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In []:

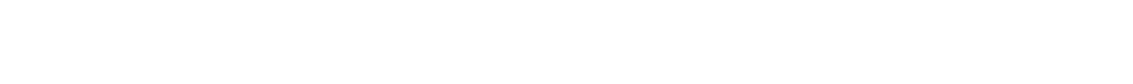
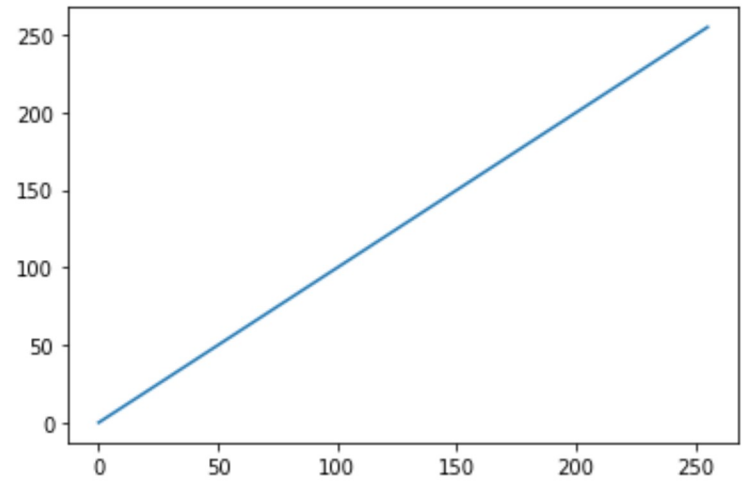
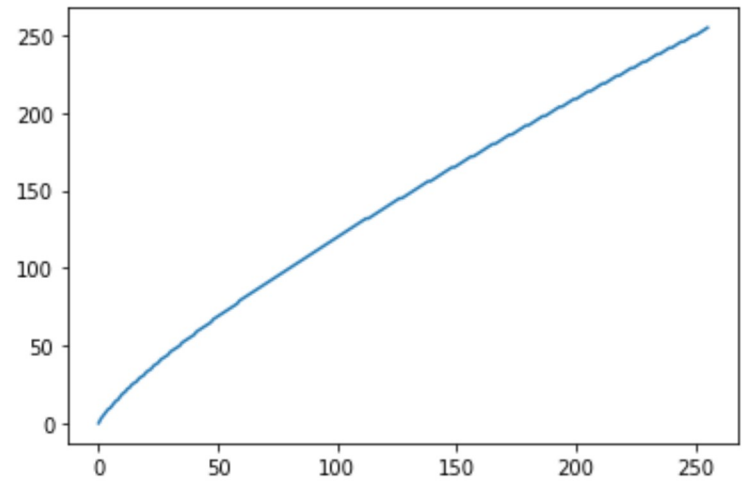
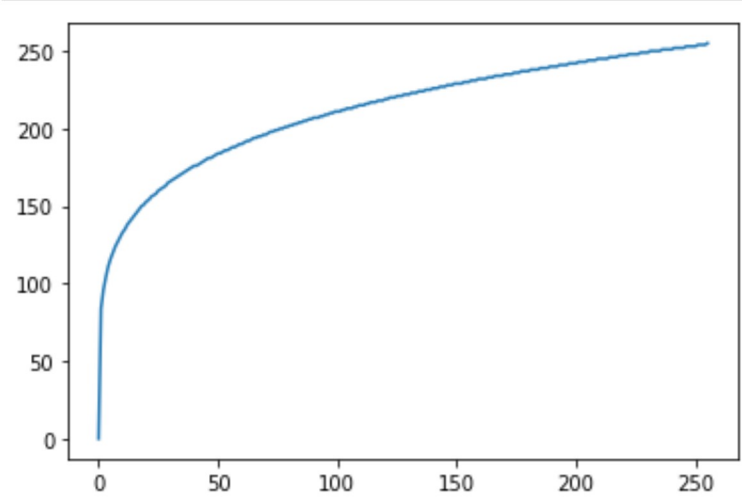
```
import numpy as np
import cv2 as cv
import matplotlib.pyplot as plt
%matplotlib inline

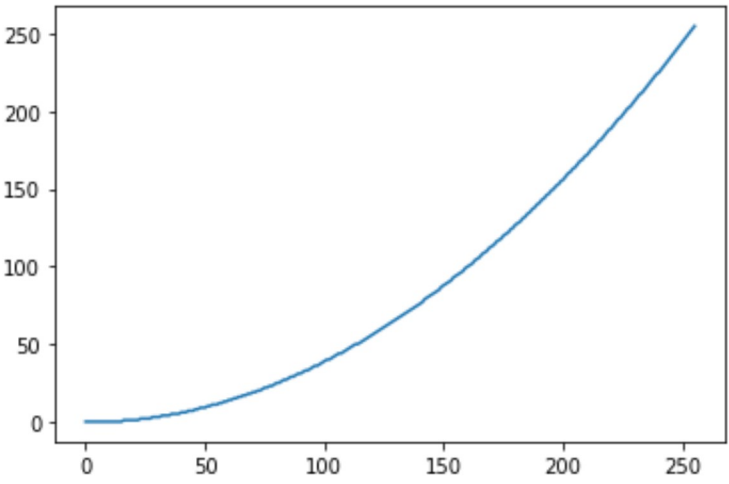
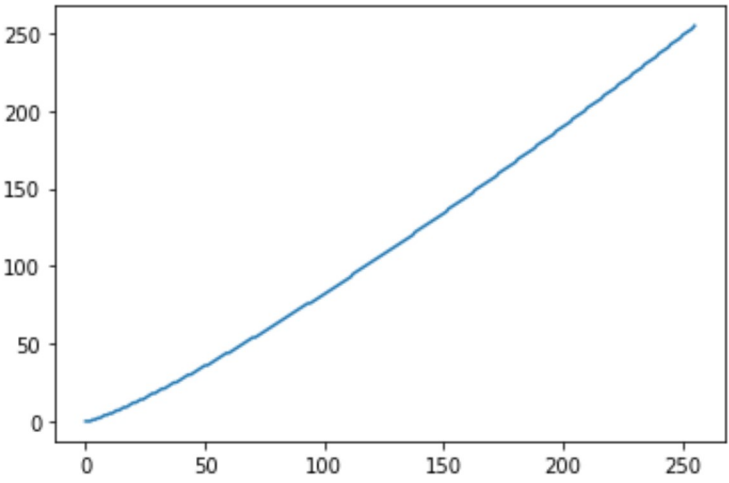
f = cv.imread(r"C:/Users/User/Downloads/Documents/ACA/Sem 4/EN2550 Machine Vision/Homeworks/HW2/spider.png", cv.IMREAD_GRAYSCALE)
assert f is not None

gamma = [0.2, 0.8, 1, 1.2, 2]
for i in range(len(gamma)):
    t = np.array([(p/255)**gamma[i]*255 for p in range(0,256)]).astype(np.uint8)
    g = cv.LUT(f, t)

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

    fig, ax = plt.subplots(figsize=(10,10))
    combined_images = np.hstack((f, g))
    plt.axis('off')
    plt.imshow(combined_images , cmap='gray')
```



