Report of CPT205 Assessment 1 – 2D Modelling Project

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1. Features

This New Year Card could be divided into 2 layers. The first layer is a curtain which is made of two parts. These two parts can be separated using the keyboard interaction. There is also an inner layer inside the card which could be seen after the first layer is separated.

Figure 1 the First Layer

Figure 2 the Second layer

1.1 Window size and position

Use the **gluOrtho2D** function to create the 2d projection and set the coordinates to suit the window by setting the origin to the left corner of the window.

1.2 Background of the first layer

Using **(GL_POLYGON)** to draw two polygons that certainly fit the size of the whole window; and use **(glShadeModel(GL_SMOOTH))** to attach gradient ramp to the two sections.

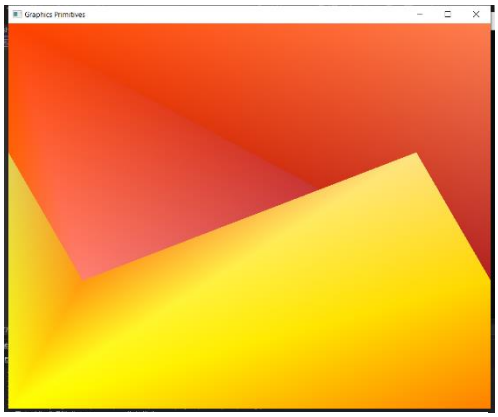

Figure 1.2 Background

1.3 Firecracker

The firecracker can be divided into two parts.

The first is to use **(GL_POLYGON)** draws ellipses. And change **glPolygonMode** between **(GL_FRONT, GL_FILL)** and **(GL_FRONT, GL_LINE)** to draw the solid shapes and the outlines. The second part is to draw Bezier Curves using **glMap1f(GL_MAP1_VERTEX_3, 0.0, 1.0, 3, 3, ctrlpoints) and glEnable(GL_MAP1_VERTEX_3) and glBegin(GL_LINE_STRIP).**

The coloring of irregular shapes was achieved by using for loop and **glBegin(GL_LINE_STRIP)** and `glLineWidth` to draw colored lines. These lines fill the whole region of the shape to make it look colored.

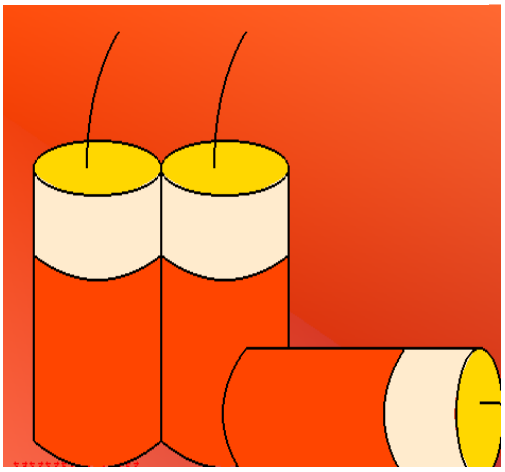

Figure 1.3 Firecracker

1.4 Paper cuttings

This shape is achieved by a recursive way. First is to using **glutSolidCube(1)** to obtain the original **cube.Secondly,using glTranslatef; glRotatef; glScalef** to change the position and size of the sub cubes. Finally by calling the method recursively, a tree-like paper cutting is showed.

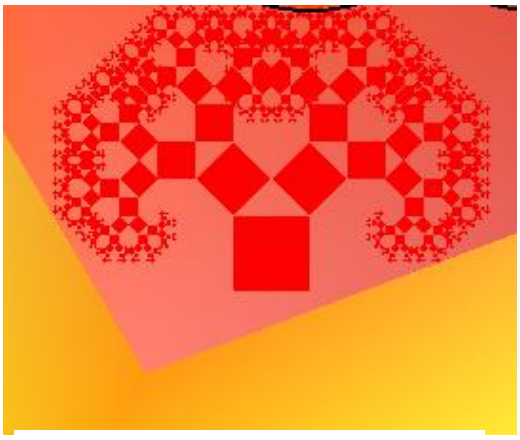

Figure 1.4 Paper Cutting

1.5 Smile face

All elements in this smile face is drawn in ellipses. They are all drawn by **glPolygonMode(GL_FRONT, GL_FILL)**. Adjusting the length of the short and long axis of the ellipse to change the size. Swithing between **glPolygonMode(GL_FRONT, GL_FILL)** and **glPolygonMode(GL_FRONT, GL_LINE)** to draw the solid part and the outline.

