Name - Rukmal.M.A.D Index No -190531L

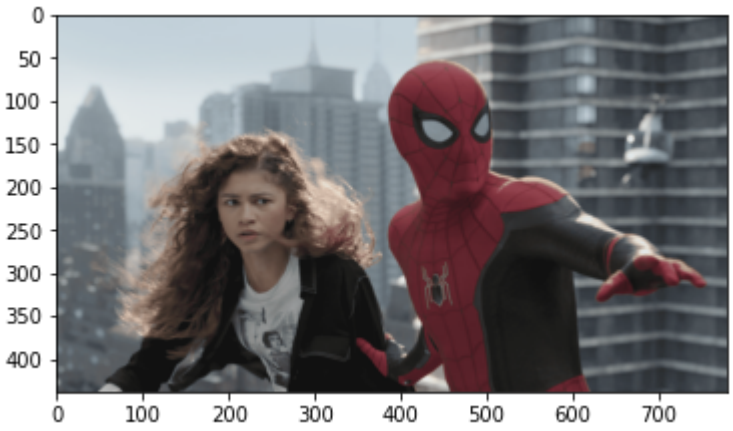
In [1]:
```
%matplotlib inline
import numpy as np
import cv2 as cv
import matplotlib.pyplot as plt
```

Gamma = 0.2

In [2]:
```
img = cv.imread(r'D:\Image processing module\Lecture 2\spider.png',cv.IMREAD_COLOR)
assert img is not None

gamma =0.2

transform = np.array([(i/255.0)**(gamma)*255.0 for i in np.arange(0,256)],dtype = np.u
t_img = cv.LUT(img,transform)

img_plt = cv.cvtColor(t_img,cv.COLOR_BGR2RGB)
fig,ax = plt.subplots()
ax.imshow(img_plt)
plt.show()
```

Gamma = 0.8

In [3]:
```
img = cv.imread(r'D:\Image processing module\Lecture 2\spider.png',cv.IMREAD_COLOR)
assert img is not None

gamma =0.8

transform = np.array([(i/255.0)**(gamma)*255.0 for i in np.arange(0,256)],dtype = np.u
t_img = cv.LUT(img,transform)

img_plt = cv.cvtColor(t_img,cv.COLOR_BGR2RGB)
fig,ax = plt.subplots()
ax.imshow(img_plt)
plt.show()
```

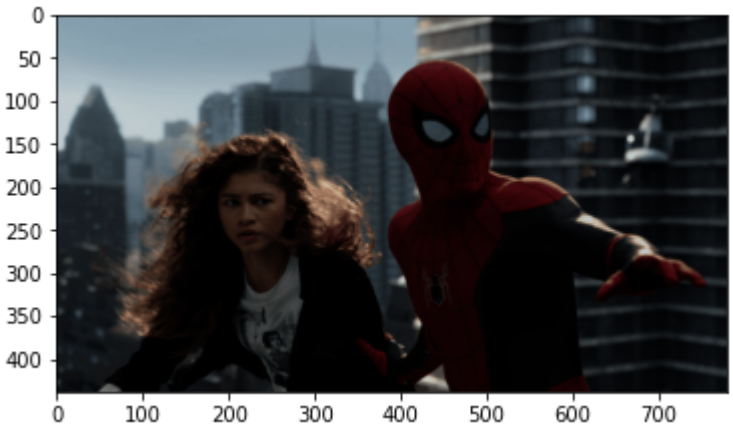


Gamma = 1.2

In [4]:
```
img = cv.imread(r'D:\Image processing module\Lecture 2\spider.png',cv.IMREAD_COLOR)
assert img is not None

gamma =1.2

transform = np.array([(i/255.0)**(gamma)*255.0 for i in np.arange(0,256)],dtype = np.u
t_img = cv.LUT(img,transform)

img_plt = cv.cvtColor(t_img,cv.COLOR_BGR2RGB)
fig,ax = plt.subplots()
ax.imshow(img_plt)
plt.show()
```

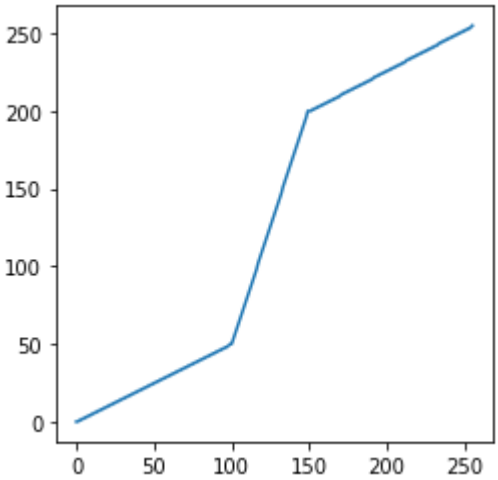
Gamma = 2

In [5]:
```
img = cv.imread(r'D:\Image processing module\Lecture 2\spider.png',cv.IMREAD_COLOR)
assert img is not None

gamma =2

transform = np.array([(i/255.0)**(gamma)*255.0 for i in np.arange(0,256)],dtype = np.u
t_img = cv.LUT(img,transform)

img_plt = cv.cvtColor(t_img,cv.COLOR_BGR2RGB)
fig,ax = plt.subplots()
ax.imshow(img_plt)
plt.show()
```



