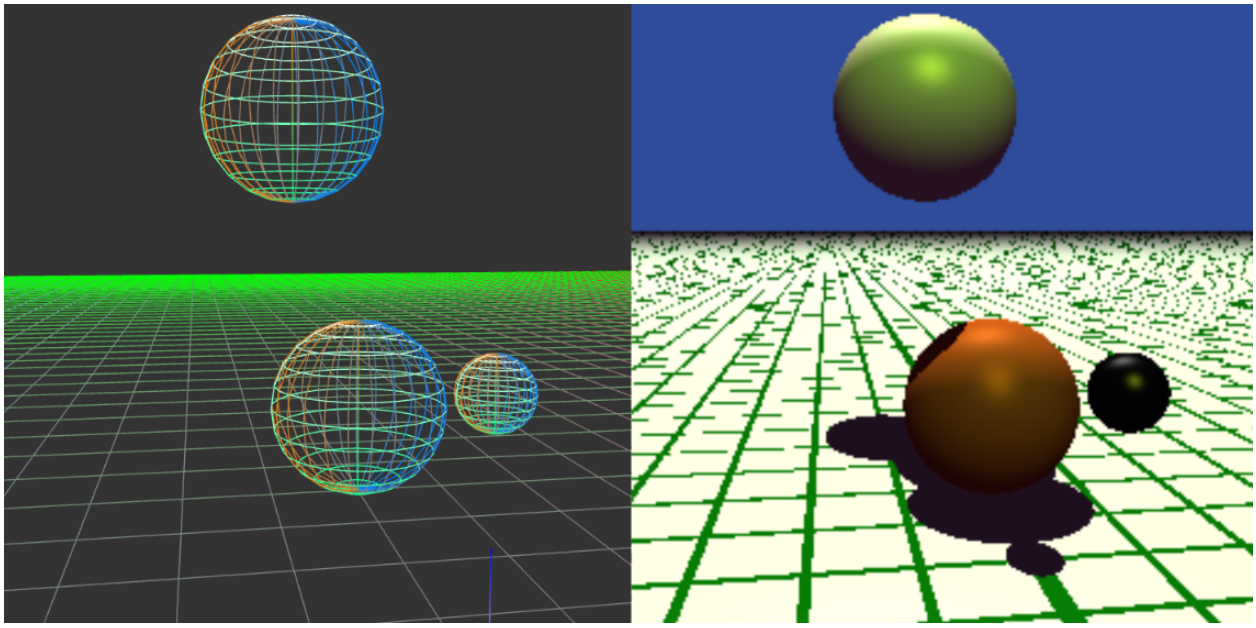

Figure 4: Scene 2 with recursion depth at 0.

