SSN COLLEGE OF ENGINEERING, KALAVAKKAM

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

UCS1712-Graphics and Multimedia Lab

Programming Assignment 4

Midpoint Circle Drawing Algorithm in C++ using OpenGL

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a) To plot points that make up the circle with center (xc,yc) and radius r using Midpoint circle drawing

algorithm. Give atleast 2 test cases.

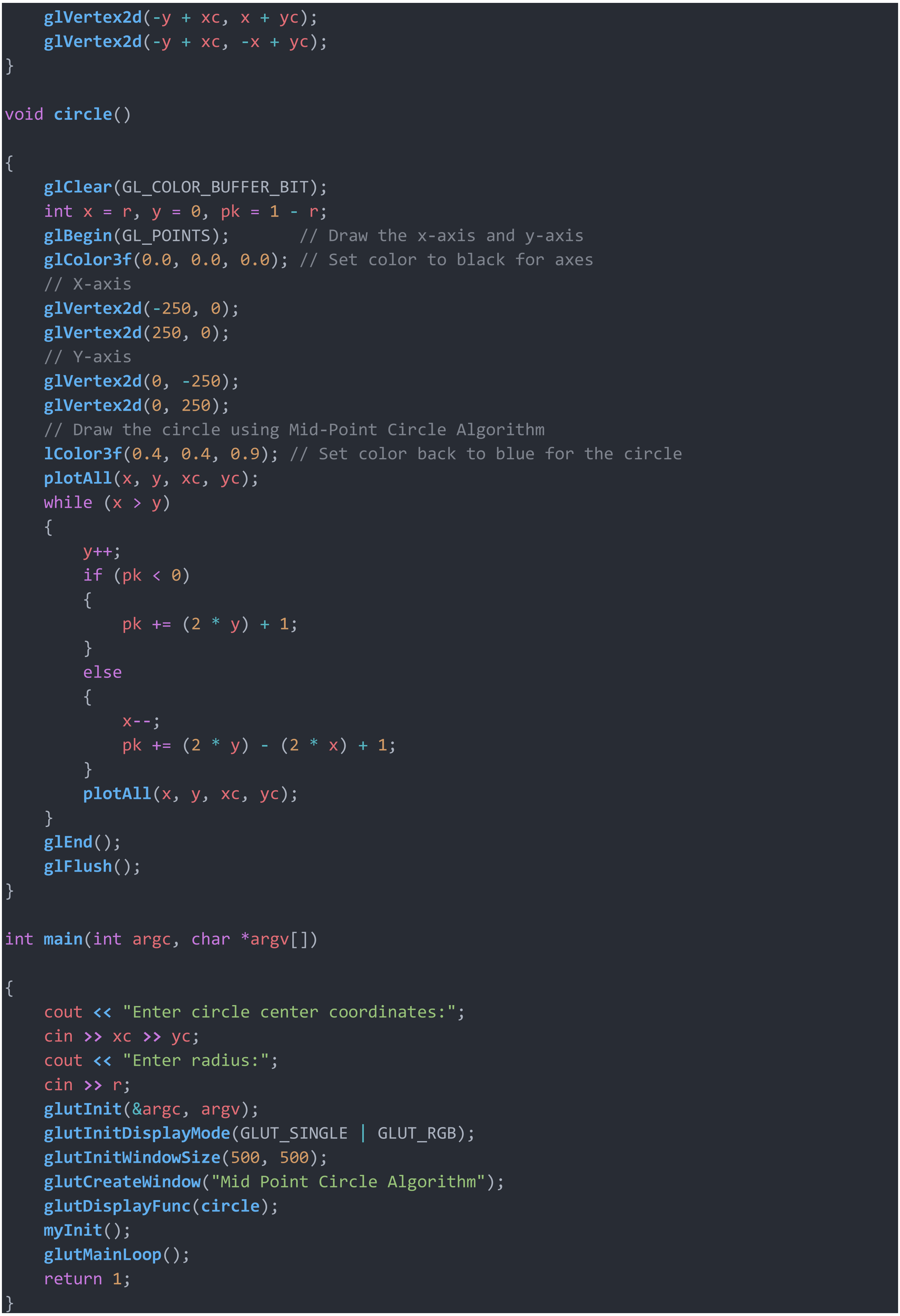
Case 1: With center (0,0)

Case 2: With center (xc,yc)

