**ĐỒ HỌA MÁY TÍNH**

BÀI TẬP THỰC HÀNH NHÓM 1

Thành viên nhóm:

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1. **Thuật toán CohenSutherLand:**
2. Code:

//code

#include<graphics.h>

#include<math.h>

#include<dos.h>

#include<stdio.h>

#include<conio.h>

#include<stdlib.h>

void Cohensutherland(int x1,int y1,int x2,int y2,int xa, int ya, int xb,int yb)

{

int a[4],b[4],i,kthuc=0;

while(kthuc==0)

{

a[1]=a[2]=a[3]=a[4]=0;

if(xa<x1) a[1]=1;

if(xa>x2) a[2]=1;

if(ya<y1) a[3]=1;

if(ya>y2) a[4]=1;b[1]=b[2]=b[3]=b[4]=0;

if(xb<x1) b[1]=1;

if(xb>x2) b[2]=1;

if(yb<y1) b[3]=1;

if(yb>y2) b[4]=1;

int ktra=0;

for(i=1;i<=4;i++)

{

if( (a[i]==1) || (b[i]==1) ) ktra=1;

};

if(ktra==0) {

setcolor(10);line(xa,ya,xb,yb);kthuc=1;

}

else

{

int ktra1=1;

for(i=1;i<=4;i++)

{

if( (a[i]==1) && (b[i]==1) ) ktra1=0;

}

if(ktra1==0) {

kthuc=1;

}

else

{

if(a[1]==0 && a[2]==0 && a[3]==0 && a[4]==0)

{

for(i=1;i<=4;i++)

{

int tg1=a[i];a[i]=b[i];b[i]=tg1;

}

int tg2=xa;xa=xb;xb=tg2;

int tg3=ya;ya=yb;yb=tg3;

}

if(a[1]==1)

{

ya=(yb-ya)\*(x1-xa)/(xb-xa)+ya;

xa=x1; //cout<<xa<<" "<<ya<<endl;

}

if(a[2]==1)

{

ya=(yb-ya)\*(x2-xa)/(xb-xa)+ya;

xa=x2;

}

if(a[3]==1)

{

xa=(xb-xa)\*(y1-ya)/(yb-ya)+xa;

ya=y1;

}

if(a[4]==1)

{

xa=(xb-xa)\*(y2-ya)/(yb-ya)+xa;

ya=y2;

}

}

}

}

}

int main(){

int md=0, dr=0;

initgraph(&md,&dr,"c:\\tc\\bgi");

setcolor(11);

rectangle(200,200,400,400);

Cohensutherland(200,200,400,400,150,100,300,300);

getch();

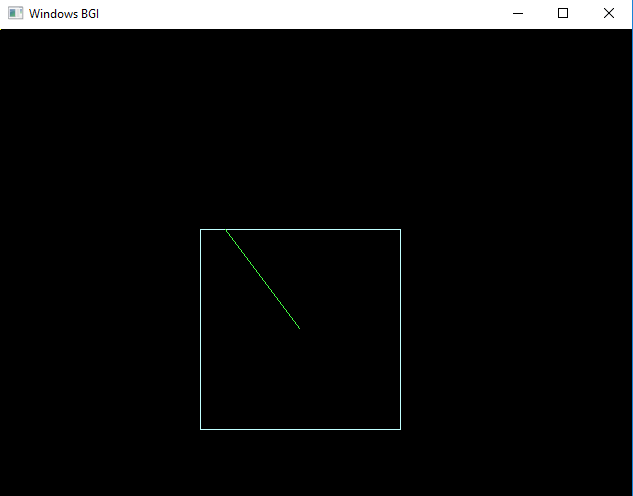
}

//code

1. Dữ liệu thử:

* Tiêu đề: “Thuat toan Line Midpoint”
* Tọa độ điểm: x1 = 150; y1 = 100; x2 = 300; y2 = 300;
* Màu: color = 2

1. Màn hình kết quả:



1. **Thuật toán tô màu theo đường biên (Tô loang):**
2. Code:

//code

#include <conio.h>

#include <winbgim.h>

#include <iostream>

#include <queue>

using namespace std;

struct ToaDo

{

int x,y;

};

int MauNen;

void NhapDaGiac(int &n,int &x,int &y,ToaDo a[])

{

cout<<"Nhap so dinh cua da giac n= "; cin>>n;

for (int i=1;i<=n;i++)

{

cout<<"Toa do dinh P["<<i<<"].x= "; cin>>a[i].x;

cout<<"Toa do dinh P["<<i<<"].y= "; cin>>a[i].y;

}

cout<<"Nhap diem (x,y) thuoc da giac:\n";

cout<<"nhap x="; cin>>x;

cout<<"nhap y="; cin>>y;

}

void VeDaGiac(int n,ToaDo a[],int color)

{

setcolor(color);

for (int i=1;i<=n;i++)

{

int j;

if (i==n) j=1; else j=i+1;

line(a[i].x,a[i].y,a[j].x,a[j].y);

}

}

void ToLoang(int x,int y,int color)

{

// Khai bao queue chua pixel chua duoc to mau

queue<ToaDo> Q;

ToaDo m, Tg;

if (getpixel(x,y)==MauNen && x<getmaxx() && y<getmaxy())

{

m.x = x;

m.y = y;

putpixel(m.x, m.y, color);

Q.push(m); // Them 1 diem vao queue, queue size tang 1

while(Q.empty() == false) //Xet 4 diem xung quanh voi moi diem luu trong queue (neu queue con phan tu)

{

Q.pop();// Xoa 1 diem phia dau queue, queue size giam 1

//Xet cac diem lan can cua 1 diem

if(getpixel(m.x+1, m.y) == MauNen)

{

putpixel(m.x+1, m.y, color );

Tg.x = m.x+1;

Tg.y = m.y;

Q.push(Tg);// Them 1 diem vao cuoi queue

}

if(getpixel(m.x-1, m.y) == MauNen)

{

putpixel(m.x-1, m.y, color);

Tg.x = m.x-1;

Tg.y = m.y;

Q.push(Tg);

}

if(getpixel(m.x, m.y+1) == MauNen)

{

putpixel(m.x, m.y+1, color);

Tg.x = m.x;

Tg.y = m.y+1;

Q.push(Tg);

}

if(getpixel(m.x, m.y-1) == MauNen)

{

putpixel(m.x, m.y-1, color);

Tg.x = m.x;

Tg.y = m.y-1;

Q.push(Tg);

}

m = Q.front();// Dua ve gia tri dau tien cho hang doi

delay(1);

}

}

}

int main()

{

int x,y,n,Gd,Gm=VGAMAX;

ToaDo a[10];

NhapDaGiac(n,x,y,a);

Gd=DETECT;

initgraph(&Gd,&Gm,"");

VeDaGiac(n,a,15);

MauNen=getpixel(x,y);

ToLoang(x,y,10);

getch();

closegraph();

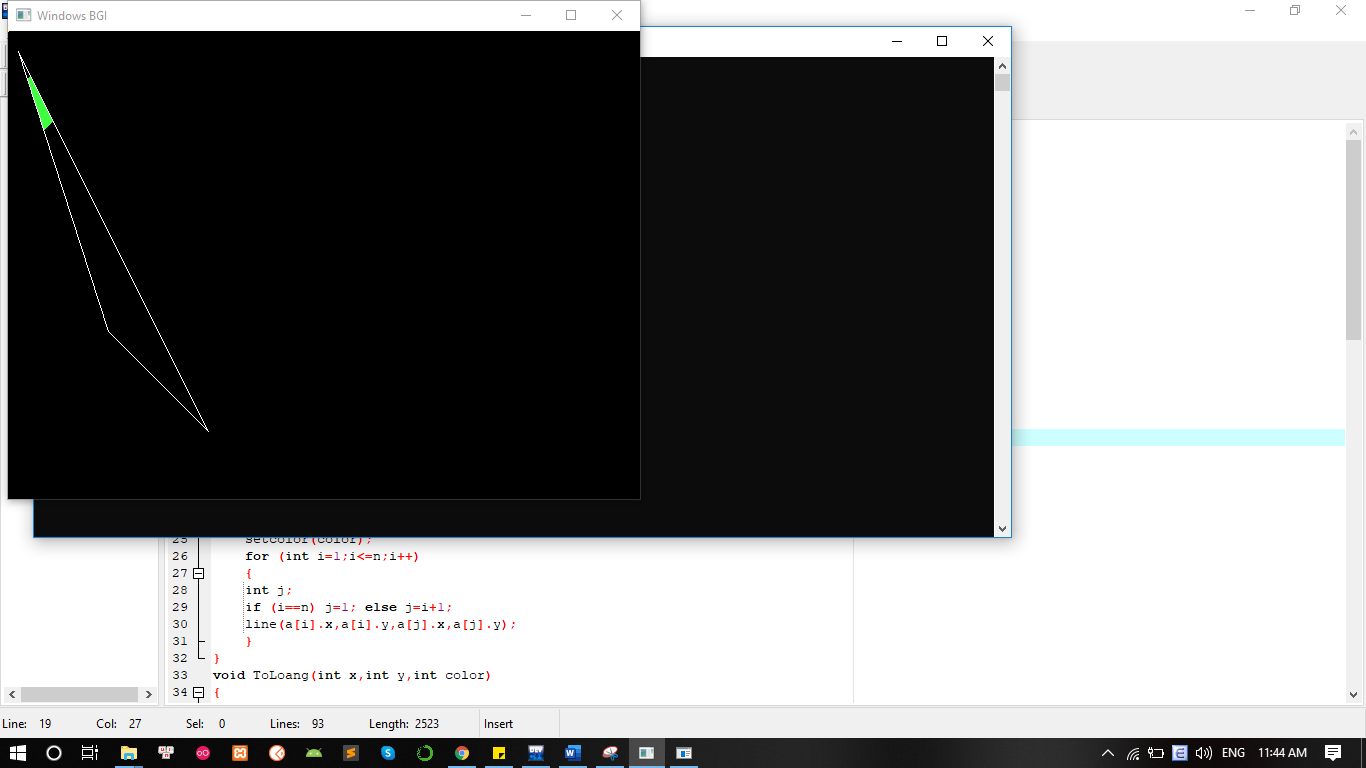
}

//code

1. Dữ liệu thử:

* Tọa độ điểm: x1 = 10; y1 = 10; x2 = 100; y2 = 300; x3 = 200; y3 = 400,x0 = 30, y0 = 70;
* Màu: color = 2

1. Màn hình kết quả:



1. **Thuật toán tô màu theo dòng quét(Scan-line):**
2. Code:

//code

#include <stdio.h>

#include <conio.h>

#include <graphics.h>

int x1,y1,x2,y2,x3,y3,x4,y4,y5,x5,x6,y6,x7,y7,x8,y8;

void velapphuong()

{

x1=200,y1=200;

x2=300,y2=200;

x3=300,y3=300;

x4=200,y4=300;

x5=250,y5=150;

x6=350,y6=150;

x7=350,y7=250;

x8=250,y8=250;

setcolor(BLUE);

rectangle(x5,y5,x7,y7);

rectangle(x1,y1,x3,y3);

line(x1,y1,x5,y5);

line(x2,y2,x6,y6);

line(x3,y3,x7,y7);

line(x4,y4,x8,y8);

}

void tinhtien()

{

int x,y;

printf("Enter x & y");

scanf("%d",&x);

scanf("%d",&y);

rectangle(x5+x,y5+y,x7+x,y7+y);

rectangle(x1+x,y1+y,x3+x,y3+y);

line(x1+x,y1+y,x5+x,y5+y);

line(x2+x,y2+y,x6+x,y6+y);

line(x3+x,y3+y,x7+x,y7+y);

line(x4+x,y4+y,x8+x,y8+y);

}

int main()

{

int gd = DETECT,gm;

initgraph(&gd, &gm,"C:\\TC\\BGI");

velapphuong();

tinhtien();

getch();

return 0;

}//code

1. Dữ liệu thử:

* Tọa độ điểm: x1=200,y1=200;x2=300,y2=200;x3=300,y3=300;x4=200,y4=300;x5=250,y5=150;x6=350,y6=150;x7=350,y7=250;x8=250,y8=250;x=100,y=300
* Màu: color = blue;

1. Màn hình kết quả:

