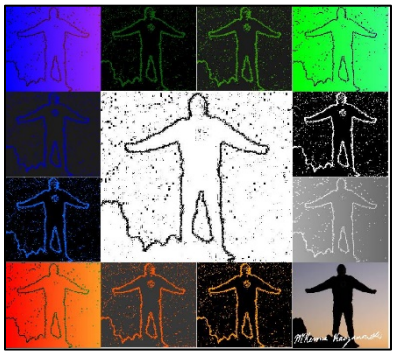
McKenna Kaczanowski

Completed



Original

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#McKenna Kaczanowski 03/09/2020
#Project 2

def collage():  #main function
  #original picture, from public domain
  pic = makePicture(getMediaPath("silhouette.jpg"))
  cropPic = crop(pic,345,1120,370,1060)    #crops picture
  width = getWidth(cropPic)
  height = getHeight(cropPic)
  collage = makeEmptyPicture(width,height)    #creates blank canvas
  scalePic = scale(cropPic,.25)    #creates scaled version of cropped image
  sketch = edgeDetect(cropPic,black,white)
  #creates image used multiple times throughout function
  scaledSketch = scale(sketch,.25)
  centerPic = scale(sketch,.5)
  copy(centerPic,collage,int(width/4),int(height/4))
  pic1 = edgeDetect(scalePic,white,black)
  copy(pic1,collage,3*int(width/4),int(height/4))
  pic2 = negative(grayScale(rainbow(scaledSketch,.8,.2,red)))
  copy(pic2,collage,3*int(width/4),2*int(height/4))
  copy(scalePic,collage,3*int(width/4),3*int(height/4))
  pic3 = rainbow(scaledSketch,.8,.2,red)
  copy(pic3,collage,0,3*int(height/4))
  redColor = makeColor(255,85,0)
  grayColor = makeColor(57,57,57)
  pic4 = edgeDetect(scalePic,redColor,grayColor)
  copy(pic4,collage,int(width/4),3*int(height/4))
  orangeColor = makeColor(255,155,0)
  pic5 = edgeDetect(scalePic,orangeColor,black)
  copy(pic5,collage,2*int(width/4),3*int(height/4))
  pic6 = rainbow(scaledSketch,.8,.2,blue)
  copy(pic6,collage,0,0)
  blueColor = makeColor(0,0,205)
  grayColor2 = makeColor(28,28,28)
  pic7 = edgeDetect(scalePic,blueColor,grayColor2)
  copy(pic7,collage,0,int(height/4))
  blueColor2 = makeColor(0,100,255)
  pic8 = edgeDetect(scalePic,blueColor2,black)
  copy(pic8,collage,0,2*int(height/4))
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  pic9 = rainbow(scaledSketch,.3,.7,green)
  copy(pic9,collage,3*int(width/4),0)
  greenColor = makeColor(50,155,0)
  pic10 = edgeDetect(scalePic,greenColor,grayColor2)
  copy(pic10,collage,2*int(width/4),0)
  greenColor2 = makeColor(0,100,0)
  pic11 = edgeDetect(scalePic,greenColor2,black)
  copy(pic11,collage,int(width/4),0)
  signature(collage,580,655)
  explore(collage)

def grayScale(pic):  #creates the grayscale effect
  width = getWidth(pic)
  height = getHeight(pic)
  newPic = makeEmptyPicture(width,height)
  for x in range(width):
    for y in range(height):
      pixel = getPixel(pic,x,y)
      newPixel = getPixel(newPic,x,y)
      lum = luminance(pixel)
      color = makeColor(lum,lum,lum)
      setColor(newPixel,color)
  return newPic

def luminance(pixel):  #returns the luminance of a pixel, used in other functions
  luminance = (getRed(pixel)+getGreen(pixel)+getBlue(pixel))/3
  return luminance

def negative(pic):   #creates the negative of the input picture
  width = getWidth(pic)
  height = getHeight(pic)
  newPic = makeEmptyPicture(width,height)
  for x in range(width):
    for y in range(height):
      pixel = getPixel(pic,x,y)
      newRed = 255-getRed(pixel)
      newGreen = 255-getGreen(pixel)
      newBlue = 255-getBlue(pixel)
      color = makeColor(newRed,newGreen,newBlue)
      newPixel = getPixel(newPic,x,y)
      setColor(newPixel,color)
  return newPic

def copy(pic,canvas,startX,startY):   #copies an image onto another image
  begX = startX
  for x in range(getWidth(pic)):
    begY = startY
    for y in range(getHeight(pic)):
      sourcePx = getPixel(pic,x,y)
      color = getColor(sourcePx)
      targetPx = getPixel(canvas,begX,begY)
      setColor(targetPx,color)
      begY = begY + 1
    begX = begX + 1

def scale(pic,factor):  #scales an image by a specified factor
  newPic = makeEmptyPicture(int(factor*getWidth(pic)),int(factor*getHeight(pic)))
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  sourceX = 0
  for x in range(getWidth(newPic)):
    sourceY = 0
    for y in range(getHeight(newPic)):
       sourcePx = getPixel(pic,int(sourceX),int(sourceY))
       targetPx = getPixel(newPic,x,y)
       color = getColor(sourcePx)
       setColor(targetPx,color)
       sourceY = sourceY + 1/factor
    sourceX = sourceX + 1/factor
  return newPic

def crop(pic,startX,endX,startY,endY):  #crops a picture
  newPic = makeEmptyPicture(endX-startX,endY-startY)
  sourceX = startX
  for x in range(getWidth(newPic)):
    sourceY = startY
    for y in range(getHeight(newPic)):
      sourcePx = getPixel(pic,sourceX,sourceY)
      color = getColor(sourcePx)
      targetPx = getPixel(newPic,x,y)
      setColor(targetPx,color)
      sourceY = sourceY + 1
    sourceX = sourceX + 1
  return newPic

#changes the color gradually across the picture, creating a sort of rainbow
def rainbow(pic,w1,w2,color1):
  width = getWidth(pic)
  height = getHeight(pic)
  inc = width/256
  if inc < float(width)/256:
    inc = inc + 1
  newPic = makeEmptyPicture(width,height)
  counter = 0
  for x in range(width):
    for y in range(height):
      pixel = getPixel(pic,x,y)
      if color1 == red:
        color = makeColor(getRed(pixel),int(w1*counter),int(w2*counter))
      elif color1 == green:
        color = makeColor(int(w1*counter),getGreen(pixel),int(w2*counter))
      elif color1 == blue:
        color = makeColor(int(w1*counter),int(w2*counter),getBlue(pixel))
      targetPixel = getPixel(newPic,x,y)
      setColor(targetPixel,color)
    if (x+1) % inc == 0:
      counter = counter + 1
  return newPic

#creates a sketch of a picture with two specified colors
def edgeDetect(pic,color1,color2):
  width = getWidth(pic)
  height = getHeight(pic)
  newPic = makeEmptyPicture(width,height)
  for x in range(width-1):
    for y in range(height-1):
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      pixel = getPixel(pic,x,y)
      botrt = getPixel(pic,x+1,y+1)
      lum1 = luminance(pixel)
      lum2 = luminance(botrt)
      newPixel = getPixel(newPic,x,y)
      if abs(lum1-lum2) > 2:
        setColor(newPixel,color1)
      elif abs(lum1-lum2) <= 2:
        setColor(newPixel,color2)
  return newPic


def signature(canvas,startX,startY):  #draws the signature on a picture
  pic = scale(crop(makePicture(getMediaPath("signature.jpg")), ↵
           956,3368,1052,1508),.075)
  targetX = startX
  for x in range(getWidth(pic)):
    targetY = startY
    for y in range(getHeight(pic)):
      pixel = getPixel(pic,x,y)
      targetPixel = getPixel(canvas,targetX,targetY)
      picColor = getColor(pixel)
      if distance(picColor,white) > 250:
        setColor(targetPixel,white)
      targetY = targetY + 1
    targetX = targetX + 1
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↵ means the line is continued on the next line.