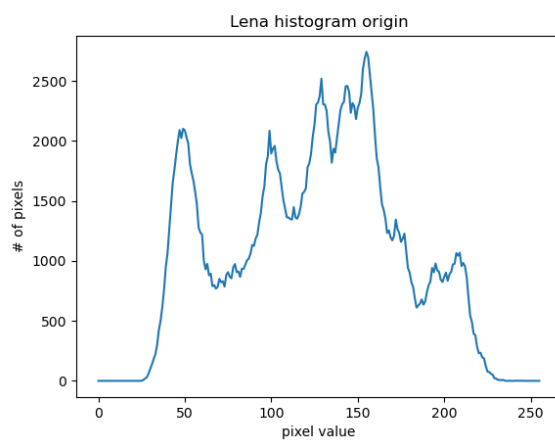


# HW3 report

R10922082 林育駿

本次作業中使用 python opencv 幫助圖片的 I/O 一些處理部分，執行 R10922082\_HW3.py 會生成 divide3\_lena.bmp, lena\_histogram.png, equalized\_lena.bmp, lena\_histogram\_divide\_by\_3.png 和 lena\_histogram\_equalized.png 五張圖片對應三個小題。

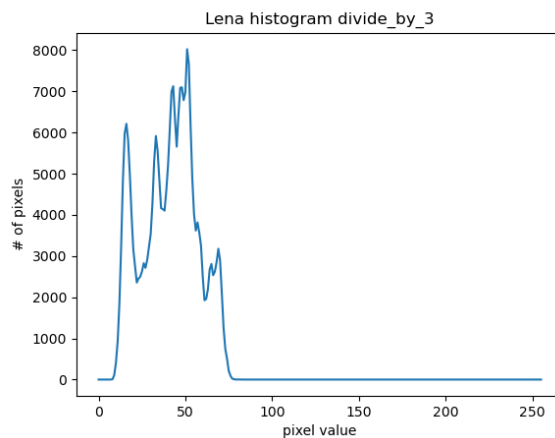
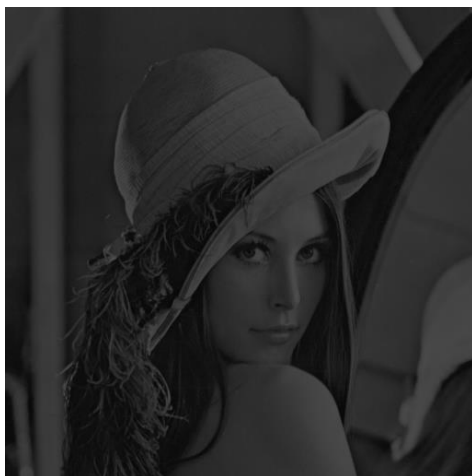
## (a) original image and its histogram



Lena 原圖和其 histogram，使用方法和作業 2 相同計算每個 pixels 值有多少個點繪成圖表。

```
for i in range(imgHeight): # height 512
    for j in range(imgWidth): # width 512
        histoy[int(img[i][j].mean())] +=1
```

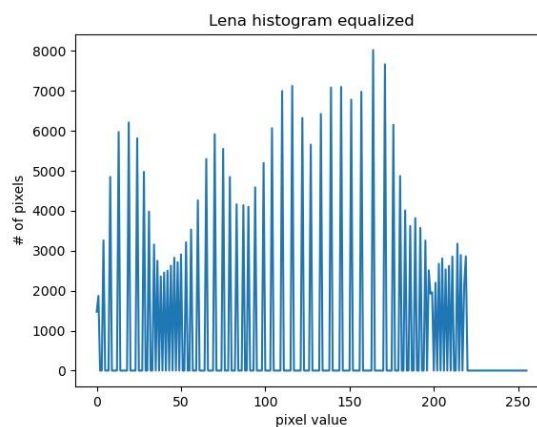
## (b) image with intensity divided by 3 and its histogram



直接對原圖所有 pixel 除以倍數 3 得到變暗的圖片，從 histogram 可以看出確實圖形向左低 value 移動。

```
# manipulate pixels
for i in range(imgHeight):
    for j in range(imgWidth):
        nimg[i][j]= img[i][j]/rate
```

(c) image after applying histogram equalization to (b) and its histogram



對(b)小題所做出的變暗圖片進行 equalization，計算每個 pixel value 點出現的機率再乘上 value 的範圍(255)再轉成累積機率函數的形式得到 mapping 到 equalized 的各 pixel value 對應值。

```
for i in range(len(histo)):
    table[i] = histo[i]*255 / N # probability of each value

for i in range(len(histo)):
    if i > 0:
        table[i] = table[i] + table[i-1]
    #print(table[i])
    table[i] = round(table[i])

# init a white canvas
nimg = np.zeros(shape=(imgWidth,imgHeight,3))

for i in range(imgHeight): # height 512
    for j in range(imgWidth): # width 512
        nimg[i][j] = table[int(img[i][j].mean())]
```