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//Program 3 To draw Pattern by using DDA Line drawing & Bresenham circle drawing algorithm
#include<graphics.h>
void drawCircle(int xc, int yc, int x, int y)
{
        putpixel(xc+x, yc+y, WHITE);
        putpixel(xc-x, yc+y, WHITE);
        putpixel(xc+x, yc-y, WHITE);
        putpixel(xc-x, yc-y, WHITE);
        putpixel(xc+y, yc+x, WHITE);
        putpixel(xc-y, yc+x, WHITE);
        putpixel(xc+y, yc-x, WHITE);
        putpixel(xc-y, yc-x, WHITE);
}


void circleBres(int xc, int yc, int r) //Bresenham's circle drawing algorithm
{
        int x = 0, y = r;
        int d = 3 - 2 * r;
        drawCircle(xc, yc, x, y);
        while (y >= x)
        {
                 x++;
                if (d > 0)
                 {
                         y--;
                         d = d + 4 * (x - y) + 10;
                 }
                 else
                         d = d + 4 * x + 6;
                 drawCircle(xc, yc, x, y);
                 delay(10);
        }
}
void dda(int x0,int y0,int x1,int y1)  //DDA line drawing algorithm
{
        int i;
        float x, y,dx,dy,steps,xin,yin;
        dx = (float)(x1 - x0);
        dy = (float)(y1 - y0);
        if(dx>=dy)
        {
                steps = dx;
        }
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    else
    {
        steps = dy;
    }
    xin = dx/steps;
    yin = dy/steps;
    x = x0;
    y = y0;
    for(int i=1; i<=steps;i++)
    {
        putpixel(x, y, WHITE);
        x =x + xin;
        y =y + yin;
    }
}

int main()
{
    int xc = 100, yc = 70, r = 30;          //Inner circle
    int xc1 = 100, yc1 = 70, r1 = 60;       // Outer circle
    int x1 = 50 , y1 = 100, x2 = 150, y2 = 100,x3= 100, y3=10; // 3 points to draw three lines
    int gd = DETECT, gm;
    initgraph(&gd, &gm, NULL);
    circleBres(xc, yc, r);              //Function call for Inner Circle
    circleBres(xc1, yc1, r1);            //Function call for Outer Circle
     dda(x1,y1,x2,y2);                   //Function call for line1
    dda(x1,y1,x3,y3);                   //Function call for line2
    dda(x3,y3,x2,y2);                    //Function call for line3
    delay(50000);
    return 0;
}
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