Assignment No.3

# Name: Omkar Manohar Hepat

# Class: CS-B

# Roll No: 31 PRN No: 12211509

# Subject: CGAVR

## Q1. Line Clipping

#include <stdio.h>

#include <GL/freeglut.h>

int INSIDE = 0, LEFT = 1, RIGHT = 2, BOTTOM = 4, TOP = 8;

float x\_min = 50, x\_max = 200, y\_min = 50, y\_max = 200;

int computeCode(float x, float y) {

int code = INSIDE;

if (x < x\_min)

code |= LEFT;

else if (x > x\_max)

code |= RIGHT;

if (y < y\_min)

code |= BOTTOM;

else if (y > y\_max)

code |= TOP;

return code;

}

void cohenSutherland(float x0, float y0, float x1, float y1) {

int code0 = computeCode(x0, y0);

int code1 = computeCode(x1, y1);

float x, y;

while (1) {

if (!(code0 | code1)) {

glColor3f(0.0, 1.0, 0.0);

glBegin(GL\_LINES);

glVertex2f(x0, y0);

glVertex2f(x1, y1);

glEnd();

break;

}

else if (code0 & code1) {

glColor3f(1.0, 0.0, 0.0);

glBegin(GL\_LINES);

glVertex2f(x0, y0);

glVertex2f(x1, y1);

glEnd();

break;

}

else {

int codeOut = code0 ? code0 : code1;

if (codeOut & TOP) {

x = x0 + (x1 - x0) \* (y\_max - y0) / (y1 - y0);

y = y\_max;

}

else if (codeOut & BOTTOM) {

x = x0 + (x1 - x0) \* (y\_min - y0) / (y1 - y0);

y = y\_min;

}

else if (codeOut & RIGHT) {

y = y0 + (y1 - y0) \* (x\_max - x0) / (x1 - x0);

x = x\_max;

}

else if (codeOut & LEFT) {

y = y0 + (y1 - y0) \* (x\_min - x0) / (x1 - x0);

x = x\_min;

}

if (codeOut == code0) {

x0 = x;

y0 = y;

code0 = computeCode(x0, y0);

}

else {

x1 = x;

y1 = y;

code1 = computeCode(x1, y1);

}

}

}

}

void display() {

glClear(GL\_COLOR\_BUFFER\_BIT);

glColor3f(1.0, 1.0, 1.0);

glBegin(GL\_LINE\_LOOP);

glVertex2f(x\_min, y\_min);

glVertex2f(x\_max, y\_min);

glVertex2f(x\_max, y\_max);

glVertex2f(x\_min, y\_max);

glEnd();

glColor3f(0.0, 0.0, 1.0);

glBegin(GL\_LINES);

glVertex2f(60, 60);

glVertex2f(100, 180); // Line Inside

glVertex2f(260, 40);

glVertex2f(350, 250); // Line Outside

glVertex2f(180, 40);

glVertex2f(250, 180); // Line Partially Inside

glEnd();

cohenSutherland(60, 60, 100, 180);

cohenSutherland(260, 40, 350, 250);

cohenSutherland(180, 40, 250, 180);

glFlush();

}

void myInit() {

glClearColor(0.0, 0.0, 0.0, 0.0);

glColor3f(1.0, 1.0, 1.0);

glMatrixMode(GL\_PROJECTION);

glLoadIdentity();

gluOrtho2D(0, 400, 0, 400);

}

int main(int argc, char\*\* argv) {

glutInit(&argc, argv);

glutInitDisplayMode(GLUT\_SINGLE | GLUT\_RGB);

glutInitWindowSize(400, 400);

glutInitWindowPosition(100, 100);

glutCreateWindow("Cohen-Sutherland Line Clipping Algorithm");

myInit();

glutDisplayFunc(display);

glutMainLoop();

return 0;

}

Output:

