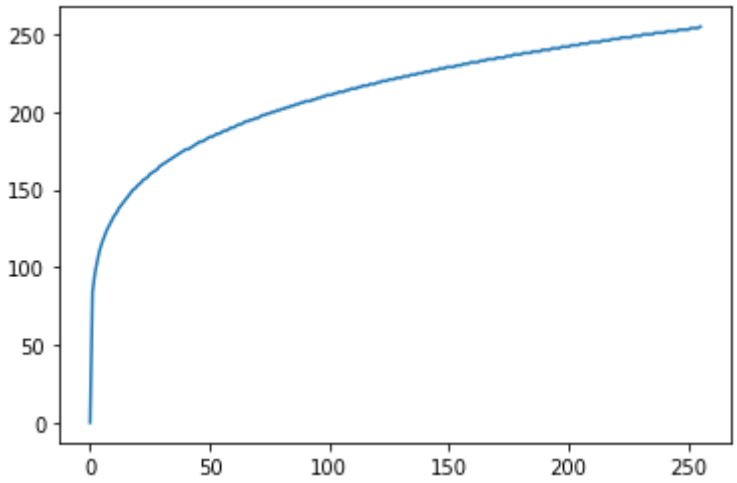
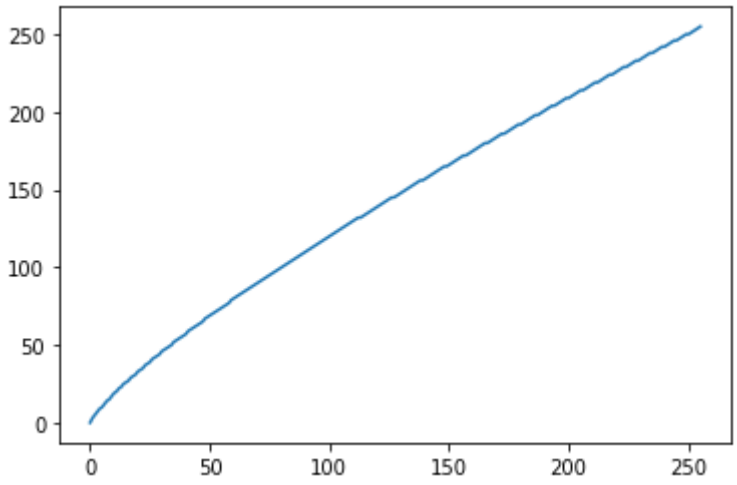
Name : Vakeesan

