**Homework 3**

Histogram Equalization

Programming language: Python 3.7.3

Library used for this homework:

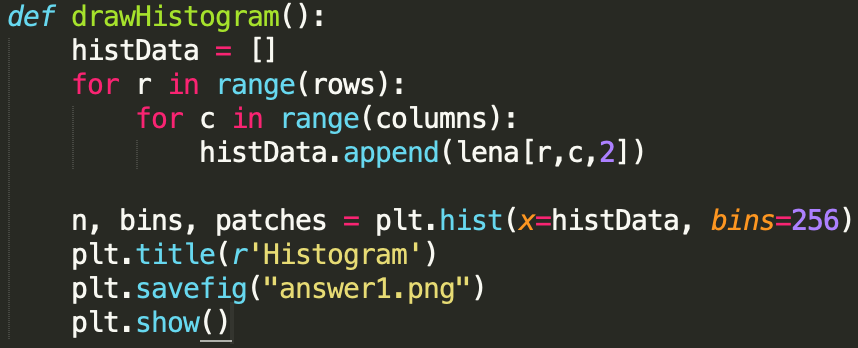
* Numpy
* OpenCv: to read and write the image file

Image info: lena.bmp [512(width),512(height),3(RGB)]

**Code explanation:**

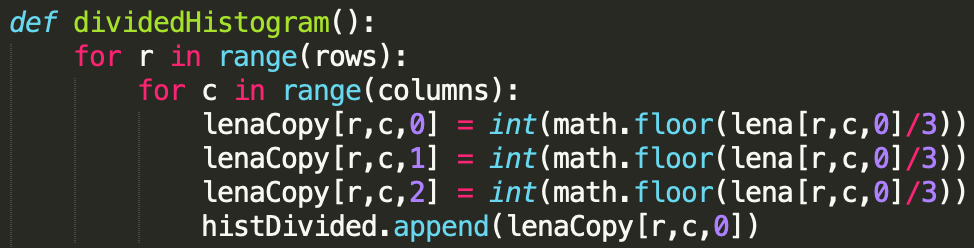
Draw a histogram with the brightness value of all pixel.

Use matplotlib.pyplot to draw the histogram.

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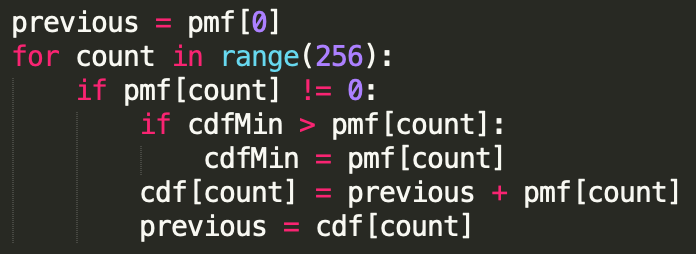
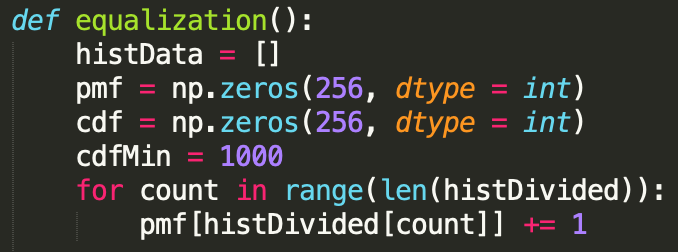
(b)

Divided all the pixels’ brightness value by 3. Save the result into each RGB channel. Use a list “histDivided” to save all the value, and draw the histogram using this list.

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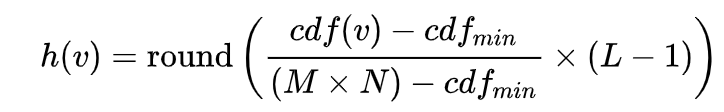
(C)

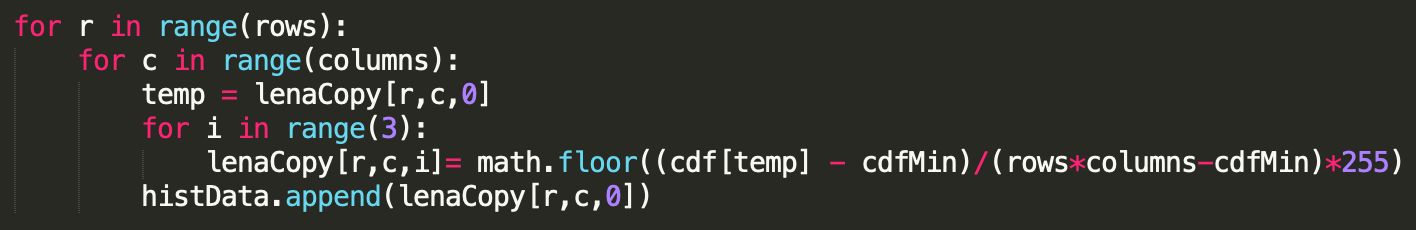
Calculate the PMF and CDF (cumulative distribution function) value of the darken image from part b. PMF was calculated from the hisDivided list from part B.

Histogram Equalization: <https://en.wikipedia.org/wiki/Histogram_equalization>

Calculate the normalized value of each pixel using the CDF values.

The general histogram equalization formula:



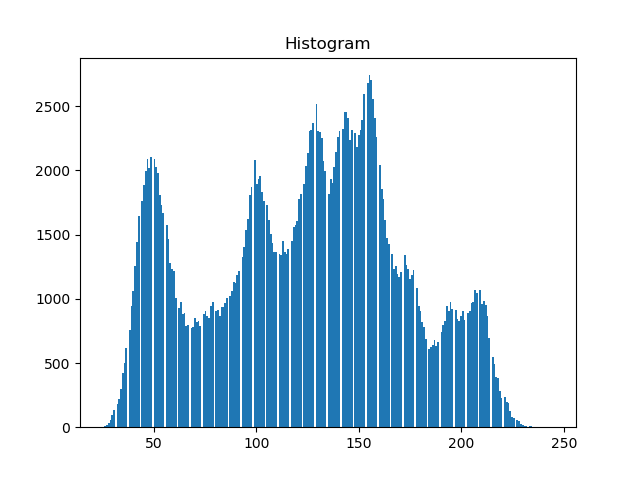


**Result:**

(a-1)



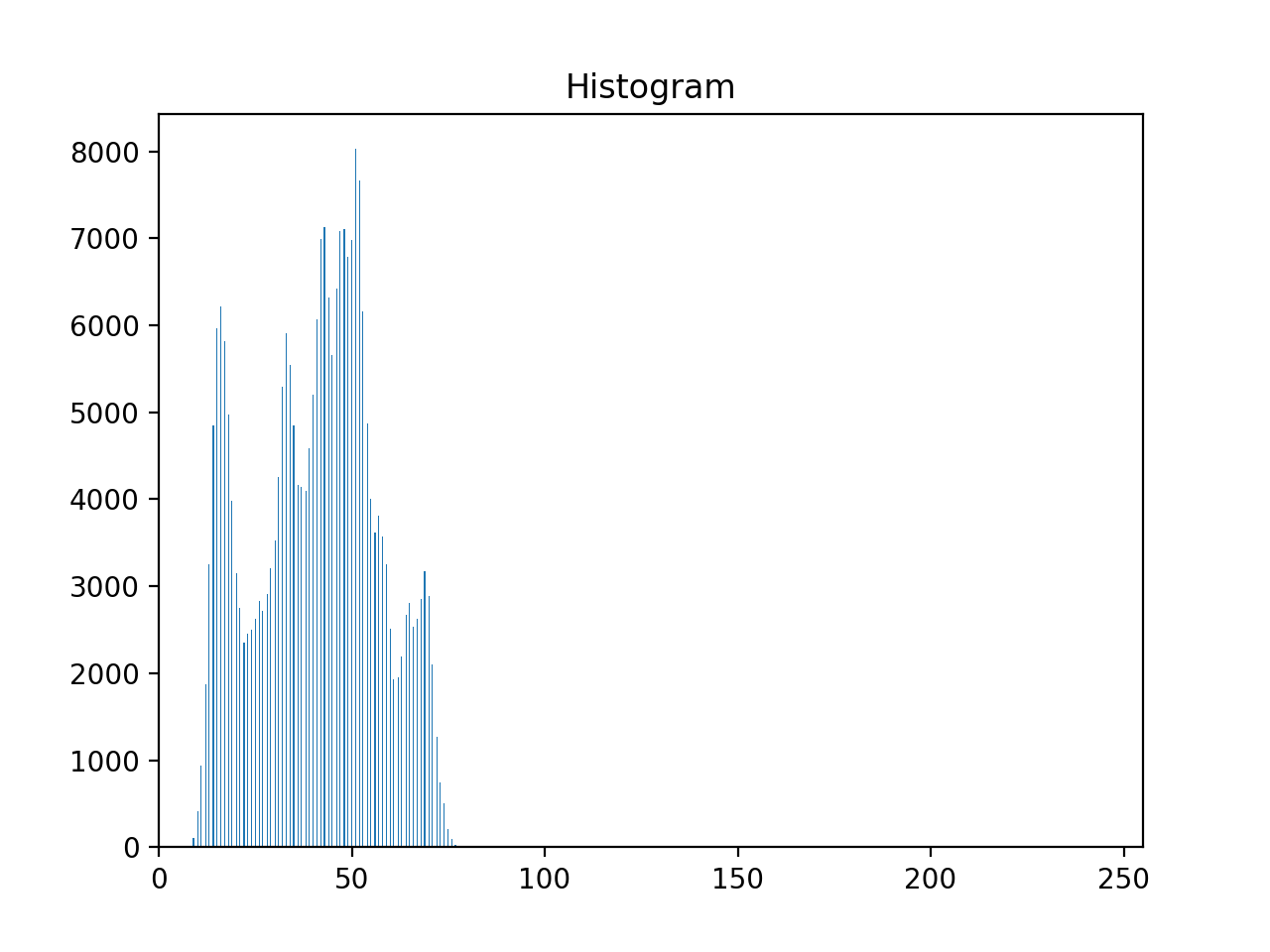
(a-2)



(b-1)



(b-2)



(c-1)



(c-2)

