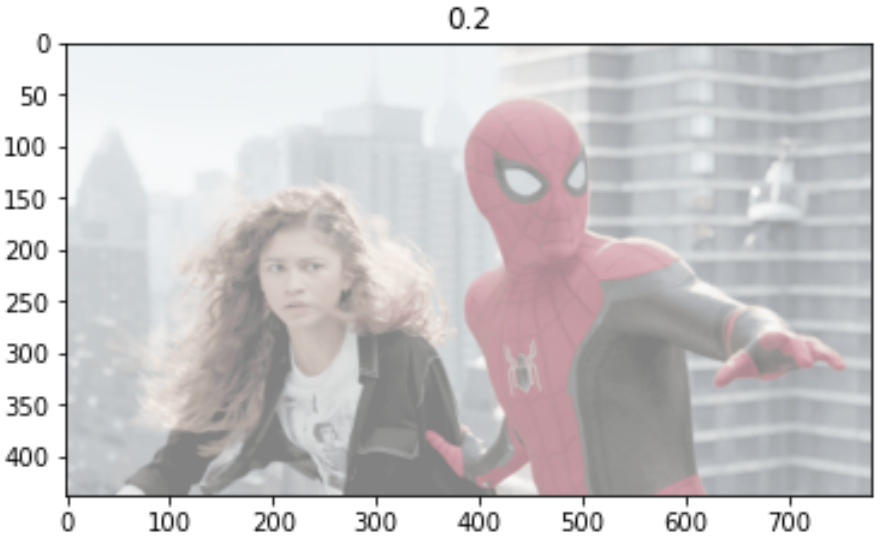
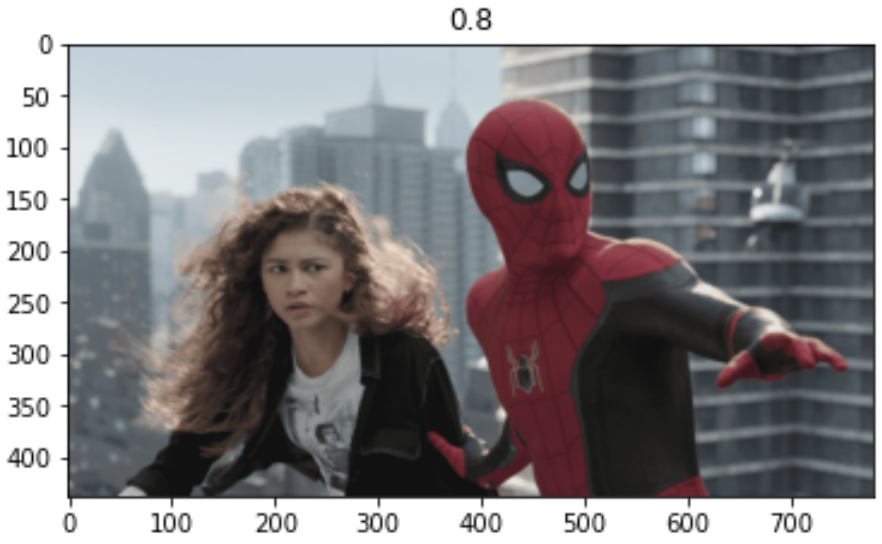
INDEX NUMBER - 190713X NAME - L.H.N.WIJEWARDENA

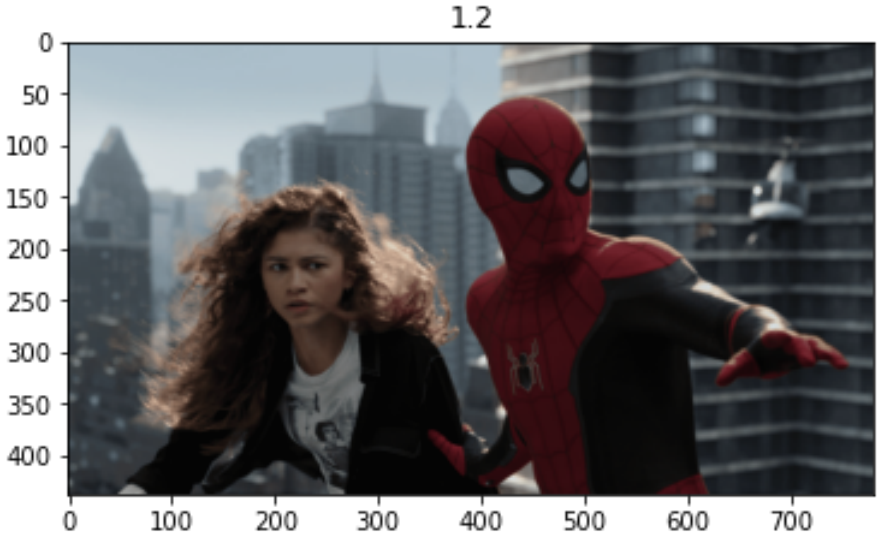
Question 1

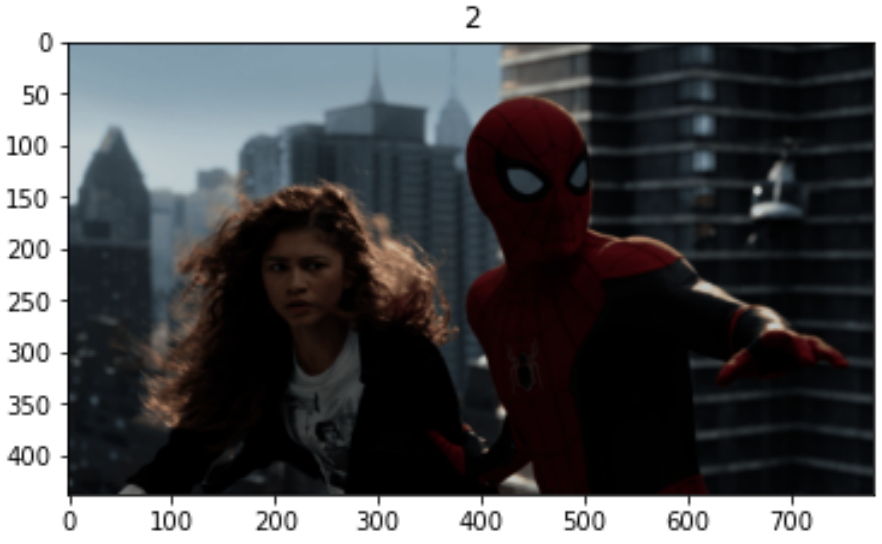
In [ ]:

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

img_old = cv.imread(r"C:\Users\HIRUNI\Desktop\EN2550\spider.png",cv.IM
assert img_old is not None

