SSN COLLEGE OF ENGINEERING, KALAVAKKAM

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

UCS1712-Graphics and Multimedia Lab

Programming Assignment 1

Study of Basic Output Primitives in C++ using OpenGL

Name: Jayannthan P T *Dept: CSE 'A'* *Roll No.: 205001049*

a)To create an output window using OPENGL and to draw the following basic output primitives:

Source code:

- POINTS

```
void points()
{
    glClear(GL_COLOR_BUFFER_BIT);
    glClearColor(1.0, 1.0, 1.0, 0.0);
    glBegin(GL_POINTS);
    glVertex2f(0.0, 0.0);
    glVertex2f(0.5, 0.0);
    glVertex2f(0.5, 0.5);
    //    glVertex2f(0.0, 0.5);
    glEnd();
    glFlush();
}
```

- LINES

```
void lines()
{
    glClear(GL_COLOR_BUFFER_BIT);
    glClearColor(1.0, 1.0, 1.0, 0.0);
    glBegin(GL_LINES);
    glVertex2f(0.0, 0.0);
    glVertex2f(0.5, 0.0);
    glEnd();
    glFlush();
}
```

- LINE_STRIP

```
void linesstrip()
```

```
{
    glClear(GL_COLOR_BUFFER_BIT);
    glClearColor(1.0, 1.0, 1.0, 0.0);
    glBegin(GL_LINE_STRIP);
    glVertex2f(0.0, 0.0);
    glVertex2f(0.5, 0.0);
    glVertex2f(1.0, 1.0);
    glVertex2f(0.7, 0.7);
    glEnd();
    glFlush();
}
```

- LINE_LOOP

```
void lineloop()
{
    glClear(GL_COLOR_BUFFER_BIT);
    glClearColor(1.0, 1.0, 1.0, 0.0);
    glBegin(GL_LINE_LOOP);
    glVertex2f(0.0, 0.0);
    glVertex2f(0.5, 0.0);
    glVertex2f(1.0, 1.0);
    glVertex2f(0.7, 0.7);
    glEnd();
    glFlush();
}
```

- TRIANGLES

```
void triangle()
{
    glClear(GL_COLOR_BUFFER_BIT);
    glClearColor(1.0, 1.0, 1.0, 0.0);
    glBegin(GL_TRIANGLES);
    glVertex2f(0.0, 0.0);
    glVertex2f(0.5, 0.0);
    glVertex2f(0.5, 0.5);
    //    glVertex2f(0.0, 0.5);
    glEnd();
    glFlush();
}
```

- QUADS

```
void quadrant()
{
    glClear(GL_COLOR_BUFFER_BIT);
    glClearColor(1.0, 1.0, 1.0, 0.0);
    glBegin(GL_QUADS);
    glVertex2f(0.0, 0.0);
    glVertex2f(0.5, 0.0);
    glVertex2f(0.5, 0.5);
    glVertex2f(0.0, 0.5);
    glEnd();
    glFlush();
}
```

- QUAD_STRIP

```
void quadstrip()
{
    glClear(GL_COLOR_BUFFER_BIT);
    glClearColor(1.0, 1.0, 1.0, 0.0);
    glBegin(GL_QUAD_STRIP);
    glVertex2f(0.0, 0.0);
    glVertex2f(0.5, 0.0);
    glVertex2f(0.5, 0.5);
    glVertex2f(0.0, 0.5);
    glVertex2f(1.0, 1.0);
    glVertex2f(0.7, 0.7);
    glEnd();
    glFlush();
}
```

