def collage():
    # written by: Tobi Lott
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    picture = makeEmptyPicture(640, 904, black)
    # creates border, pictures, and center pictures
    border(picture)
    mural = makePicture(getMediaPath("Mural.jpg"))
    floral = makePicture(getMediaPath("Flowerfence.jpg"))
    newMural = makeEmptyPicture(getWidth(mural)/2, getHeight(mural)/2)
    newFloral = makeEmptyPicture(getWidth(floral)/2, getHeight(floral)/2)
    combinedPicture = makeEmptyPicture(getWidth(newFloral), getHeight(newFloral))
    newCombinedPicture = makeEmptyPicture(384, 670)
    centerPictures(mural, floral, newMural, newFloral, combinedPicture, newCombinedPicture)
    # copies all elements into one picture
    for x in range(0, 384):
        for y in range(0, 640):
            color = getColor(getPixel(newCombinedPicture, x, y))
            setColor(getPixel(picture, x + 128, y + 132), color)
    signature = makePicture(getMediaPath("signature.jpeg"))
    sign(signature, picture)
    explore(picture)

def centerPictures(mural, floral, newMural, newFloral, combinedPicture, newCombinedPicture):
    scale(mural, newMural, 2)
    scale(floral, newFloral, 2)
    wF = getWidth(newFloral)
    hF = getHeight(newFloral)
wM = getWidth(newMural)
hM = getHeight(newMural)
barWF = wF / 5
barWM = wM / 5
merge(newFloral, combinedPicture, wF/2, wF, 0, hF/2, 0)
merge(newFloral, combinedPicture, 0, wF/2, hF/2, hF, 0)
merge(newMural, combinedPicture, 0, wF/2, 0, hF/2, 0)
merge(newMural, combinedPicture, wM - wF/2, wM, hF/2, hF, 38)
grayScale(combinedPicture, 0, wF/2, 0, hF/2)
redScale(combinedPicture, wF/2, wF, 0, hF/2)
greenScale(combinedPicture, 0, wF/2, hF/2, hF)
blueScale(combinedPicture, wF/2, wF, hF/2, hF)
copy(combinedPicture, newCombinedPicture, 48, 432, 0, 640, -48, 0)
return newCombinedPicture
def border(border):
    #scales the butterfly picture
    butterfly = makePicture(getMediaPath("butterfly2.jpg"))
wB = getWidth(butterfly)
hB = getHeight(butterfly)
newButterfly = makeEmptyPicture(wB/15, int(hB/15))
nWB = getWidth(newButterfly)
nHB = getHeight(newButterfly)
scale(butterfly, newButterfly, 15)
background = makePicture(getMediaPath("Flowerfence.jpg"))
copy(newButterfly, border, 0, nWB, 0, nHB, 0, nHB*3)
    #changes the background color of the butterfly
changeColor(newButterfly, 200, 200, 200, makeColor(0, 100, 89), black, 20, 20, 20)
copy(newButterfly, border, 0, nWB, 0, nHB, nWB, 0)
    #resets butterfly to the original colors and changes the butterfly to the new color
changeColor(newButterfly, 0, 100, 89, white, black, 20, 20, 20)
changeColor(newButterfly, 200, 200, 200, white, makeColor(0, 100, 89), 20, 20, 20)
copy(newButterfly, border, 0, nWB, 0, nHB, nWB*2, 0)
    #resets butterfly to original colors
changeColor(newButterfly, 0, 100, 89, white, black, 0, 100, 89)
copy(newButterfly, border, 0, nWB, 0, nHB, 0, nHB)
    #edits the colors in the butterfly picture to blue scale
blueScale(newButterfly, 0, nWB, 0, nHB)
copy(newButterfly, border, 0, nWB, 0, nHB, 0, nHB*2)
    #resets butterfly picture back to original picture and puts the floral picture as the butterfly
changeColor(newButterfly, 170, 170, 255, white, black, 20, 20, 20)
chromakey(newButterfly, background, 323, 555)
copy(newButterfly, border, 0, nWB, 0, nHB, 0, 0)
    #mirrors the border all around
mirrorVertical(border)
def sign(picture, combinedPicture):
    # adds the signature to the bottom
    sign0 = makeEmptyPicture(1000, 1000)
    rotate(picture, sign0)
    sign1 = makeEmptyPicture(200, 200)
    scale(sign0, sign1, 5)
    sign2 = makeEmptyPicture(640, 904)
    copy(sign1, sign2, 0, 200, 0, 100, 440, 804)
    chromakey2(sign2, combinedPicture)
    return combinedPicture

