UCS1712 – GRAPHICS AND MULTIMEDIA LAB

Lab Exercise 4 : Midpoint Circle Drawing Algorithm in C++ using OpenGL

a) **To plot points that make up the circle with center (xc,yc) and radius r using Midpoint circle drawing algorithm. Give at least 2 test cases.**

Case 1: With center (0,0)

Case 2: With center (xc,yc)

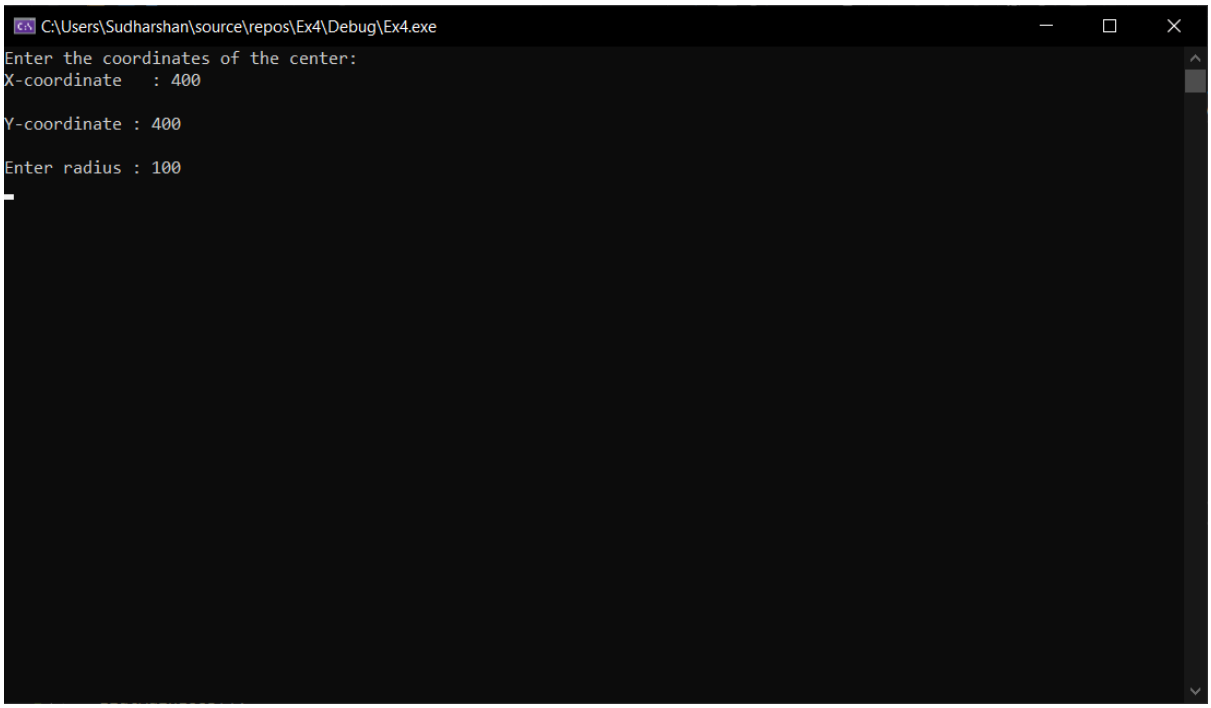
b) **To draw any object using line and circle drawing algorithms.**

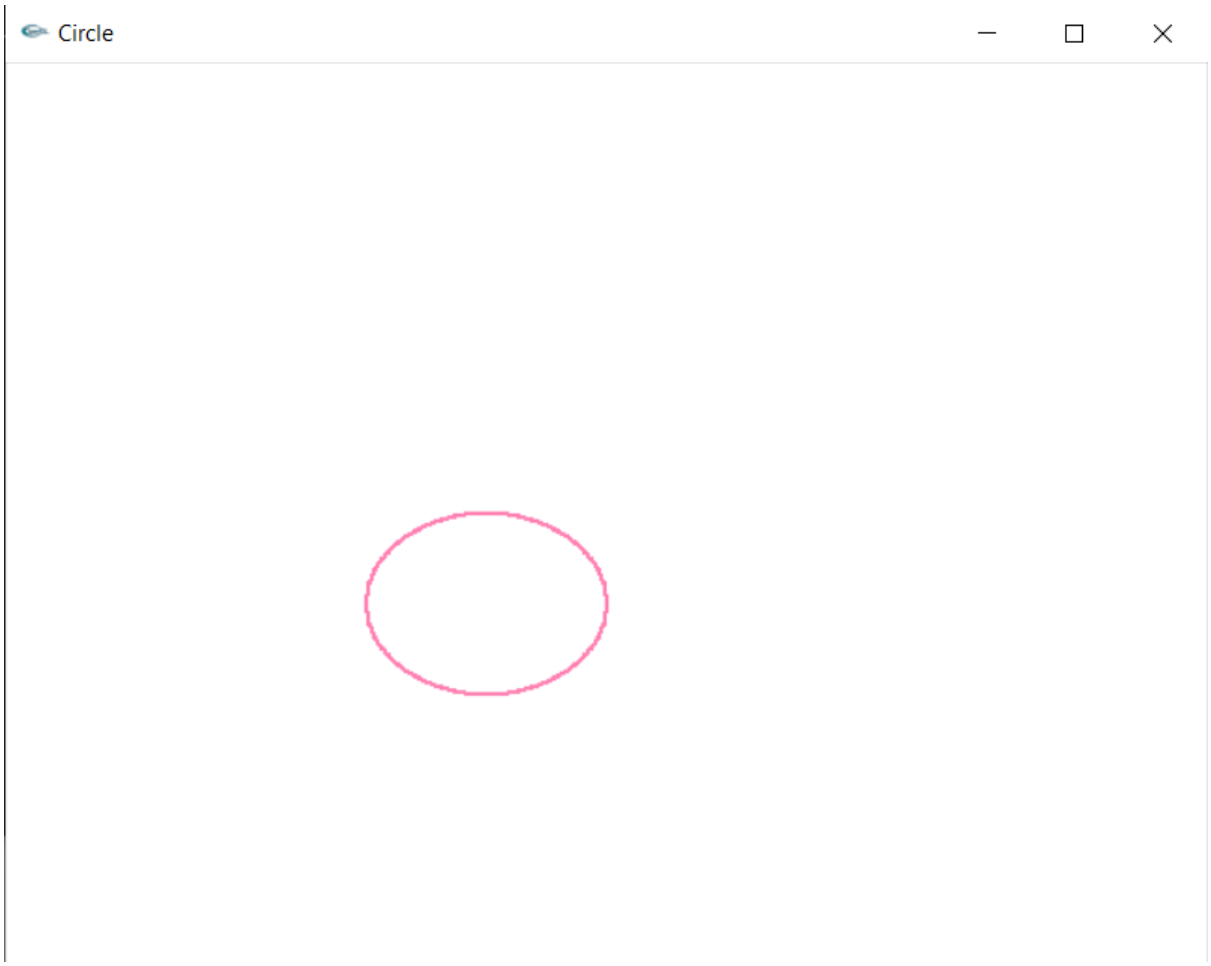
Code:

```
#include <stdio.h>
#include <iostream>
#include <GL/glut.h>
using namespace std;

int pntX1, pntY1, r;

void plot(int x, int y)
{
	glBegin(GL_POINTS);
	glVertex2i(x + pntX1, y + pntY1);
	glEnd();
}


void myInit(void)
{
	glClearColor(1.0, 1.0, 1.0, 1.0);
	glColor3f(0.0f, 0.0f, 0.0f);
	glPointSize(4.0);
	glMatrixMode(GL_PROJECTION);
	glLoadIdentity();
	gluOrtho2D(0.0, 1000.0, 0.0, 1000.0);
}


void midPointCircleAlgo()
{
	int x = 0;
	int y = r;
	float decision = 5 / 4 - r;
	plot(x, y);

	while (y > x)
	{
		if (decision < 0)
		{
			x++;
			decision += 2 * x + 1;
		}
		else
		{
			y--;
```

```
                        x++;
                        decision += 2 * (x - y) + 1;
                }
                plot(x, y);
                plot(x, -y);
                plot(-x, y);
                plot(-x, -y);
                plot(y, x);
                plot(-y, x);
                plot(y, -x);
                plot(-y, -x);
        }

}

void myDisplay(void)
{
        glClear(GL_COLOR_BUFFER_BIT);
        glColor3f(1.0, 0.5, 0.7);
        glPointSize(2.0);

        midPointCircleAlgo();

        glFlush();
}

int main(int argc, char** argv)
{
        cout << "Enter the coordinates of the center: " << endl;

        cout << "X-coordinate   : "; cin >> pntX1;
        cout << "\nY-coordinate : "; cin >> pntY1;
        cout << "\nEnter radius : "; cin >> r;

        glutInit(&argc, argv);
        glutInitDisplayMode(GLUT_SINGLE | GLUT_RGB);
        glutInitWindowSize(640, 480);
        glutInitWindowPosition(100, 150);
        glutCreateWindow("Circle");
        glutDisplayFunc(myDisplay);
        myInit();
        glutMainLoop();
        return 0;
}
```

Output:


C:\Users\Sudharshan\source\repos\Ex4\Debug\Ex4.exe
Enter the coordinates of the center:
X-coordinate : 400
Y-coordinate : 400
Enter radius : 100


Circle