- POLYGON

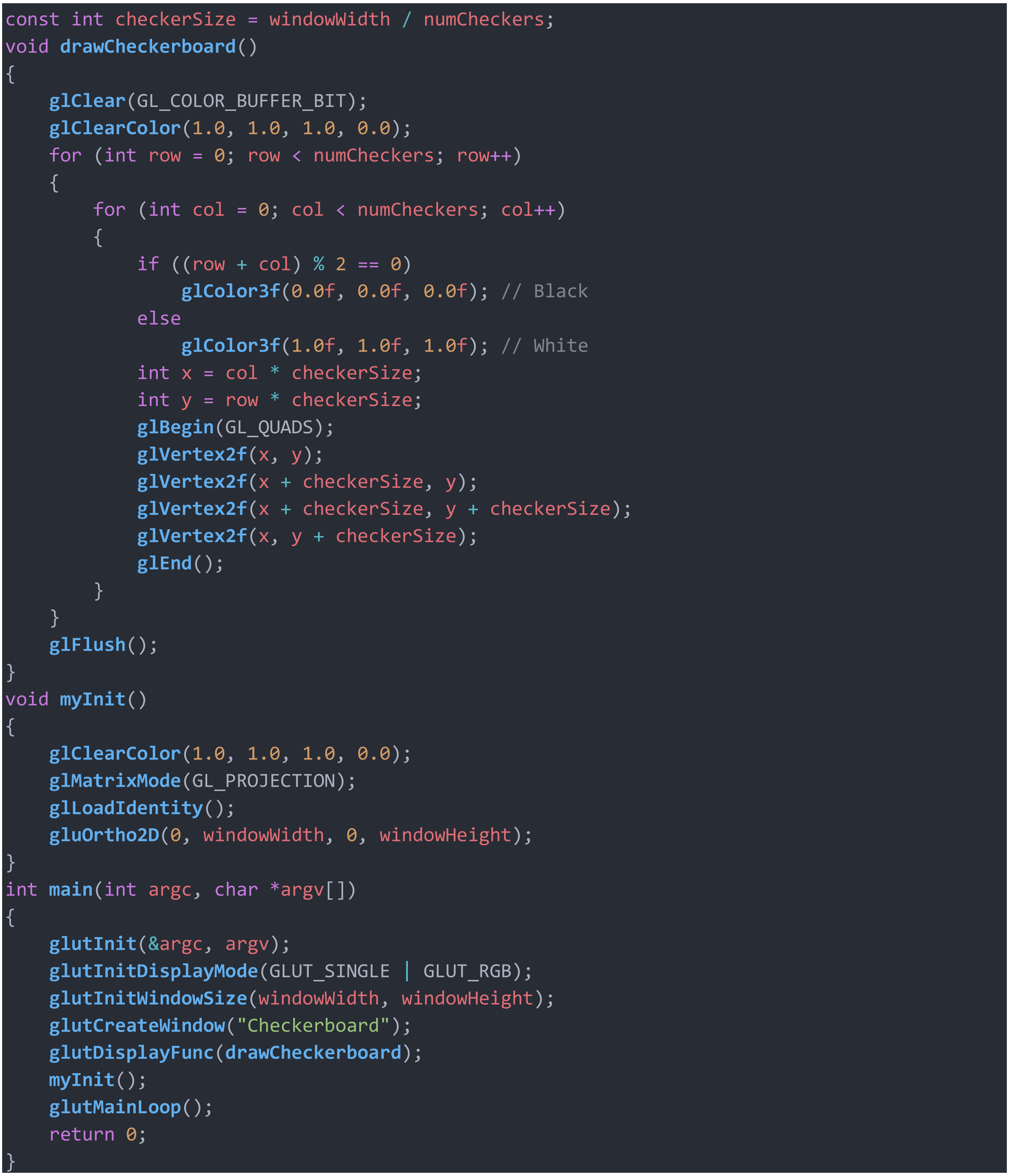
```

void polygon()
{
    glClear(GL_COLOR_BUFFER_BIT);
    glClearColor(1.0, 1.0, 1.0, 0.0);
    glBegin(GL_POLYGON);
    glVertex2f(0.0, 0.0);
    glVertex2f(0.5, 0.0);
    glVertex2f(0.5, 0.5);
    glVertex2f(0.0, 0.5);
    glVertex2f(1.0, 1.0);
    glVertex2f(0.7, 0.7);
    glEnd();
    glFlush();
}
```