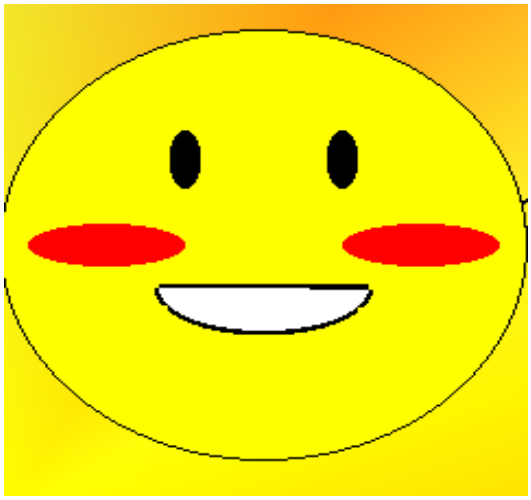

Figure 1.5 Smile face

1.6 Lantern

The main body of this lantern is made of ellipses and quadrangles which are drawn with **glBegin(GL_QUADS)** and **glBegin(GL_POLYGON)**. Enabling **glPolygonMode(GL_FRONT, GL_LINE)** to draw the outline of the main body. For the inner grains and details(curves), they are drawn with Bezier Curves and change the controlling points.

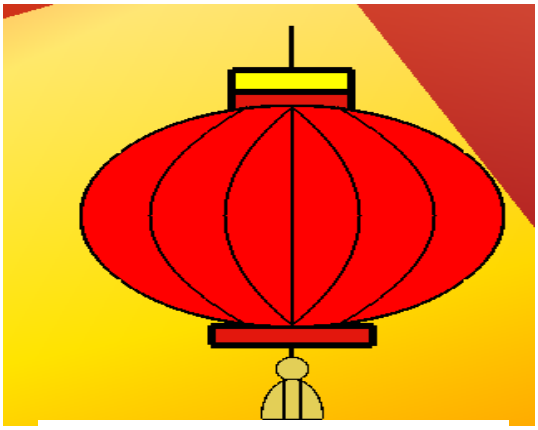

Figure 1.6 Lantern

1.7 Dialogue box

The dialogue box is drawn using **glBegin(GL_LINE_LOOP)**. The four corner actually is achieved by drawing four quarters of a circle. The rest of it is simply drawn in lines.

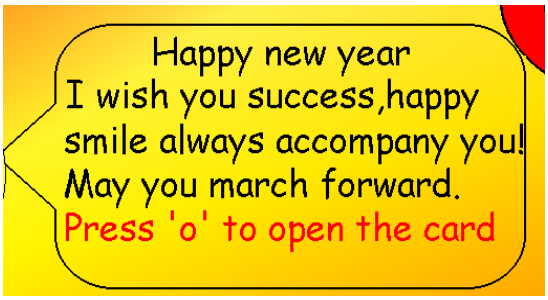

Figure 1.7 Dialogue Box

1.8 Rabbit

The rabbit is drawn by detailedly deciding the coordinate of every point and then using **glBegin(GL_LINE_LOOP)** to link them.

Figure 1.8 Rabbit

1.9 Stars

Their positions change randomly over time. By using the **glutTimerFunc** function, the stars will rotate unceasingly. Besides,their sizes will be enlarged or shrink over time forever.

1.10 Flower

The flower is drawn with parametric function and glBegin**(GL_LINE_STRIP)**.

Figure 1.9 Stars

Figure 1.10 Flower

1.11 Spring festival scrolls and other texts

These are some text information including greeting information, spring festival scrolls and instruction.

2. Instruction

2.1. Keyboard function

i.
Press 'q' or 'Q' to exit
ii.
Press 'o' or 'O' to lift the curtain layer (open the card).
iii.
Press 'x' or 'X' to zoom in
iv.
Press 'z' or 'Z' to zoom out
v.
Press 'w' or 'W' to move the card up
vi.
Press 's' or 'S' to move the card down
vii.
Press 'a' or 'A' to move the card to the left
viii.
Press 'd' or 'D' to move the card to the right
ix.
Press 'r' or 'R' to reset the card
x.
Press 'i' or 'I' to show or hide the instruction text

2.2. Mouse function

i. Hold down the left mouse button and move to rotate the card around the X, Y axes
ii. Hold down the right mouse button and move to rotate the card

around the Z axis

3.Sreenshots

3.1 First layer

3.2 After pressing ‘o’(in progress)

3.3 second layer