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Project Report
CAP 4730
4/18/18

For my project, I wanted to create a web application that allows the user to play around with various aspects of a 3D scene. I specifically wanted to implement my project in a web browser, as there has been a huge rise in web graphics in the recent years. I decided to use a JavaScript library called Three.js, which uses WebGL to render 3D scenes. The application I created allows the user to adjust aspects of the perspective camera, such as the frame of view, near clipping plane, and far clipping plane. Additionally, you can toggle the meshes' wireframe on or off, and switch between various models.

The first challenge of this project was linking the Three.js library, and setting up a scene. I first had to setup the html page, and link the three.min.js file. Most web applications with 3D graphics read and write to an html5 canvas. I set the canvas to fill the entire window, and wrote a JavaScript function to resize the canvas if the window size is adjusted. Then, in order to ensure

my scene and camera were setup properly, I decided to render a torus. Three.js comes with several built in geometries such as a box, circle, cone, etc. I applied a normal material to the torus, so I could see the torus without implementing lights. This material is
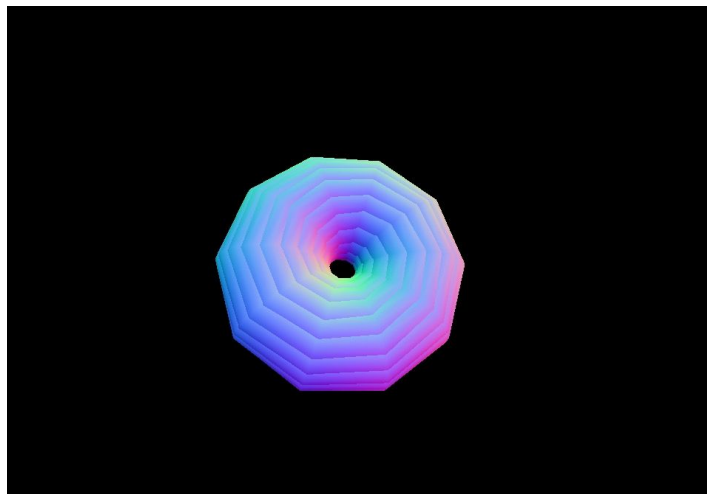
commonly used for debugging, as it applies a different colors to the mesh depending on it's normal vector.

Next, I implemented three sliders that allow the user to adjust the camera's frame of view, near clipping plane, and far clipping plane. I created an html range input and set the max and min values to be appropriate values for the given fields. I then wrote a function that maps the sliders input to the camera's settings, and updates the camera's projection matrix anytime the slider is moved. This was my favorite part of the project, as it allowed me to interact with the scene, and get a hands on feel for something that we learned about in class. At this point, I also decided to add a switch which allows the user to toggle the meshes' wireframe on or off. I thought this was a nice feature of the smooth program we used in the second homework assignment, and I wanted to add it to my program.
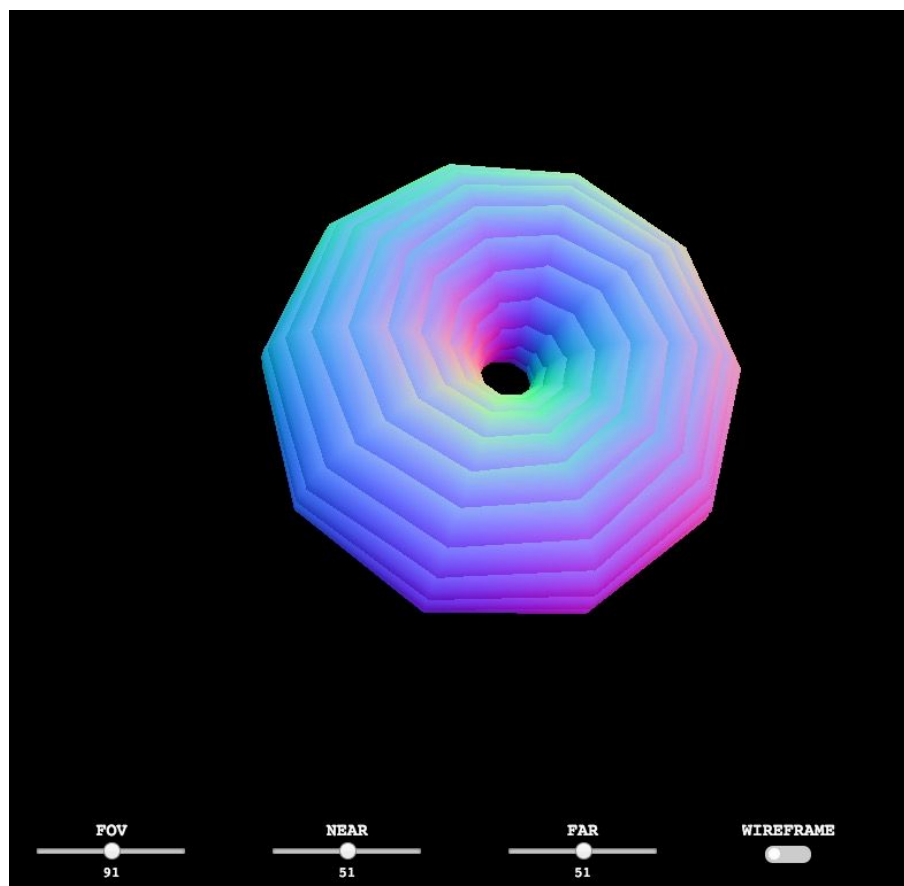
Finally, I implemented the ability to change between three different meshes. This allowed me to experiment with importing .obj models and adding textures. First, I created a box by using the cube geometry, and mapping a texture I found online. I also added a plant model that I found online. This proved to be one of the more difficult parts of the project, as loading a .obj model with Three.js is rather confusing.

In the future, in order to extend the interactivity of the scene, I would like to add the ability for the user to switch between ambient, and directional lighting. I would like to have some sort of slider that allows the user to change the direction of the directional light, and see how it affects the model. It would also be cool if they could change the color of the light.