**5: Cohen-Sutherland**

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#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_SI
NGLE|GLUT_RGB);  glutInitWindowSize(500,500);
glutInitWindowPosition(0,0);
glutCreateWindow("Cohen Suderland Line Clipping
Algorithm");
glutDisplayFunc(display); myinit(); glutMainLoop();  }
```