

1)

```
def zero(img):  
    for px in getPixels(img):  
        col = makeColor(0, 0, 0)  
        setColor(px, col)
```

The result is the entire image is black.

2)

```
def zero(img):  
    for px in getPixels(img):  
        col = makeColor(255, 255, 255)  
        setColor(px, col)
```

The result is the entire image is white.

3) 1: Decreases the R value of each pixel by half

2: Increases the B value of each pixel by 50%

3: Sets the G value of each pixel to 0

4: Increases the R, G and B values by 10

5: Decreases the value of the R, G, and B of each pixel by 20, unless the decrease puts the value below 0, in which case the value is set to 0.

6: Literally nothing

7: Reduces the value of each component by half for each pixel.

8: Reduces the value of each component by a third for each pixel.

9: Doubles the value of each component for each pixel.

4) The majority of the image is white-washed.

5)

```
def blue(img):  
    for px in getPixels(img):  
        if getBlue(px) > 100:  
            b = getBlue(px)+50  
            if b < 255:  
                b = 255  
            col = makeColor(getRed(px), getGreen(px), b)  
            setColor(px, col)
```

6)

```
def blueify(img):  
    for px in getPixels(img):  
        r = getRed(px) / 2
```

```

g = getGreen(px) / 2
b = getBlue(px) * 2
col = makeColor(r, g, b)
setColor(px, col)

```



Before and after:

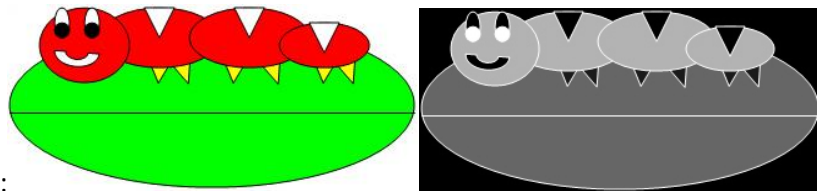
```

7) def negGrey(img):
    #Greyscale

    for px in getPixels(img):
        intensity = getRed(px) * 0.3 + getGreen(px) * 0.6 + getBlue(px) * 0.1
        setColor(px, makeColor(intensity, intensity, intensity))

    for px in getPixels(img):
        setColor(px, makeColor(255-getRed(px), 255-getGreen(px), 255-getBlue(255)))

```



Before and after:

```

8) def negGrey(img):
    greyscale(img)
    negate(img)

def greyscale(img):
    for px in getPixels(img):
        intensity = getRed(px) * 0.3 + getGreen(px) * 0.6 + getBlue(px) * 0.1
        setColor(px, makeColor(intensity, intensity, intensity))

def negate(img):
    for px in getPixels(img):
        setColor(px, makeColor(255-getRed(px), 255-getGreen(px), 255-getBlue(255)))

```

The program in #7 is the most efficient, while the one in #8 is easier to understand.

9)

```

def lightGrey(img):
    for px in getPixels(img):

```

```
r = getRed(px) + 75
g = getGreen(px) + 75
b = getBlue(px) + 75
intensity = r * 0.3 + g * 0.6 + b * 0.1
setColor(px, makeColor(intensity, intensity, intensity))
```

10)

```
def lightGrey2(img):
```

```
    for px in getPixels(img):
```

```
        setColor(px, makeLighter(makeColor(getRed(px), getGreen(px), getBlue(px))))
```

```
    intensity = getRed(px) * 0.3 + getGreen(px) * 0.6 + getBlue(px) * 0.1
```

```
    setColor(px, makeColor(intensity, intensity, intensity))
```

Original, from question 9, from question 10



The makeLighter() function keeps the contrast level of the image the same, while simply adding 75 to each component does not.