**EXPERIMENT - 05**

**5. Program to clip a lines using Cohen-Sutherland line-clipping algorithm.**

#include <stdio.h>

#include <GL\glut.h>

double xmin=50,ymin=50, xmax=100,ymax=100;

double xvmin=200,yvmin=200,xvmax=300,yvmax=300;

const int RIGHT = 8;

const int LEFT = 2;

const int TOP = 4;

const int BOTTOM = 1;

int ComputeOutCode (double x, double y)

{

int code = 0;

if (y > ymax) //above the clip window

code |= TOP;

else if (y < ymin) //below the clip window

code |= BOTTOM;

if (x > xmax) //to the right of clip window

code |= RIGHT;

else if (x < xmin) //to the left of clip window

code |= LEFT;

return code;

}

void CohenSutherland(double x0, double y0,double x1, double y1)

{

int outcode0, outcode1, outcodeOut;

bool accept = false, done = false;

outcode0 = ComputeOutCode (x0, y0);

outcode1 = ComputeOutCode (x1, y1);

do{

if (!(outcode0 | outcode1))

{

accept = true;

done = true;

}

else if (outcode0 & outcode1)

done = true;

else {

double x, y;

outcodeOut = outcode0? outcode0: outcode1;

if (outcodeOut & TOP)

{

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

y = ymax;

}

else if (outcodeOut & BOTTOM)

{

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

y = ymin;

}

else if (outcodeOut & RIGHT)

{

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

x = xmax;

}

else

{

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

x = xmin;

}

if (outcodeOut == outcode0)

{

x0 = x;

y0 = y;

outcode0 = ComputeOutCode (x0, y0);

}

else

{

x1 = x;

y1 = y;

outcode1 = ComputeOutCode (x1, y1);

}

}

}

while (!done);

if (accept)

{

double sx=(xvmax-xvmin)/(xmax-xmin);

double sy=(yvmax-yvmin)/(ymax-ymin);

double vx0=xvmin+(x0-xmin)\*sx;

double vy0=yvmin+(y0-ymin)\*sy;

double vx1=xvmin+(x1-xmin)\*sx;

double vy1=yvmin+(y1-ymin)\*sy;

glColor3f(1.0, 1.0, 1.0);

glBegin(GL\_LINE\_LOOP);

glVertex2f(xvmin, yvmin);

glVertex2f(xvmax, yvmin);

glVertex2f(xvmax, yvmax);

glVertex2f(xvmin, yvmax);

glEnd();

glColor3f(1.0,1.0,1.0);

glBegin(GL\_LINES);

glVertex2d (vx0, vy0);

glVertex2d (vx1, vy1);

glEnd();

}

}

void display()

{

double x0=60,y0=20,x1=80,y1=120;

glClear(GL\_COLOR\_BUFFER\_BIT);

glColor3f(1.0,1.0,1.0);

glBegin(GL\_LINES);

glVertex2d (x0, y0);

glVertex2d (x1, y1);

glEnd();

glColor3f(1.0, 1.0, 1.0);

glBegin(GL\_LINE\_LOOP);

glVertex2f(xmin, ymin);

glVertex2f(xmax, ymin);

glVertex2f(xmax, ymax);

glVertex2f(xmin, ymax);

glEnd();

CohenSutherland(x0,y0,x1,y1);

glFlush();

**}**

void myinit()

{

glClearColor(0.0,0.0,0.0,1.0);

glMatrixMode(GL\_PROJECTION);

glLoadIdentity();

gluOrtho2D(0.0,500.0,0.0,500.0);

glMatrixMode(GL\_MODELVIEW);

}

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

{

glutInit(&argc,argv);

glutInitDisplayMode(GLUT\_SINGLE|GLUT\_RGB);

glutInitWindowSize(500,500);

glutInitWindowPosition(0,0);

glutCreateWindow("Cohen Suderland Line Clipping Algorithm");

myinit();

glutDisplayFunc(display);

glutMainLoop();

}

**OUTPUT**

