

Assignment 3 Report

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ACM Reference Format:

Aman Mehra - 2017017. 2020. Assignment 3 Report. 1, 1 (November 2020), 6 pages. <https://doi.org/10.1145/nnnnnnnn.nnnnnnnn>

1 OVERVIEW

The code implements the following -

- Triangle class extension to Object class
- Blinn Phong Shading
- Shadows
- Reflection and Refraction
- Schlick's approximation and Beers Law.

2 SCENES

There are three scenes that have been used to depict various aspects of the assignment.

2.1 Scene1

This scene comprises 5 spheres along with a triangle. These objects are bounded on my walls and a floor. There are walls on each side and towards the back along with a floor. Both the left wall and the floor are reflective surfaces. Additionally, the large blue-green sphere in the center and the triangle to its side are reflective surfaces. The triangle additionally exhibits high specularity as well. There are two red spheres. The one closer to the camera lying on the floor is has a matte surface, while the suspended red sphere further back exhibits specularity and is reflective. The two smaller orange spheres are translucent and refract light. These spheres are also capable of obey Beer's Law and use Shlick's Approximation.

The scene is illuminated by three point sources of light positioned on either side of the camera in a plane above it. Two light sources are to the right while one light source is to the left of the camera's gaze direction.

2.2 Scene2

The second scene consists of two spheres placed one behind the other. The sphere nearer to the camera is translucent and hence displays refraction. The sphere at the back has a matte surface. The scene is illuminated by 4 point light sources. Each light source is placed roughly 20 units away from the center of the nearest sphere (the translucent one) along the x and y axes. This scene is created to primarily demonstrate the phenomenon of refraction.

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XXXX-XXXX/2020/11-ART \$15.00

<https://doi.org/10.1145/nnnnnnnn.nnnnnnnn>

2.3 Scene3

The third scene is a stripped down version of scene 1 to facilitate faster rendering. It consists of the same objects and light sources as scene one, however, it removes the side and back walls to reduce rendering time.

