#Max Rollo 03/15/2021

def collage():
    picture = makePicture(getMediaPath("back.jpg"))
    final = makeEmptyPicture(getWidth(picture), getHeight(picture))
    handPicture = makePicture(getMediaPath("hand.jpg"))
    crackPicture = makePicture(getMediaPath("crack.jpg"))
    eyePicture = makePicture(getMediaPath("eye.jpg"))
    signaturePicture = makePicture(getMediaPath("signature.jpg"))
    average(picture, final)
    sepia(picture, final)
    swap(picture, final)
    edgeDetect(picture, final)
    negative(picture, final)
    bigHand = scale(handPicture, .85)
    hand(bigHand, final)
    smallPicture = scale(picture, 2.5)
    smallCrackPicture = scale(crackPicture, 4.15)
    crack(smallCrackPicture, smallPicture, final)
    smallEye = scale(eyePicture, 13)
    eye(smallEye, final)
    smallSignature = scale(signaturePicture, 5)
    signature(smallSignature, final)
    show(final)

# creates a smaller canvas to edit section of picture

def rect(picture, startX, startY, endX, endY):
    canvas = makeEmptyPicture(endX - startX, endY - startY)
    for x in range(startX, endX):
        for y in range(startY, endY):
            canvas = setPixel(canvas, x, y, getPixel(picture, x, y))
for y in range(startY,endY):
    color=getColor(getPixel(picture,x,y))
    setColor(getPixel(canvas,x-startX,y-startY),color)
return canvas

#averages rgb values
def average(picture,final):
    source=rect(picture,0,0,799,533)
    for x in range(0,getWidth(source)):
        for y in range(0,getHeight(source)):
            newRed=(getRed(getPixel(source,x,y))+127)/2
            newBlue=(getBlue(getPixel(source,x,y))+63)/2
            newGreen=(getGreen(getPixel(source,x,y))+181)/2
            setColor(getPixel(final,x,y),makeColor(newRed,newBlue,newGreen))

#changes r and b values based on original r values to make sepia
def sepia(picture,final):
    source=rect(picture,50,50,749,483)
    for x in range(0,getWidth(source)):
        for y in range(0,getHeight(source)):
            red=getRed(getPixel(source,x,y))
            blue=getBlue(getPixel(source,x,y))
            if (red<63):
                red=red*1.1
                blue=blue*0.9
            if (red>62 and red<192):
                red=red*1.15
                blue=blue*0.85
            if (red>191):
                red=red*1.08
            if (red>255):
                red=255
            setBlue(getPixel(final,x+50,y+50),blue)
            setRed(getPixel(final,x+50,y+50),red)

#swaps rgb values
def swap(picture,final):
    source=rect(picture,100,100,699,433)
    for x in range(0,getWidth(source)):
        for y in range(0,getHeight(source)):
            redS=getRed(getPixel(source,x,y))
            blueS=getBlue(getPixel(source,x,y))
            greenS=getGreen(getPixel(source,x,y))
            setColor(getPixel(final,x+100,y+100),makeColor(blueS,redS,greenS))
#finds average between rgb values

def luminance(pixel):
    r=getRed(pixel)
    g=getGreen(pixel)
    b=getBlue(pixel)
    return(r+g+b)/3

#create an outline (edge detect)

def edgeDetect(picture, final):
    source=rect(picture, 150, 150, 649, 383)
    for px in getPixels(source):
        x=getX(px)
        y=getY(px)
        if y < getHeight(source)-1 and x< getWidth(source)-1:
            botrt=getPixel(source, x+1, y+1)
            thislum=luminance(px)
            brlum=luminance(botrt)
            if abs(brlum-thislum)>30:
                setColor(getPixel(final, x+150, y+150), yellow)
            if abs(brlum-thislum)<=20:
                setColor(getPixel(final, x+150, y+150), blue)

#takes away rgb value from 255 to create negative

def negative(picture, final):
    source=rect(picture, 200, 200, 599, 333)
    for x in range(0, getWidth(source)):
        for y in range(0, getHeight(source)):
            newRed=255-getRed(getPixel(source, x,y))
            newGreen=255-getGreen(getPixel(source, x,y))
            newBlue=255-getBlue(getPixel(source, x,y))
            setColor(getPixel(final, x+200, y+200), makeColor(newRed, newGreen, newBlue))

#makes image larger or smaller

def scale(picture, factor):
    canvas=makeEmptyPicture(int(getWidth(picture)/factor), int(getHeight(picture)/factor))
    sourceX=0
    for targetX in range(0, int(getWidth(picture)/factor)):
        sourceY=0
        for targetY in range(0, int(getHeight(picture)/factor)):
            color=getColor(getPixel(picture, int(sourceX), int(sourceY)))
            setColor(getPixel(canvas, targetX, targetY), color)
        sourceY=sourceY+factor
        sourceX=sourceX+factor
    return canvas
#chromakeys + places hand in final image
def hand(handPicture, final):
    for x in range(0, getWidth(handPicture)):
        for y in range(0, getHeight(handPicture)):
            colorB = getBlue(getPixel(handPicture, x, y))
            if (colorB < 200):
                color = getColor(getPixel(handPicture, x, y))
                setColor(getPixel(final, x-32, y+43), color)

#chromakeys + place crack picture in final image
def crack(picture, back, final):
    for x in range(0, getWidth(picture)):
        for y in range(0, getHeight(picture)):
            greenP = getGreen(getPixel(picture, x, y))
            if (greenP < 10):
                color = getColor(getPixel(picture, x, y))
                setColor(getPixel(final, x+245, y+200), color)
            if (greenP > 11) and (greenP < 250):
                color = getColor(getPixel(back, x, y))
                setColor(getPixel(final, x+245, y+200), color)

#combines eyepicture + background into final image
def eye(picture, final):
    for x in range(0, getWidth(picture)):
        for y in range(0, getHeight(picture)):
            r1 = getRed(getPixel(picture, x, y))
            g1 = getGreen(getPixel(picture, x, y))
            b1 = getBlue(getPixel(picture, x, y))
            r2 = getRed(getPixel(final, x+364, y+265))
            g2 = getGreen(getPixel(final, x+364, y+265))
            b2 = getBlue(getPixel(final, x+364, y+265))
            setColor(getPixel(final, x+364, y+265), makeColor((r1+r2)/2, (g1+g2)/2, (b1+b2)/2))

#chromakeys + places picture in final image
def signature(picture, final):
    for x in range(0, getWidth(picture)):
        for y in range(0, getHeight(picture)):
            if (getRed(getPixel(picture, x, y)) < 100):
                color = getColor(getPixel(picture, x, y))
                setColor(getPixel(final, x, y), color)