UCS 1712 – GRAPHICS AND MULTIMEDIA LAB

ASSIGNMENT – 9

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25.10.2021 **CSEC**

1. PARALLEL AND PERSPECTIVE PROJECTIONS:

projections.cpp:

```
#pragma warning(disable : 4996)
#include <GL/glut.h>
#include <stdio.h>
#include <stdlib.h>
#include <iostream>

using namespace std;

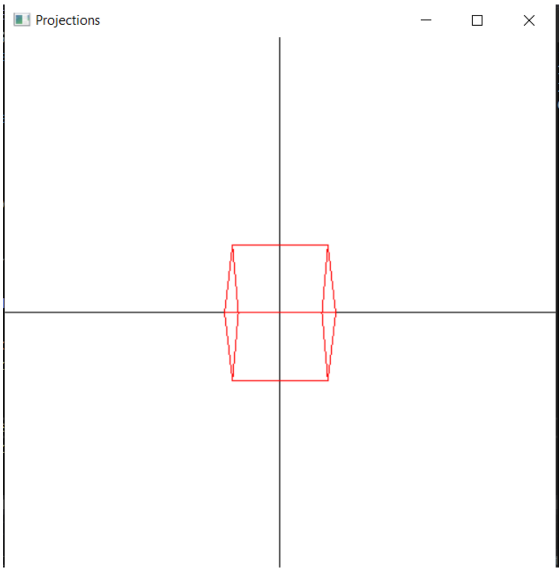
bool* keyStates = new bool[256];
int x_angle = 0, y_angle = 0, z_angle = 0;

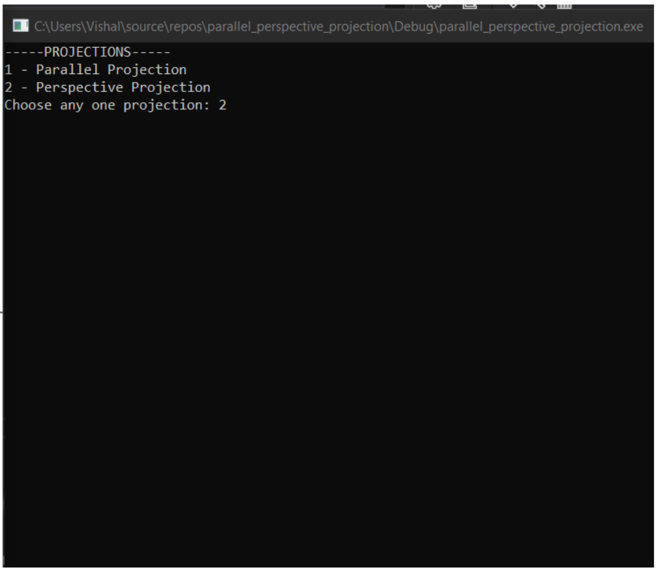
void drawAxis() {
        glBegin(GL_LINES);
        glVertex3d(-500, 0, 0);
        glVertex3d(500, 0, 0);
        glEnd();
        glBegin(GL_LINES);
        glVertex3d(0, 500, 0);
        glVertex3d(0, -500, 0);
        glEnd();
}

void drawTeapot() {
        glClear(GL_COLOR_BUFFER_BIT | GL_DEPTH_BUFFER_BIT);
        glColor3f(0.0, 0.0, 0.0);
        // X, Y and Z axis
        glBegin(GL_LINES);
        glVertex3d(-5, 0, 0);
        glVertex3d(5, 0, 0);
        glVertex3d(0, -5, 0);
        glVertex3d(0, 5, 0);
        glVertex3d(0, 0, 1);
        glVertex3d(0, 0, 100);
        glEnd();
        glColor3f(1.0, 0.0, 0.0);
        glLoadIdentity();
        glTranslatef(0.0f, 0.0f, -5.0f);
        glPushMatrix();
        glRotatef(x_angle, 1, 0, 0);
        glRotatef(y_angle, 0, 1, 0);
        glRotatef(z_angle, 0, 0, 1);
        glutWireCube(1);
        glPopMatrix();
        glFlush();
}
void keyOperations(void) {
        int ANGLE_INC = 45;
        if (keyStates['w']) {
                x_angle += ANGLE_INC;
        }
        else if (keyStates['s']) {
                x_angle -= ANGLE_INC;
        }
        else if (keyStates['a']) {
                y_angle -= ANGLE_INC;
        }
        else if (keyStates['d']) {
                y_angle += ANGLE_INC;
        }
        else if (keyStates[' ']) {
                z_angle += ANGLE_INC;
        }
        x_angle %= 360;
        y_angle %= 360;
        z_angle %= 360;
        drawTeapot();
}
void initialize() {
        int WIDTH = 500, HEIGHT = 500, choice=1;
        cout << "-----PROJECTIONS-----\n1 - Parallel Projection\n2 - Perspective Projection\nChoose any one projection: ";
        cin >> choice;
        glClearColor(1.0f, 1.0f, 1.0f, 0.0f);

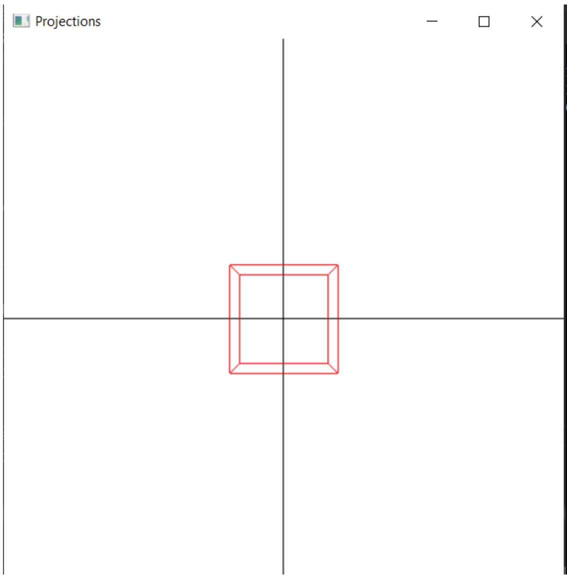
        glViewport(0, 0, WIDTH, HEIGHT);
        glMatrixMode(GL_PROJECTION);
        glLoadIdentity();
        if (choice == 1) {
                glOrtho(-2.0, 2.0, -2.0, 2.0, 1, 100);
        }
        else {
                gluPerspective(60, (GLfloat)WIDTH / (GLfloat)HEIGHT, 1, 100.0);
        }
        glMatrixMode(GL_MODELVIEW);
        for (int i = 0; i < 256; i++) {
                keyStates[i] = false;
        }
}
void keyPressed(unsigned char key, int x, int y) {
        keyStates[key] = true;
        keyOperations();
}
void keyUp(unsigned char key, int x, int y) {
        keyStates[key] = false;
}
int main(int argc, char** argv) {
        glutInit(&argc, argv);
        glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
        glutInitWindowSize(500, 500);
        glutCreateWindow("Projections");
        glutDisplayFunc(drawTeapot);
        drawAxis();
        initialize();
        glutKeyboardFunc(keyPressed);
        glutKeyboardUpFunc(keyUp);
        glutMainLoop();
}
```