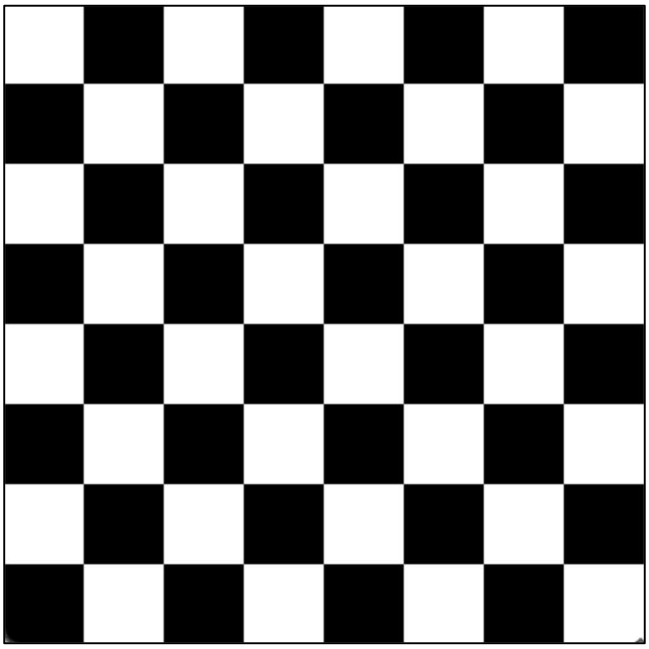
b) To create an output window and draw a checkerboard using OpenGL.

Source code:

```
#include <iostream>
#include <GLUT/glut.h>
const int windowWidth = 400;
const int windowHeight = 400;
const int numCheckers = 8;
```

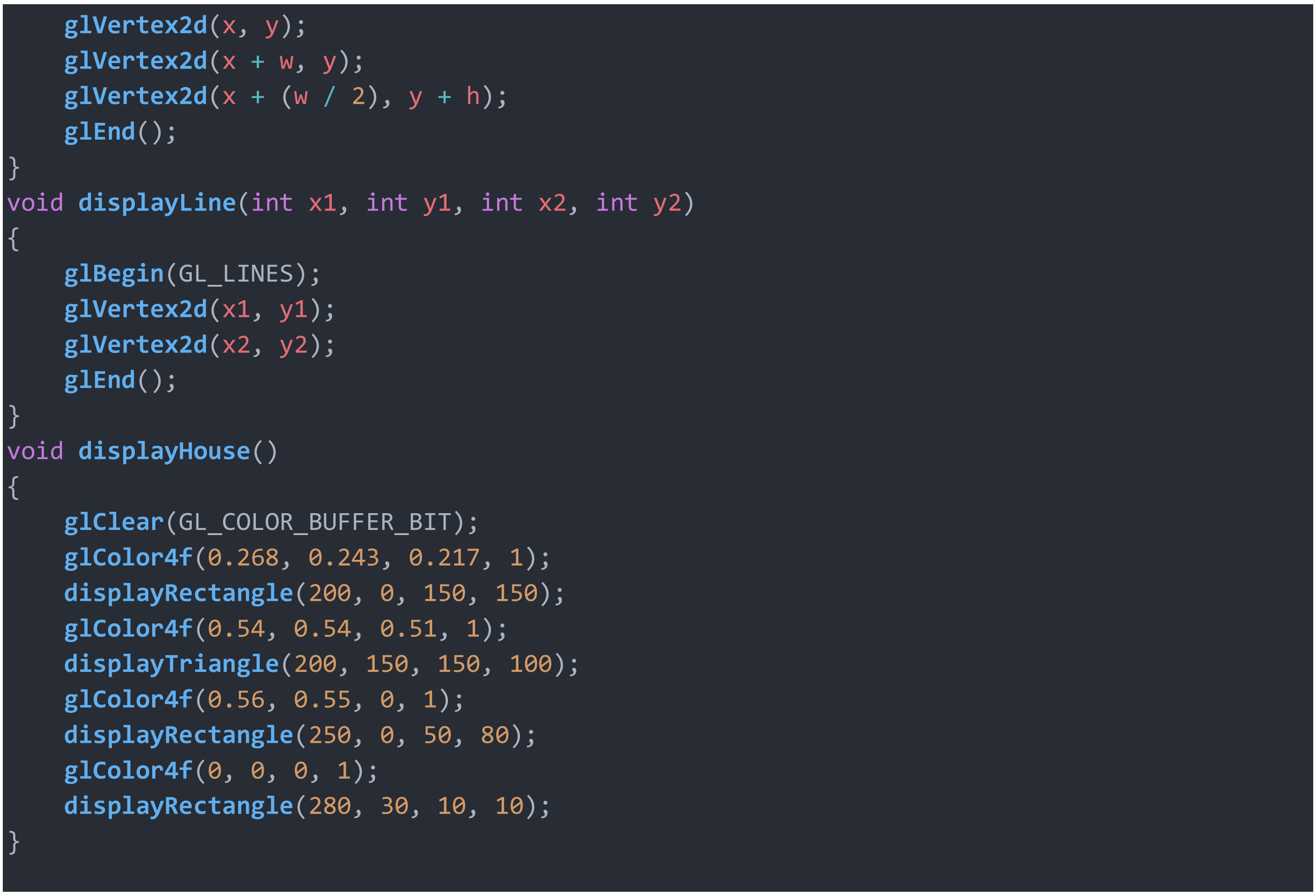


```
const int checkerSize = windowWidth / numCheckers;
void drawCheckerboard()
{
    glClear(GL_COLOR_BUFFER_BIT);
    glClearColor(1.0, 1.0, 1.0, 0.0);
    for (int row = 0; row < numCheckers; row++)
    {
        for (int col = 0; col < numCheckers; col++)
        {
            if ((row + col) % 2 == 0)
                glColor3f(0.0f, 0.0f, 0.0f); // Black
            else
                glColor3f(1.0f, 1.0f, 1.0f); // White
            int x = col * checkerSize;
            int y = row * checkerSize;
            glBegin(GL_QUADS);
            glVertex2f(x, y);
            glVertex2f(x + checkerSize, y);
            glVertex2f(x + checkerSize, y + checkerSize);
            glVertex2f(x, y + checkerSize);
            glEnd();
        }
    }
    glFlush();
}
void myInit()
{
    glClearColor(1.0, 1.0, 1.0, 0.0);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(0, windowWidth, 0, windowHeight);
}
int main(int argc, char *argv[])
{
    glutInit(&argc, argv);
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
    glutInitWindowSize(windowWidth, windowHeight);
    glutCreateWindow("Checkerboard");
    glutDisplayFunc(drawCheckerboard);
    myInit();
    glutMainLoop();
    return 0;
}
```



c) To create an output window and draw a house using POINTS, LINES, TRAINGLES and QUADS/POLYGON.

```
#include <GLUT/glut.h>
void myInit()
{
    glClearColor(1.0, 1.0, 1.0, 0.0);
    glColor3f(0.0f, 0.0f, 0.0f);
    glPointSize(10);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    gluOrtho2D(0.0, 640.0, 0.0, 480.0);
}
void displayPoints()
{
    glBegin(GL_POINTS);
    glVertex2d(150, 100);
    glVertex2d(100, 230);
    glVertex2d(170, 130);
    glVertex2d(300, 350);
    glEnd();
}
void displayRectangle(int x, int y, int w, int h)
{
    glBegin(GL_POLYGON);
    glVertex2d(x, y);
    glVertex2d(x + w, y);
    glVertex2d(x + w, y + h);
    glVertex2d(x, y + h);
    glEnd();
}
void displayTriangle(int x, int y, int w, int h)
{
    glBegin(GL_TRIANGLES);
```



```
    glVertex2d(x, y);
    glVertex2d(x + w, y);
    glVertex2d(x + (w / 2), y + h);
    glEnd();
}
void displayLine(int x1, int y1, int x2, int y2)
{
    glBegin(GL_LINES);
    glVertex2d(x1, y1);
    glVertex2d(x2, y2);
    glEnd();
}
void displayHouse()
{
    glClear(GL_COLOR_BUFFER_BIT);
    glColor4f(0.268, 0.243, 0.217, 1);
    displayRectangle(200, 0, 150, 150);
    glColor4f(0.54, 0.54, 0.51, 1);
    displayTriangle(200, 150, 150, 100);
    glColor4f(0.56, 0.55, 0, 1);
    displayRectangle(250, 0, 50, 80);
    glColor4f(0, 0, 0, 1);
    displayRectangle(280, 30, 10, 10);
}
```