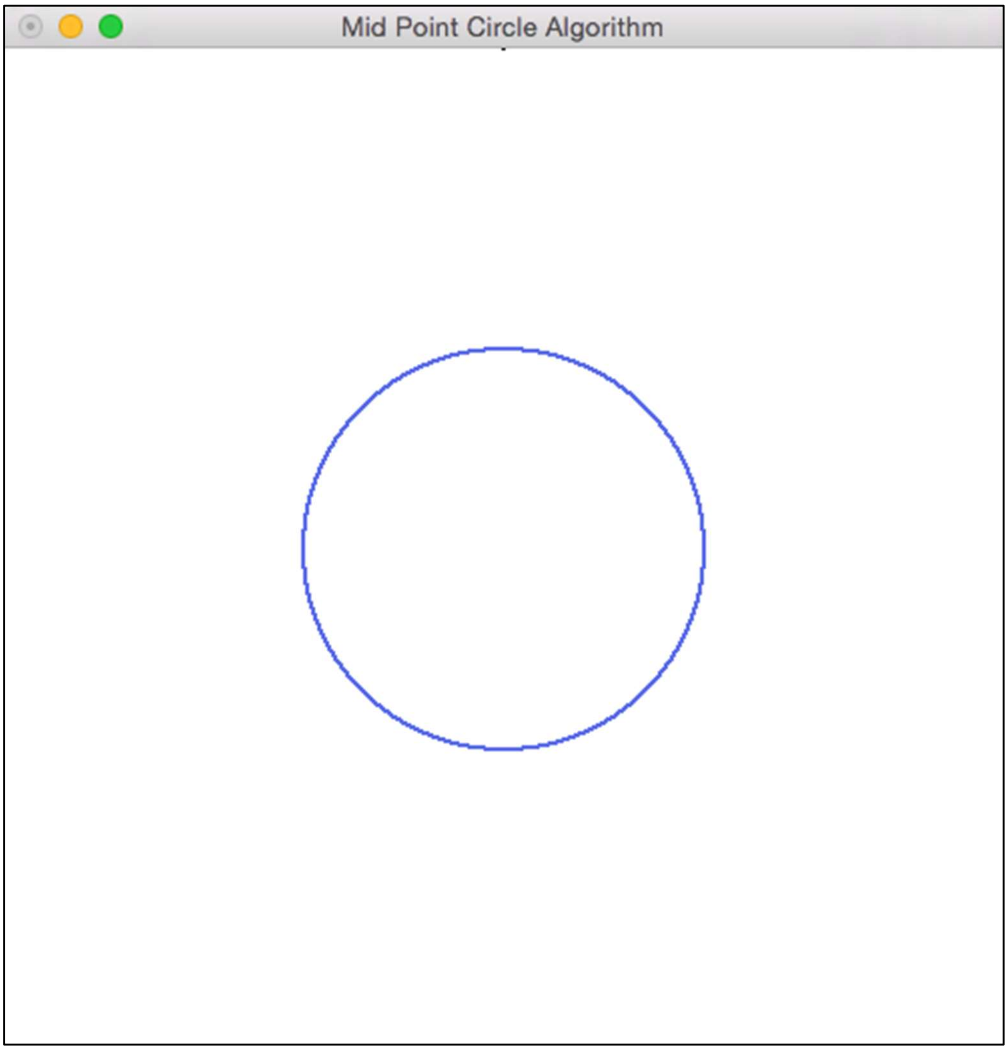
b) To draw any object using line and circle drawing algorithms.

Source code:

```
#include <stdlib.h>
#include <GLUT/glut.h>
#include <iostream>
using namespace std;

int xc, yc, r;

void myInit()

{
    glClearColor(1.0, 1.0, 1.0, 0.0);
    glColor3f(0.4, 0.4, 0.9);
    glMatrixMode(GL_PROJECTION);
    glLoadIdentity();
    glPointSize(2);
    gluOrtho2D(-250.0, 250.0, -250.0, 250.0);
}

void plotAll(int x, int y, int xc, int yc)

{
    glVertex2d(x + xc, y + yc);
    glVertex2d(x + xc, -y + yc);
    glVertex2d(-x + xc, y + yc);
    glVertex2d(-x + xc, -y + yc);
    glVertex2d(y + xc, x + yc);
    glVertex2d(y + xc, -x + yc);
```



```
    glVertex2d(-y + xc, x + yc);
    glVertex2d(-y + xc, -x + yc);
}

void circle()

{
    glClear(GL_COLOR_BUFFER_BIT);
    int x = r, y = 0, pk = 1 - r;
    glBegin(GL_POINTS);       // Draw the x-axis and y-axis
    glColor3f(0.0, 0.0, 0.0); // Set color to black for axes
    // X-axis
    glVertex2d(-250, 0);
    glVertex2d(250, 0);
    // Y-axis
    glVertex2d(0, -250);
    glVertex2d(0, 250);
    // Draw the circle using Mid-Point Circle Algorithm
    lColor3f(0.4, 0.4, 0.9); // Set color back to blue for the circle
    plotAll(x, y, xc, yc);
    while (x > y)
    {
        y++;
        if (pk < 0)
        {
            pk += (2 * y) + 1;
        }
        else
        {
            x--;
            pk += (2 * y) - (2 * x) + 1;
        }
        plotAll(x, y, xc, yc);
    }
    glEnd();
    glFlush();
}

int main(int argc, char *argv[])

{
    cout << "Enter circle center coordinates:";
    cin >> xc >> yc;
    cout << "Enter radius:";
    cin >> r;
    glutInit(&argc, argv);
    glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
    glutInitWindowSize(500, 500);
    glutCreateWindow("Mid Point Circle Algorithm");
    glutDisplayFunc(circle);
    myInit();
    glutMainLoop();
    return 1;
}
```


Mid Point Circle Algorithm