EN2550 Excercise 02

Index No. : 190018V

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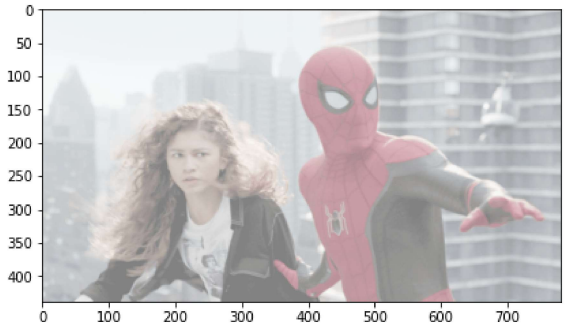
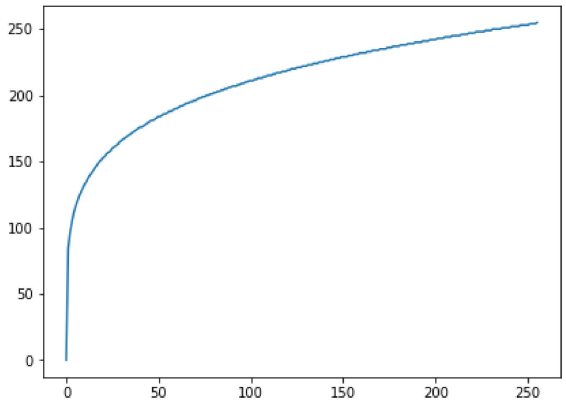
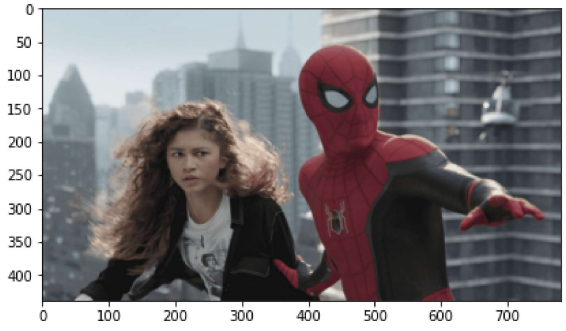
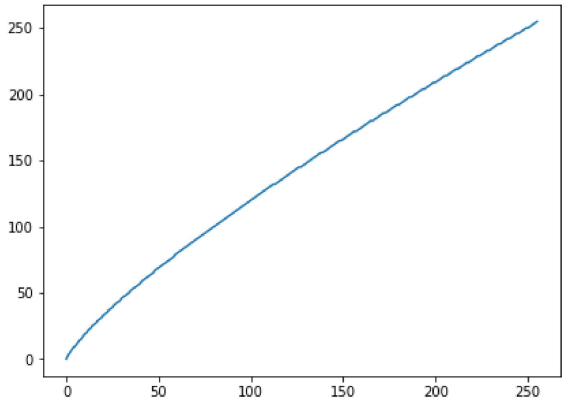
In [ ]:
```
# imports
import numpy as np
import cv2 as cv
import matplotlib.pyplot as plt
```

