11/28(日) hw2 D0886261 黃柏儒

直方圖等化

程式：

```python
def Histogram(image,copy):

    rows, cols= image.shape

    size = (rows * cols) # 總 pixel 值
    count = np.zeros(256) # 存放每個像素值出現的次數
    pmf = [] # 存放每個像素值出現的機率

    create = np.zeros((rows, cols, 1), np.uint8) # 新的畫布

    for i in range (size):
        index = copy[i] # 每個像素值設為索引
        count[index] = count[index]+1 # 利用索引存放出現的次數

    for i in range (256):
        pmf.append((count[i]/size)) # 存放出現次數的機率

    cdf = CDF(pmf)  # 傳回所選機率的累加函數

    for x in range(cols):
        for y in range(rows):
            index = image[y,x] # 以向素值為索引
            create[y, x] = round(cdf[index]*255) # 計算轉換函數並返回值給新的畫布

    return create
```

```python
def CDF(pmf): # 傳回所選機率的累加函數
    cdf = []
    for i in range (256):
        sum = 0
        for j in range (0,i+1):
            sum = sum + pmf[j]
        cdf.append(sum)
    return cdf
```

原理：創建陣列存放每個像素值出現的機率，再利用這個機率創建 CDF（累加），利用 CDF，使的取得的座標對應的像素值轉換成對應累加的像素值。

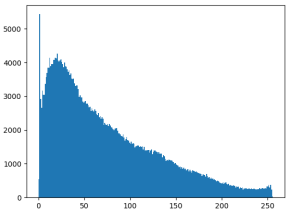
原圖：

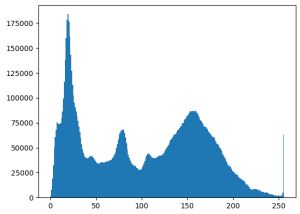
灰階：

處理前：

處理後：

處理前直方圖：





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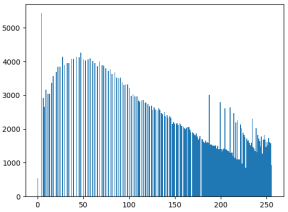
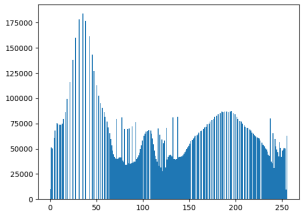
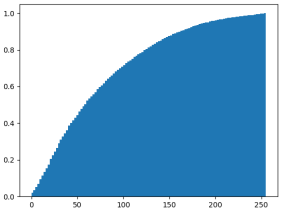
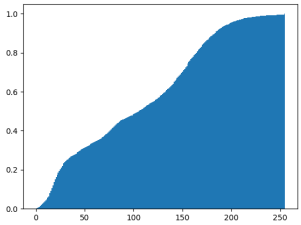




處理前累積直方圖：





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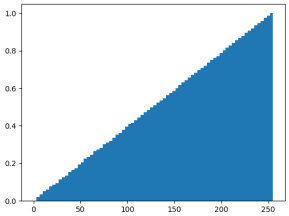

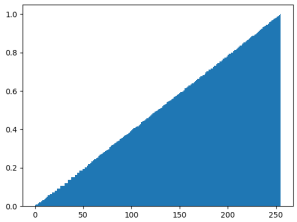

彩色：

R：

處理前：

處理後：

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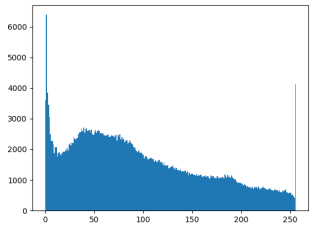

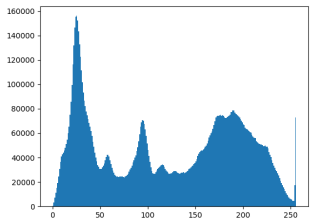

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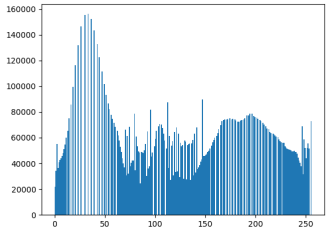

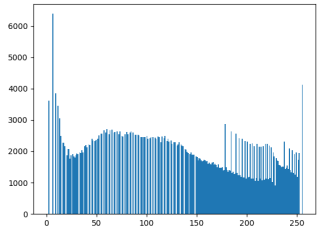

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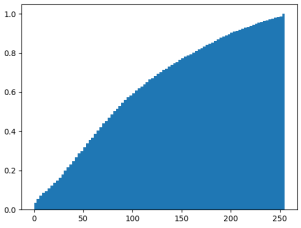

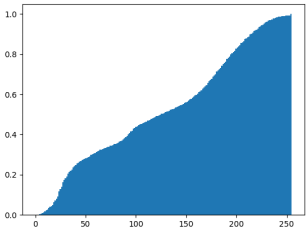

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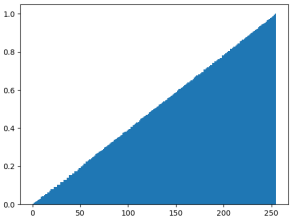
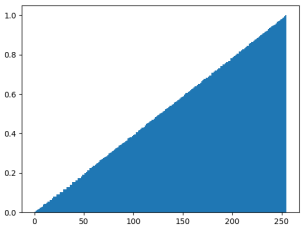


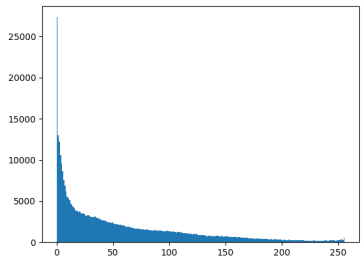


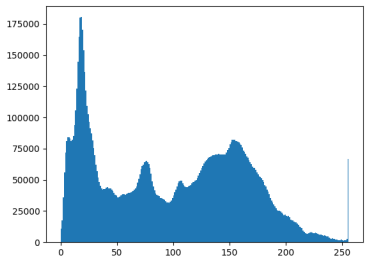
G：

處理前：

處理後：

處理前直方圖：





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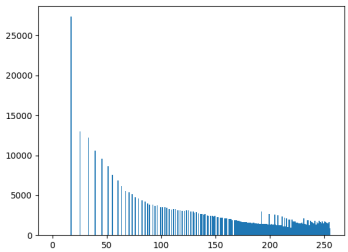

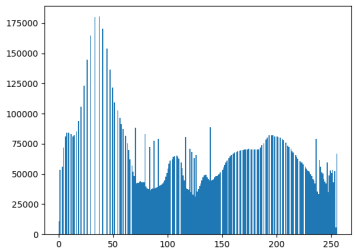

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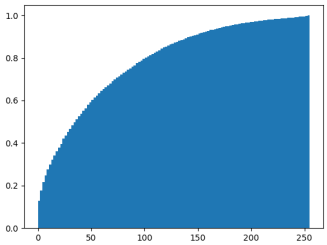

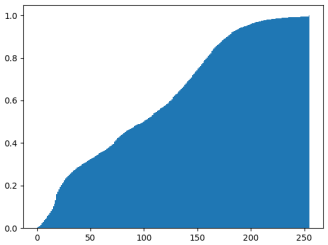

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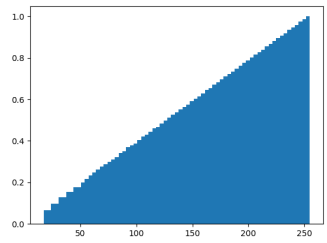
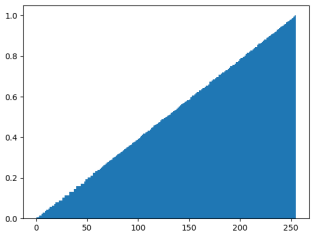


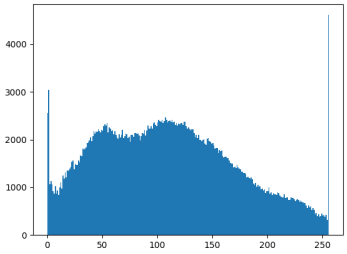


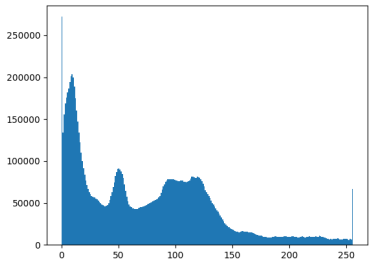
B：

處理前：

處理後：

處理前直方圖：





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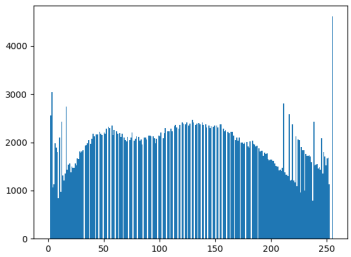

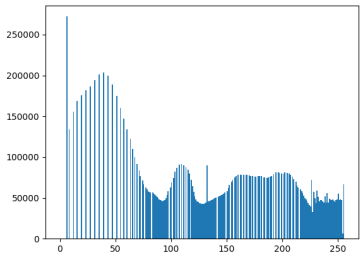

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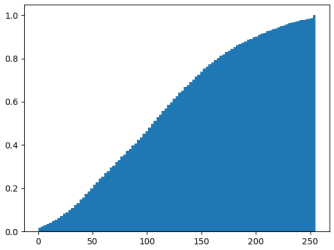
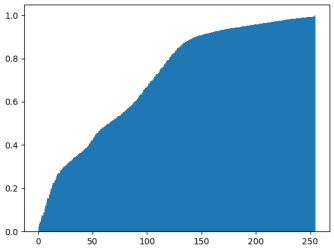
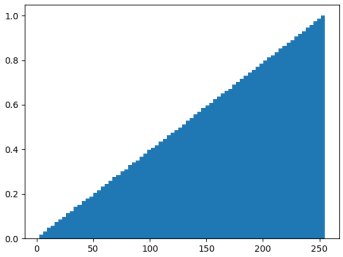
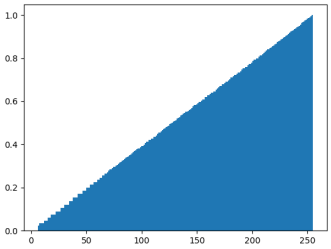




處理後累積直方圖：





合併（RGB）：

心得：

雖然最後成功做出來了，但用函式去比對時，雖然大致上直方圖都是一樣的，但還是會有些許的差別，這部分就搞不太懂原因了。