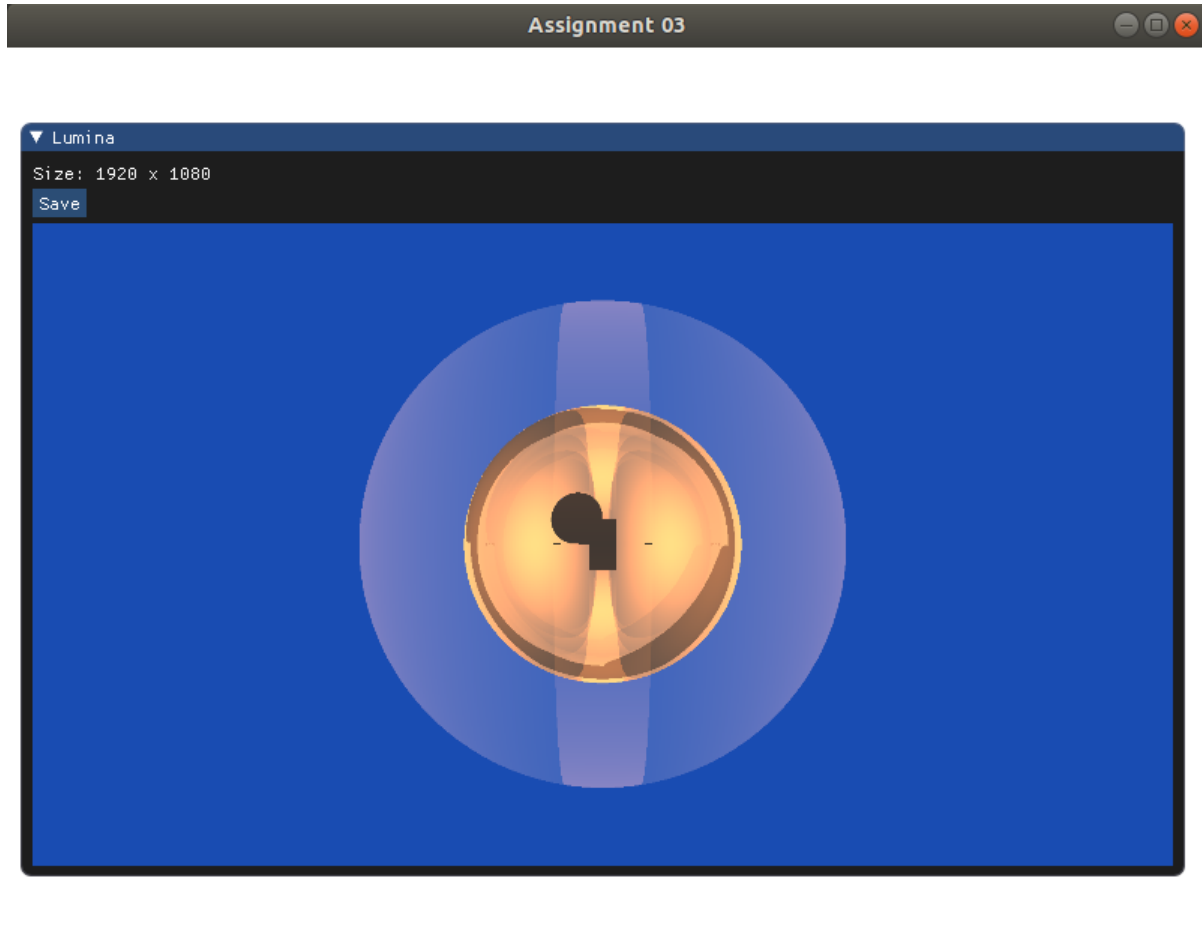


Fig. 1. This image depicts **Scene 2** and shows the refraction of the hidden sphere through the nearer translucent sphere.

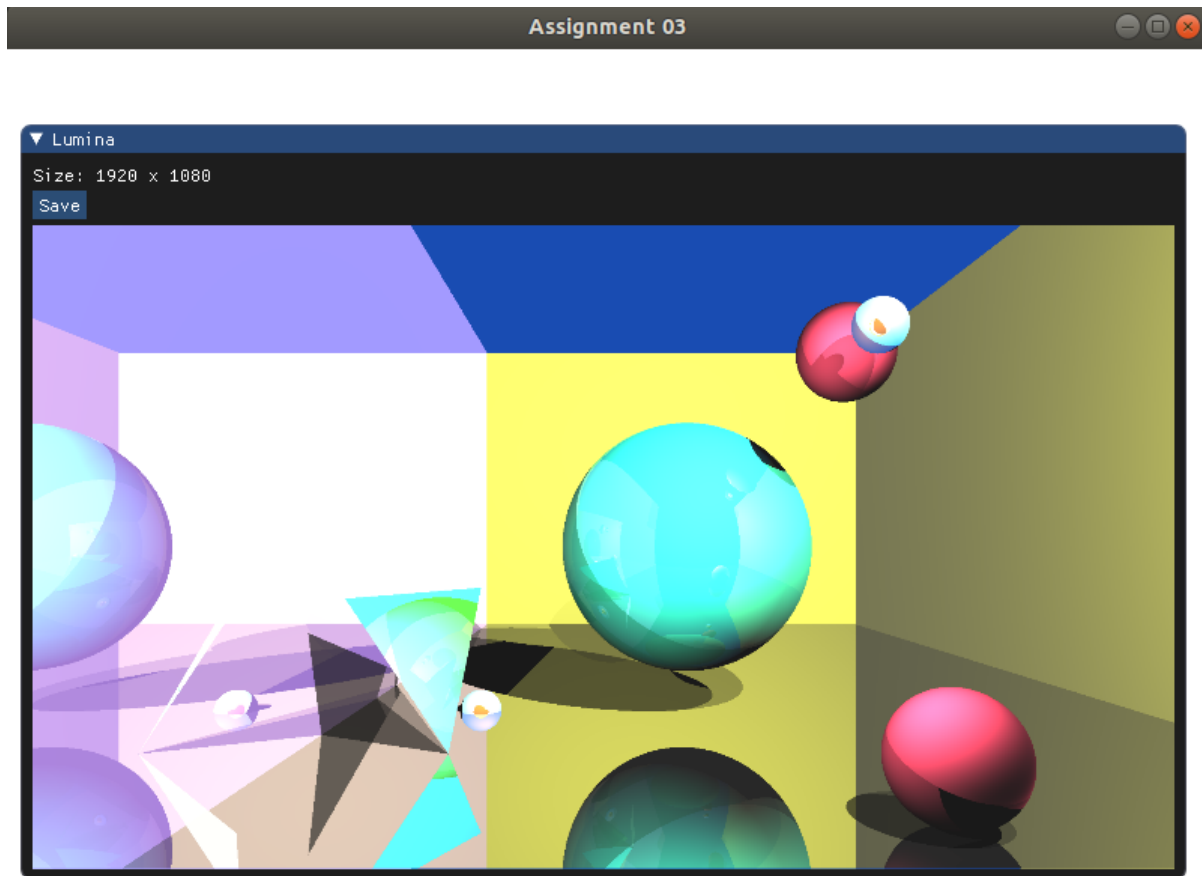


Fig. 2. This image shows **Scene 1** and implements Blinn Phong Shading, Shadows and Reflection + Refraction

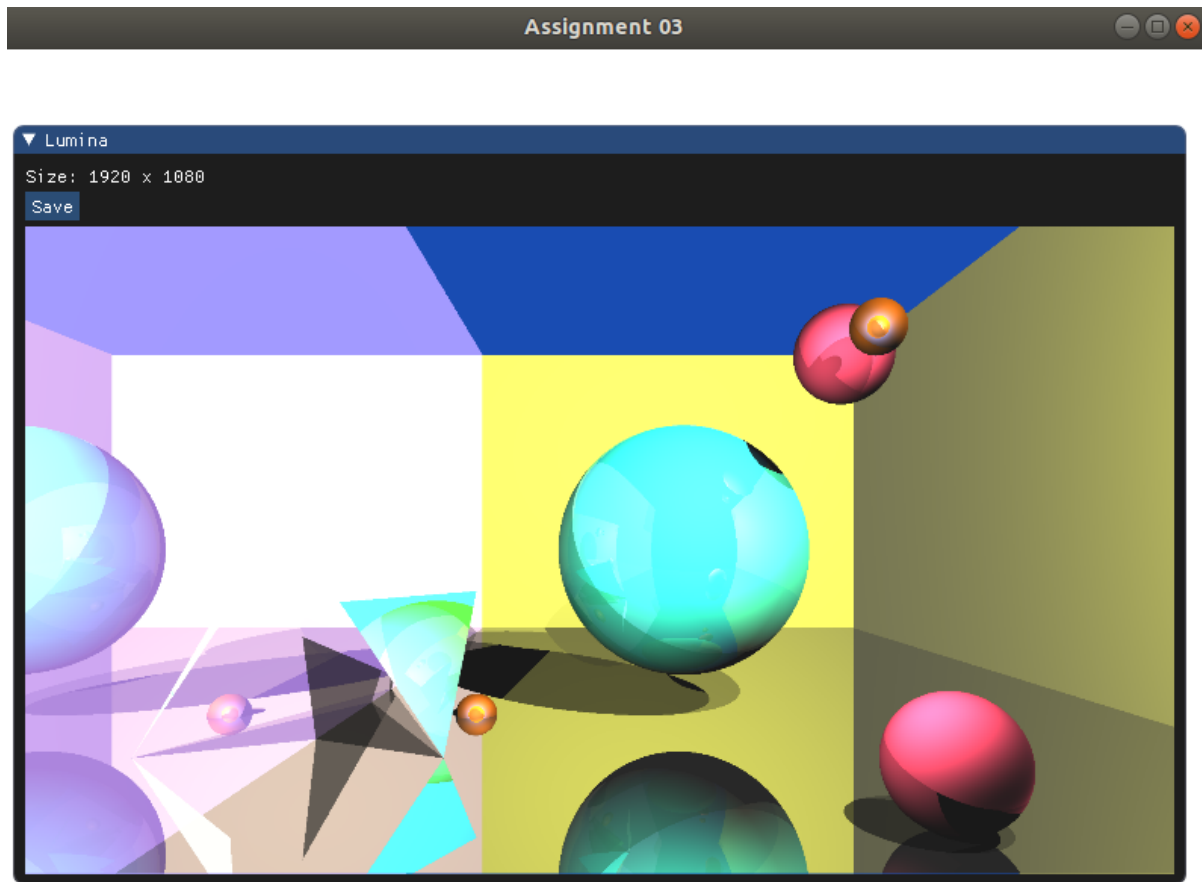


Fig. 3. This image shows **Scene 1** with addition of Schlick's Approximation and Beer's Law. Notice that the two small spheres are now orange as compared to whitish in the previous image. These are the two translucent spheres that demonstrate Schlick's Approximation and Beer's Law

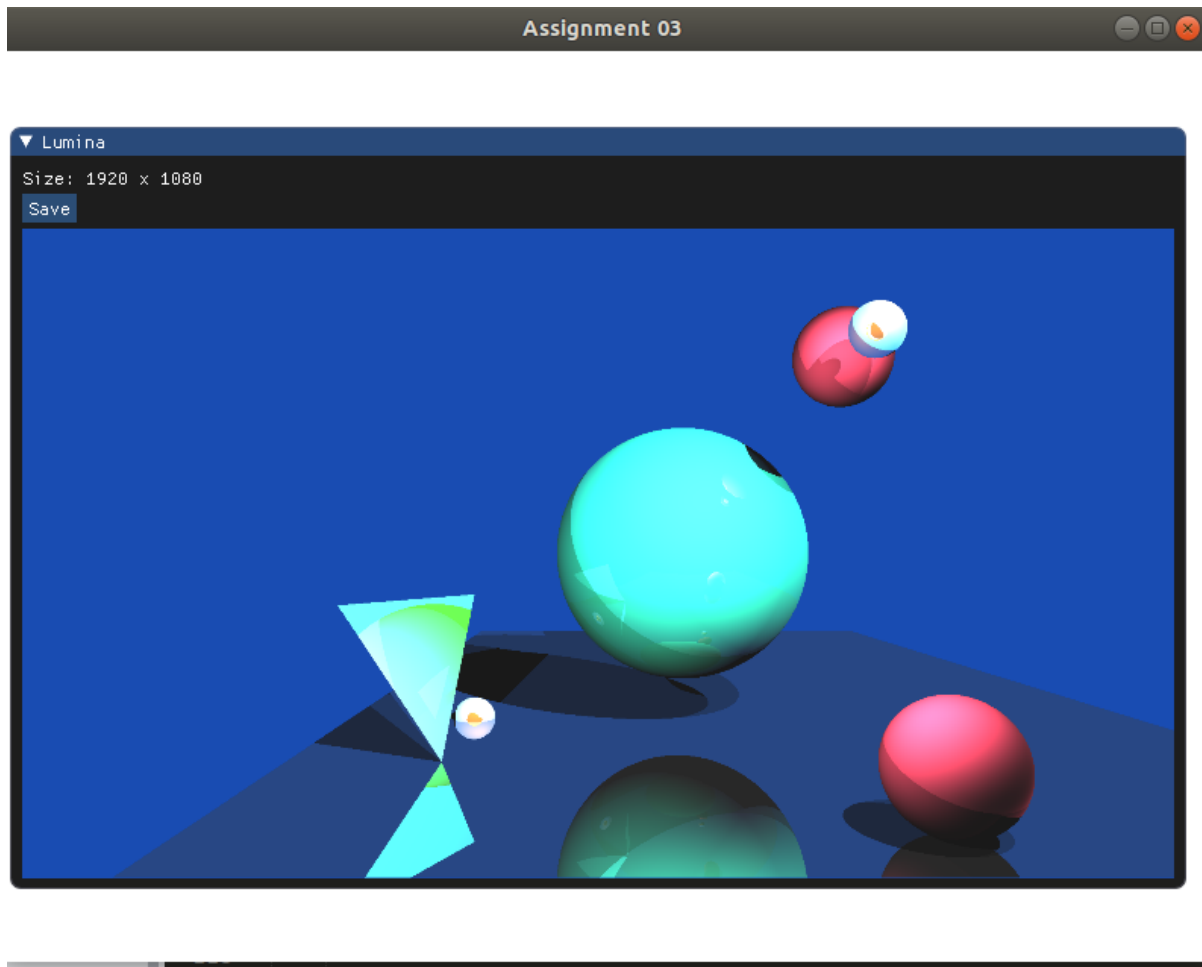


Fig. 4. This image presents **Scene 3** rendered with Blinn Phong Shading, Shadows and Reflection + Refraction. Shadows and reflections are clearly visible on the reflective ground surface.

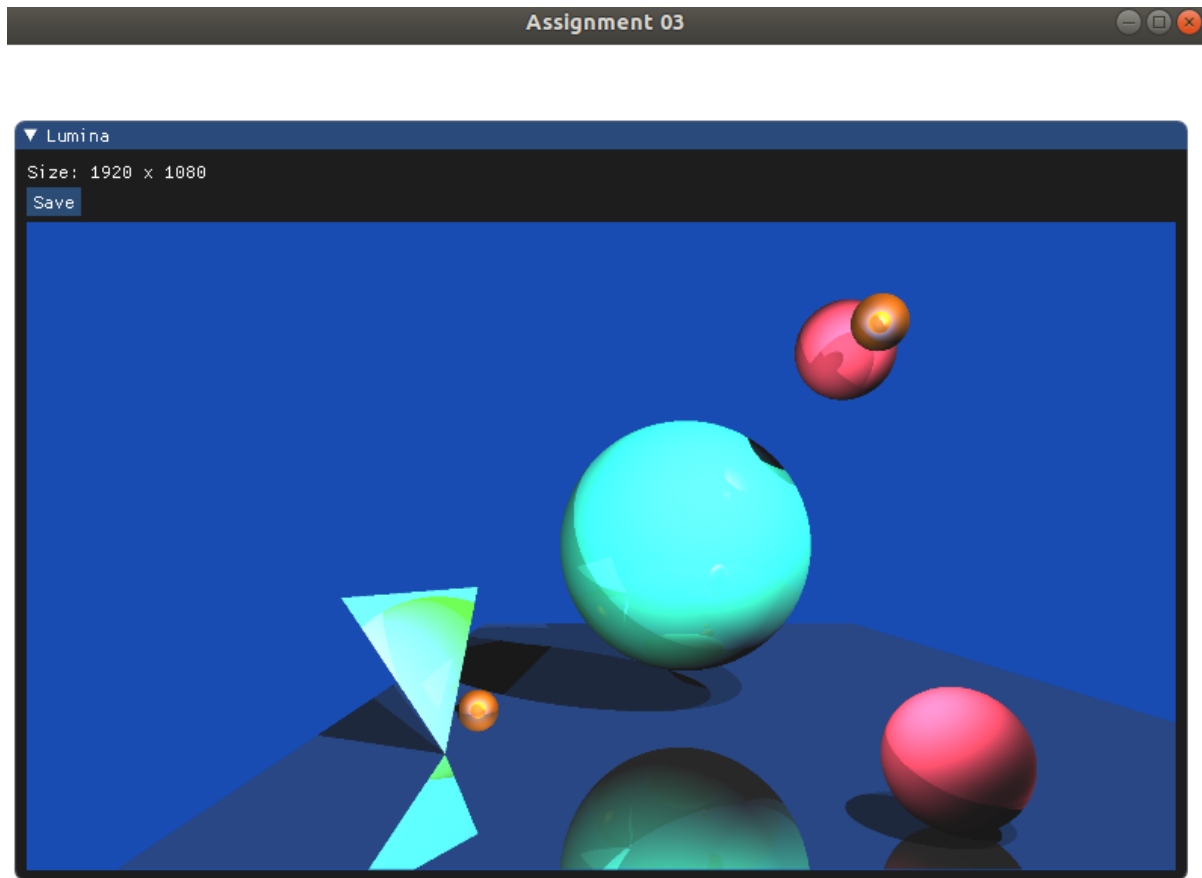


Fig. 5. This image presents **Scene 3** with the addition of Schlick's Approximation and Beers Law. Notice that the two small spheres are now orange as compared to whitish in the previous image. These are the two translucent spheres that demonstrate Schlick's Approximation and Beer's Law