gamma_list= [0.2,0.8,1.2,2]
for i in gamma_list:
    t = np.array([(p/255)**i*255 for p in range (0,256)]).astype(np.ui
    g = cv.LUT(img_old,t)
    img = cv.cvtColor(g, cv.COLOR_BGR2RGB)
    fig, ax = plt.subplots()
    ax.imshow(img)
    ax.set_title(i)
    plt.show()
```





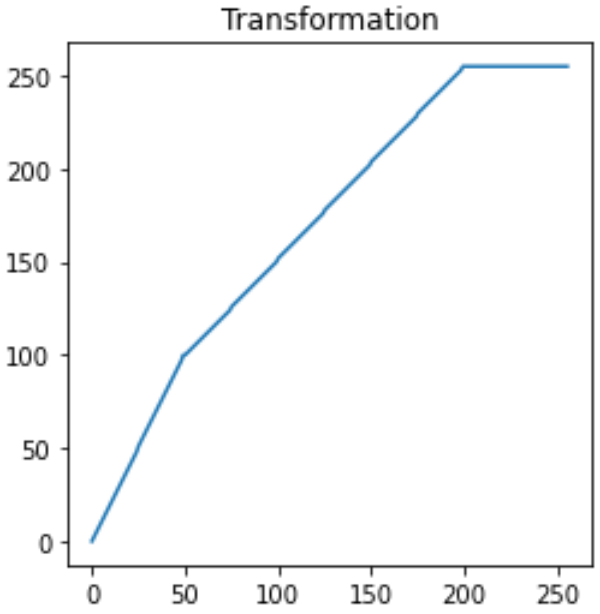



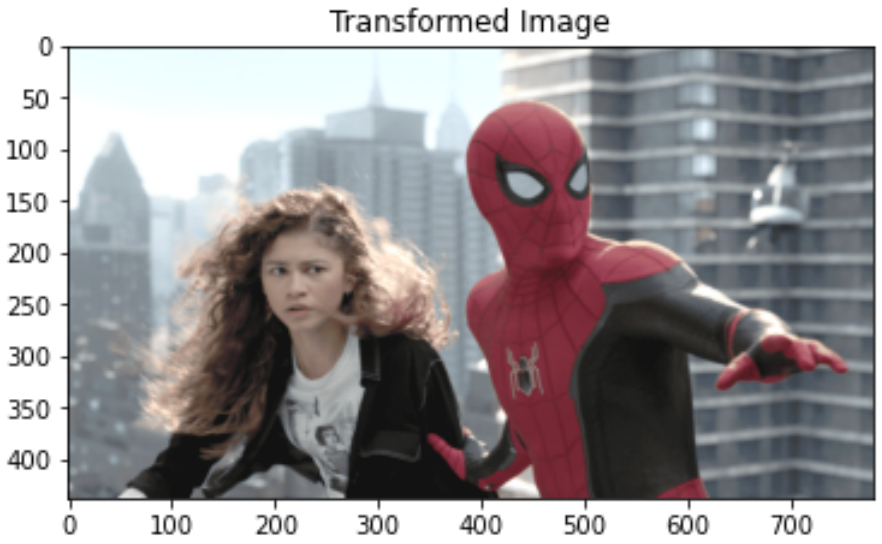

## Question 2

In [ ]:

```
import numpy as np
import cv2 as cv
```

```
import matplotlib.pyplot as plt

old = cv.imread(r"C:\Users\HIRUNI\Desktop\EN2550\spider.png",cv.IMREAD
assert old 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_title("Transformation")
ax.set_aspect('equal')
assert len(t) == 256
g = cv.LUT(old,t)

img = cv.cvtColor(g, cv.COLOR_BGR2RGB)
fig, ax = plt.subplots()
ax.imshow(img)
ax.set_title("Transformed Image")
plt.show()

