

CS405 Project Phase 3 Report

Ahmet Melih Afşar

29457

Task 1

For this task, I needed to change the "sceneNode.js" to apply the transformations done. The transformations applied are Translation, Rotation, and Scale (TRS). These transformations are applied to the Model-View-Projection (MVP) matrix, the ModelView matrix, the Normal matrix, and the Model matrix. The transformed matrices are then used to draw the mesh and the child nodes.

I also added a recursive operation to include the children objects into account.

Task 2

For this task, I updated the "meshDrawer.js" file to make our program simulate the specular reflection and the normal look of the diffuse light correctly, giving the user a realistic depth effect.

For the diffuse light, I simply took the dot product of the light direction with the normal and took the max function to ensure that the diffuse light component is not negative. For the specular lighting, firstly I calculated the view direction vector. It assumes the camera is at the origin (0,0,0), so the view direction is simply the negative of the fragment position (fragPos). Then, I calculated the reflection direction vector with reflect function. Lastly, I calculated the specular lighting amount, by taking the dot operation of viewDir and reflectDir, and then raising it to the power of phongExp, as the Phong shading rules dictate.

Task 3

For this task, we needed to add another object into the scene, which was "Mars". To add Mars here, I examined the code for the earth and paved a similar way for the Mars. I started by creating a new meshdrawer and setting the mesh as a sphere. Then, I went on setting the texture with the previously given image URL. I also needed to crate a TRS object to store the position, rotation and scale of our Mars in the 3D space of our scene. Then, I set the translation and scale values given in the task. Lastly in this part, I created a sceneNode object

for Mars to appear, as the sceneNode represents it in the structure. I located it as a child of the Sun.

Then, in the renderLoop function, I set the rotation for our Mars sceneNode object.

Final Image

