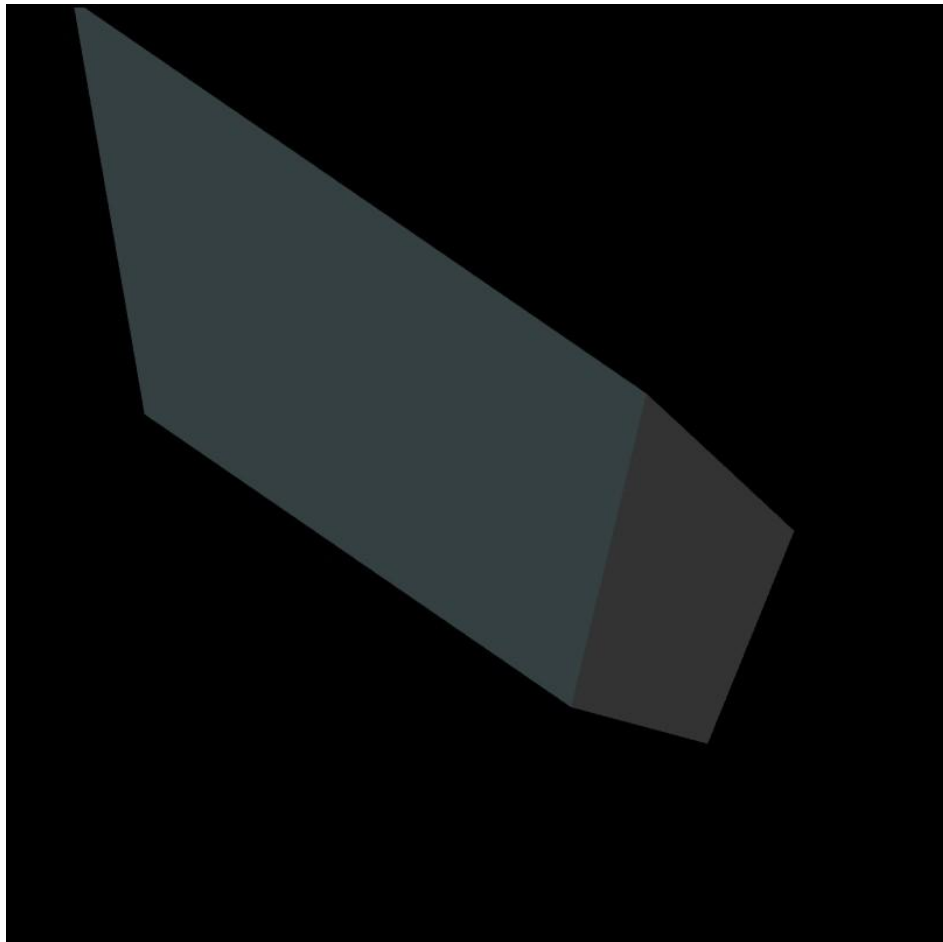


# CS405 Project 1 Report

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For task 1, I asked ChatGPT to make a transformation as instructed in the prompt, which aimed a translation 0.3 units in x-axis and -0.25 units in y-axis, 0.5 scaling by both x and y axes, and a rotation of 30 degrees on x-axis, 45 degrees on y-axis, and 60 degrees on z-axis. The first result was different than the expected format, so I asked GPT to regenerate the answer with calculated, final values and I had a matrix that was ready to be processed. The resulting shape is the following image:

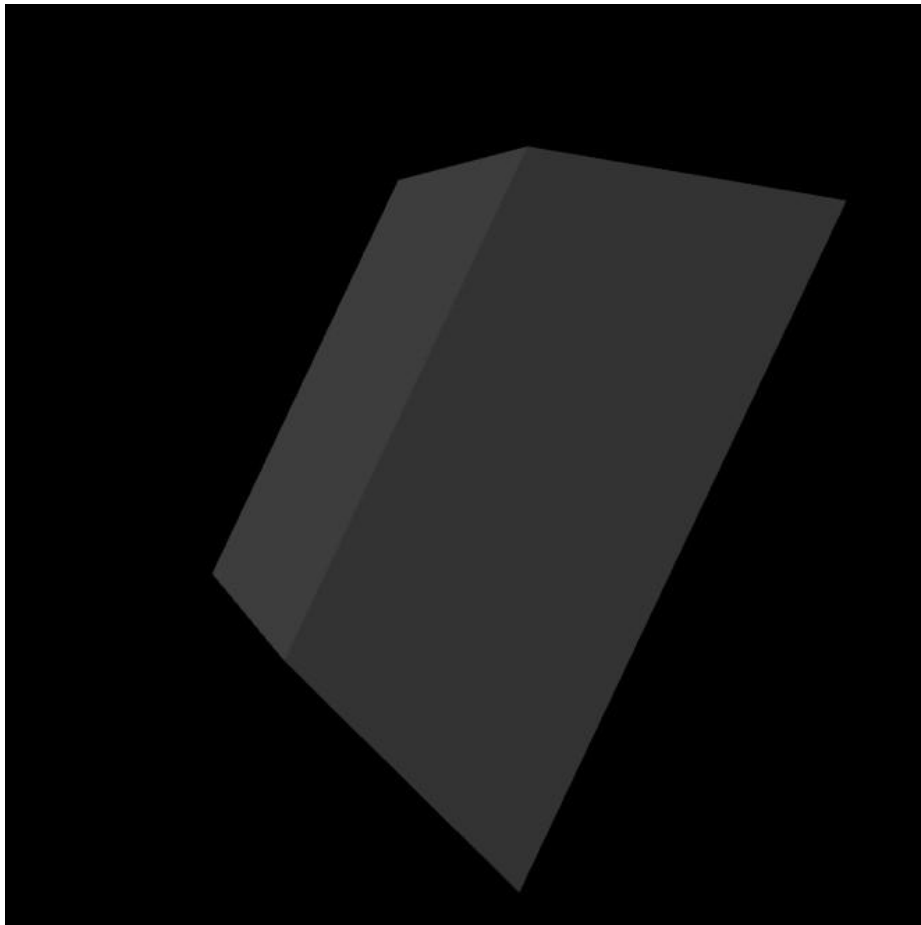


*Image 1: Task 1 Shape*

Here is the link to the related chat:

<https://chat.openai.com/share/d5c748ad-7dd2-474f-9381-bb6fff34021f>

For task 2, in order to calculate the transformation manually, I made use of the *multiplyMatrices*, *createIdentityMatrix*, *createScaleMatrix*, *createTranslationMatrix*, *createRotationMatrix* for all axes, and *getTransposeMatrix* functions provided above in the “utils.js” class. For the *getModelViewMatrix* function, I created 6 different matrices: an identity matrix, a translation matrix with 0.3 x-axis, -0.25 y-axis and 0 z-axis translation values, a scale matrix with 0.5 x-axis, 0.5 y-axis and 1 z-axis scaling values, an X-axis rotation matrix with the radian parameter 30, a Y-axis rotation matrix with the radian parameter 45 and a Z-axis rotation matrix with the radian value 60. Then, I multiplied them all in the following order: identity matrix with the translation matrix, resulting matrix with the scale matrix, resulting matrix with rotation X, resulting matrix with rotation Y, resulting matrix with rotation Z. And ultimately I called the *getTransposeMatrix* method with the final matrix and finally had a shape like this:



*Image 2: Task 2 Shape*

We can see that the two images (Task 1 and Task 2) are entirely different. There may be a few reasons for that to occur. First, I regenerated the result for Task 1 a number of times, and ChatGPT gave a different result for each one of them. Therefore, I made sure that the inconsistent result was given by ChatGPT. The reason behind it could be the order of operations, because changing the order of any operation; translation, scaling and rotation, will give different results. We are not sure in which order ChatGPT does its calculations.

For task 3, I asked ChatGPT to animate the transformation in task 2 by providing the entire `utils.js` class, in order to make GPT understand the implementations of functions used in task 2. The resulting answer was partially correct, it animated a shape transformation, but it started from the final shape from task 2 and morphed into an unrelated shape. So I modified the resulting code to start with the identity matrix (regular cube), and transform into the final shape in task 2, step by step. But the main problem was, the first 5 seconds worked correctly as it morphed from identity matrix to task 2 shape, but the last 5 seconds did not work at all and it only showed the identity matrix standing still for 5 seconds, and repeat. After a 2-hour long conversation with ChatGPT, it could not solve the problem after trying many other methods, such as adding an internal function which did the reverse of task 2, however it still did not work.

Chat Link:

<https://chat.openai.com/share/d19d745d-12ac-409d-9ebe-f48b8ce6100e>