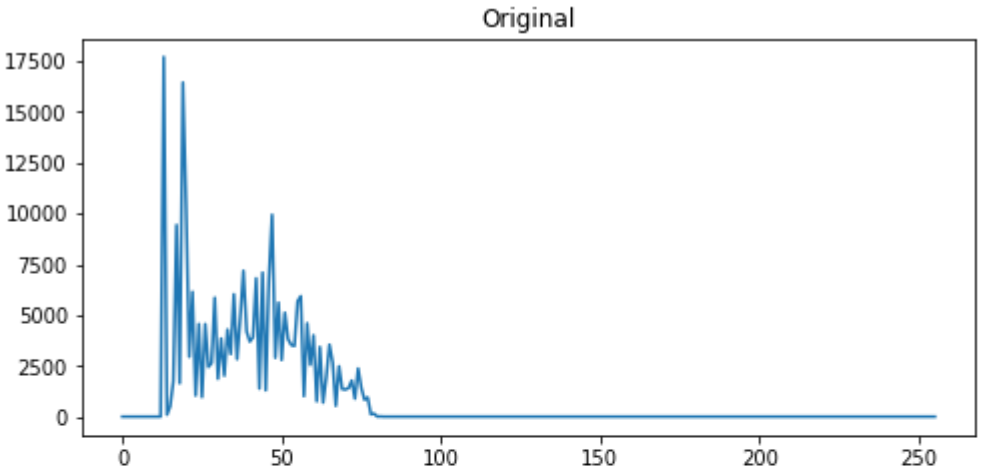
Question 2

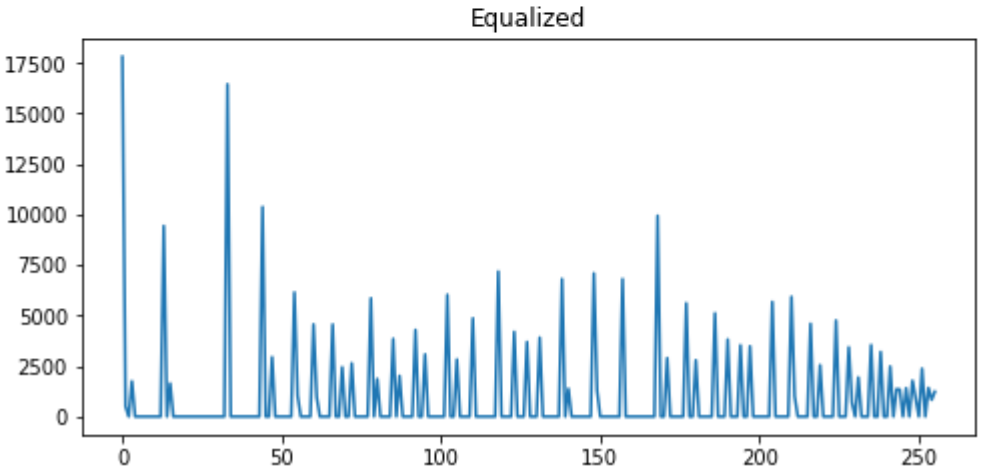
In [6]:
```
img = cv.imread(r'D:\Image processing module\Lecture 2\spider.png',cv.IMREAD_COLOR)
assert img is not None


t1 = np.linspace(0,50,100)
t2 = np.linspace(50,200,50)
t3 = np.linspace(200,255,106)

t = np.concatenate((t1,t2,t3),axis= 0).astype(np.uint8)
fig,ax = plt.subplots()
plt.plot(t)
ax.set_aspect('equal')
assert len(t) == 256

t_img = cv.LUT(img,t)

img_plt = cv.cvtColor(t_img,cv.COLOR_BGR2RGB)
fig,ax = plt.subplots()
ax.imshow(img_plt)
plt.show()
```

