Final Project Report

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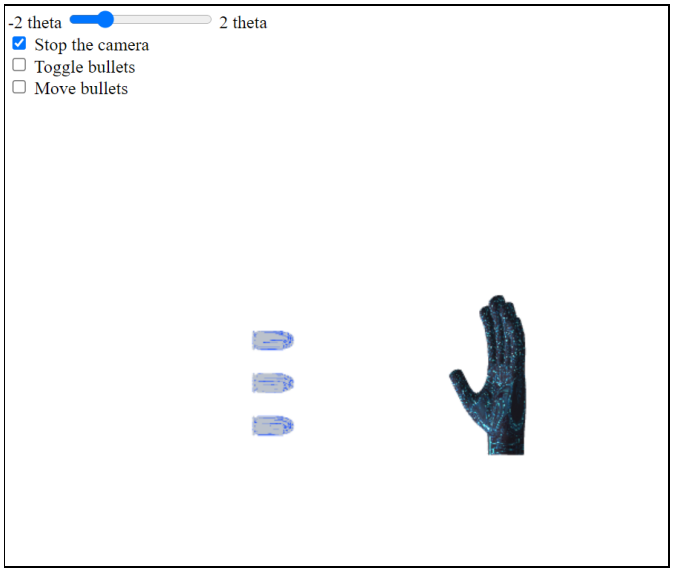
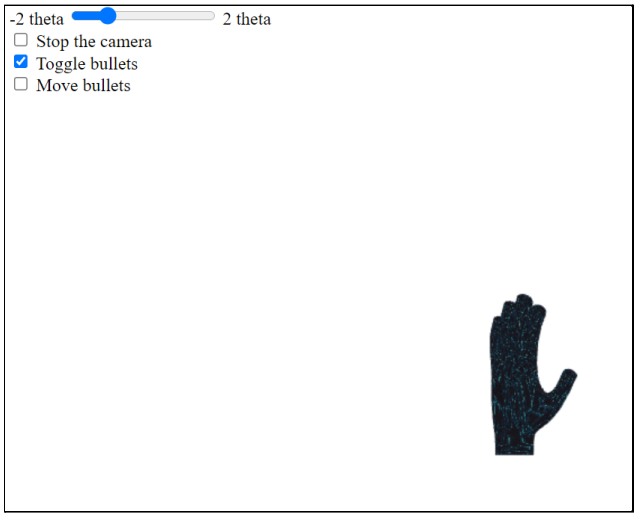
Our final project implements a scene that contains a hand and 3 bullets. It is meant to be a very simple version of the scene in “The Matrix” where Neo blocks some bullets.

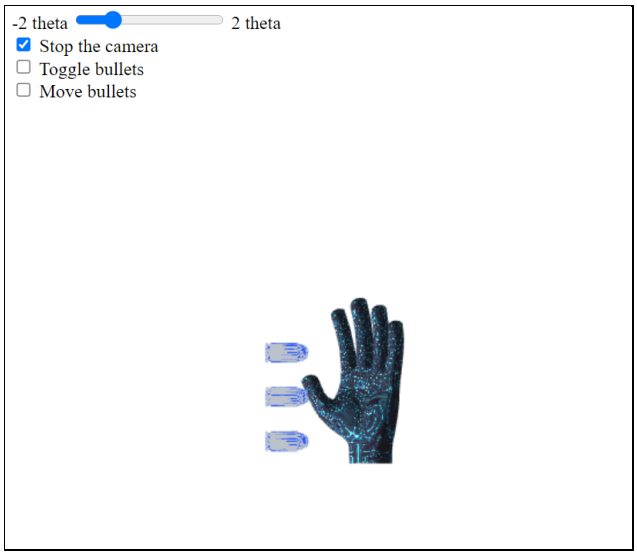
All the objects in the program are loaded using the obj loader we got from the class. Both of us tried to implement instancing to load multiple bullets efficiently but we both constantly ended up running into errors that broke the program so we ended up loading multiple bullets using loadobjfrompath(). We believe this is fine because we specified that we would use the obj loader multiple times if we couldn’t make instancing work. Loading the objects using obj loader uses the same techniques as in homework 3. Both Jerry and Noah worked on loading and rendering these objects.

The scene has 2 cameras: one orthographic camera that continually rotates around the hand in a circle and one static orthographic camera around the bullets. You can use the checkbox to stop the camera rotating around the hand. Afterwards, you can use the slider to manually rotate the camera around the hand. The slider only works once the checkbox to stop the camera is checked. The cameras were done by Noah while the event listeners / user interaction features were done by Jerry. The techniques used for the cameras are the same as in homework 3 but a circular path is used instead of an elliptical path.

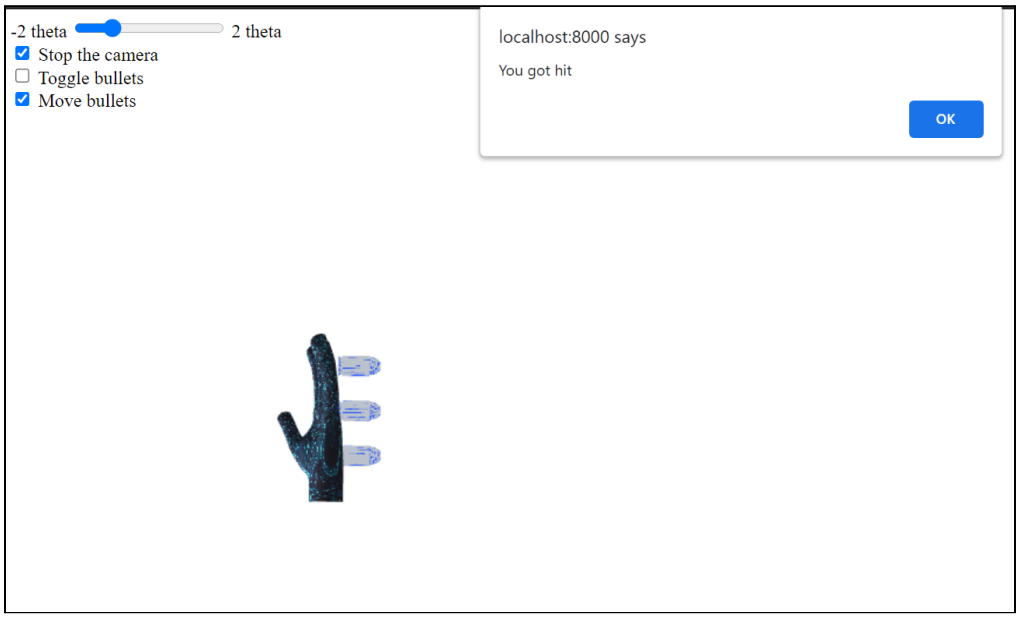
For user interaction, one can also use the checkbox to toggle the bullets which makes them disappear.



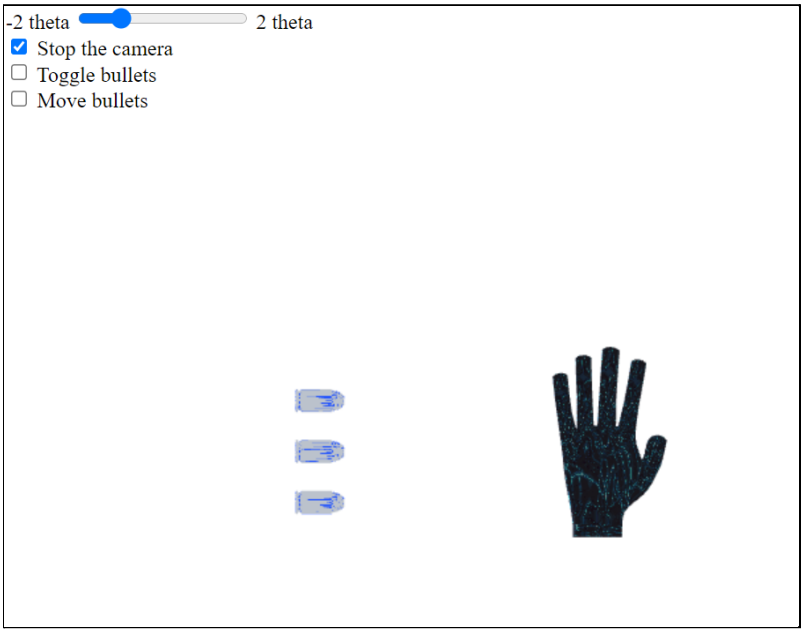




The user can also move the hand to anywhere on half the canvas by clicking the position. If you try moving the hand past the bullets, it resets to the default position because the left side is reserved for bullets.
Also, the user can also check the move bullets checkbox to make the bullets move left and right. If the bullet(s) hit the hand, a pop up will occur once that notifies the user that they have been hit.



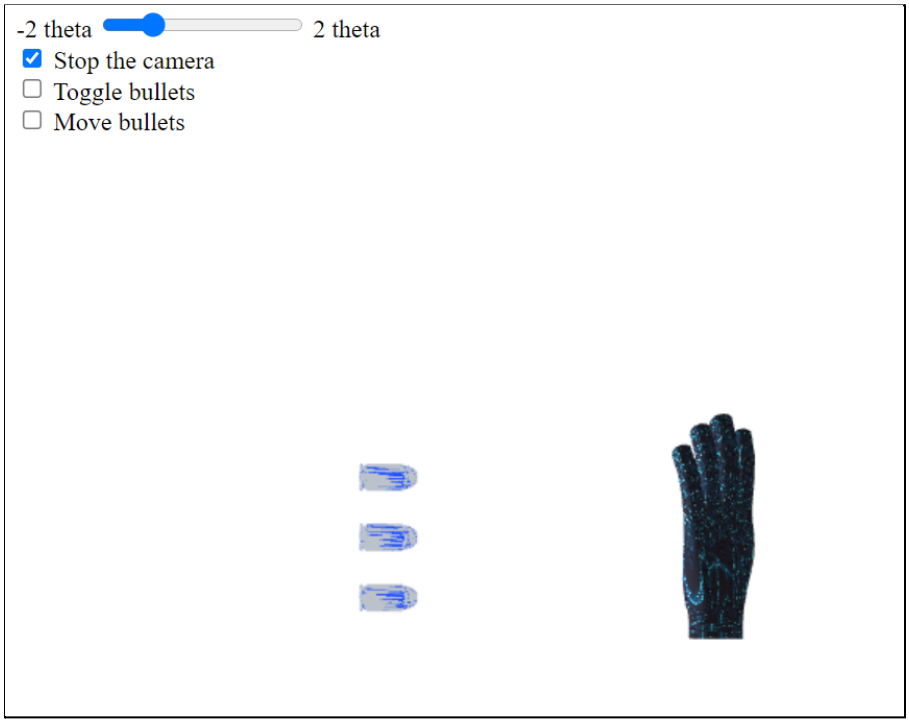
All the user interaction features are using the same techniques from homework 2. Javascript event listeners are used to see if the user is using the interactive features and if they are, the code sends over the appropriate translation, rotation, or scaling matrix over to the html to create the changes on the screen.



The hand is texture mapped to the blue and black patterned image so that it looks like a tech glove, using wrapping as the texture image is not a power of 2. The hand also has standard lighting on it so that at certain camera positions, it looks darker or lighter. The texture mapping and lighting were done by Noah. In the screenshot on the side, notice how the blue is not as

prominent in that camera angle. The texture mapping is done using the same techniques in homework 3.

The bullets have been textured using reflective mapping. We wanted the bullets to reflect the blue parts of the hand, giving a somewhat realistic reflective effect where blue streaks shine on the bullet, changing as the hand rotates. It's hard to show using a simple screenshot but depending on the camera position, the amount of blue on the bullets changes. If you stop the camera, the reflective mapping is static and doesn't change. Notice how in the screenshot below the amount of blue on the bullets is more than some of the previous screenshots. It's also hard to screenshot but the reflective mapping still works when the bullets are moving backwards. The reflective mapping has been attempted by both parties and finished by Noah. The techniques used for reflective mapping are the same as the ones in Angel Chapter 7's reflective mapping code. We used textureCube() and configureCubeMap() to reflect the blue. The colors used in configureCubeMap() are silver and blue because it creates a decent contrast to see the reflective mapping in action and how the amount of blue on the bullet changes based on the camera position.



In terms of work split, Noah handled more of the technical side of the project while Jerry handled more of the creative side and the writeups.