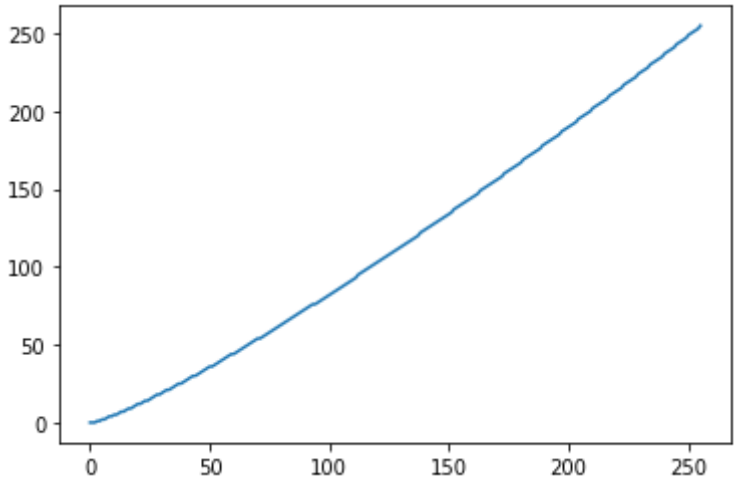
Index No. : 190643G

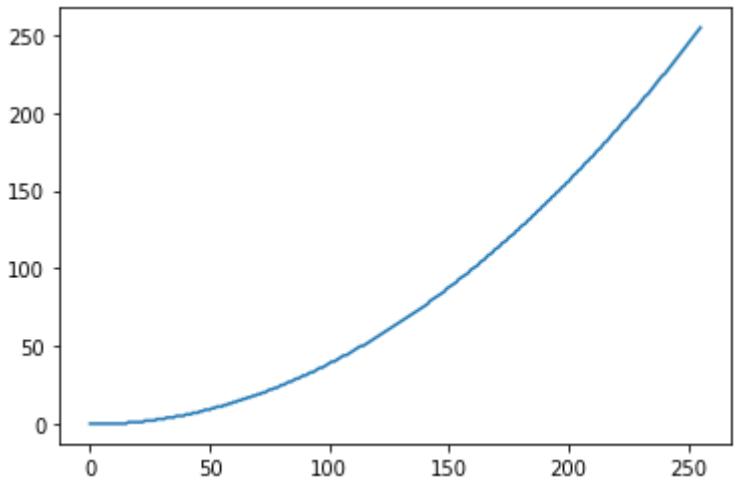
1)

In [ ]:
```
%matplotlib inline
import numpy as np
import cv2 as cv
import matplotlib.pyplot as plt

f=cv.imread(r'C:\Python39\cv\exercices\lec 2\spider.png', cv.IMREAD_GRAYSCALE)
assert f is not None

gamma = np.array([0.2 ,0.8, 1.2, 2])

for i in gamma:
    t =np.array ([(p/255)**i*255 for p in range(0,256)]).astype(np.uint8)
    g = cv.LUT(f,t)

    fig,ax = plt.subplots()
    ax.plot(t)

    cv.namedWindow('Image',cv.WINDOW_AUTOSIZE)
    cv.imshow('Image', f)
    cv.waitKey(0)
    cv.imshow("Image", g)
    cv.waitKey(0)
    cv.destroyAllWindows()
```





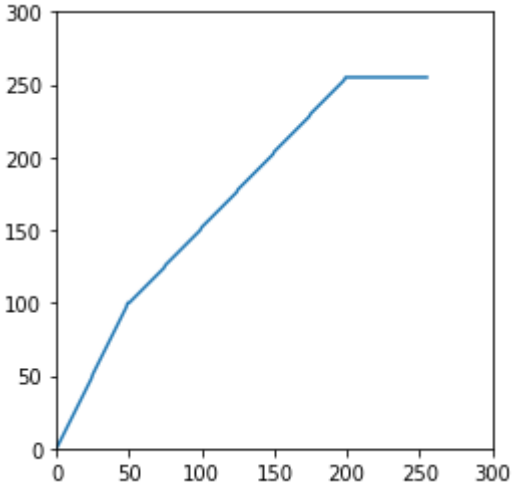




2)

In [ ]:
```
%matplotlib inline
import numpy as np
import cv2 as cv
import matplotlib.pyplot as plt

f=cv.imread(r'C:\Python39\cv\exercices\lec 2\spider.png', cv.IMREAD_GRAYSCALE)
assert f is not None

t1 = np.linspace(0,100,50)
t2 = np.linspace(100,255,150)
t3= np.linspace(255,255,56)

t=np.concatenate((t1,t2,t3), axis=0).astype(np.uint8)
fig, ax = plt.subplots()
```

