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Project 4

Developer's Guide

To run the project, double click "Project 4.zip" from the UMGC submission portal. This will

download the files. If the zip file does not unzip, unzip it. In a local server, open the

SolarSystem.html file and it will display the scene in your browser.

- **Note:** The scene requires running from a local host server due to the skybox employed in

  its design. Running the file in a public web browser will not display the solar system

  scene.

Test Plan

Test - Name	Input	Expected Output	Actual Output	Pass?
Run the animation	Open the BeachDay.html file in a local server.	An animation of a rotating torus, with many rotating toruses in the background will be displayed in a skybox, with bright, overhead lighting.	An animation of a rotating torus, with many rotating toruses in the background will be displayed in a skybox, with bright, overhead lighting.	Yes
Use the mouse to rotate the scene	Using the mouse, rotate the scene to reveal the beach	The animation continues smoothly, the lighting reflects off the objects and the rotation of the central reflective object is unbroken.	The animation continues smoothly, the lighting reflects off the objects and the rotation of the central reflective object is unbroken.	Yes
Use the arrow keys to rotate the central object	Using the arrow keys, rotate the object.	An interaction of animations rotating in an elliptical fashion, without loss of smooth motion or lighting.	An interaction of animations rotating in an elliptical fashion, without loss of smooth motion or lighting.	Yes

Use the selection menu to chose other shapes	Click on another object in the menu, for example the cube.	View how the transition to the other shapes is smooth and the animation does not stop, the lighting continues to aide in the reflection within the skybox.	View how the transition to the other shapes is smooth and the animation does not stop, the lighting continues to aide in the reflection within the skybox.	Yes

Screen Captures
The file opens to the animation in the view of the skybox. The central reflective item is rotating and reflecting the light and the other objects in view.

The mouse allows for the view of the scene in the sky box. The animation continues smoothly.

Beach Day

Drag with mouse on the picture to rotate the view.
Use arrow keys to rotate the object. Home or Enter key resets view.

☑ Animate   The Reflective Object: [Torus ⬍]   [Reset]

Arrow keys allow the user to manually rotate the 3D shapes.

The user can switch between shapes to see the reflections and lighting within the scene off each one.

Beach Day

Drag with mouse on the picture to rotate the view.
Use arrow keys to rotate the object. Home or Enter key resets view.

☑ **Animate**   **The Reflective Object:** [Sphere ⇕]   [Reset]

Beach Day

Drag with mouse on the picture to rotate the view.
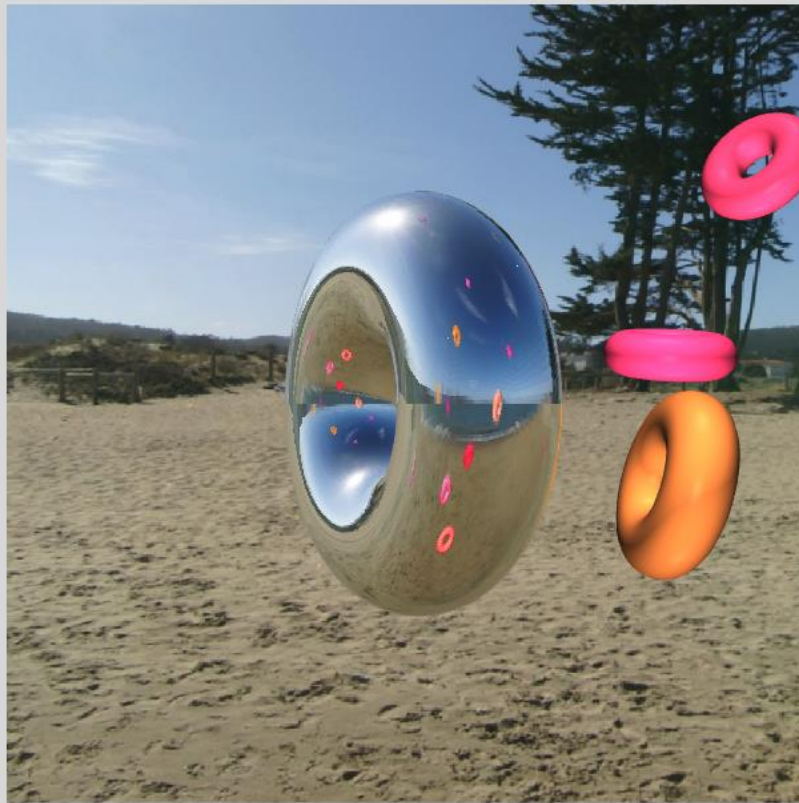**Use arrow keys to rotate the object. Home or Enter key resets view.**

☑ **Animate**   **The Reflective Object:** [Cylinder ⇕]   [Reset]
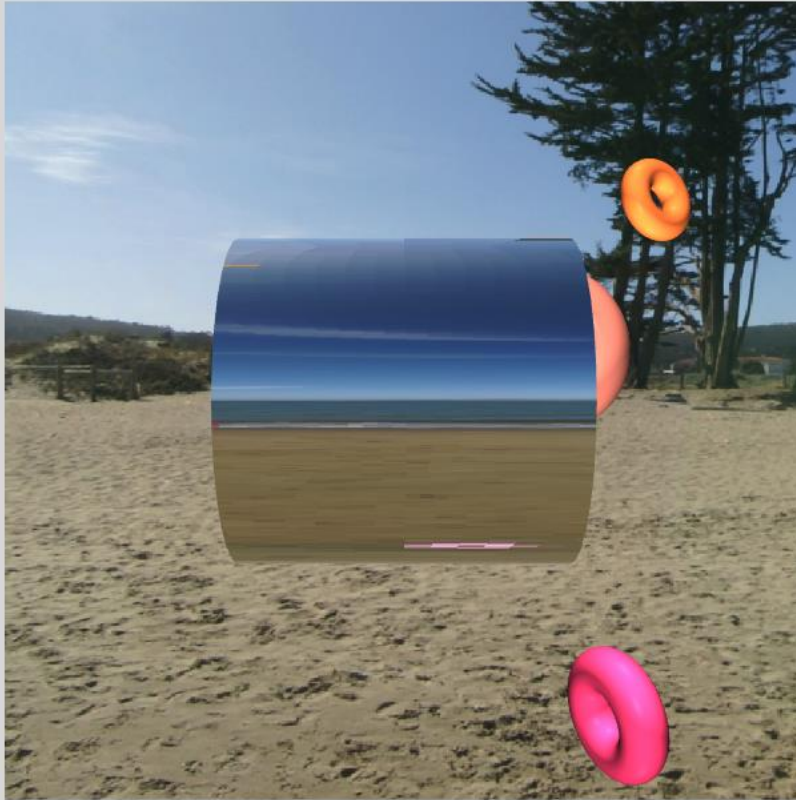
They can also completely reset or pause the animation.

Lessons Learned

WebGL is certainly a step up and another level beyond the world of JOGL and Three.js. The ability to create scenes, with dynamic lighting, reflection, and the ability to immerse the viewer in an animation is a brilliant step into the world of animation graphics. The use of the skybox in this project is what made it fun for me especially. Finding a texture to place in the "beach day" scene and being able to design a variety of lighting techniques to really make the viewer experience the scene as if they were at the shore is fantastic. I felt better able to manipulate objects in an abstract sense. Dissecting the examples and finding tools to enhance my project allowed me to develop the scene and be creative. I really enjoyed learning how to use

WebGL, and how to build upon my prior knowledge of field of view, lighting, and shapes to create a dynamic scene. Beyond that, learning how to create the reflective texture on the shapes was fascinating and a huge step up from the techniques I was enthralled with before. Understanding how the sky box and the lighting and the other shapes in the animation interacted with the rendering of the central shape really allowed me to grasp concepts involving cubemaps both dynamic and static, as well as the integration of HTML elements like selection objects.

This project helped me to have a greater understanding for how to integrate HTML and Javascript in a way I never have before. Using the HTML elements to allow the user to stop, start, reset and vary the animation was challenging but very worth it to be able to see how the reflection mapping seamlessly interacts with the skybox. I feel that I accomplished my goal of learning this animation foundation and furthering my ability to allow a user to interaction with the animation I create. I hope to use these skills further in my journey to develop both online and locally, as graphic design is in high demand.

Sources:

Graphics and WebGL

D. J. Eck.(2018, January).*Introduction to Computer Graphics V 1.2*.Hobart and William Smith Colleges.(pp. 213-312).
https://learn.umgc.edu/d2l/le/content/580433/viewContent/21625861/View

Provided WebGL example files

Skybox

http://math.hws.edu/eck/cs424/notes2013/webgl/skybox-and-reflection/skybox.html