CSC4140 Assignment II

Computer Graphics

February 25, 2022

Transformation

This assignment is 10% of the total mark.

Strict Due Date: 11:59PM, Feb 25^{th}, 2022

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This assignment represents my own work in accordance with University regulations.

Signature:

1 Report

1.1 Eye Position

I set the eye position at $\begin{bmatrix} 0 & 0 & 5 \end{bmatrix}$

```
145     Eigen::Vector3f eye_pos = {0, 0, 5};
```

Figure 1: Eye Position

1.2 Triangle

I set the init triangle to be 0, and the rotate axis is. $\begin{bmatrix} 0 & 0 & 1 \end{bmatrix}$ It means P0 and P1 can be P0:$\begin{bmatrix} 0 & 0 & 0 \end{bmatrix}$ P1:$\begin{bmatrix} 0 & 0 & 1 \end{bmatrix}$.

```
127     float angle = 0;
```

Figure 2: Triangle

```
175     P0 << 0, 0, 0;
176     P1 << 0, 1, 0;
177
178     // P1 << 0, 0, 1;
```

Figure 3: Rotate Axis

You can also uncomment Line 178 to test another rotate axis !

1.3 Eye_pov, aspect_ratio, zNear, zFar

Define as follows:

```
166     float eye_fov, aspect_ratio, zNear, zFar;
167     eye_fov = 45;
168     aspect_ratio = 1;
169     zNear = 0.1;
170     zFar = 50;
```

Figure 4: Eye_pov, aspect_ratio, zNear, zFar

1.4 More information about Graphic

Position of two Triangles r and r2 are defined as follows:

```
147     std::vector<Eigen::Vector3f> pos{{2, 0, -2}, {0, 2, -2}, {-2, 0, -2}};
148     std::vector<Eigen::Vector3i> ind{{0, 1, 2}};
149     std::vector<Eigen::Vector3f> pos2{{1, 0, -1}, {0, 1, -1}, {-1, 0, -1}};
150     std::vector<Eigen::Vector3i> ind2{{0, 1, 2}};
151     // define a triangle named by "pos" and "ind"
```

Figure 5: Position of two Triangles

2 Result

2.1 Rotate Along [0 1 0]

Rotate 0 degree

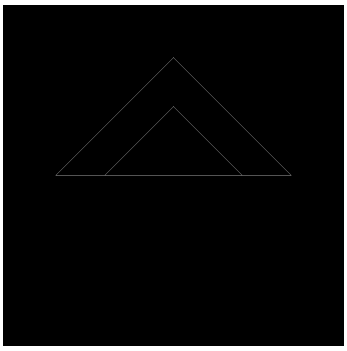

Figure 6: Rotate 0 degree

Rotate 20 degree

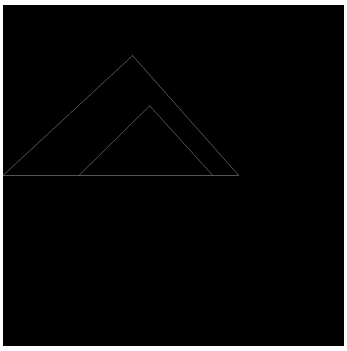

Figure 7: Rotate 20 degree

Rotate 40 degree

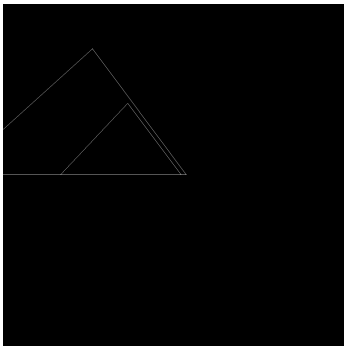

Figure 8: Rotate 40 degree

2.2 Rotate Along [0 0 1]

Uncomment Line 178 First! Rotate 0 degree

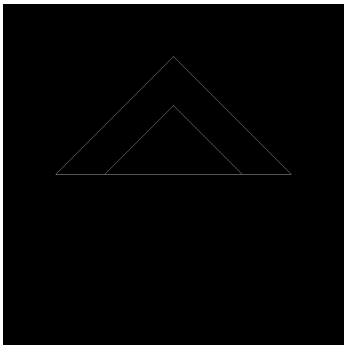

Figure 9: Rotate 0 degree

Rotate 20 degree

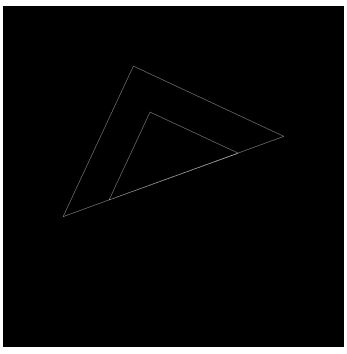

Figure 10: Rotate 20 degree

Rotate 40 degree

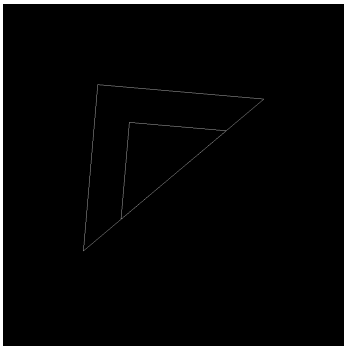

Figure 11: Rotate 40 degree