def scale(picture, canvas, scale):
    sourceX = 0
    for x in range(0, getWidth(picture)/scale):
        sourceY = 0
        for y in range(0, int(getHeight(picture)/scale)):
            px = getPixel(picture, sourceX, sourceY)
            color = getColor(px)
            setColor(getPixel(canvas, x, y), color)
            sourceY = sourceY + scale
        sourceX = sourceX + scale
    return canvas

def grayScale(picture, widthStart, widthStop, heightStart, heightStop):
    for x in range(widthStart, widthStop):
        for y in range(heightStart, heightStop):
            p = getPixel(picture, x, y)
            intensity = (getRed(p) + getGreen(p) + getBlue(p)) / 3
            setColor(p, makeColor(intensity, intensity, intensity))
    return picture

def redScale(picture, widthStart, widthStop, heightStart, heightStop):
    # lowers the intensity of all the colors except red
    for x in range(widthStart, widthStop):
        for y in range(heightStart, heightStop):
            p = getPixel(picture, x, y)
            intensity = (getGreen(p) + getBlue(p)) / 3
            setColor(p, makeColor(getRed(p), intensity, intensity))
    return picture

def greenScale(picture, widthStart, widthStop, heightStart, heightStop):
#lowers the intensity of all the colors except green
for x in range(widthStart, widthStop):
    for y in range(heightStart, heightStop):
        p = getPixel(picture, x, y)
        intensity = (getRed(p) + getBlue(p)) / 3
        setColor(p, makeColor(intensity, getGreen(p), intensity))
return picture

def blueScale(picture, widthStart, widthStop, heightStart, heightStop):
    #lowers the intensity of all the colors except blue
    for x in range(widthStart, widthStop):
        for y in range(heightStart, heightStop):
            p = getPixel(picture, x, y)
            intensity = (getRed(p) + getGreen(p)) / 3
            setColor(p, makeColor(intensity, intensity, getBlue(p)))
    return picture

def merge(picture, newPicture, widthStart, widthStop, heightStart, heightStop, offset):
    for x in range(widthStart, widthStop):
        for y in range(heightStart, heightStop):
            px = getPixel(picture, x, y)
            color = getColor(px)
            px2 = getPixel(newPicture, x + offset, y)
            setColor(px2, color)
    return newPicture

def copy(picture, newPicture, widthStart, widthStop, heightStart, heightStop, xOffset, yOffset):
    for x in range(widthStart, widthStop):
        for y in range(heightStart, heightStop):
            color = getColor(getPixel(picture, x, y))
            setColor(getPixel(newPicture, x + xOffset, y + yOffset), color)
    return border

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)
    return picture

def mirrorHorizontal(picture):
mirrorPoint = getHeight(picture) / 2
height = getHeight(picture)
for x in range(0, getWidth(picture)):
    for y in range(0, mirrorPoint):
        topPixel = getPixel(picture, x, y)
        bottomPixel = getPixel(picture, x, height - y - 1)
        color = getColor(topPixel)
        setColor(bottomPixel, color)
return picture

def chromakey(picture, background, xoffset, yoffset):
    #moves background to picture
    for x in range(0, getWidth(picture)):
        for y in range(0, getHeight(picture)):
            p = getPixel(picture, x, y)
            r = getRed(p)
            b = getBlue(p)
            g = getGreen(p)
            if ((r < 10) and (b < 10) and (g < 10)):
                bgpx = getPixel(background, x + xoffset, y + yoffset)
                bgcol = getColor(bgpx)
                setColor(p, bgcol)
    return picture

def chromakey2(picture, background):
    #moves picture to background
    for x in range(0, getWidth(picture)):
        for y in range(0, getHeight(picture)):
            p = getPixel(picture, x, y)
            r = getRed(p)
            b = getBlue(p)
            g = getGreen(p)
            if ((r < 10) and (b < 10) and (g < 10)):
                bgpx = getPixel(background, x, y)
                color = getColor(p)
                setColor(bgpx, color)
    return background

def changeColor(picture, rSet, gSet, bSet, color, color2, rSet2, gSet2, bSet2):
    for x in range(0, getWidth(picture)):
        for y in range(0, getHeight(picture)):
            p = getPixel(picture, x, y)
            r = getRed(p)
            b = getBlue(p)
            g = getGreen(p)
if (r >= rSet) and (b >= bSet) and (g >= gSet):
    setColor(p, color)
if (r <= rSet2) and (b <= bSet2) and (g <= gSet2):
    setColor(p, color2)
return picture

def rotate(picture, canvas):
    targetX = 0
    for x in range(0, getWidth(picture)):
        targetY = 0
        for y in range(0, getHeight(picture)):
            color = getColor(getPixel(picture, x, y))
            setColor(getPixel(canvas, targetY, getWidth(picture) - targetX - 1), color)
            targetY = targetY + 1
            targetX = targetX + 1
    return canvas