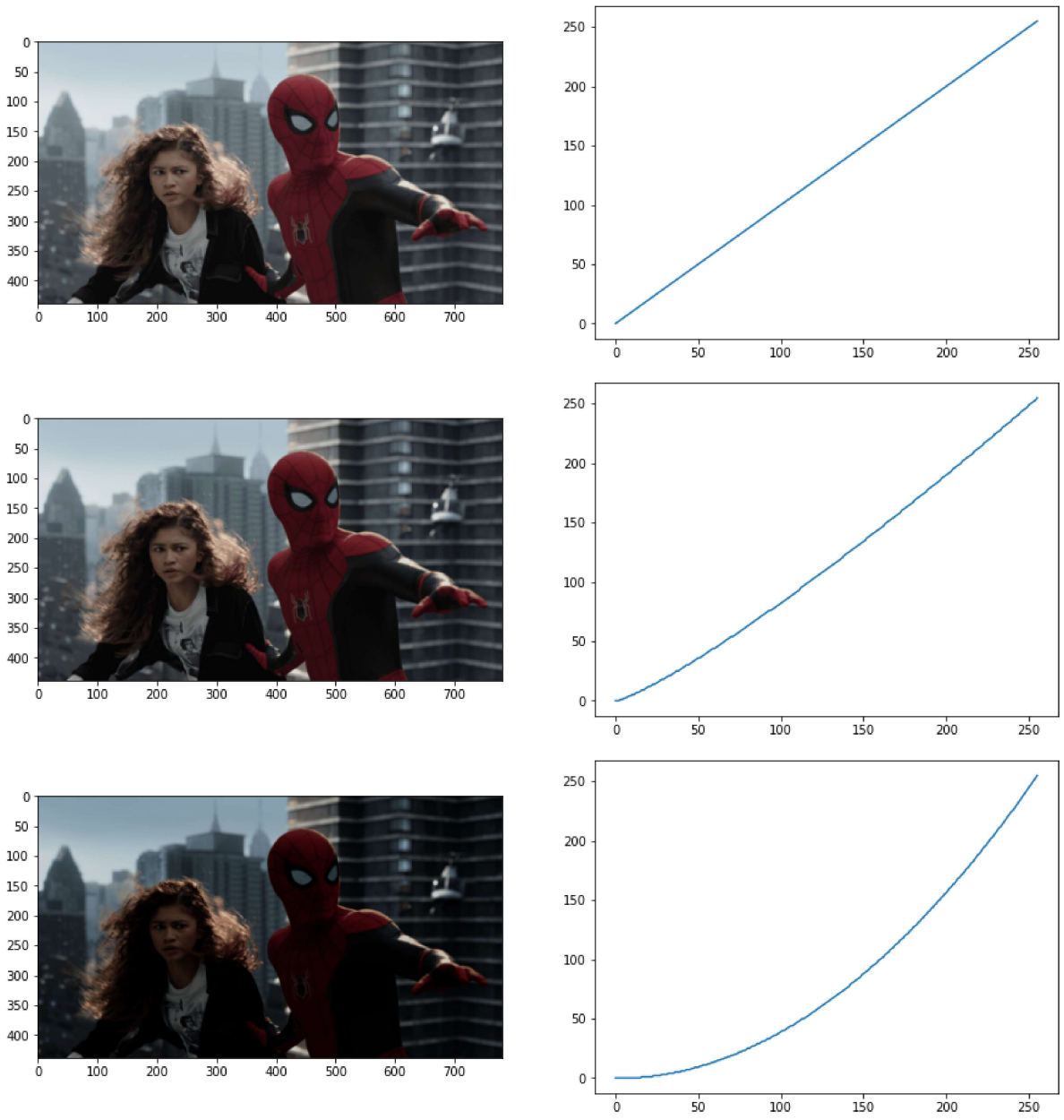
In [ ]:
```
# 1

f=cv.imread('spider.png')
assert f is not None

for gamma in  [0.2,0.8,1,1.2,2]:
    t=np.array([(p/255)**gamma*255 for p in range(0,256)]).astype(np.uint8)
    g=cv.cvtColor(cv.LUT(f,t),cv.COLOR_BGR2RGB)

    fig,ax=plt.subplots(1,2,figsize=(15,5))

    ax[0].imshow(g)
    ax[1].plot(t)
```





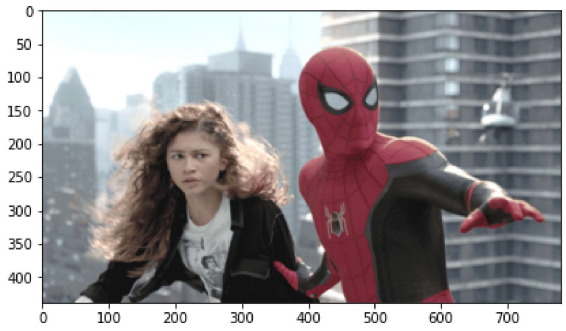


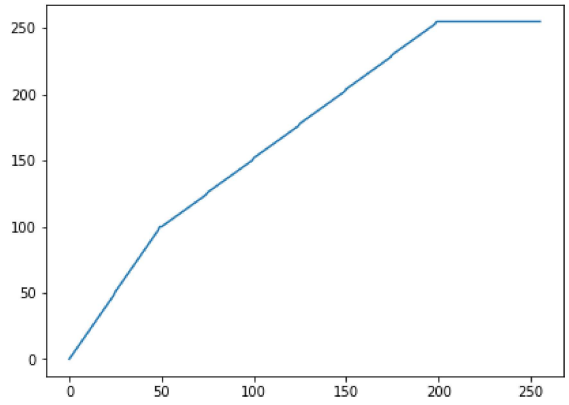




In [ ]:
```
# 2

f=cv.imread('spider.png')
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)

g=cv.cvtColor(cv.LUT(f,t),cv.COLOR_BGR2RGB)

fig,ax=plt.subplots(1,2,figsize=(15,5))

ax[0].imshow(g)
ax[1].plot(t)
```

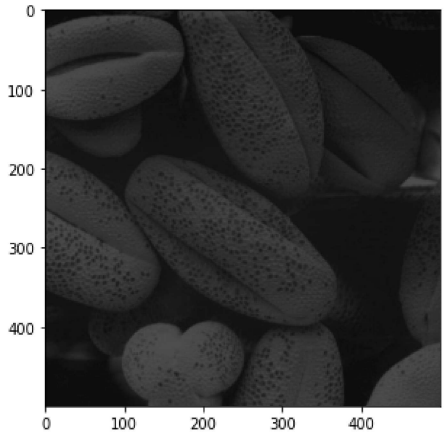
Out[ ]:
```
[<matplotlib.lines.Line2D at 0x20d00d48ac0>]
```

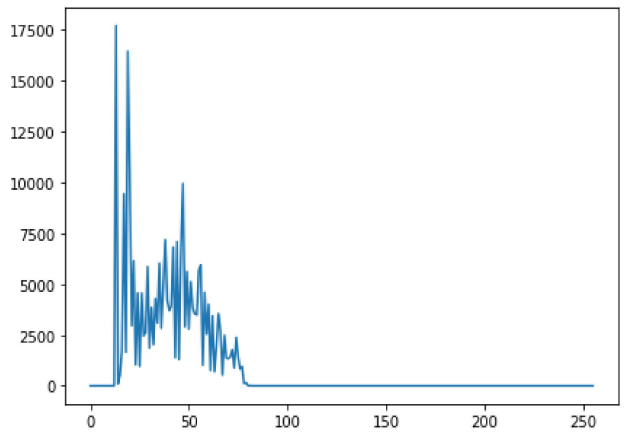


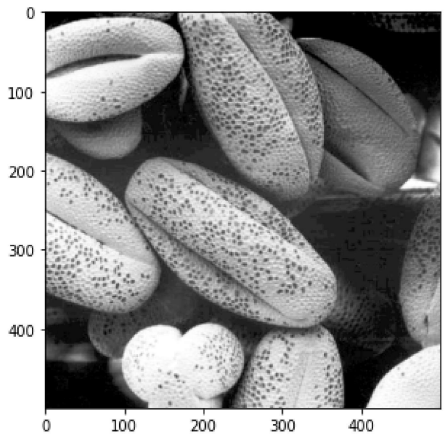


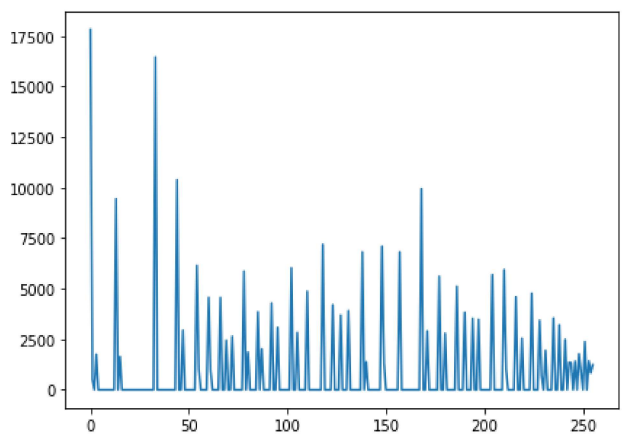
In [ ]:
```
# 3

img_org=cv.imread('shells.tif',cv.IMREAD_GRAYSCALE)
assert img_org is not None

hist_org=cv.calcHist([img_org],[0],None,[256],[0,256])

fig,ax=plt.subplots(1,2,figsize=(15,5))

ax[0].imshow(img_org,cmap='gray', vmin=0, vmax=255)
ax[1].plot(hist_org)

img_equ=cv.equalizeHist(img_org)

hist_equ=cv.calcHist([img_equ],[0],None,[256],[0,256])

fig,ax=plt.subplots(1,2,figsize=(15,5))

ax[0].imshow(img_equ,cmap='gray', vmin=0, vmax=255)
ax[1].plot(hist_equ)
```

Out[ ]:
```
[<matplotlib.lines.Line2D at 0x20d00e29b10>]
```



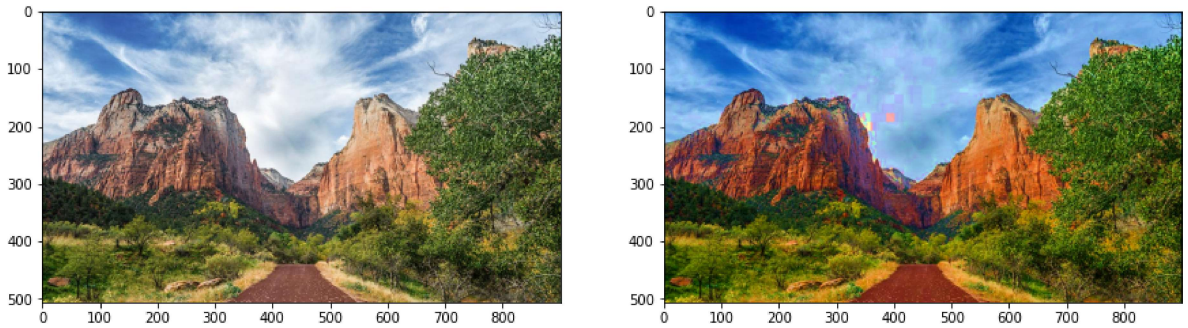






In [ ]:
```
# 4 (a)

img_org=cv.imread('zion_pass.jpg')
assert img_org is not None

img_hsv=cv.cvtColor(img_org,cv.COLOR_BGR2HSV)

img_sat=np.clip(img_hsv+[0,80,0],[0,0,0],[255,255,255]).astype(np.uint8)
fig,ax=plt.subplots(1,2,figsize=(15,5))
ax[0].imshow(cv.cvtColor(img_org,cv.COLOR_BGR2RGB))
ax[1].imshow(cv.cvtColor(img_sat,cv.COLOR_HSV2RGB))
```

Out[ ]:
```
<matplotlib.image.AxesImage at 0x20d05f13be0>
```



In [ ]:
```
# 4 (b)

img_hue=np.clip(img_hsv+[30,0,0],[0,0,0],[255,255,255]).astype(np.uint8)
fig,ax=plt.subplots(1,2,figsize=(15,5))
ax[0].imshow(cv.cvtColor(img_org,cv.COLOR_BGR2RGB))
ax[1].imshow(cv.cvtColor(img_hue,cv.COLOR_HSV2RGB))
```

Out[ ]:
```
<matplotlib.image.AxesImage at 0x20d064caa40>
```