**5: Cohen-Sutherland**

#include <stdio.h> #include <GL/glut.h>

#include<stdbool.h>

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

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

**const int** TOP = 8; **const int** BOTTOM = 4;

**const int** RIGHT= 2; **const int** LEFT = 1;

**int** ComputeOutCode (**double** x, **double** y);

**void** CohenSutherlandLineClipAndDraw (**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)==0)

{accept = true;done = true;}

else if (outcode0 & outcode1)

done = true;

else

{double x, y;

outcodeOut = outcode0? outcode0: outcode1;

float slope=(y1-y0)/(x1-x0);

if (outcodeOut & TOP) //point is above the clip rectangle

{x = x0 + (1/slope) \* (ymax - y0); y = ymax; }

else if (outcodeOut & BOTTOM) //point is below the clip rectangle

{x = x0 + (1/slope) \* (ymin - y0); y = ymin; }

else if (outcodeOut & RIGHT) //point is to the right of clip rectangle

{y = y0 + slope \* (xmax - x0); x = xmax; }

else

{y = y0 + slope\* (xmin - 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, 0.0, 0.0);glBegin(GL\_LINE\_LOOP);

glVertex2f(xvmin, yvmin);glVertex2f(xvmax, yvmin);

glVertex2f(xvmax, yvmax);glVertex2f(xvmin, yvmax);

glEnd();glColor3f(0.0,0.0,1.0); glBegin(GL\_LINES);

glVertex2d (vx0, vy0);glVertex2d (vx1, vy1);glEnd(); } }

int ComputeOutCode (double x, double y)

{int code = 0;

if (y > ymax)

code |= TOP;

else if (y < ymin)

code |= BOTTOM;

if (x > xmax)

code |= RIGHT;

else if (x < xmin)

code |= LEFT;

return code; }

void display()

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

glClear(GL\_COLOR\_BUFFER\_BIT);

glColor3f(1.0,0.0,0.0);glBegin(GL\_LINES);

glVertex2d (x0, y0);glVertex2d (x1, y1);glEnd();

glColor3f(0.0, 0.0, 1.0);glBegin(GL\_LINE\_LOOP);

glVertex2f(xmin, ymin);glVertex2f(xmax, ymin);

glVertex2f(xmax, ymax);glVertex2f(xmin, ymax);glEnd();

CohenSutherlandLineClipAndDraw(x0,y0,x1,y1);

glFlush(); }

void myinit()

{glClearColor(1.0,1.0,1.0,1.0);glColor3f(1.0,0.0,0.0);

glPointSize(1.0);glMatrixMode(GL\_PROJECTION);

glLoadIdentity();gluOrtho2D(0.0,499.0,0.0,499.0); }

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");

glutDisplayFunc(display); myinit(); glutMainLoop(); }