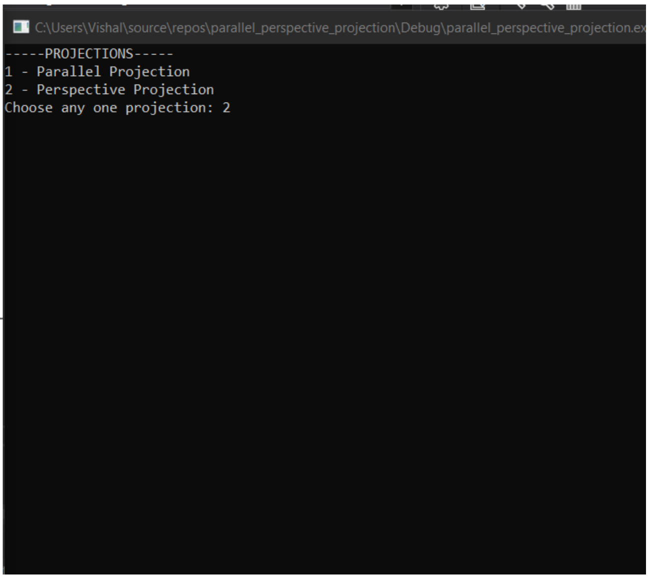
OUTPUTS:




C:\Users\Vishal\source\repos\parallel_perspective_projection\Debug\parallel_perspective_projection.exe

```
-----PROJECTIONS-----
1 - Parallel Projection
2 - Perspective Projection
Choose any one projection: 2
```




C:\Users\Vishal\source\repos\parallel_perspective_projection\Debug\parallel_perspective_projection.ex

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-----PROJECTIONS-----
1 - Parallel Projection
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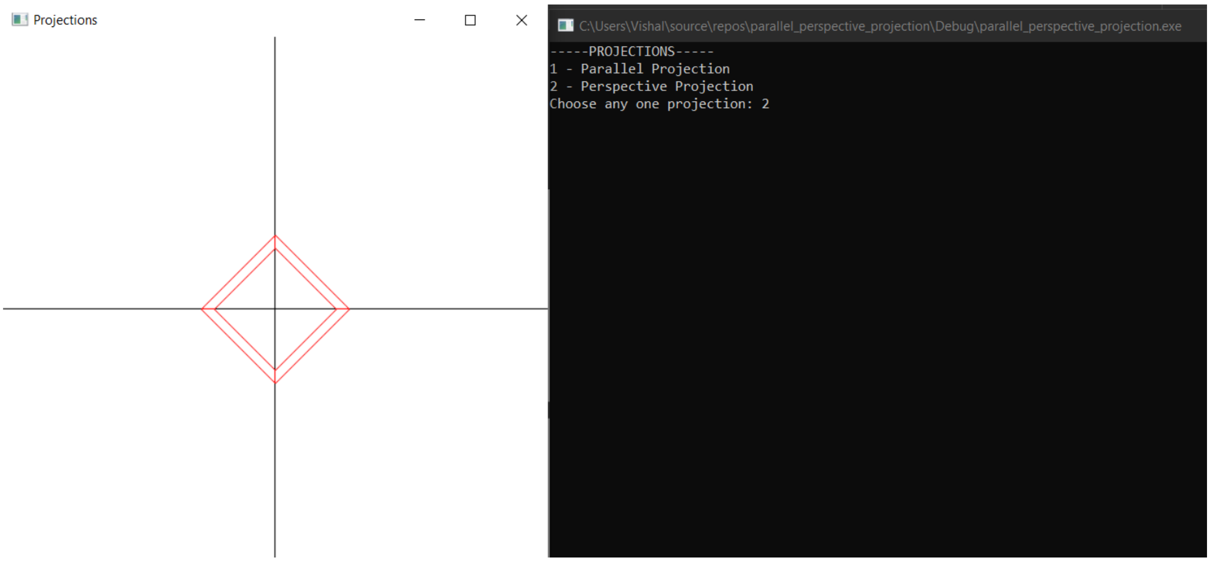
