from jes import *

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#COLLAGE NAME: 'Color Wheel'

def collage():
    picture1 = makePicture("pictures/picture1.jpg")
    picture2 = makePicture("pictures/picture2.jpg")
    picture3 = makePicture("pictures/picture3.jpg")
    picture4 = makePicture("pictures/picture4.jpg")

    picWidth = getWidth(picture1)
    picHeight = getHeight(picture1)
    canvas = makeEmptyPicture(picWidth * 3, (picHeight * 3) - 5)

    #COORDINATES IN (Y,X)
    #Example: oneone = row one, column one = (0,0)
    #or threetwo = row three, column two = (3,2)

    # Code to place pictures on canvas

#oneone
oneone(picture1)
copy(picture1, canvas, 0, 0)

#onetwo
blend(picture1, picture2)
onetwo(picture2)
copy(picture2, canvas, picWidth, 0)

twoone(picture3)
blend(picture1, picture3)
twoone(picture3)
copy(picture3, canvas, 0, picHeight)

twotwo(picture5)
twotwo(picture5)
copy(picture5, canvas, picWidth, picHeight)

#twoone
threeone(picture3)
blend(picture1, picture3)
threeone(picture3)
copy(picture3, canvas, 0, picHeight)

twotwo(picture5)
twotwo(picture5)
copy(picture5, canvas, picWidth, picHeight)

#twothree
onethree(picture2)
threethree(picture4)
blend(picture2, picture4)
twothree(picture4)
copy(picture4, canvas, picWidth * 2, picHeight)

picture3 = makePicture("pictures/picture3.jpg")
picture4 = makePicture("pictures/picture4.jpg")

#threeone
threeone(picture3)
copy(picture3, canvas, 0, picHeight * 2)

#threethree
threethree(picture4)
copy(picture4, canvas, picWidth * 2, picHeight * 2)

#threetwo
blend(picture3, picture4)
threetwo(picture4)
copy(picture4, canvas, picWidth, picHeight * 2)

#INNER-PICTURE BORDER ADD-ON

picture1 = makePicture("pictures/picture1.jpg")
picture2 = makePicture("pictures/picture2.jpg")
smallpic1 = scaleDown(picture1, 2)
smallpic2 = scaleDown(picture2, 2)

copy(smallpic1, canvas, (picWidth / 4) * 3, (picHeight / 4) * 3)
copy(smallpic2, canvas, (((picWidth / 4) * 3) + picWidth)-1, ((picHeight / 4) * 3))
blend(smallpic1, smallpic2)
copy(smallpic2, canvas, (picWidth / 4) * 5, ((picHeight / 4) * 3) - 25)

picture3 = makePicture("pictures/picture3.jpg")
picture4 = makePicture("pictures/picture4.jpg")
smallpic3 = scaleDown(picture3, 2)
smallpic4 = scaleDown(picture4, 2)

copy(smallpic3, canvas, ((picWidth / 4) * 3), (((picHeight / 4) * 3) + picHeight)-1)
copy(smallpic4, canvas, (((picWidth / 4) * 3) + picWidth)-1, (((picHeight / 4) * 3) + picHeight)-1)
blend(smallpic3, smallpic4)
picture1 = makePicture("pictures/picture1.jpg")
picture3 = makePicture("pictures/picture3.jpg")
smallpic1 = scaleDown(picture1, 2)
smallpic3 = scaleDown(picture3, 2)
blend(smallpic1, smallpic3)
copy(smallpic3, canvas, ((picWidth / 4) * 3)-30, (picHeight / 4) * 5)

picture2 = makePicture("pictures/picture2.jpg")
picture4 = makePicture("pictures/picture4.jpg")
smallpic2 = scaleDown(picture2, 2)
smallpic4 = scaleDown(picture4, 2)
blend(smallpic2, smallpic4)
copy(smallpic4, canvas, (((picWidth / 4) * 3) + picWidth)+30, (picHeight / 4) * 5)

#SIGNATURE

sig = makePicture("pictures/sig.jpg")
small_sig = scaleDown(sig, 5)
chromaSigRed(small_sig, canvas, ((getWidth(picture1) * 3) - 100), ((getHeight(picture1) * 3) - 105))
chromaSigWhite(small_sig, canvas, ((getWidth(picture1) * 3) - 99), ((getHeight(picture1) * 3) - 104))
chromaSigBlue(small_sig, canvas, ((getWidth(picture1) * 3) - 98), ((getHeight(picture1) * 3) - 103))

#SAVE AND DISPLAY CANVAS

writePictureTo(canvas, "pictures/collage.jpg")
show(canvas)

#PICTURE EFFECTS IN in 3x3 GRID

def oneone(picture):
    maxRed(picture)
    reduceBlue(picture)
    reduceGreen(picture)
    lighten(picture)

def onetwo(picture):
maxBlue(picture)

def onethree(picture):
    maxBlue(picture)

def twoone(picture):
    increaseRed(picture)
    reduceGreen(picture)
    reduceBlue(picture)
    lighten(picture)

def twotwo(picture):
    mirrorHorizontal(picture)
    mirrorLeftToRight(picture)
    negative(picture)
    lighten(picture)

def twothree(picture):
    increaseBlue(picture)
    increaseBlue(picture)

def threeone(picture):
    increaseRed(picture)
    increaseGreen(picture)
    increaseRed(picture)
    reduceBlue(picture)
    reduceBlue(picture)
    reduceBlue(picture)
    lighten(picture)

def threetwo(picture):
    reduceRed(picture)
    increaseGreen(picture)

def threethree(picture):
    grayScale(picture)

#PICTURE EFFECTS

def lighten(picture):
    for px in getPixels(picture):
        color = getColor(px)
def increaseRed(picture):
    for pixel in getPixels(picture):
        value = getRed(pixel)
        setRed(pixel, value * 1.5)

def increaseGreen(picture):
    for pixel in getPixels(picture):
        value = getGreen(pixel)
        setGreen(pixel, value * 1.6)

def increaseBlue(picture):
    for pixel in getPixels(picture):
        value = getBlue(pixel)
        setBlue(pixel, value * 1.7)

def reduceRed(picture):
    for pixel in getPixels(picture):
        value = getRed(pixel)
        setRed(pixel, value * 0.7)

def reduceGreen(picture):
    for pixel in getPixels(picture):
        value = getGreen(pixel)
        setGreen(pixel, value * 0.6)

def reduceBlue(picture):
    for pixel in getPixels(picture):
        value = getBlue(pixel)
        setBlue(pixel, value * 0.5)

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

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

def maxBlue(picture):
    for p in getPixels(picture):
        setBlue(p, 255)

def maxRed(picture):
    for p in getPixels(picture):
        setRed(p, 255)

def maxGreen(picture):
    for p in getPixels(picture):
        setGreen(p, 255)

def sepiaTint(picture):
    grayScale(picture)
    for p in getPixels(picture):
        picRed = getRed(p)
        picBlue = getBlue(p)

        if (picRed < 63):
            newRed = picRed * 1.1
            newBlue = picBlue * 0.9
        if (picRed > 62 and picRed < 192):
            newRed = picRed * 1.15
            newBlue = picBlue * 0.85
        if (picRed > 192):
            newRed = newRed * 1.08
        if (newRed > 255):
            newRed = 255
        newBlue = picBlue * 0.93

        setBlue(p, newBlue)
        setRed(p, newRed)

#BLENDING

def blend(picture1, picture2):
    for start in range(2):
        for x in range(start, getWidth(picture1), 2):
for y in range(start, getHeight(picture1), 2):
    picture1Px = getPixel(picture1, x, y)
    picture2Px = getPixel(picture2, x, y)
    setColor(picture2Px, getColor(picture1Px))

#CANVAS PLACING

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

#MIRRORING

def mirrorLeftToRight(source):
    mirrorPoint = getWidth(source) // 2
    width = getWidth(source)
    for y in range(0, getHeight(source)):
        for x in range(0, mirrorPoint):
            leftPixel = getPixel(source, x, y)
            rightPixel = getPixel(source, width - x - 1, y)
            color = getColor(rightPixel)
            setColor(leftPixel, color)

def mirrorHorizontal(source):
    mirrorPoint = getHeight(source) // 2
    height = getHeight(source)
    for x in range(0, getWidth(source)):
        for y in range(0, mirrorPoint):
            topPixel = getPixel(source, x, y)
            bottomPixel = getPixel(source, x, height - y - 1)
            color = getColor(topPixel)
def scaleDown(pic, factor):
    canvas = makeEmptyPicture(int(getWidth(pic) / factor), int(getHeight(pic) / factor))
    scale(pic, canvas, 1.0 / factor)
    return canvas

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

def chromaSigRed(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 chromaSigBlue(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, blue)
def chromaSigWhite(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, white)

collage()