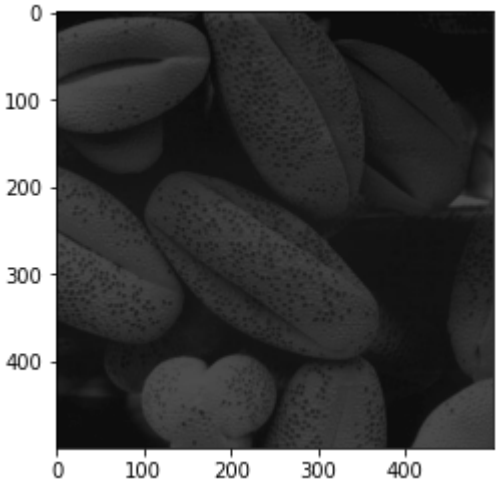


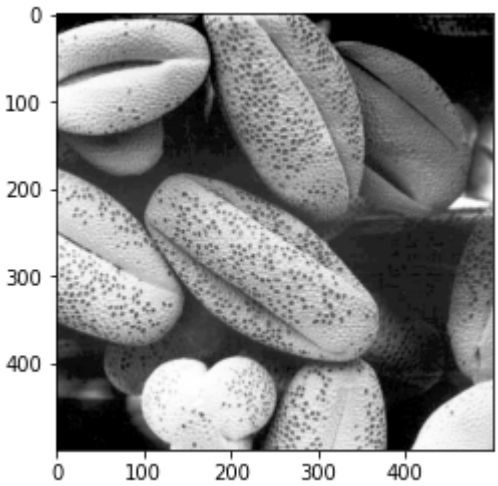
Question (3)

In [7]:
```
img = cv.imread(r'D:\Image processing module\Lecture 2\shells.tif',cv.IMREAD_GRAYSCALE
assert img is not None

hist_img = cv.calcHist([img],[0],None,[256],[0,256])
E_img = cv.equalizeHist(img)
E_hist_img = cv.calcHist([E_img],[0],None,[256],[0,256])
fig,ax = plt.subplots(2,1,figsize=(8,8))

ax[0].title.set_text("Original")
ax[1].title.set_text("Equalized")
ax[0].plot(hist_img)
ax[1].plot(E_hist_img)

img_o = cv.cvtColor(img,cv.COLOR_BGR2RGB)
fig,ax = plt.subplots()
ax.imshow(img_o)
plt.show()


E_img_plt = cv.cvtColor(E_img,cv.COLOR_BGR2RGB)
fig,ax = plt.subplots()
ax.imshow(E_img_plt)
plt.show()
```


Original
17500
15000
12500
10000
7500
5000
2500
0
0
50
100
150
200
250


Equalized
17500
15000
12500
10000
7500
5000
2500
0
0
50
100
150
200
250

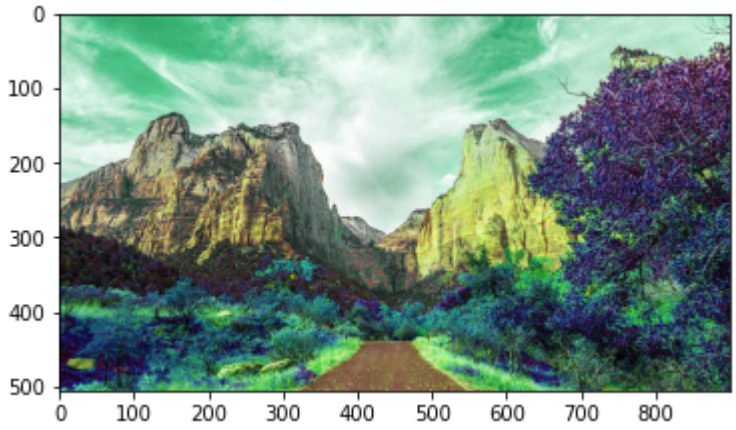

0
100
200
300
400
0
100
200
300
400



In [18]:
```
img = cv.imread(r'D:\Image processing module\Lecture 2\zion_pass.jpg',cv.IMREAD_COLOR)
assert img is not None

imghsv = cv.cvtColor(img,cv.COLOR_BGR2HSV).astype(np.float32)
(h,s,v)  = cv.split(imghsv)
s_new = s*2

s_new = np.clip(s_new,0,255)
imghsv = cv.merge([h,s_new,v])

imgbgr = cv.cvtColor(imghsv.astype(np.uint8),cv.COLOR_HSV2BGR)


img_plt = cv.cvtColor(imgbgr,cv.COLOR_BGR2RGB)
fig,ax = plt.subplots()
ax.imshow(img_plt)
plt.show()
```

In [21]:
```
mg = cv.imread(r'D:\Image processing module\Lecture 2\zion_pass.jpg',cv.IMREAD_COLOR)
assert img is not None

imghsv = cv.cvtColor(img,cv.COLOR_BGR2HSV).astype(np.float32)
(h,s,v)  = cv.split(imghsv)
h_new = h*3

h_new = np.clip(h_new,0,255)
imghsv = cv.merge([h_new,s,v])
```

```
imgbgr = cv.cvtColor(imghsv.astype(np.uint8),cv.COLOR_HSV2BGR)


img_plt = cv.cvtColor(imgbgr,cv.COLOR_BGR2RGB)
fig,ax = plt.subplots()
ax.imshow(img_plt)
plt.show()
```



In [ ]: