Name: Piyush Patil

Roll no:48

**PROGRAM**

#include <GL/glut.h>

#include <iostream>

using namespace std;

#define INSIDE 0

#define LEFT 1

#define RIGHT 2

#define BOTTOM 4

#define TOP 8

const float x\_min = -0.5, y\_min = -0.5, x\_max = 0.5, y\_max = 0.5;

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;

}

bool cohenSutherlandLineClip(float &x0, float &y0, float &x1, float &y1) {

int code0 = computeCode(x0, y0);

int code1 = computeCode(x1, y1);

bool accept = false;

while (true) {

if ((code0 == 0) && (code1 == 0)) {

accept = true;

break;

} else if ((code0 & code1) != 0) {

break;

} else {

int code\_out = code0 ? code0 : code1;

float x, y;

if (code\_out & TOP) {

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

y = y\_max;

} else if (code\_out & BOTTOM) {

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

y = y\_min;

} else if (code\_out & RIGHT) {

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

x = x\_max;

} else if (code\_out & LEFT) {

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

x = x\_min;

}

if (code\_out == code0) {

x0 = x;

y0 = y;

code0 = computeCode(x0, y0);

} else {

x1 = x;

y1 = y;

code1 = computeCode(x1, y1);

}

}

}

return accept;

}

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

glBegin(GL\_LINES);

glVertex2f(x0, y0);

glVertex2f(x1, y1);

glEnd();

}

void drawClippingWindow() {

glBegin(GL\_LINE\_LOOP);

glVertex2f(x\_min, y\_min);

glVertex2f(x\_min, y\_max);

glVertex2f(x\_max, y\_max);

glVertex2f(x\_max, y\_min);

glEnd();

}

void displayOriginalLine() {

glClear(GL\_COLOR\_BUFFER\_BIT);

glColor3f(1.0f, 0.0f, 0.0f);

drawClippingWindow();

float x0 = -0.8f, y0 = -0.7f, x1 = 0.9f, y1 = 0.8f;

glColor3f(0.0f, 1.0f, 0.0f);

drawLine(x0, y0, x1, y1);

glFlush();

}

void displayClippedLine() {

glClear(GL\_COLOR\_BUFFER\_BIT);

glColor3f(1.0f, 0.0f, 0.0f);

drawClippingWindow();

float x0 = -0.8f, y0 = -0.7f, x1 = 0.9f, y1 = 0.8f;

if (cohenSutherlandLineClip(x0, y0, x1, y1)) {

glColor3f(0.0f, 1.0f, 0.0f);

drawLine(x0, y0, x1, y1);

} else {

glColor3f(1.0f, 0.0f, 0.0f);

drawLine(x0, y0, x1, y1);

}

glFlush();

}

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

glutInit(&argc, argv);

glutInitDisplayMode(GLUT\_SINGLE | GLUT\_RGB);

glutInitWindowSize(500, 500);

glutCreateWindow("Original Line (Unclipped)");

glMatrixMode(GL\_PROJECTION);

glLoadIdentity();

glOrtho(-1.0, 1.0, -1.0, 1.0, -1.0, 1.0);

glutDisplayFunc(displayOriginalLine);

glutInitWindowSize(500, 500);

glutCreateWindow("Clipped Line");

glMatrixMode(GL\_PROJECTION);

glLoadIdentity();

glOrtho(-1.0, 1.0, -1.0, 1.0, -1.0, 1.0);

glutDisplayFunc(displayClippedLine);

glutMainLoop();

return 0;

}

Name: Piyush Patil

Roll no:48

