def p2():
    pic = makePicture(getMediaPath("passionFlower.jpg"))
    pic1 = duplicatePicture(pic)
    pic2 = duplicatePicture(pic)
    pic3 = duplicatePicture(pic)
    pic4 = duplicatePicture(pic)
    height = getHeight(pic)
    width = getWidth(pic)
    sig = makePicture(getMediaPath("signature.jpg"))
    canvas = makeEmptyPicture(width * 2, height * 2, black)
    grayPosterize(pic1)
    copyTL(pic1, canvas, height, width)
    grayScale(pic2)
    copyTR(pic2, canvas, height, width)
    redr(pic3)
    copyBL(pic3, canvas, height, width)
    negative(pic4)
    copyBR(pic4, canvas, height, width)
    copyM(pic, canvas, height, width)
    explore(sig)
    chromakeyGreen(sig, canvas)
    explore(canvas)

def chromakeyGreen(source,bg):
    for px in getPixels(source):
        x = getX(px)
        y = getY(px)
        if (getGreen(px)<255):
            bgpx = getPixel(source,x,y)
            bgcol = getColor(bgpx)
            target = getPixel(bg,x,y)
            setColor(target,bgcol)
        return(bg)

def redr(picture):
    for p in getPixels(picture):
        r = getRed(p)
        g = getGreen(p)
        b = getBlue(p)
        newr = r*2
        newg = g/2
        newb = b/2
        setColor(p,makeColor(newr,newg,newb))
        return(picture)
def grayPosterize(picture):
    for p in getPixels(picture):
        intensity = (getRed(p)+getGreen(p)+getBlue(p))/3
        setColor(p,makeColor(intensity,intensity,intensity))
    for p in getPixels(picture):
        r = getRed(p)
        g = getGreen(p)
        b = getBlue(p)
        luminance = (r+g+b)/3
        if luminance < 64:
            setColor(p,black)
        if luminance >= 64:
            setColor(p,white)
    return(picture)

def grayScale(picture):
    for p in getPixels(picture):
        intensity = (getRed(p)+getGreen(p)+getBlue(p))/3
        setColor(p,makeColor(intensity,intensity,intensity))
    return(picture)

def negative(picture):
    for px in getPixels(picture):
        red=getRed(px)
        green=getGreen(px)
        blue=getBlue(px)
        negColor=makeColor(255-red, 255-green, 255-blue)
        setColor(px,negColor)
    return(picture)

def copyTL(pic, canvas, height, width):
    for px in range(width):
        for py in range(height):
            color=getColor(getPixel(picture,px,py))
            target=getPixel(canvas,px,py)
            setColor(target,color)

def copyTR(pic, canvas, height, width):
    for px in range(width):
        for py in range(height):
            color=getColor(getPixel(pic,px,py))
            target=getPixel(canvas,px+width,py)
            setColor(target,color)

def copyBL(pic, canvas, height, width):
    for px in range(width):
        for py in range(height):
            color=getColor(getPixel(pic,px,py))
            target=getPixel(canvas,px,py+height)
            setColor(target,color)

def copyBR(pic, canvas, height, width):
    for px in range(width):
        for py in range(height):
            color=getColor(getPixel(picture,px,py))
            target=getPixel(canvas,px+width,py+height)
            setColor(target,color)
def copyM(pic, canvas, height, width):
    for px in range(width):
        for py in range(height):
            color=getColor(getPixel(pic, px, py))
            target=getPixel(canvas, px+(width/2), py+(height/2))
            setColor(target, color)