

# Alex Bratek

Completed



Original



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def collage():
    #original picture file, this is the picture that is being transformed
    pic = makePicture(getMediaPath("butterfly.png"))
    width = getWidth(pic)
    height = getHeight(pic)

    #this is an empty canvas that all the following modifications are placed upon
    finalCanv = makeEmptyPicture(1000,684,green)

    #the original picture's dimensions are outside the range of the canvas and the
    #maximum possible canvas for this project, so I first make an empty canvas that's
    #a quarter of the original size and scale the picture down
    #there are four copies of this picture to be transformed individually
    smallerPic1 = makeEmptyPicture(int(width/4),int(height/4))
    smallerPic2 = makeEmptyPicture(int(width/4),int(height/4))
    smallerPic3 = makeEmptyPicture(int(width/4),int(height/4))
    smallerPic4 = makeEmptyPicture(int(width/4),int(height/4))
    scaleDown(pic,smallerPic1,width,height,4)
    scaleDown(pic,smallerPic2,width,height,4)
    scaleDown(pic,smallerPic3,width,height,4)
    scaleDown(pic,smallerPic4,width,height,4)

    #here's another scaled picture, this one being half the size of the original
    medPic = makeEmptyPicture(int(width/2),int(height/2))
    scaleDown(pic,medPic,width,height,2)

    #this medium picture is copied to the bottom left corner of the canvas
    copy(medPic,finalCanv,0,684-int(height/2))

    #here I flip medPic both horizontally and vertically and invert its colors
    #I place it opposite the first one in the top right corner
    flipH(medPic,int(width/2),int(height/2))
    flipV(medPic,int(width/2),int(height/2))
    swapColorPic(medPic)
    copy(medPic,finalCanv,1000-int(width/2)-1,0)

    #horizontally flipped and color-swapped small picture
    #copied to top left corner
    flipH(smallerPic1,int(width/4),int(height/4))
    swapColorPic(smallerPic1)
    copy(smallerPic1,finalCanv,0,0)

    #small picture mirrored horizontally and copied next to smallerPic1
    mirrorH(smallerPic2,int(width/4),int(height/4))
    copy(smallerPic2,finalCanv,getWidth(smallerPic1),0)

    #mirrored small picture both horizontally and vertically and copied to lower
    #right side
    mirrorH(smallerPic3,int(width/4),int(height/4))
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mirrorV(smallerPic3,int(width/4),int(height/4))
copy(smallerPic3,finalCanv,int(width/2),684-getHeight(smallerPic3))

#chromakey background of smaller picture and replace it with a redder background
#copied to lower right corner
chromaKey(smallerPic4)
copy(smallerPic4,finalCanv,1000-getWidth(smallerPic4),684-getHeight(smallerPic4))

#add signature
sign = makePicture(getMediaPath("signature.png"))
smallerSign = makeEmptyPicture(getWidth(sign)/2,getHeight(sign)/2)
scaleDown(sign,smallerSign,250,250,2)
signature(smallerSign,finalCanv,finalCanv)

#touch up to fix border/copy issues
vertBar(finalCanv,finalCanv,0,0,228)
vertBar2(finalCanv,finalCanv,499,227,684)
horBar(finalCanv,finalCanv,227,0,500)
horBar(finalCanv,finalCanv,0,500,1000)
vertBar2(finalCanv,finalCanv,999,0,684)
horBar2(finalCanv,finalCanv,683,0,500)
horBar2(finalCanv,finalCanv,683,750,1000)

show(finalCanv)

def scaleDown(pic,canv,width,height,factor):
    widthNew = int(width/factor)
    heightNew = int(height/factor)
    xIn = 0
    for x in range(0,widthNew-1):
        yIn = 0
        for y in range(0,heightNew-1):
            color = getColor(getPixel(pic,xIn,yIn))
            setColor(getPixel(canv,x,y),color)
            yIn = yIn + factor
            xIn = xIn + factor

def mirrorH(pic,width,height):
    mirrorPt = width/2
    for y in range(0,height):
        for x in range(0,mirrorPt):
            leftPixel = getPixel(pic,x,y)
            rightPixel = getPixel(pic,width-x-1,y)
            setColor(rightPixel,getColor(leftPixel))

def mirrorV(pic,width,height):
    mirrorPt = height/2
    for x in range(0,width):
        for y in range(0,mirrorPt):
            topPixel = getPixel(pic,x,y)
            bottomPixel = getPixel(pic,x,height-y-1)
            setColor(bottomPixel,getColor(topPixel))

def flipH(pic,width,height):
    for y in range(0,height):
        for x in range(0,width/2):
            leftPixel = getPixel(pic,x,y)
            rightPixel = getPixel(pic,width-x-1,y)
            rightPixel2 = getPixel(pic,width-x-1,y)
            setColor(rightPixel,getColor(leftPixel))

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        setColor(leftPixel,getColor(rightPixel2))

def flipV(pic,width,height):
    for x in range(0,width):
        for y in range(0,height/2):
            topPixel = getPixel(pic,x,y)
            bottomPixel = getPixel(pic,x,height-y-1)
            bottomPixel2 = getPixel(pic,x,height-y-1)
            setColor(bottomPixel,getColor(topPixel))
            setColor(topPixel,getColor(bottomPixel2))

def copy(pic,canv,startX,startY):
    for x in range(0,getWidth(pic)):
        for y in range(0,getHeight(pic)):
            px = getPixel(pic,x,y)
            canvPx = getPixel(canv,startX,startY)
            color = getColor(px)
            setColor(canvPx,color)
            startY += 1
        startY -= getHeight(pic)
        startX += 1

def chromaKey(source):
    for px in getPixels(source):
        x = getX(px)
        y = getY(px)
        if (getRed(px) > 0 and getGreen(px) > 0 and getBlue(px) < 100):
            bgPx = getPixel(source,x,y)
            setColor(px,incrRed(bgPx))

def incrRed(pixel):
    r = getRed(pixel)
    rNew = r+80
    gNew = getGreen(pixel)-210
    bNew = getBlue(pixel)+100
    setRed(pixel,rNew)
    setGreen(pixel,gNew)
    setBlue(pixel,bNew)
    return(getColor(pixel))

def swapColorPic(pic):
    for pixel in getPixels(pic):
        r = getRed(pixel)
        b = getBlue(pixel)
        g = getGreen(pixel)
        setRed(pixel,b)
        setBlue(pixel,g)
        setGreen(pixel,r)

def signature(sign,bg,canv):
    bgX = 375
    bgY = 200
    for x in range(0,getWidth(sign)):
        for y in range(0,getHeight(sign)):
            px = getPixel(sign,x,y)
            if (getRed(px) > 200 and getGreen(px) > 200 and getBlue(px) > 200):
                signPx = getPixel(sign,x,y)
                bgPx = getPixel(bg,bgX,bgY)
                bgColor = getColor(bgPx)
                setColor(signPx,bgColor)

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    bgY +=1
    bgX +=1
    bgY -=getHeight(sign)
    copy(sign, canv, 375, 200)

def vertBar(pic, canv, startX, startY, stopY):
    x = startX
    for y in range(startY, stopY):
        px = getPixel(pic, x+1, y)
        canvPx = getPixel(canv, x, y)
        color = getColor(px)
        setColor(canvPx, color)

def vertBar2(pic, canv, startX, startY, stopY):
    x = startX
    for y in range(startY, stopY):
        px = getPixel(pic, x-1, y)
        canvPx = getPixel(canv, x, y)
        color = getColor(px)
        setColor(canvPx, color)

def horBar(pic, canv, startY, startX, stopX):
    y = startY
    for x in range(startX, stopX):
        px = getPixel(pic, x, y+1)
        canvPx = getPixel(canv, x, y)
        color = getColor(px)
        setColor(canvPx, color)

def horBar2(pic, canv, startY, startX, stopX):
    y = startY
    for x in range(startX, stopX):
        px = getPixel(pic, x, y-1)
        canvPx = getPixel(canv, x, y)
        color = getColor(px)
        setColor(canvPx, color)

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