**//Write C++ program to draw a concave polygon and fill it with desired color using scan fill algorithm. Apply the concept of inheritance.**

#include <conio.h>

#include <iostream>

#include <graphics.h>

#include <stdlib.h>

using namespace std;

//Declaration of class point

class point

{

public:

int x,y;

};

class poly

{

private:

point p[20];

int inter[20],x,y;

int v,xmin,ymin,xmax,ymax;

public:

int c;

void read();

void calcs();

void display();

void ints(float);

void sort(int);

};

void poly::read()

{

int i;

cout<<"\n\t SCAN\_FILL ALGORITHM";

cout<<"\n Enter the no of vertices of polygon:";

cin>>v;

if(v>2)

{

for(i=0;i<v; i++) //ACCEPT THE VERTICES

{

cout<<"\nEnter the co-ordinate no.- "<<i+1<<" : ";

cout<<"\n\tx"<<(i+1)<<"=";

cin>>p[i].x;

cout<<"\n\ty"<<(i+1)<<"=";

cin>>p[i].y;

}

p[i].x=p[0].x;

p[i].y=p[0].y;

xmin=xmax=p[0].x;

ymin=ymax=p[0].y;

}

else

cout<<"\n Enter valid no. of vertices.";

}

//FUNCTION FOR FINDING

void poly::calcs()

{ //MAX,MIN

for(int i=0;i<v;i++)

{

if(xmin>p[i].x)

xmin=p[i].x;

if(xmax<p[i].x)

xmax=p[i].x;

if(ymin>p[i].y)

ymin=p[i].y;

if(ymax<p[i].y)

ymax=p[i].y;

}

}

//DISPLAY FUNCTION

void poly::display()

{

int ch1;

char ch='y';

float s,s2;

do

{

cout<<"\n\nMENU:";

cout<<"\n\n\t1 . Scan line Fill ";

cout<<"\n\n\t2 . Exit ";

cout<<"\n\nEnter your choice:";

cin>>ch1;

switch(ch1)

{

case 1:

s=ymin+0.01;

delay(100);

cleardevice();

while(s<=ymax)

{

ints(s);

sort(s);

s++;

}

break;

case 2:

exit(0);

}

cout<<"Do you want to continue?: ";

cin>>ch;

}while(ch=='y' || ch=='Y');

}

void poly::ints(float z) //DEFINE FUNCTION INTS

{

int x1,x2,y1,y2,temp;

c=0;

for(int i=0;i<v;i++)

{

x1=p[i].x;

y1=p[i].y;

x2=p[i+1].x;

y2=p[i+1].y;

if(y2<y1)

{

temp=x1;

x1=x2;

x2=temp;

temp=y1;

y1=y2;

y2=temp;

}

if(z<=y2&&z>=y1)

{

if((y1-y2)==0)

x=x1;

else // used to make changes in x. so that we can fill our polygon after certain distance

{

x=((x2-x1)\*(z-y1))/(y2-y1);

x=x+x1;

}

if(x<=xmax && x>=xmin)

inter[c++]=x;

}

}

}

void poly::sort(int z) //SORT FUNCTION

{

int temp,j,i;

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

{

line(p[i].x,p[i].y,p[i+1].x,p[i+1].y); // used to make hollow outlines of a polygon

}

delay(100);

for(i=0; i<c;i+=2)

{

delay(100);

line(inter[i],z,inter[i+1],z); // Used to fill the polygon ....

}

}

int main() //START OF MAIN

{

int cl;

initwindow(500,600);

cleardevice();

poly x;

x.read();

x.calcs();

cleardevice();

cout<<"\n\tEnter the colour u want:(0-15)->"; //Selecting colour

cin>>cl;

setcolor(cl);

x.display();

closegraph(); //CLOSE OF GRAPH

getch();

return 0;

}