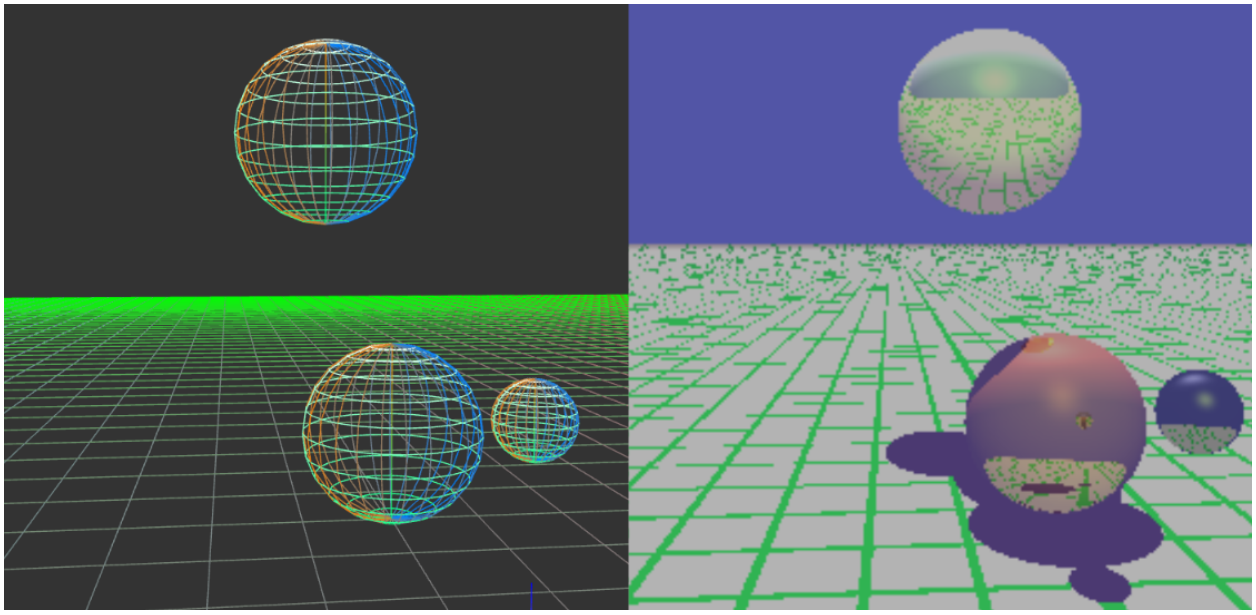

Figure 5: Scene 2 with recursion depth at 8.

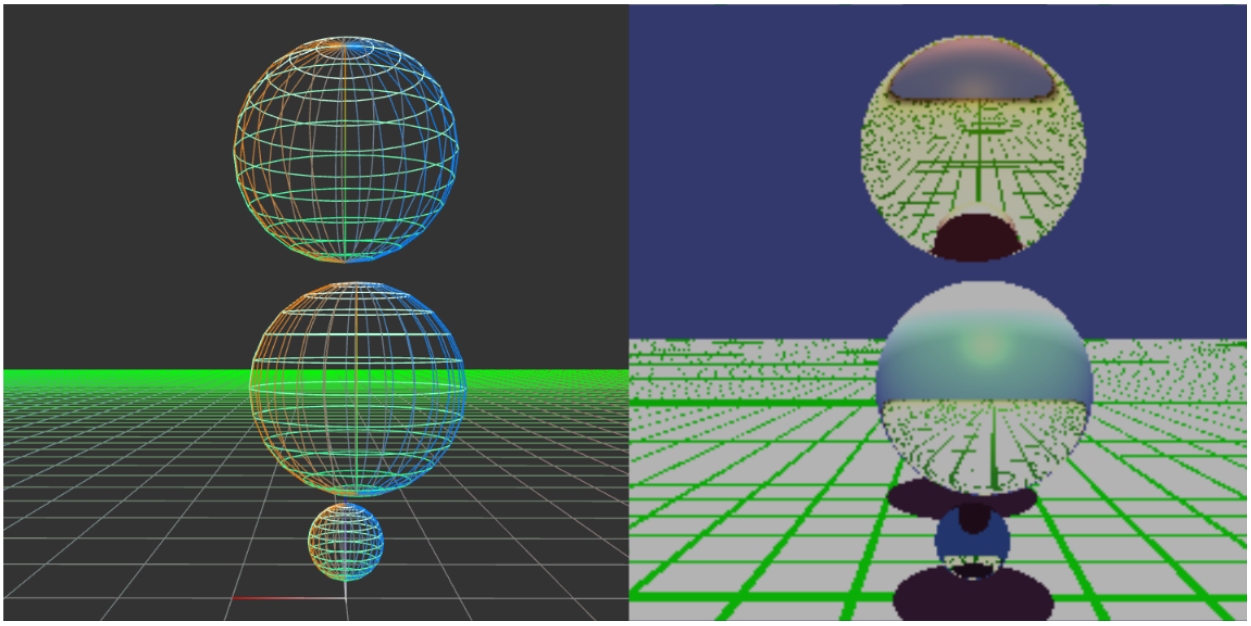

Figure 6: Final scene, scene 3 with the lights placed in different locations.

Admittedly, scene 3 is a lot like scene 2, but ultimately it is still distinct from it. Also, the middle sphere is ⅔ the size of the top sphere, and the bottom one is ⅓ the size of the top sphere.
Please refer to my video to see the camera movement in action, as well as many previously mentioned features such as light adjustment and reflections that are more comprehensible with video.

I did not complete any optionals.