from jes import *

#Brad 10/23/2020

def collage():
    picture = makePicture("leaves.jpg")
    picWidth = getWidth(picture)
    picHeight = getHeight(picture)
    canvas = makeEmptyPicture(picHeight*2 + picWidth*2, picHeight*3)
    copy(picture, canvas, picWidth + picHeight, 0)
    copy(picture, canvas, picHeight, 0)
    canvas2 = makeEmptyPicture(picHeight, picWidth)
    picture_right = rotateRight(picture, canvas2)
    copy(picture_right, canvas, picHeight+picWidth*2, 0)
    copy(picture_right, canvas, 0, 0)
    copy(picture_right, canvas, picHeight+picWidth*2, picHeight*2)
    canvas3 = makeEmptyPicture(picHeight, picWidth)
    picture_left = rotateLeft(picture, canvas3)
    negative_pic = negative(picture)
    copy(picture_left, canvas, 0, picHeight)
    copy(picture_left, canvas, 0, picHeight*2)
    copy(picture_left, canvas, picHeight+picWidth*2, picHeight)
    copy(negative_pic, canvas, picHeight, picHeight)
    copy(negative_pic, canvas, picHeight + picWidth, picHeight)
    picture2 = makePicture("leaves.jpg")
    mirror_pic = mirrorVertical (picture2)
    copy (mirror_pic, canvas, picHeight, picHeight*2)
copy (mirror_pic, canvas, picHeight + picWidth, picHeight*2)
addredBorder (canvas)
sig = makePicture("sig.jpg")
small_sig = scaleDown(sig, 3.5)
chromaSig(small_sig, canvas, 670, 500)
show(canvas)
writePictureTo(canvas, "brandon_picture.jpg")

def copy(source, target, targX, targY):
    targetX = targX
    for sourceX in range(0, getWidth(source)):
        targetY = targY
        for sourceY in range (0, getHeight(source)):
            px = getPixel(source, sourceX, sourceY)
            tx = getPixel(target, targetX, targetY)
            setColor(tx, getColor(px))
            targetY=targetY+1
            targetX=targetX + 1

def rotateRight(source, canvas):
    targetX=0
    width = getWidth(source)
    height = getHeight(source)
    for sourceX in range (0,getWidth(source)):
        targetY = 0
        for sourceY in range(0, getHeight(source)):
            color = getColor(getPixel(source, sourceX, sourceY))
            setColor(getPixel(canvas, height-targetY-1, targetX), color)
            targetY = targetY + 1
        targetX=targetX+1
    return canvas

def rotateLeft(source, canvas):
    targetX = 0
    width = getWidth(source)
    for sourceX in range (0, getWidth(source)):
        targetY = 0
        for sourceY in range(0, getHeight(source)):
            color = getColor(getPixel(source, sourceX, sourceY))
            setColor(getPixel(canvas, targetY, width-targetX-1), color)
            targetY = targetY + 1
        targetX=targetX+1
    return canvas
def scale(source, canvas, factor):
    sourceX = 0
    for targetX in range(0, int(getWidth(source) * factor)):
        sourceY = 0
        for targetY in range(0, int(getHeight(source) * factor)):
            color = getColor(getPixel(source, int(sourceX), int(sourceY)))
            setColor(getPixel(canvas, targetX, targetY), color)
            sourceY = sourceY + 1.0 / factor
            sourceX = sourceX + 1.0 / factor

def scaleDown(picture, factor):
    canvas = makeEmptyPicture(int(getWidth(picture) / factor), int(getHeight(picture) / factor))
    scale(picture, canvas, 1.0/factor)
    return canvas

def negative(picture3):
    for pixel in getPixels(picture3):
        redPx = getRed(pixel)
        greenPx = getGreen(pixel)
        bluePx = getBlue(pixel)
        negColor = makeColor(255-redPx, 255-greenPx, 255-bluePx)
        setColor(pixel, negColor)
    return picture3

def chromaSig (source, target, targetX, targetY):
    for x in range(0, getWidth(source)):
        for y in range(0, getHeight(source)):
            px = getPixel(source, x, y)
            color = getColor(px)
            targ = getPixel(target, x+targetX, y + targetY)
            if distance(black, color) < 200:
                setColor(targ, red)

def mirrorVertical(picture):
    mirrorpoint = getWidth(picture)//2
    width = getWidth(picture)
    for y in range (0, getHeight(picture)):
        for x in range (0, mirrorpoint):
            leftPixel = getPixel(picture, x, y)
            rightPixel = getPixel(picture, width - x-1, y)
            color = getColor(leftPixel)
            setColor(rightPixel, color)
def addRedBorder(canvas):
    bottom = getHeight(canvas) - 20
    side = getWidth(canvas) - 20
    for p in getPixels(canvas):
        y = getY(p)
        x = getX(p)
        if y < 20:
            setColor(p, red)
        if y > bottom:
            setColor(p, red)
        if x < 20:
            setColor(p, red)
        if x > side:
            setColor(p, red)

collage()