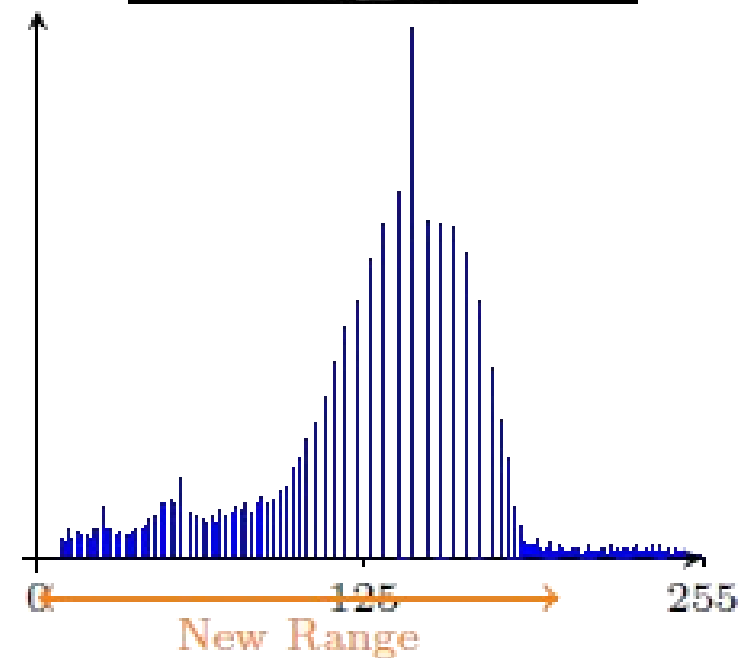
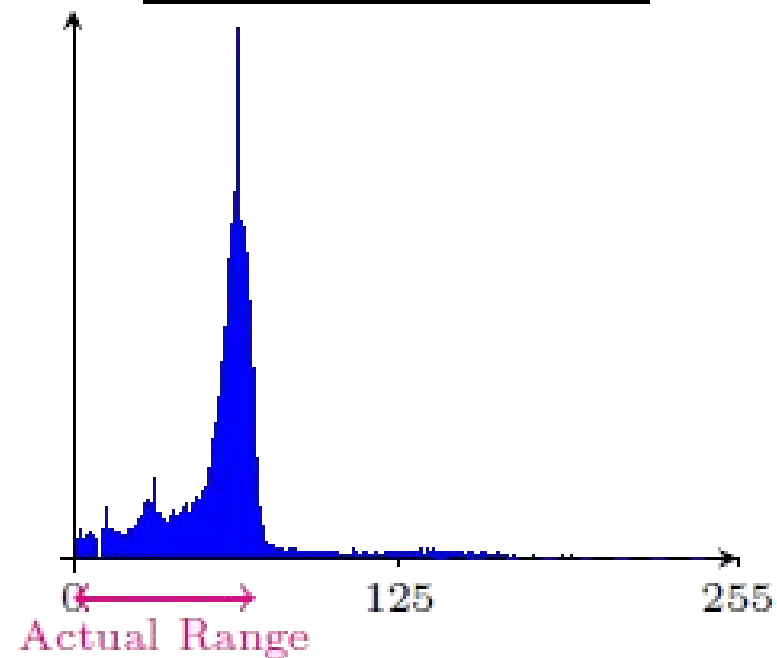
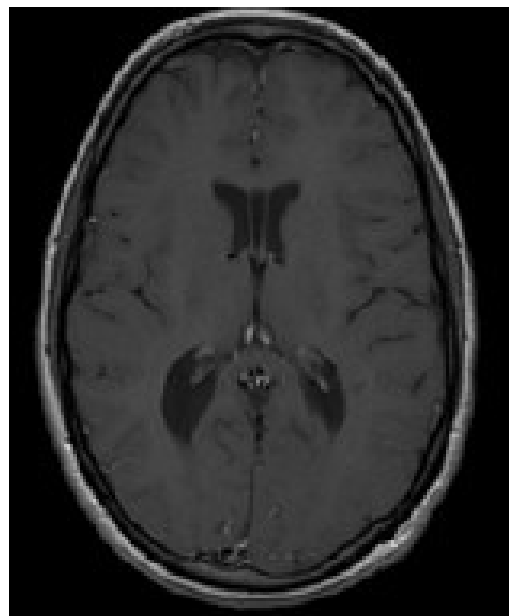


Image Enhancement

Additional Computer Exercise for Team 5

By
PASHEVICH Alexander
And
SID-LAKHDAR Riyane

Contrasting



Principle of the method

$$y[n] = newMin + (x[n] - actualMin) * \frac{newMax - newMin}{currentMax - currentMin}$$

$$y[n] = newMin + (x[n] - actualMin) * \alpha$$

Linear and strictly increasing function ($\alpha > 0$)

Principle of the method:

$$y[n] = newMin + (x[n] - actualMin) * \alpha$$

Lower bound

$$y_{min}[n] = newMin + \alpha(x_{min}[n] - currentMin)$$

$$y_{min}[n] = newMin + \alpha(currentMin - currentMin)$$

$$y_{min}[n] = newMin$$

Principle of the method:

$$y[n] = newMin + (x[n] - actualMin) * \frac{newMax - newMin}{currentMax - currentMin}$$

Upper bound

$$y_{min}[n] = newMin + \frac{newMax - newMin}{currentMax - currentMin} * (x_{max}[n] - currentMin)$$

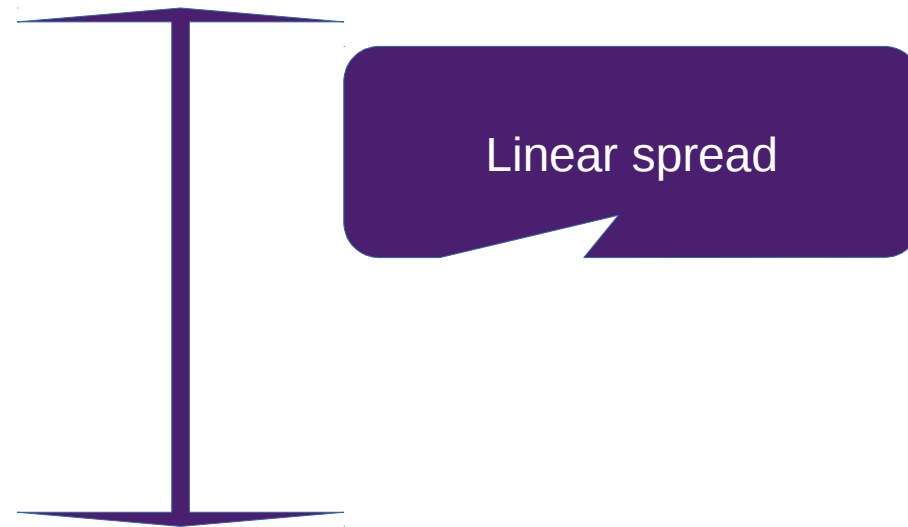
$$y_{min}[n] = newMin + \frac{newMax - newMin}{currentMax - currentMin} * (currentMax - currentMin)$$

$$y_{min}[n] = newMin + newMax - newMin$$

$$y_{min}[n] = newMax$$

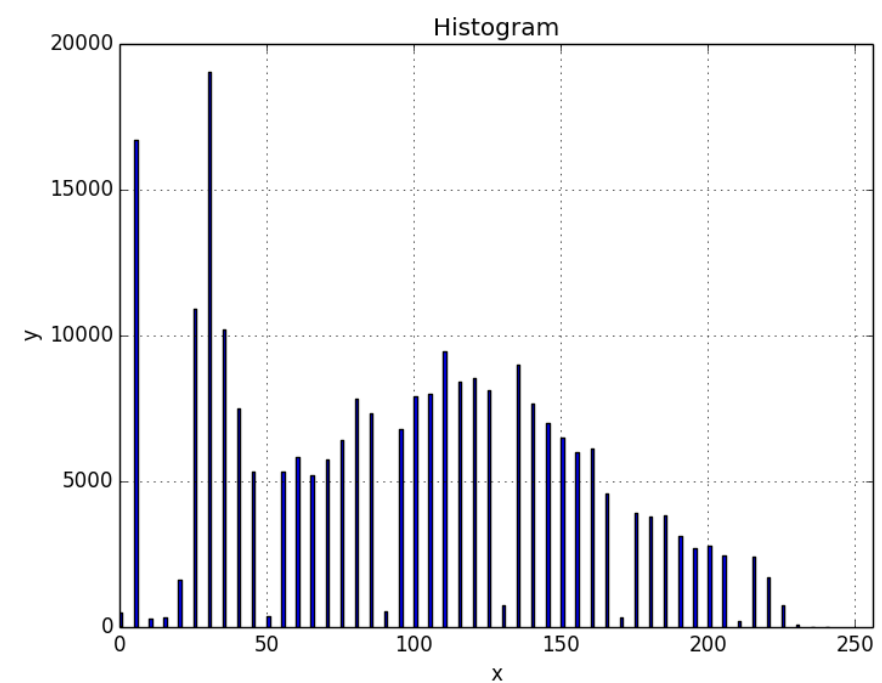
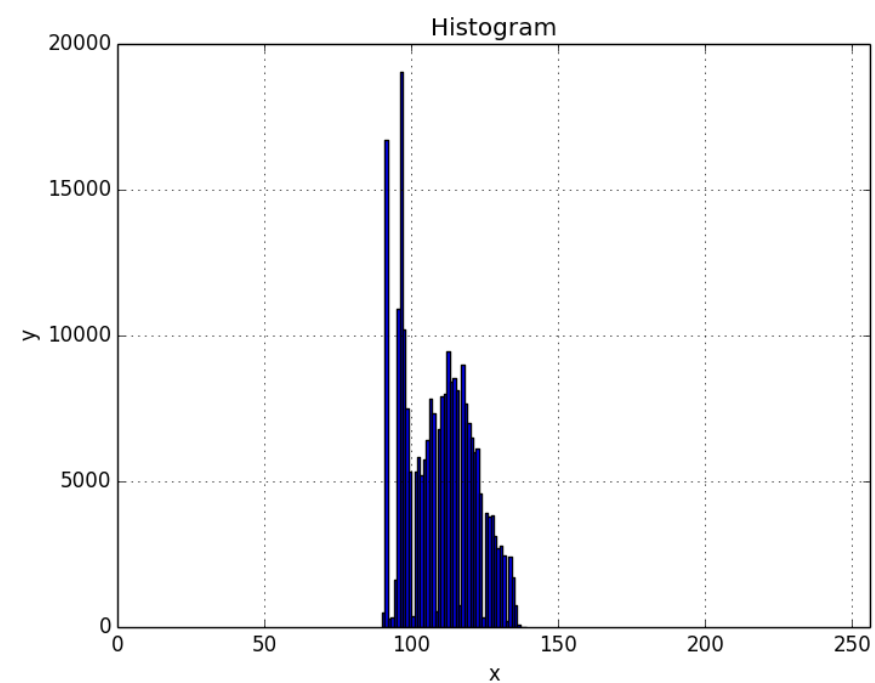
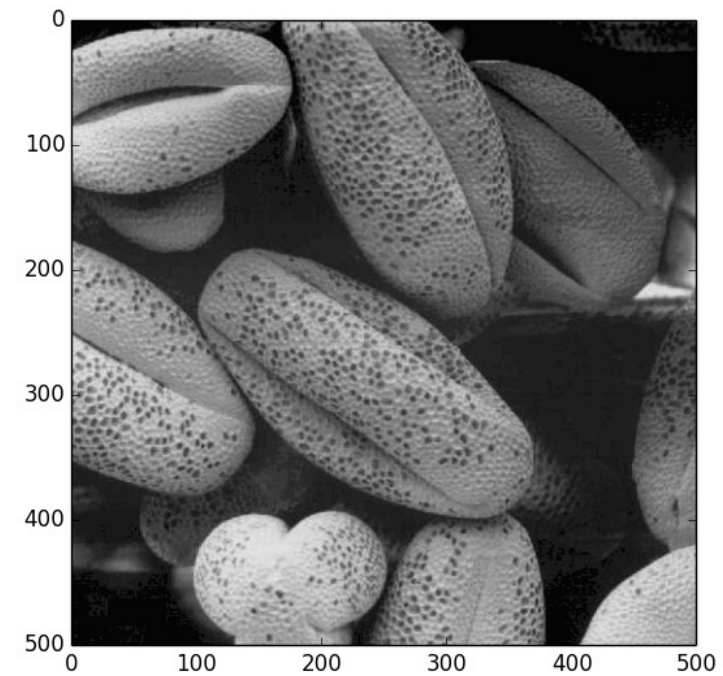
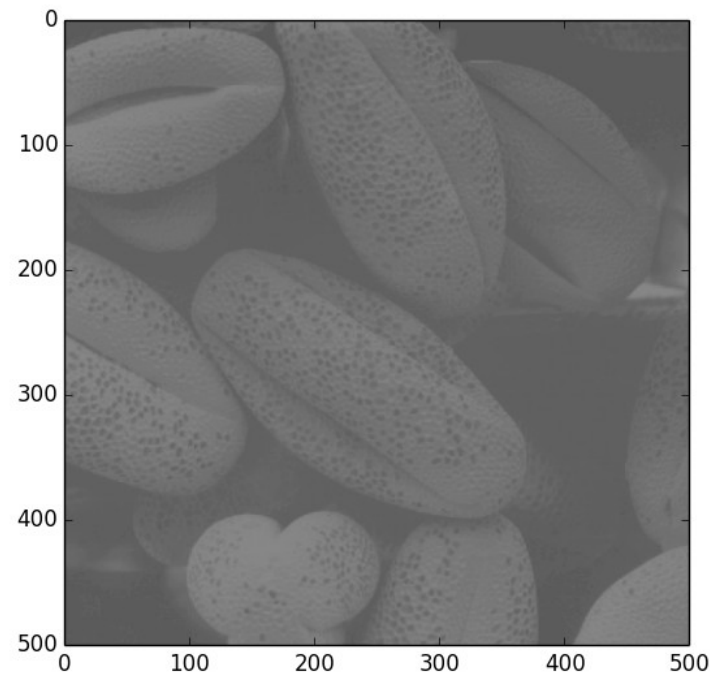
Principle of the method:

[currentMin, currentMax]

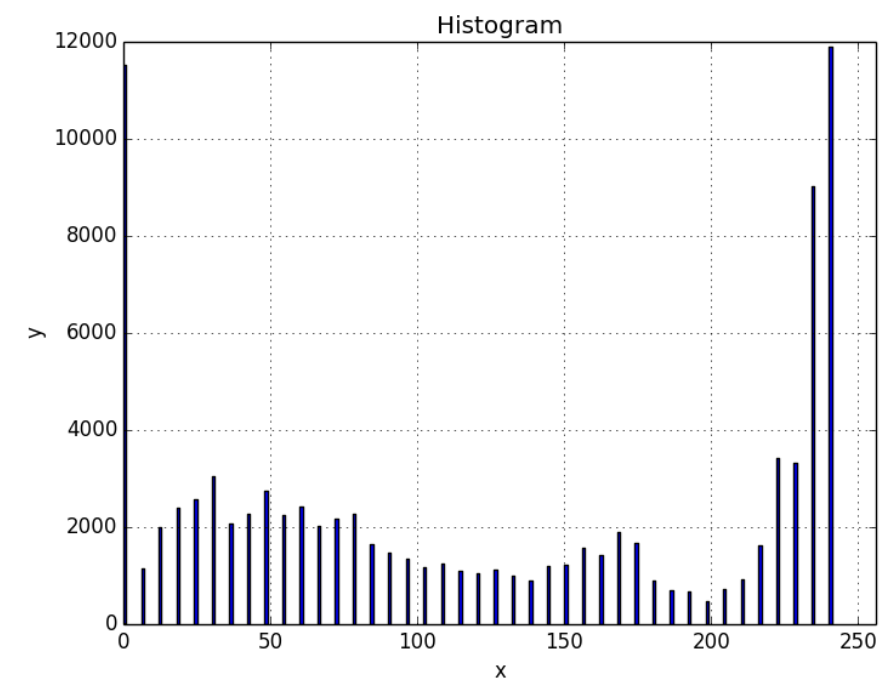
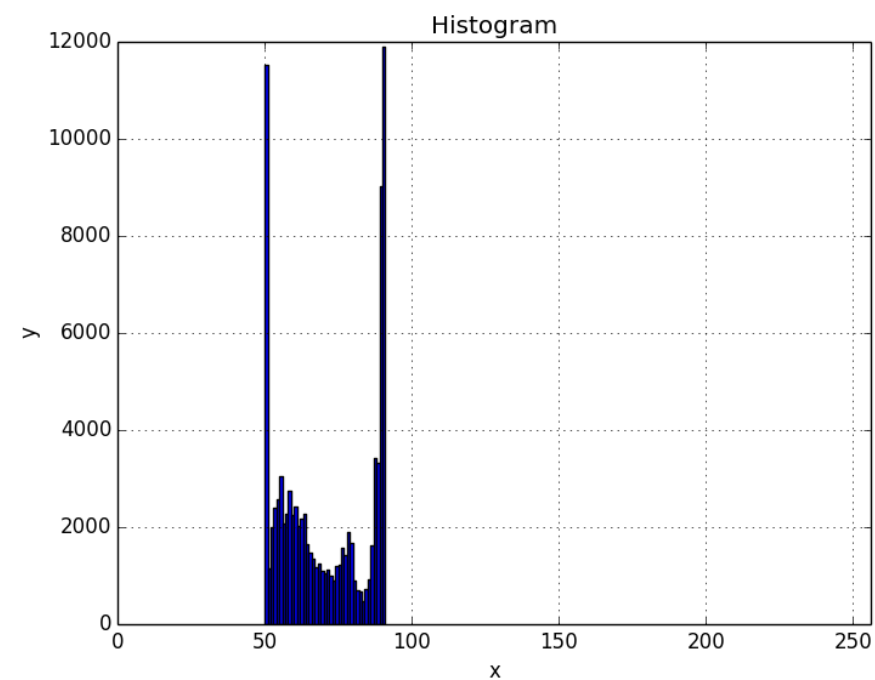
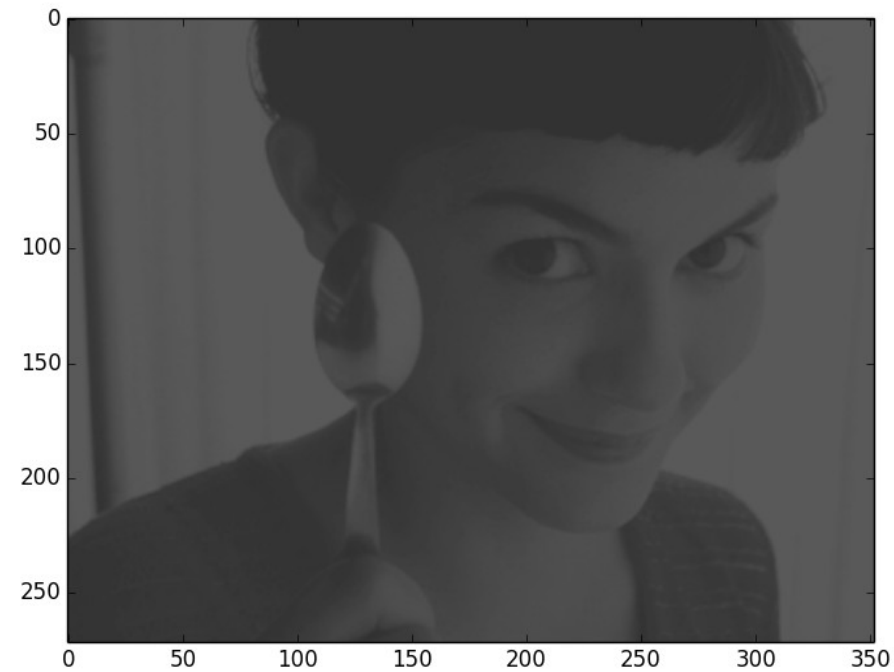


[newMin , newMax]

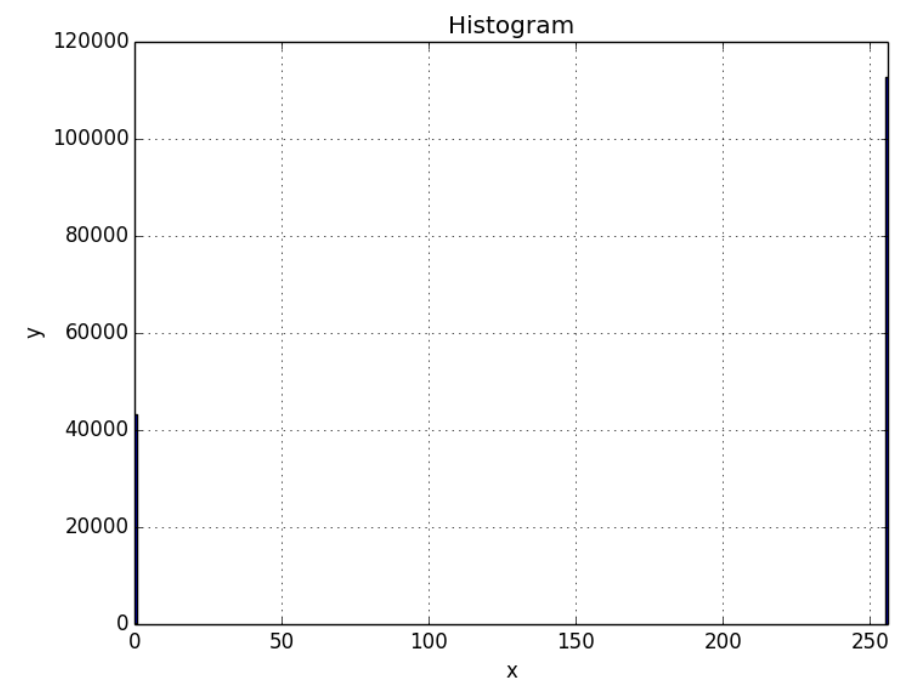
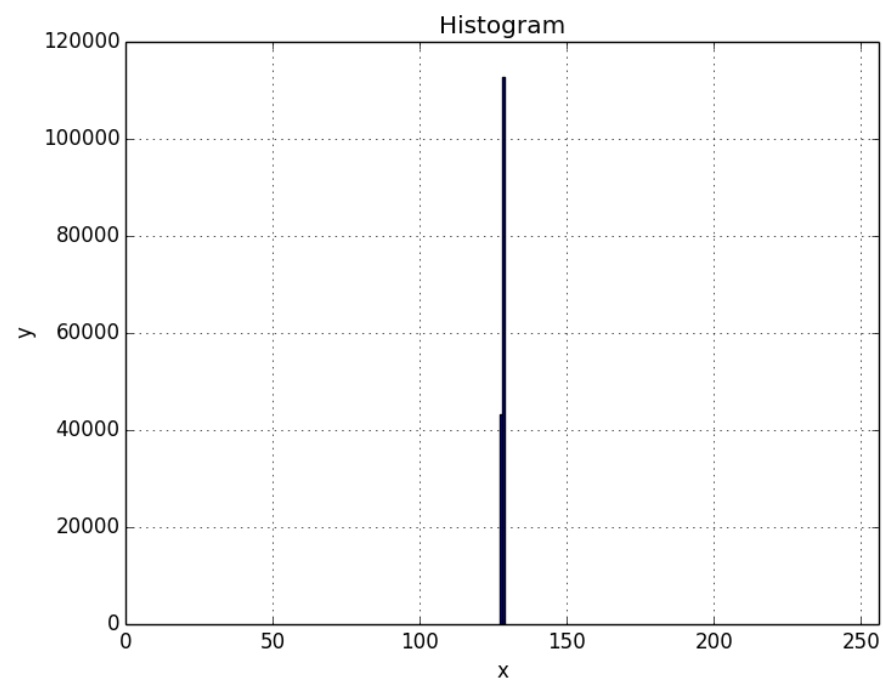
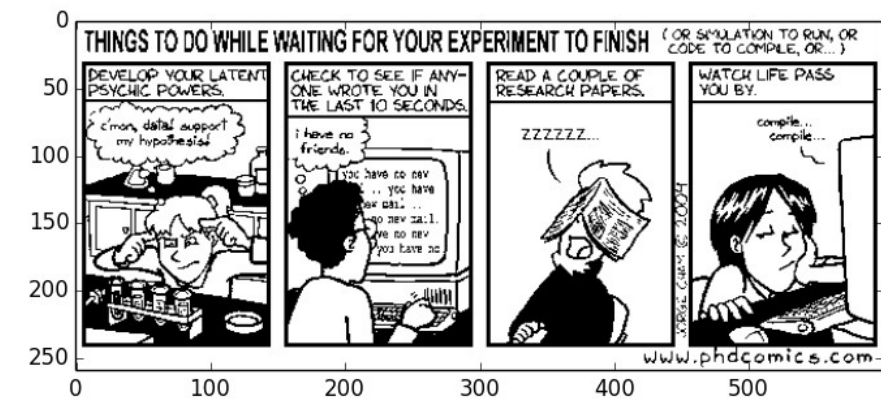
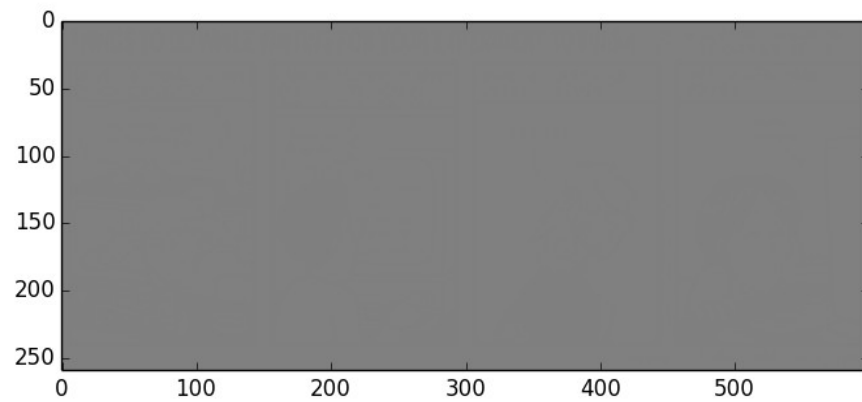
Results (pollen)



Results (amelie)



Results (mystery)



Advantages of this method

- Extremely simple to implement

```
def stretchContrast(inputImage, newRangeMin, newRangeMax):  
    actualMax = myMax(img.flatten())  
    actualMin = myMin(img.flatten())  
    outputImage = np.zeros(len(inputImage))  
    for i in range(len(inputImage)):  
        newVal = newRangeMin + (newRangeMax - newRangeMin) / (actualMax -  
            actualMin) * (inputImage[i] - actualMin)  
        outputImage[i] = newVal  
    return outputImage
```

Advantages of this method

- Very efficient: complexity $C(n) = O(n)$
- May be applied no matter the picture encoding used

Thanks