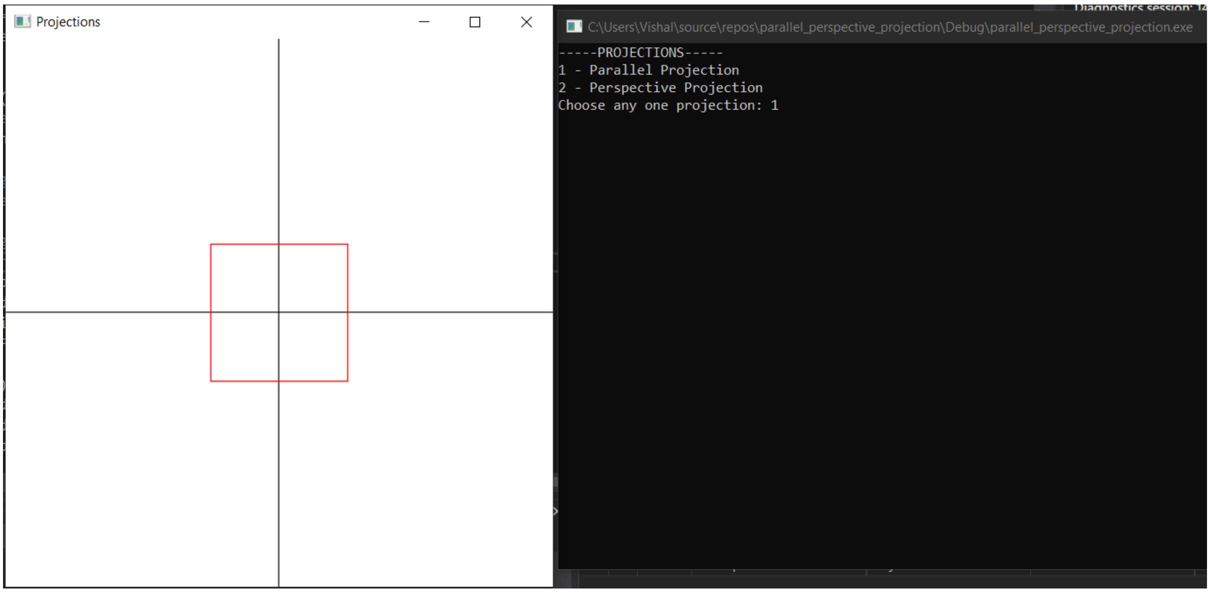
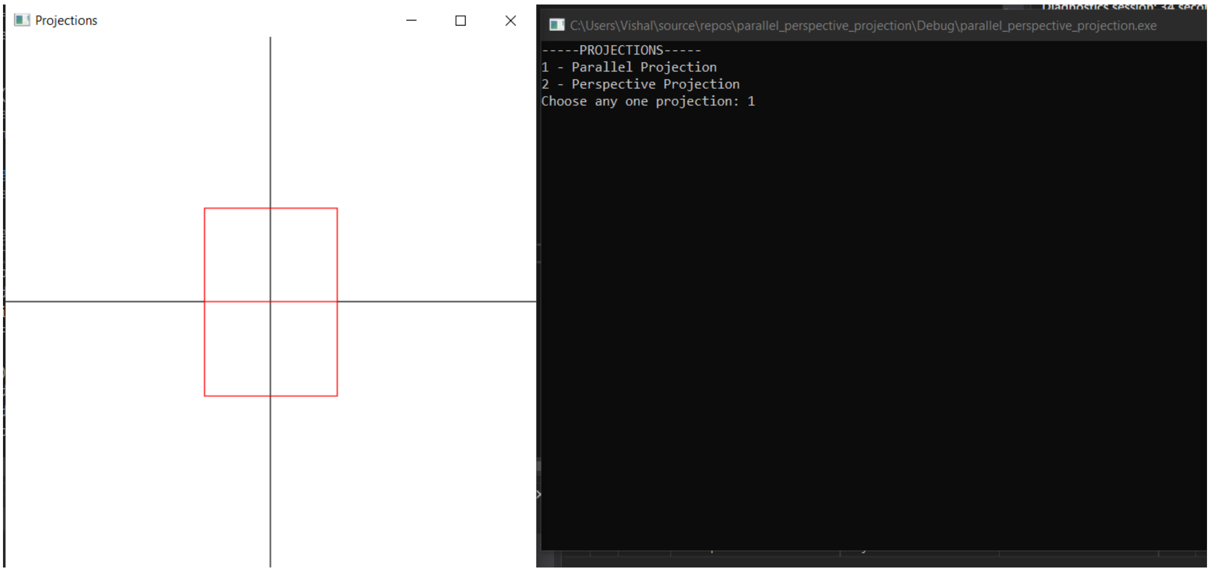


```
C:\Users\Vishal\source\repos\parallel_perspective_projection\Debug\parallel_perspective_projection.exe
-----PROJECTIONS-----
1 - Parallel Projection
2 - Perspective Projection
Choose any one projection: 2
```



```
C:\Users\Vishal\source\repos\parallel_perspective_projection\Debug\parallel_perspective_projection.exe
-----PROJECTIONS-----
1 - Parallel Projection
2 - Perspective Projection
Choose any one projection: 1
```


Projections
C:\Users\Vishal\source\repos\parallel_perspective_projection\Debug\parallel_perspective_projection.exe

```
-----PROJECTIONS-----
1 - Parallel Projection
2 - Perspective Projection
Choose any one projection: 1
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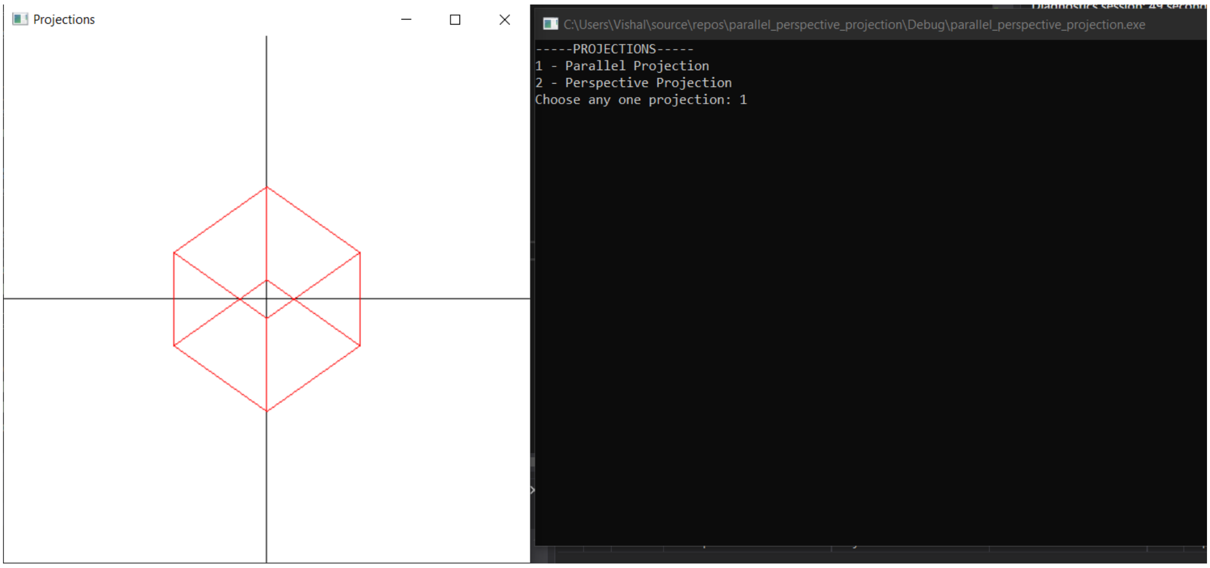
Projections
C:\Users\Vishal\source\repos\parallel_perspective_projection\Debug\parallel_perspective_projection.exe

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-----PROJECTIONS-----
1 - Parallel Projection
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Choose any one projection: 1
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