#show image from opencv
cv.namedWindow('Image',cv.WINDOW_AUTOSIZE)
cv.imshow('Image',g)
cv.waitKey(0)
cv.destroyAllWindows()
```

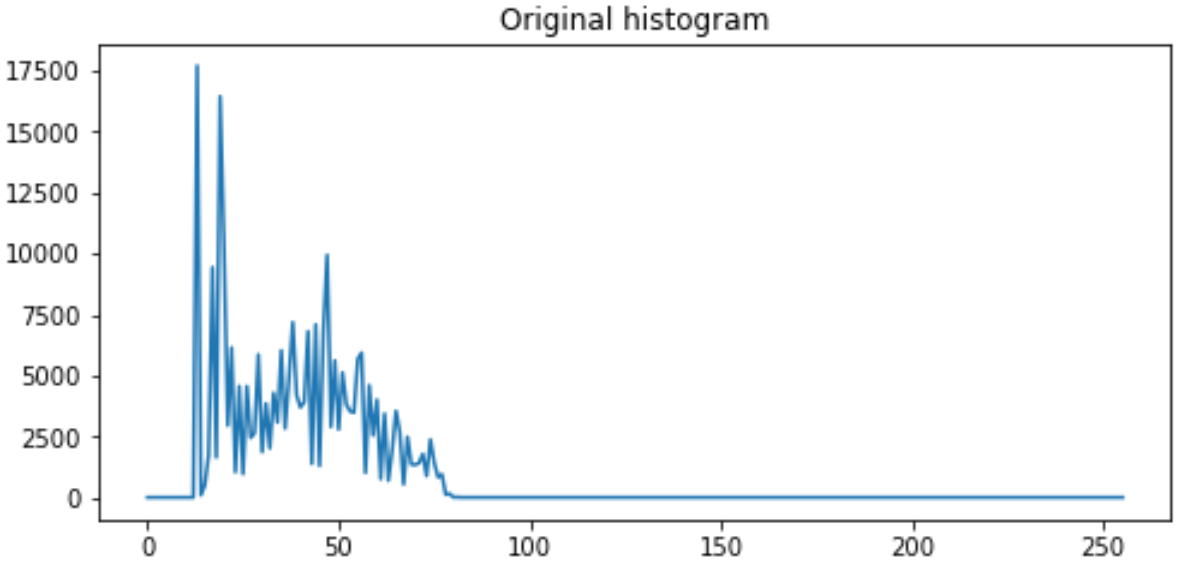


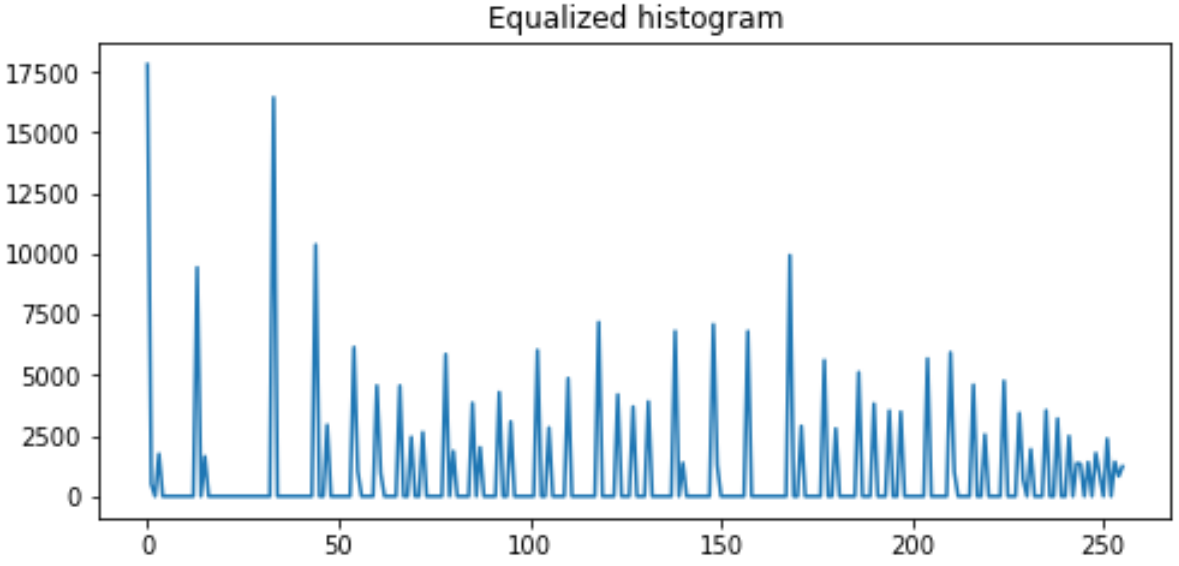


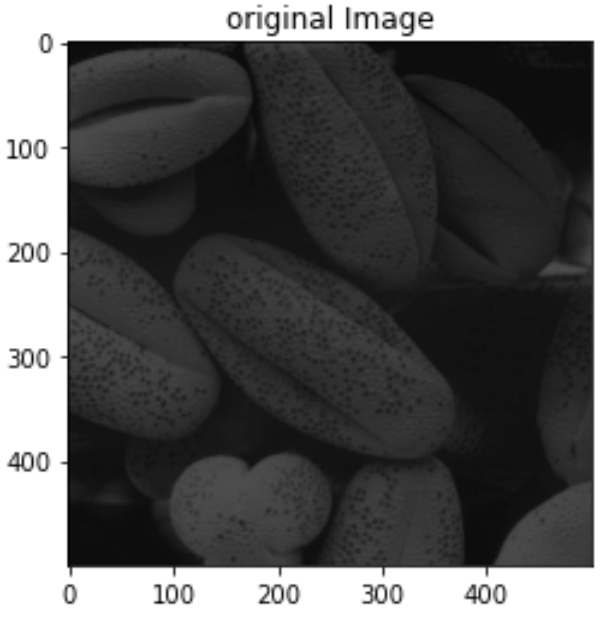

Question 3

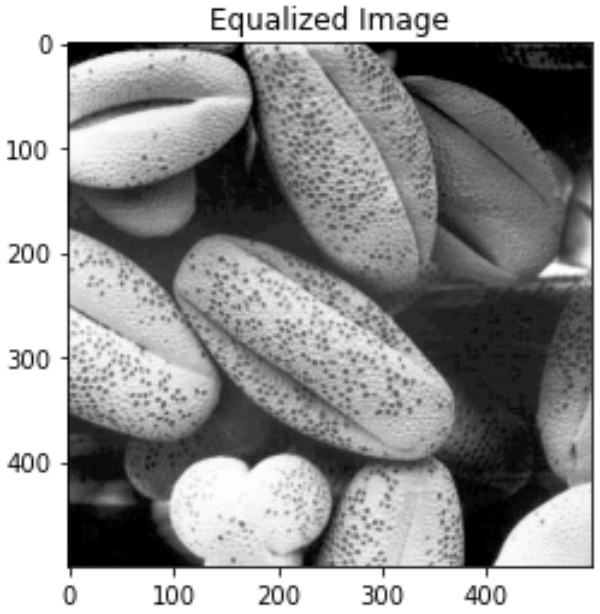
In [ ]:

```
import cv2 as cv
import numpy as np
from matplotlib import pyplot as plt
f = cv . imread ( r"C:\Users\HIRUNI\Desktop\EN2550\shells.tif", cv . I
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[0].set_title("Original histogram")
ax[1].plot(hist_g)
ax[1].set_title("Equalized histogram")

fplot = cv.cvtColor(f, cv.COLOR_BGR2RGB)
fig, ax = plt.subplots()
ax.imshow(fplot)
ax.set_title("original Image")
plt.show()

gplot = cv.cvtColor(g, cv.COLOR_BGR2RGB)
fig, ax = plt.subplots()
ax.imshow(gplot)
ax.set_title("Equalized Image")
plt.show()
```


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


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


original Image
0
100
200
300
400
0
100
200
300
400




Question 4

In [ ]:

```
original = cv.imread(r"C:\Users\HIRUNI\Desktop\EN2550\zion_pass.jpg",
assert old is not None

fig,ax = plt.subplots()
ax.imshow(cv.cvtColor(original, cv.COLOR_BGR2RGB))
plt.title("Original Image")
plt.show()

imghsv = cv.cvtColor(original, cv.COLOR_BGR2HSV).astype("float32")
# Saturating
(h, s, v) = cv.split(imghsv)
s = s*3
s = np.clip(s,0,255)
hsv_sat = cv.merge([h,s,v])
img_sat = cv.cvtColor(hsv_sat.astype("uint8"), cv.COLOR_HSV2BGR)

fig,ax = plt.subplots()
ax.imshow(cv.cvtColor(img_sat, cv.COLOR_BGR2RGB))
plt.title("Saturated Image")
plt.show()

# Hue
h = h*2
h = np.clip(h,0,255)
hsv_hue = cv.merge([h,s,v])
img_hue = cv.cvtColor(hsv_hue.astype("uint8"), cv.COLOR_HSV2BGR)


fig,ax = plt.subplots()
ax.imshow(cv.cvtColor(img_hue, cv.COLOR_BGR2RGB))
```

```
plt.title("Hued Image")
plt.show()
```