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PROJECT1 REPORT

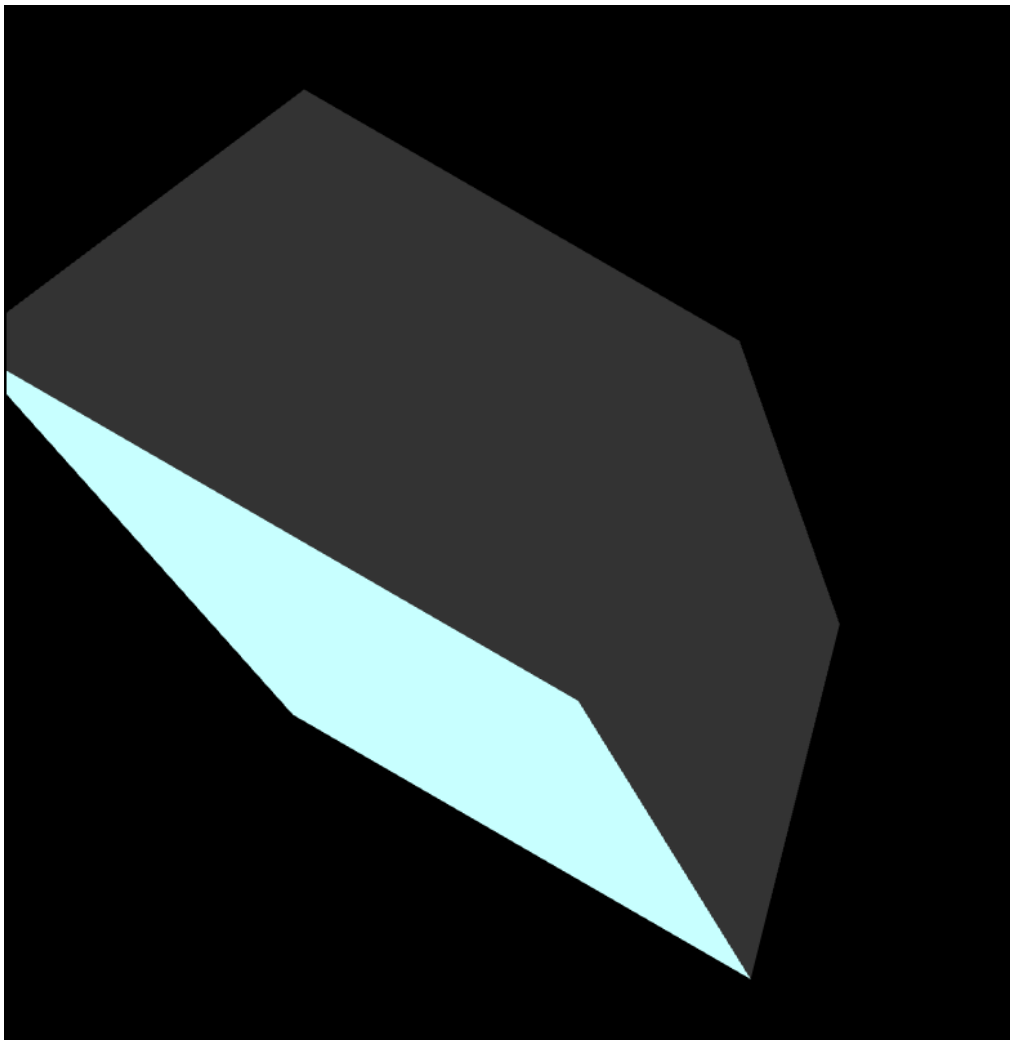
TASK1:

Chat Link: https://chat.openai.com/share/33370baf-13be-4023-8bd5-9c14802559dd
Result Matrix:

javascript Copy code

```javascript
const transformationMatrix = new Float32Array([
    0.3535533845424652, 0.612372398853302, 0.7071067690849304, 0.3,
    -0.3535533845424652, 0.612372398853302, -0.7071067690849304, -0.25,
    -0.8660253882408142, 0.5, 0, 0,
    0, 0, 0, 1
]);
```

Generated Cube:



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TASK2:

Transformation Matrix Order:

translation:
- 0.3 units in x-axis
- -0.25 units in y-axis

scaling:
- 0.5 by x-axis
- 0.5 by y-axis

rotation:
- 30 degrees on x-axis
- 45 degrees on y-axis
- 60 degrees on z-axis

Translation Matrix: (T)

1	0	0	0.3
0	1	0	-0.25
0	0	1	0
0	0	0	1

Scaling Matrix: (S)

0.5	0	0	0
0	0.5	0	0
0	0	1	0
0	0	0	1

Rotation Matrix on X-axis: (Rx)

1	0	0	0
0	cos30	-sin30	0
0	sin30	cos30	0
0	0	0	1

Rotation Matrix on Y-axis: (Ry)

cos45	0	sin45	0
0	1	0	0
-sin45	0	cos45	0
0	0	0	1

Rotation Matrix on Z-axis: (Rz)

cos60	-sin60	0	0
sin60	cos60	0	0
0	0	1	0
0	0	0	1

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Order of Matrix Multiplication:

Transformation Matrix = Rz . Ry . Rx . S . T

ST =

0.5	0	0	0.15
0	0.5	0	-0.125
0	0	1	0
0	0	0	1

RxST =

0.5	0	0	0.15
0	0.433	-0.5	-0.10825
0	0.25	0.866	-0.0625
0	0	0	1

RyRxST =

0.35355	0.176775	0.6123486	0.06187125
0	0.433	-0.5	-0.10825
-0.35355	0.176775	0.6123486	-0.15025875
0	0	0	1