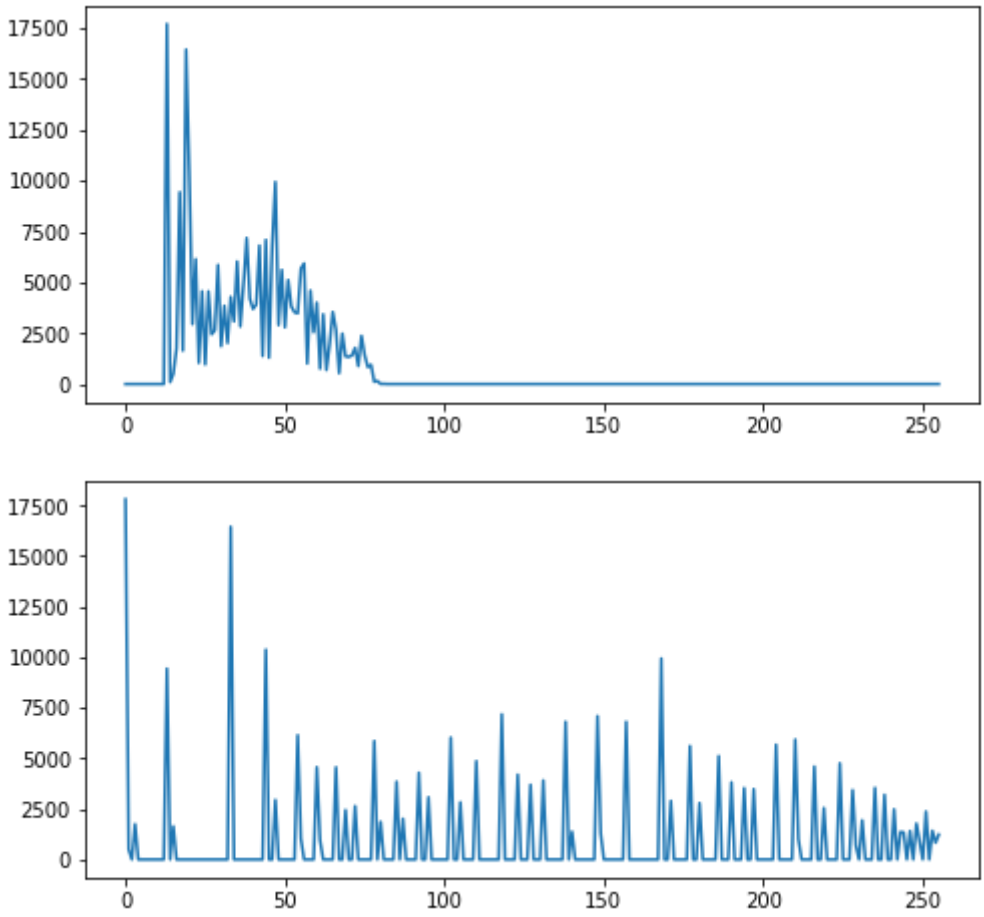
```
ax.plot(t)
ax.set_aspect('equal')
ax.set_xlim(0,300)
ax.set_ylim(0,300)
assert len(t)== 256
g = cv.LUT(f,t)

cv.namedWindow('Image',cv.WINDOW_AUTOSIZE)
cv.imshow('Image', f)
cv.waitKey(0)
cv.imshow('Image', g)
cv.waitKey(0)
cv.destroyAllWindows()
```



3)

In [ ]:

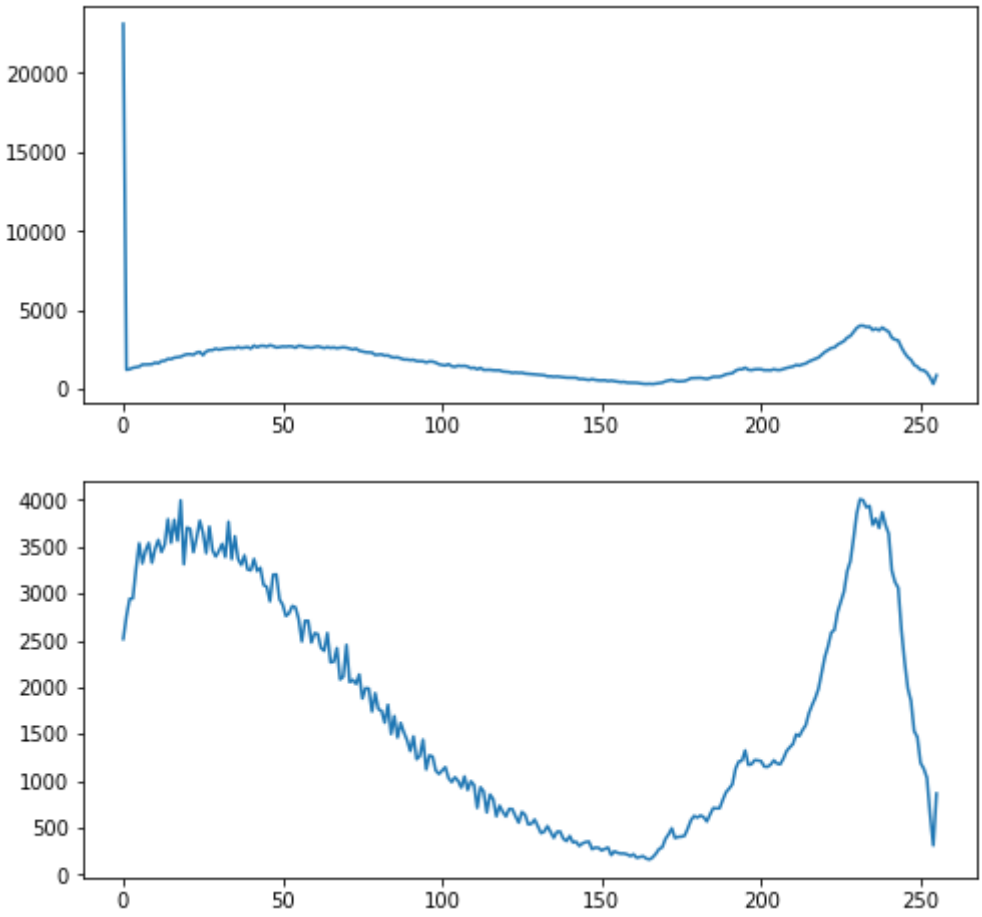
```
%matplotlib inline
import numpy as np
import cv2 as cv
import matplotlib.pyplot as plt

f=cv.imread(r'C:\Python39\cv\exercices\lec 2\shells.tif', cv.IMREAD_GRAYSCALE)
assert f is not None

hist_f = cv.calcHist([f],[0],None,[256],[0,256])
g = cv.equalizeHist(f)
hist_g = cv.calcHist([g],[0],None, [256],[0,256])
fig, ax = plt.subplots(2,1, figsize=(8,8))
ax[0].plot(hist_f)
ax[1].plot(hist_g)

cv.namedWindow('Image',cv.WINDOW_AUTOSIZE)
cv.imshow('Image', f)
cv.waitKey(0)
cv.imshow('Image', g)
cv.waitKey(0)
cv.destroyAllWindows()
```



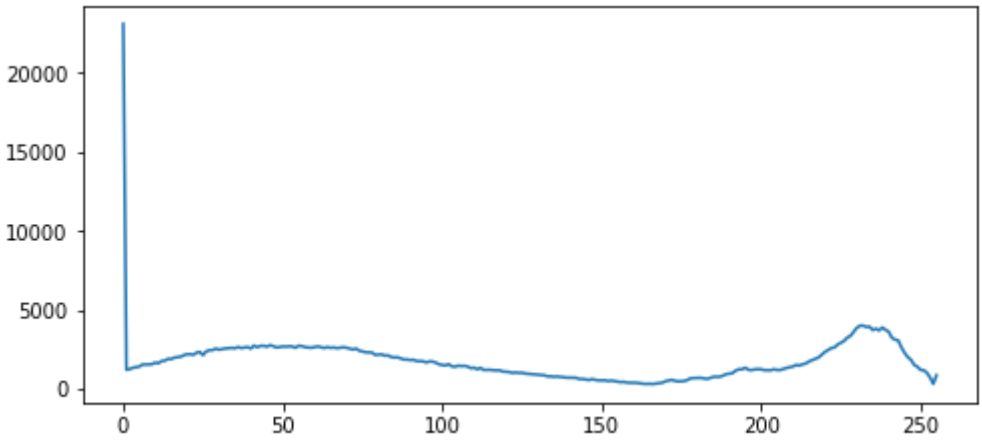
4)

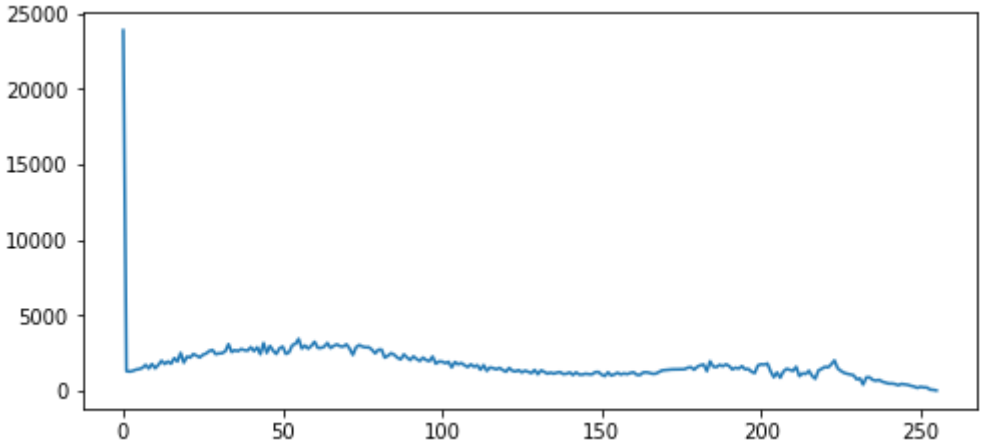
In [ ]:

```
%matplotlib inline
import numpy as np
import cv2 as cv
import matplotlib.pyplot as plt

f=cv.imread(r'C:\Python39\cv\exercices\lec 2\zion_pass.jpg')
assert f is not None

hsv_img = cv.cvtColor(f,cv.COLOR_BGR2HSV).astype("float32")

hsv_img[:,:,1] =hsv_img[:,:,1] * 1.5
sat_img = cv.cvtColor(hsv_img.astype("uint8"),cv.COLOR_HSV2BGR)

hist_f = cv.calcHist([f],[0],None,[256],[0,256])
hist_s = cv.calcHist([sat_img],[0],None, [256],[0,256])
fig, ax = plt.subplots(2,1, figsize=(8,8))
ax[0].plot(hist_f)
ax[1].plot(hist_s)

cv.namedWindow('Image',cv.WINDOW_AUTOSIZE)
cv.imshow('Image', f)
cv.waitKey(0)
cv.imshow('Image', sat_img)
cv.waitKey(0)
cv.destroyAllWindows()
```



In [ ]:
```
%matplotlib inline
import numpy as np
import cv2 as cv
import matplotlib.pyplot as plt

f=cv.imread(r'C:\Python39\cv\exercices\lec 2\zion_pass.jpg')
assert f is not None

hsv_img = cv.cvtColor(f,cv.COLOR_BGR2HSV).astype("float32")

hsv_img[:,:,0] =hsv_img[:,:,0] * 0.4
sat_img = cv.cvtColor(hsv_img.astype("uint8"),cv.COLOR_HSV2BGR)

hist_f = cv.calcHist([f],[0],None,[256],[0,256])
hist_s = cv.calcHist([sat_img],[0],None, [256],[0,256])
fig, ax = plt.subplots(2,1, figsize=(8,8))
ax[0].plot(hist_f)
ax[1].plot(hist_s)

cv.namedWindow('Image',cv.WINDOW_AUTOSIZE)
cv.imshow('Image', f)
cv.waitKey(0)
cv.imshow('Image', sat_img)
cv.waitKey(0)
cv.destroyAllWindows()
```


20000
15000
10000
5000
0
0
50
100
150
200
250


25000
20000
15000
10000
5000
0
0
50
100
150
200
250

In [ ]: