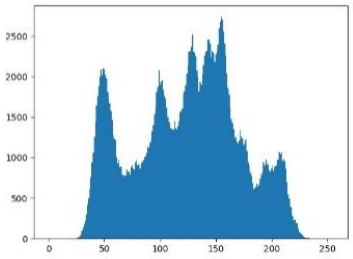
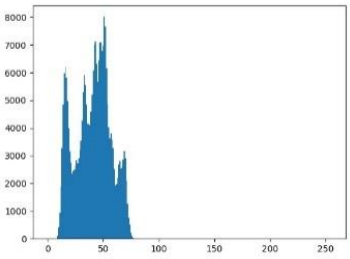
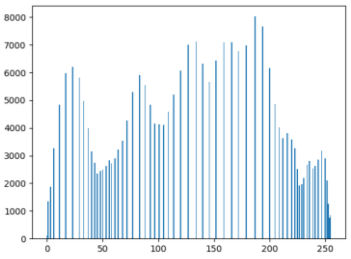
2021 CV HW3 Report

Results

a	b	c
		
		

(a) original image and its histogram

建立兩個 list，一個為直方圖的 X 軸（表示 pixel value 0~255），一個為直方圖的 Y 軸（各 pixel value 的總數）。

兩層 for loop 查看 pixel value 為多少，在相對應的 list 位置將 count 加 1。

```
histogramX = [i for i in range(256)]
histogramY = [0 for _ in range(256)]
for i in range(h):
    for j in range(w):
        histogramY[img[i][j]] += 1
```

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

將 original image 所有的 pixel value 除以 3。並和 (a) 部分一樣計算此圖的 histogram。

```
for i in range(h):
    for j in range(w):
        histogramY[int(img[i][j]/3)] += 1
```

```
        img[i][j] = int(img[i][j]/3)
```

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

Step1. 先去計算圖 b 的 histogram

```
histogramX = [i for i in range(256)]
histogramY = [0 for _ in range(256)]
for i in range(h):
    for j in range(w):
        histogramY[int(img[i][j])] += 1
```

Step2. 接著將其 histogram 累加計算 CDF，產生灰階值的對照表。

```
accumulate = 0
for i in range(256):
    accumulate += histogramY[i]
    histogramY[i] = int(np.round(accumulate / total * 255))
```

Step3. 最後再去計算做完 histogram equalization 的圖片的 histogram。

```
output = img.copy()
histogramEqu = [0 for _ in range(256)]
for i in range(h):
    for j in range(w):
        output[i][j] = histogramY[int(img[i][j])]
        histogramEqu[int(output[i][j])] += 1
```