**Program 13(a)**

**Write a program to implement Cohen Sutherland Algorithm.**

#include<graphics.h>

#include<stdio.h>

#define TOP 0x1

#define BOTTOM 0x2

#define RIGHT 0x4

#define LEFT 0x8

#define ROUND(a) ((int)(a+0.5))

void ddaline(int x1, int y1, int x2, int y2)

{

float xsteps, ysteps, x=x1, y=y1;

int dx = x2-x1;

int dy = y2-y1;

int steps,k=1;

if(abs(dx)>=abs(dy))

steps=abs(dx);

else steps=abs(dy);

xsteps= dx/(float)steps;

ysteps= dy/(float)steps;

putpixel(ROUND(x),ROUND(y),15);

while(k<=steps)

{

x+=xsteps;

y+=ysteps;

putpixel(ROUND(x), ROUND(y),15);

k++;

}

}

int calcode (float x,float y,float xwmin, float ywmin,float xwmax,float ywmax)

{

int code =0;

if(y> ywmax)

code |=TOP;

else if( y<ywmin)

code |= BOTTOM;

else if(x > xwmax)

code |= RIGHT;

else if ( x< xwmin)

code |= LEFT;

return(code);

}

void lineclip(float x0,float y0,float x1,float y1,float xwmin,float ywmin,float xwmax,float ywmax )

{

unsigned int code0,code1,codeout;

int accept = 0, done=0;

code0 = calcode(x0,y0,xwmin,ywmin,xwmax,ywmax);

code1 = calcode(x1,y1,xwmin,ywmin,xwmax,ywmax);

do{

if(!(code0 | code1))

{ accept =1 ; done =1; }

else

if(code0 & code1) done = 1;

else

{

float x,y;

codeout = code0 ? code0 : code1;

if(codeout & TOP)

{

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

y = ywmax;

}

else

if( codeout & BOTTOM)

{

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

y = ywmin;

}

else

if ( codeout & RIGHT)

{

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

x = xwmax;

}

else

{

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

x = xwmin;

}

if( codeout == code0)

{

x0 = x; y0 = y;

code0=calcode(x0,y0,xwmin,ywmin,xwmax,ywmax);

}

else

{

x1 = x; y1 = y;

code1 = calcode(x1,y1,xwmin,ywmin,xwmax,ywmax);

}

}

} while( done == 0);

if(accept) ddaline(x0,y0,x1,y1);

ddaline(xwmin,ywmin,xwmin,ywmax);

ddaline(xwmin,ywmax,xwmax,ywmax);

ddaline(xwmax,ywmax,xwmax,ywmin);

ddaline(xwmax,ywmin,xwmin,ywmin);

getch();

}

int main()

{

float x2,y2,x1,y1,xwmin,ywmin,xwmax,ywmax;

int gdriver = DETECT, gmode, errorcode;

initgraph(&gdriver, &gmode, "..\\");

errorcode = graphresult();

if (errorcode != grOk)

{

printf("Graphics error: %s\n", grapherrormsg(errorcode));

printf("Press any key to halt:");

getch();

exit(1);

}

printf("Enter the starting point\n");

scanf("%f %f", &x1, &y1);

printf("Enter the ending point\n");

scanf("%f %f", &x2, &y2);

printf("Enter xwmin, ywmin, xwmax, ywmax\n");

scanf("%f %f %f %f",&xwmin,&ywmin,&xwmax,&ywmax);

lineclip(x1,y1,x2,y2,xwmin,ywmin,xwmax,ywmax );

getch();

closegraph();

return 0;

}



