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/*WAP to implement BLA algorithm in Cpp*/
//Bresenham Line Drawing Algorithm
#include <iostream> //line(x1,y1,x2,y2)
#include <cmath>
#include <graphics.h>
using namespace std;
int x_1,x_2,y_1,y_2,p_n,dx,dy,add_y;
float m;
void line_plot_m_s() // del_y = y2-y1 , del_x = x2 -x1 , p(0)=2*del_y-del_x, if
p(n)>0 p(n+1)=p(n)+2*del_y-2*del_x, if p(n)<=0 p(n+1)=p(n)+2*del_y
{
    if (p_n<0)
    {
        p_n=p_n+2*dy;
        x_1++; // changhe x_1 only
    }
    else
    {
        p_n=p_n+2*dy-2*dx;
        x_1++; //change both x_1 and y_1
        y_1=y_1+add_y;
    }
    putpixel(x_1,y_1,GREEN);
}

void line_plot_m_l() // del_y = y2-y1 , del_x = x2 -x1 , p(0)=2*del_x-del_y, if
p(n)>0 p(n+1)=p(n)+2*del_x-2*del_y, if p(n)<=0 p(n+1)=p(n)+2*del_x
{
    if (p_n<0)
    {
        p_n=p_n+2*dx;
        y_1=y_1+add_y; //change y_1 only
    }
    else
    {
        p_n=p_n+2*dx-2*dy;
        x_1++; //change both x_1 and y_1
        y_1=y_1+add_y;
    }
}

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    }
    putpixel(x_1,y_1,GREEN);
}
int main()
{
    int i;
    while(1)
    {
        cout<<"\n\n\n\t\t\t\t\t1366*768 ";
        cout<<"\n\n\n\t\t\t\t\tEnter line coordinates (x1,y1), (x2,y2) with in range (0,0)
to (1365,767)";
        cout<<"\n\n Enter (x1,y1)";
        cout<<"\n Enter x1: ";
        cin>>x_1;
        cout<<" Enter y1: ";
        cin>>y_1;
        cout<<"\n\n Enter (x2,y2)";
        cout<<"\n Enter x2: ";
        cin>>x_2;
        cout<<" Enter y2: ";
        cin>>y_2;
        initwindow(1366,768);
        for(i=0; i<=1365; i++) // creates white background
        {
            line(0,i,1365,i);
        }
        //setcolor(GREEN);
        //line(x_1+50,y_1+50,x_2+50,y_2+50);
        if (x_2==x_1)
        {
            if (y_2<y_1)
            {
                y_1=y_1+y_2;
                y_2=y_1-y_2;
                y_1=y_1-y_2;
            }
            while(y_1<y_2)//small slope |m|=1/0

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    {
        putpixel(x_1,y_1,GREEN);
        y_1++;
    }
    getch();
    break;
}
m=(y_2-y_1)/(x_2-x_1);
if (x_2<x_1)//swap
{
    x_1=x_1+x_2;
    x_2=x_1-x_2;
    x_1=x_1-x_2;
    y_1=y_1+y_2;
    y_2=y_1-y_2;
    y_1=y_1-y_2;
}
dx=abs(x_2-x_1);
dy=abs(y_2-y_1);
if (y_2<y_1)
{
    add_y=-1;
}
else
{
    add_y=1;
}
putpixel(x_1,y_1,GREEN);
if (fabs(m)<1)// small slope |m|<1
{
    p_n=2*dy-dx;
    while(x_1<x_2)//small slope |m|<1
    {
        line_plot_m_s();
    }
}
else

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    {
        p_n=2*dx-dy;
        while(x_1<x_2)// large slope |m|=>1
        {
            line_plot_m_l();
        }
    }
    getch();
    closegraph();
}
return 0;
}
/*
Test lines (x1,y1,x2,y2,slope)
(50,60,1200,600,0.46)
(1200,600,50,60,0.46)
(50,600,1200,70,-0.46)
(1200,70,50,600,-0.46)
(50,60,600,700,1.16)
(600,700,50,60,1.16)
(70,600,400,60,-1.63)
(400,60,70,600,-1.63)
(50,50,70,70,1)
(70,70,50,50,1)
(70,30,50,50,-1)
(50,50,70,30,-1)
(80,70,900,70,0)
(900,70,80,70,0)
(80,70,80,700,1/0)
(80,700,80,70,-1/0)
*/

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