import random

def scale(picture, factor):
    scaled = makeEmptyPicture(int(getWidth(picture)*factor), int(getHeight(picture)*factor))
    srcx = 0
    for x in range(int(getWidth(picture)*factor)):
        srcy = 0
        for y in range(int(getHeight(picture)*factor)):
            px = getPixel(picture, int(srcx), int(srcy))
            color = getColor(px)
            setColor(getPixel(scaled, x, y), color)
            srcy = srcy + 1.0/factor
        srcx = srcx + 1.0/factor
    return scaled

def colorSwap(pic):
    colorSwap = duplicatePicture(pic)
    for px in getPixels(colorSwap):
        r = getBlue(px)
        g = getRed(px)
        b = getGreen(px)
        setColor(px, makeColor(r, g, b))
    return colorSwap
def waffle(pic):
    waffled = duplicatePicture(pic)
    for x in range(0, getWidth(waffled), 2):
        for y in range(0, getHeight(waffled), 2):
            setColor(getPixel(waffled, x, y), white)
    return waffled

def inverse(pic, w, h):
    inverted = duplicatePicture(pic)
    for x in range(w):
        for y in range(h):
            px = getPixel(inverted, x, y)
            level = 255 - int(0.21*getRed(px) + 0.71*getGreen(px) + 0.07*getBlue(px))
            if (level < 15):
                color = makeColor(255, 255, 255)
            else:
                color = makeColor(level, level, level)
            setColor(px, color)
    return inverted

def swap(h, w, newPic, pic, startX, startY, endX, endY, goX, goY):
    for x in range(startX, endX):
        for y in range(startY, endY):
            color = getColor(getPixel(pic, x, y))
            setColor(getPixel(newPic, x+goX, y+goY), color)

def copy(turtle, canvas, startX, startY):
    srcx = 0
    for x in range(startX, startX+getWidth(turtle)):
        srcy = 0
        for y in range(startY, startY+getHeight(turtle)):
            color = getColor(getPixel(turtle, srcx, srcy))
            setColor(getPixel(canvas, x, y), color)
        srcy = srcy + 1
        srcx = srcx + 1
    return canvas

def chromakey(bkgr, canvas):
    for px in getPixels(canvas):
        x = getX(px)
        y = getY(px)
        if (getRed(px) > 230 and getGreen(px) > 230 and getBlue(px) > 230):
            bgpx = getPixel(bkgr, x, y)
            bgcol = getColor(bgpx)
            setColor(px, bgcol)
def randomTurtle(turtle, first, second, third, forth, fifth):
    if (turtle == 0):
        turtle = first
    elif (turtle == 1):
        turtle = second
    elif (turtle == 2):
        turtle = third
    elif (turtle == 3):
        turtle = forth
    elif (turtle == 4):
        turtle = fifth
    else:
        return
    return turtle

def collage():
    import random
    sig = makePicture(getMediaPath("signature.png"))
    pic = makePicture(getMediaPath("turtle.jpg"))
    bkgr = makePicture(getMediaPath("beach.jpg"))
    w = getWidth(pic)
    h = getHeight(pic)
    canvas = makeEmptyPicture(getWidth(bkgr), getHeight(bkgr))
    swapPic = makeEmptyPicture(w, h)
    first = inverse(pic, w, h)
    second = pic
    swap(h, w, swapPic, pic, 0, 0, w/2, h/2, w/2, 0)
    swap(h, w, swapPic, pic, w/2, 0, w, h/2, 0, h/2)
    swap(h, w, swapPic, pic, w/2, h/2, w, h, -(w/2), 0)
    swap(h, w, swapPic, pic, 0, h/2, w/2, h, 0, -(h/2))
    third = swapPic
    forth = colorSwap(pic)
    fifth = waffle(pic)
    ran = random.sample(xrange(5),5)
    turtle1 = randomTurtle(ran[0], first, second, third, forth, fifth)
    turtle2 = randomTurtle(ran[1], first, second, third, forth, fifth)
    turtle3 = randomTurtle(ran[2], first, second, third, forth, fifth)
    turtle4 = randomTurtle(ran[3], first, second, third, forth, fifth)
    turtle5 = randomTurtle(ran[4], first, second, third, forth, fifth)
    copy(scale(turtle1, 2), canvas, 490, 332)
    copy(turtle2, canvas, 411, 391)
    copy(turtle3, canvas, 333, 380)
    copy(turtle4, canvas, 240, 385)
    copy(turtle5, canvas, 150, 372)
signature = scale(sig, 0.25)
copy(signature, canvas, 0,0)
chromakey(bkgr, canvas)
explore(canvas)