**ASSIGNMENT NO. :- 02**

**TITLE :- Write C++ program to implement Cohen Southerland line clipping algorithm.**

#include<iostream>

#include<stdlib.h>

#include<math.h>

#include<graphics.h>

#include<dos.h>

using namespace std;

typedef struct coordinate

{

int x,y;

char code[4];

}PT;

void drawwindow();

void drawline(PT p1,PT p2);

PT setcode(PT p);

int visibility(PT p1,PT p2);

PT resetendpt(PT p1,PT p2);

int main()

{

int gd=DETECT,v,gm;

PT p1,p2,p3,p4,ptemp;

cout<<"\nEnter x1 and y1\n";

cin>>p1.x>>p1.y;

cout<<"\nEnter x2 and y2\n";

cin>>p2.x>>p2.y;

initgraph(&gd,&gm,"c:\\turboc3\\bgi");

drawwindow();

delay(500);

drawline(p1,p2);

delay(500);

cleardevice();

delay(500);

p1=setcode(p1);

p2=setcode(p2);

v=visibility(p1,p2);

delay(500);

switch(v)

{

case 0: drawwindow();

delay(500);

drawline(p1,p2);

break;

case 1: drawwindow();

delay(500);

break;

case 2: p3=resetendpt(p1,p2);

p4=resetendpt(p2,p1);

drawwindow();

delay(500);

drawline(p3,p4);

break;

}

delay(5000);

closegraph();

return 0;

}

void drawwindow()

{

line(150,100,450,100);

line(450,100,450,350);

line(450,350,150,350);

line(150,350,150,100);

}

void drawline(PT p1,PT p2)

{

line(p1.x,p1.y,p2.x,p2.y);

}

PT setcode(PT p) //for setting the 4 bit code

{

PT ptemp;

if(p.y<100)

ptemp.code[0]='1'; //Top

else

ptemp.code[0]='0';

if(p.y>350)

ptemp.code[1]='1'; //Bottom

else

ptemp.code[1]='0';

if(p.x>450)

ptemp.code[2]='1'; //Right

else

ptemp.code[2]='0';

if(p.x<150)

ptemp.code[3]='1'; //Left

else

ptemp.code[3]='0';

ptemp.x=p.x;

ptemp.y=p.y;

return(ptemp);

}

int visibility(PT p1,PT p2)

{

int i,flag=0;

for(i=0;i<4;i++)

{

if((p1.code[i]!='0') || (p2.code[i]!='0'))

flag=1;

}

if(flag==0)

return(0);

for(i=0;i<4;i++)

{

if((p1.code[i]==p2.code[i]) && (p1.code[i]=='1'))

flag='0';

}

if(flag==0)

return(1);

return(2);

}

PT resetendpt(PT p1,PT p2)

{

PT temp;

int x,y,i;

float m,k;

if(p1.code[3]=='1')

x=150;

if(p1.code[2]=='1')

x=450;

if((p1.code[3]=='1') || (p1.code[2]=='1'))

{

m=(float)(p2.y-p1.y)/(p2.x-p1.x);

k=(p1.y+(m\*(x-p1.x)));

temp.y=k;

temp.x=x;

for(i=0;i<4;i++)

temp.code[i]=p1.code[i];

if(temp.y<=350 && temp.y>=100)

return (temp);

}

if(p1.code[0]=='1')

y=100;

if(p1.code[1]=='1')

y=350;

if((p1.code[0]=='1') || (p1.code[1]=='1'))

{

m=(float)(p2.y-p1.y)/(p2.x-p1.x);

k=(float)p1.x+(float)(y-p1.y)/m;

temp.x=k;

temp.y=y;

for(i=0;i<4;i++)

temp.code[i]=p1.code[i];

return(temp);

}

else

return(p1);

}

**OUTPUT :-**