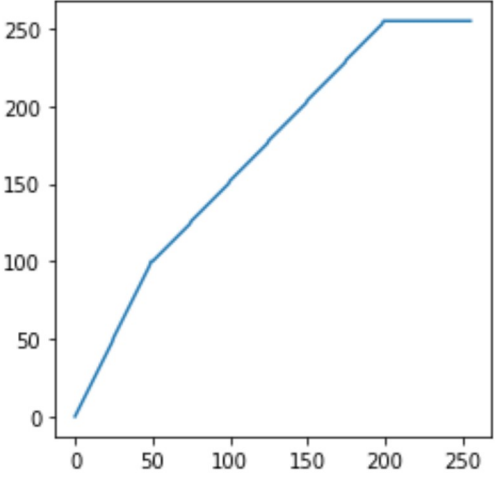


```
In [ ]: f = cv.imread(r"C:/Users/User/Downloads/Documents/ACA/Sem 4/EN2550 Machine Vision/Homeworks/HW2/spider.png", cv.IMREAD_GRAYSCALE)
assert f is not None

t1 = np.linspace(0,100,50)
t2 = np.linspace(100, 255, 150)
t3 = 255*np.ones(56)
t = np.concatenate((t1, t2, t3), axis=0).astype(np.uint8)
fig, ax = plt.subplots()
ax.plot(t)
ax.set_aspect('equal')
assert len(t) == 256
g = cv.LUT(f, t)

fig, ax = plt.subplots(figsize=(10,10))
combined_images = np.hstack((f, g))
plt.axis('off')
plt.imshow(combined_images , cmap='gray')
```

Out[]: <matplotlib.image.AxesImage at 0x234151b3880>





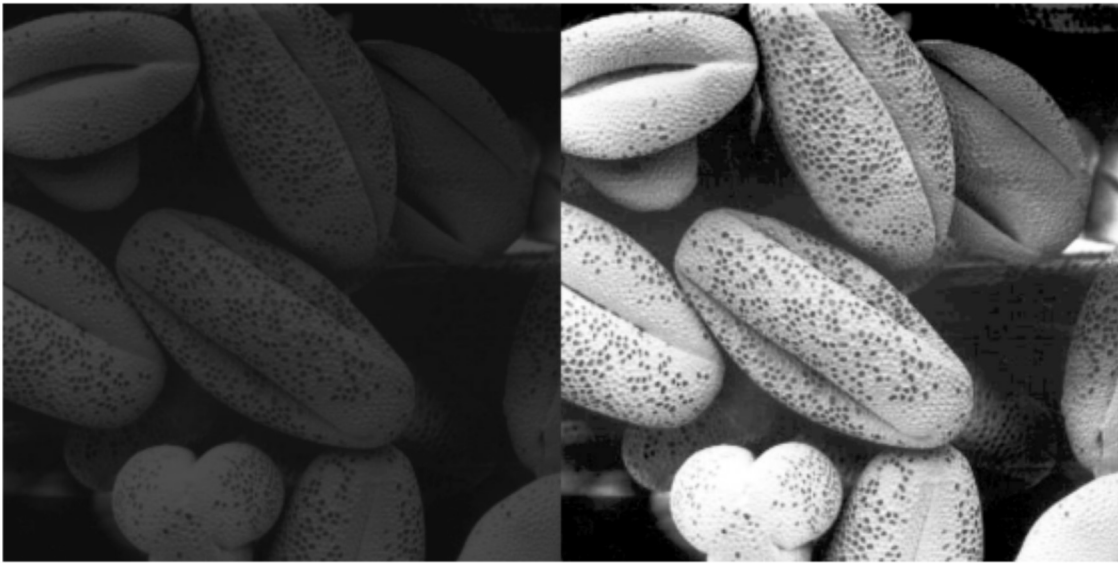
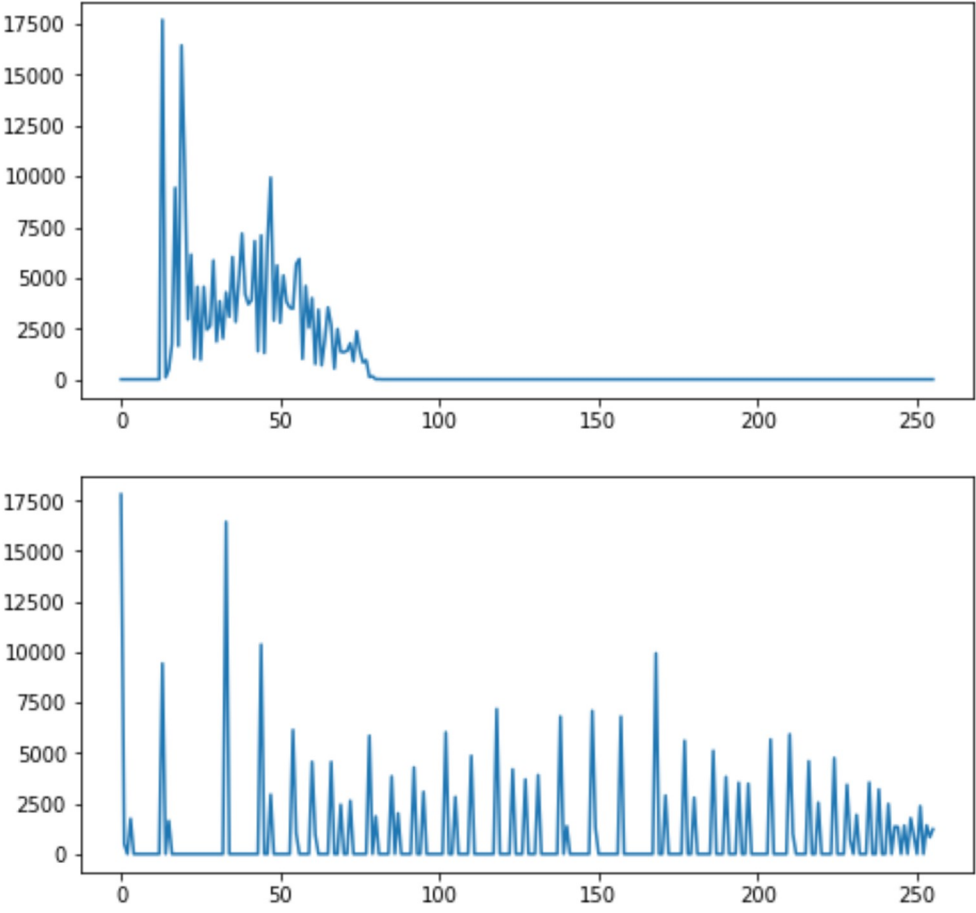
```
In [ ]: f = cv.imread(r'C:/Users/User/Downloads/Documents/ACA/Sem 4/EN2550 Machine Vision/Homeworks/HW2/shells.tif', cv . IMREAD_GRAYSCALE)
assert f is not None

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)

fig, ax = plt.subplots(figsize=(10,10))
combined_images = np.hstack((f, g))
plt.axis('off')
plt.imshow(combined_images , cmap='gray')
```

Out[]: <matplotlib.image.AxesImage at 0x23415272eb0>



```
In [ ]: img = cv.imread(r'C:/Users/User/Downloads/Documents/ACA/Sem 4/EN2550 Machine Vision/Homeworks/HW2/zion_pass.jpg')
assert img is not None

img1 = cv.cvtColor(img, cv.COLOR_BGR2RGB).astype("uint8")
img_hsv = cv.cvtColor(img, cv.COLOR_BGR2HSV).astype("float32")

(h, s, v) = cv.split(img_hsv)
s = cv.add(s, 56)
img_hsv = cv.merge([h,s,v])

#img_rgb = cv.cvtColor(img_hsv.astype("uint8"), cv.COLOR_HSV2BGR)
img2 = cv.cvtColor(img_hsv.astype("uint8"), cv.COLOR_HSV2RGB)

fig, ax = plt.subplots(figsize=(15,15))
combined_images = np.hstack((img1, img2))
plt.axis('off')
plt.imshow(combined_images)
```


Out[]: <matplotlib.image.AxesImage at 0x23415248bb0>



```
In [ ]: img = cv.imread(r'C:/Users/User/Downloads/Documents/ACA/Sem 4/EN2550 Machine Vision/Homeworks/HW2/zion_pass.jpg')
assert img is not None

img1 = cv.cvtColor(img, cv.COLOR_BGR2RGB).astype("uint8")

imgHSV = cv.cvtColor(img, cv.COLOR_BGR2HSV).astype("float32")
(h, s, v) = cv.split(imgHSV)
h = cv.add(s, 56)
imgHSV = cv.merge([h,s,v])

img2 = cv.cvtColor(imgHSV.astype("uint8"), cv.COLOR_HSV2RGB)

fig, ax = plt.subplots(figsize=(15,15))
combined_images = np.hstack((img1, img2))
plt.axis('off')
plt.imshow(combined_images)
```

Out[]: <matplotlib.image.AxesImage at 0x2341538c4c0>

