7. Clip lines using Cohen-Sutherland algorithm.

```
#include<stdio.h>
#include<GL/glut.h>
#include<stdbool.h>
#define outcode int
float xvmin=200,yvmin=200,xvmax=300,yvmax=300;
float xmin,ymin,xmax,ymax;
float x0,y0,x1,y1;
const int RIGHT=2;
const int LEFT=1;
const int TOP=8;
const int BOTTOM=4;
int computeoutcode(float x,float y);
void CSLCAD(float x0,float y0,float x1,float 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!=0)
done=true;
else
{
double x,y;
outcodeout=outcode0?outcode0:outcode1;
if(outcodeout & TOP)            //point is above clipping window
{
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;
}
//Now we move outside point to intersection point to clip
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-xmin)* Sy;
double vx1=xvmin+(x1-xmin)* Sx;
double vy1=yvmin+(y1-xmin)* Sx;
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(float x,float y)
{
int code=0;
if(y>ymax)
code=code|TOP;
else if(y<ymin)
code=code|BOTTOM;
if(x>xmax)
code=code|RIGHT;
else if(x<xmin)
code=code|LEFT;
return code;
}
void drawline()
{
glBegin(GL_LINES);
glVertex2f(x0,y0);
glVertex2f(x1,y1);
glEnd();
}
void drawrect()
{
glBegin(GL_LINE_LOOP);
glVertex2f(xmin,ymin);
glVertex2f(xmax,ymin);
glVertex2f(xmax,ymax);
glVertex2f(xmin,ymax);
glEnd();
}
void display()
{
glColor3f(1.0,0.0,0.0);
drawline();
glColor3f(0.0,0.0,1.0);
drawrect();
CSLCAD(x0,y0,x1,y1);
glFlush();
}
void myinit()
{
glClearColor(1.0,1.0,1.0,1.0);
glClear(GL_COLOR_BUFFER_BIT);
glColor3f(1.0,0.0,0.0);
```

```
glPointSize(1.0);
glMatrixMode(GL_PROJECTION);
glLoadIdentity();
gluOrtho2D(0.0,499.0,0.0,499.0);
}
int main(int argc,char *argv[])
{
printf("enter the end points of clipping window\n");
scanf("%f%f%f%f",&xmin,&ymin,&xmax,&ymax);
printf("enter the end points:");
scanf("%f%f%f%f",&x0,&y0,&x1,&y1);
glutInit(&argc,argv);
glutInitDisplayMode(GLUT_SINGLE|GLUT_RGB);
glutInitWindowSize(500,500);
glutInitWindowPosition(0,0);
glutCreateWindow("Cohen-Sutherland line-clippuing");
glutDisplayFunc(display);
myinit();
glutMainLoop();
return 0;
}
```