Transformation Matrix = RzRyRxST =

0.176775	-0.2865905	0.7391743	0.124680125
0.3061743	0.36958715	0.2802938876	-0.0005444975
-0.35355	0.176775	0.6123486	-0.15025875
0	0	0	1

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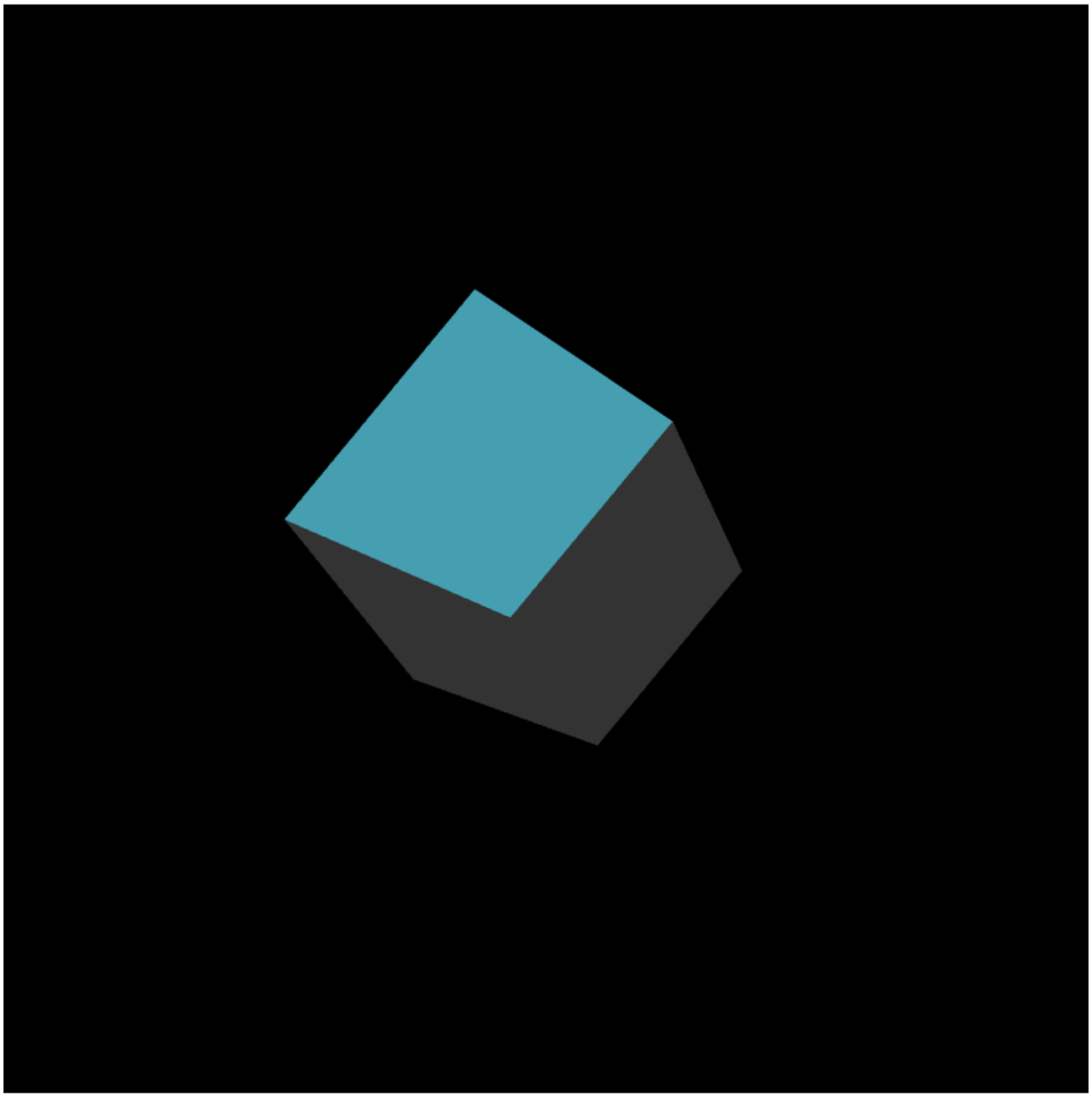
Generated Cube:



ChatGPT’s result and mine are quite different. I think the main cause of this that the order of multiplication. I think GPT has multiplied the matrices in reverse order. In addition to the order differences, probably precision of the sin and cos values are calculated differently.

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TASK3:

Chat Link: https://chat.openai.com/share/23b5e1aa-e138-42d2-b784-11be07b390ed

I prompted to ChatGPT as follows:

"I want to animate openGL cube for 10 seconds. The animation should continue infinitely, with an interval of 10 seconds. In the first 5 seconds, the cube should transition to the calculated transformation according to the above transformation matrix. In the last 5 seconds, the object should return to its initial position. Give me a javascript function for this. The matrices should be defined inside the function. Function should look like this: function getPeriodicMovement(startTime) { }"

The output of ChatGPT was involving a animation/render function which was unnecessary since there is already a rendering function in index.html. Therefore I prompted again to correct this issue.

After resolving that issue, I tried to see the animation in the browser, however, there was nothing rendered. Then I asked ChatGPT to configure the initial and target matrixes as Float32Array. Finally, I have pasted the output and change the function name, then It was working.