def all():
    picture = makePicture(getMediaPath("JPG images/beach.jpg"))
    bg = makePicture(getMediaPath("JPG images/moon-surface.jpg"))
    h = getHeight(picture)
    w = getWidth(picture)
    canvas = makeEmptyPicture(w, h + (h / 2), black)
    two_mid(picture, bg, canvas)
    Alice(canvas)
    leftT(picture, canvas)
    TTBmirror(picture)
    alien(picture)
    merge(bg, picture)
    Bright(canvas)
    top(picture, canvas)
    explore(canvas)

def two_mid(picture, bg, canvas):
    scale = 2
    TTBmirror(picture)
    alien(picture)
    h = getHeight(picture)
    w = getWidth(picture)
    smallPc = makeEmptyPicture(int(w / scale), int(h / scale))
    scaled(picture, smallPc, 1.0 / scale)
    merge(picture, bg)
    TTBmirror(bg)
    alien(bg)
    mid(bg, canvas)
    mid(smallPc, canvas)

def mid(picture, canvas):
    targetX = (getWidth(canvas) / 2) - (getWidth(picture) / 2)
    for sourceX in range(0, getWidth(picture)):
        targetY = (getHeight(canvas) / 2) - (getHeight(picture) / 2)
        for sourceY in range(0, getHeight(picture)):
            px = getPixel(picture, sourceX, sourceY)
            cx = getPixel(canvas, targetX, targetY)
            setColor(cx, getColor(px))
            targetY = targetY + 1
            targetX = targetX + 1
#Second picture, 100 pi
def top(picture, canvas):
    scale = 4
    h = getHeight(picture)
    w = getWidth(picture)
    smallPc = makeEmptyPicture(int(w/scale), int(h/scale))
    scaled(picture, smallPc, 1.0/scale)
    targetX = 0
    for sourceX in range(0, getWidth(smallPc)):
        targetY = 0
        for sourceY in range(0, getHeight(smallPc)):
            px = getPixel(smallPc, sourceX, sourceY)
            cx = getPixel(canvas, targetX, targetY)
            setColor(cx, getColor(px))
        targetY = targetY + 1
    targetX = targetX + 1

def leftT(picture, canvas):
    scale = 4
    h = getHeight(picture)
    w = getWidth(picture)
    smallPc = makeEmptyPicture(int(w/scale), int(h/scale))
    scaled(picture, smallPc, 1.0/scale)
    grayScale(smallPc)
    targetX = (getWidth(canvas)/2) + getWidth(smallPc)
    for sourceX in range(0, getWidth(smallPc)):
        targetY = 0
        for sourceY in range(0, getHeight(smallPc)):
            px = getPixel(smallPc, sourceX, sourceY)
            cx = getPixel(canvas, targetX, targetY)
            setColor(cx, getColor(px))
        targetY = targetY + 1
    targetX = targetX + 1

def merge(picture, bg):
    h = getHeight(picture)
    w = getWidth(picture)
    for x in range(0, w, 2):
        for y in range(0, h, 2):
            sourcePx = getColor(getPixel(picture, x, y))
            setColor(getPixel(bg, x, y), sourcePx)
    for x in range(0, w, 3):
        for y in range(0, h, 3):
            sourcePx = getColor(getPixel(picture, x, y))
            setColor(getPixel(bg, x, y), sourcePx)

def alien(picture):
    for pixels in getPixels(picture):
        r = getRed(pixels)
        b = getBlue(pixels)
        g = getGreen(pixels)
        setBlue(pixels, r)
        setGreen(pixels, b)
        setRed(pixels, g)

def Alice(bg):
    alice = makePicture(getMediaPath("JPG images/Alice.jpg"))
    scale = 4
    h = getHeight(alice)
    w = getWidth(alice)
    smallPc = makeEmptyPicture(int(w/scale), int(h/scale))
scaled(alice,smallPc,1.0/scale)
for px in getPixels(smallPc):
    x = getX(px)
    y = getY(px)
    if (getRed(px) + getBlue(px) < getGreen(px)):
        bgpx = getPixel(bg,x,y)
        bgcol = getColor(bgpx)
        setColor(px,bgcol)
mid(smallPc,bg)

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

def Bright(picture):
    #reference program 66(pg 152/153)
    #reference program 63(pg 148)
    for x in range(0,getWidth(picture)):
        for y in range(0,getHeight(picture)):
            px = getPixel(picture,x,y)
            color = getColor(px)
            color = makeLighter(makeLighter(color))
            setColor(px,color)

def TTBmirror(picture):
    h = getHeight(picture)
    w = getWidth(picture)
    mP = (h/2)
    for x in range(0,w):
        for y in range(0,mP):
            topPixel = getPixel(picture,x,y)
            bottomPixel = getPixel(picture,x,h - y - 1)
            color = getColor(topPixel)
            setColor(bottomPixel,color)

def BTTmirror(picture):
    h = getHeight(picture)
    w = getWidth(picture)
    mP = (h/4)
    for x in range(0,w):
        for y in range(0,mP):
            topPixel = getPixel(picture,x,y)
            bottomPixel = getPixel(picture,x,h - y - 1)
            color = getColor(bottomPixel)
            setColor(topPixel,color)

def scaled(picture,canvas,scale):
    w = getWidth(canvas)
    h = getHeight(canvas)
    srcX = 0
    for x in range(0,int(w)):
        srcY = 0
        for y in range(0,int(h)):
            px = getPixel(picture,int(srcX),int(srcY))
            color = getColor(px)
            npx = getPixel(canvas,x,y)
            setColor(npx, color)
            srcY = srcY+(1.0/scale)
            srcX = srcX+(1.0/scale)