Exercise 02

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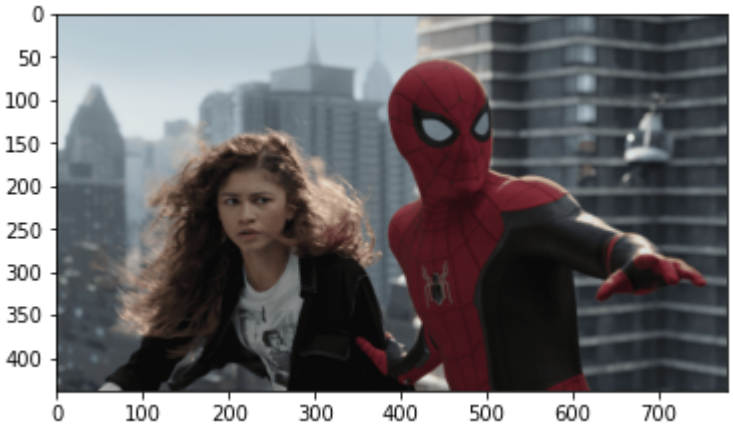
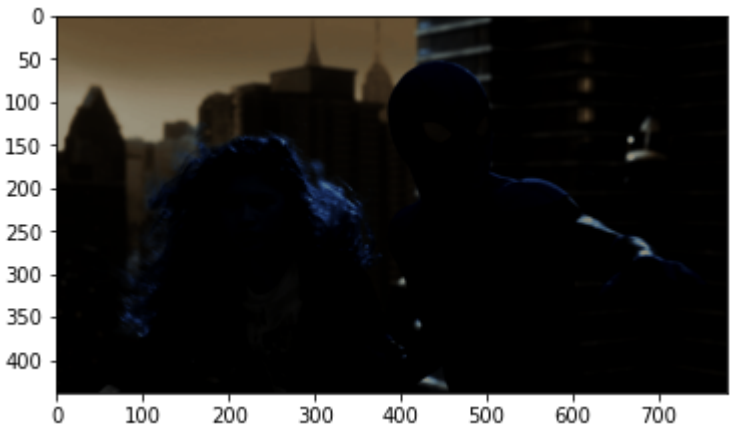
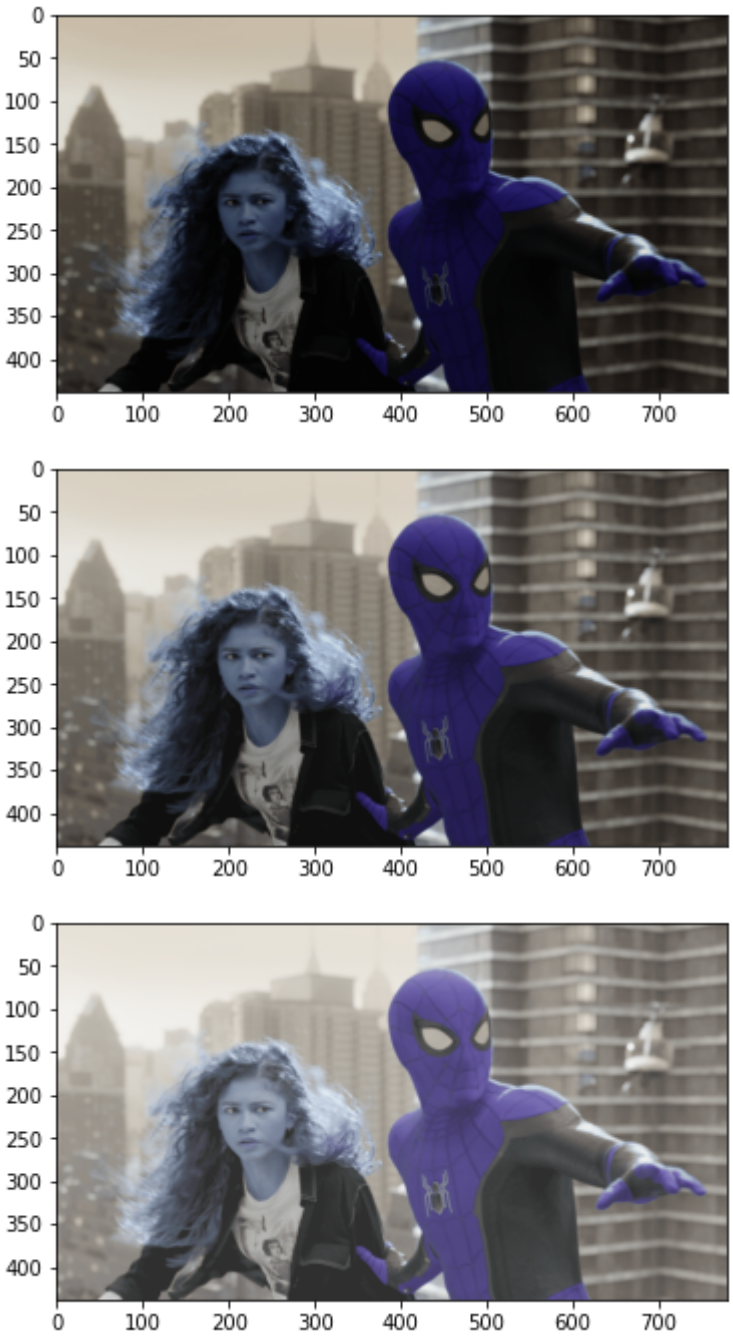
In [ ]:
```
import cv2 as cv
import matplotlib.pyplot as plt
import numpy as np
img_orig = cv.imread(r'spider.png')

img_orig = cv.cvtColor(img_orig, cv.COLOR_BGR2RGB)
f, axarr = plt.subplots()
axarr.imshow(img_orig)

gamma_list = [0.2,0.8,1.2,2]
for gamma in gamma_list:
    table = np.array([(i/255.0)**(1/gamma)*255.0 for i in np.arange(0,256)]).astype('u
    img_gamma = cv.LUT(img_orig, table)

    img_gamma = cv.cvtColor(img_gamma, cv.COLOR_BGR2RGB)
    f, axarr = plt.subplots()

    axarr.imshow(img_gamma)
```



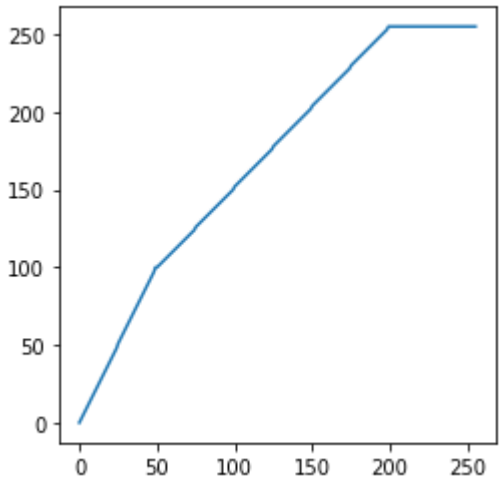


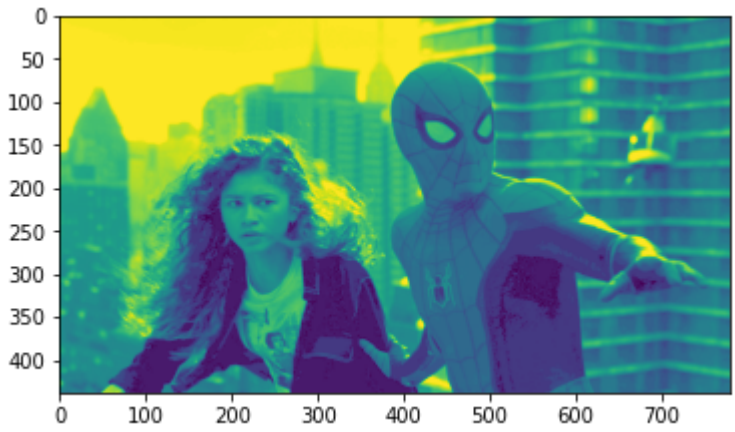


In [ ]:
```
import cv2 as cv
import matplotlib.pyplot as plt
import numpy as np
img_orig = cv.imread('spider.png', cv.IMREAD_GRAYSCALE)


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')
assert len(t)==256
```

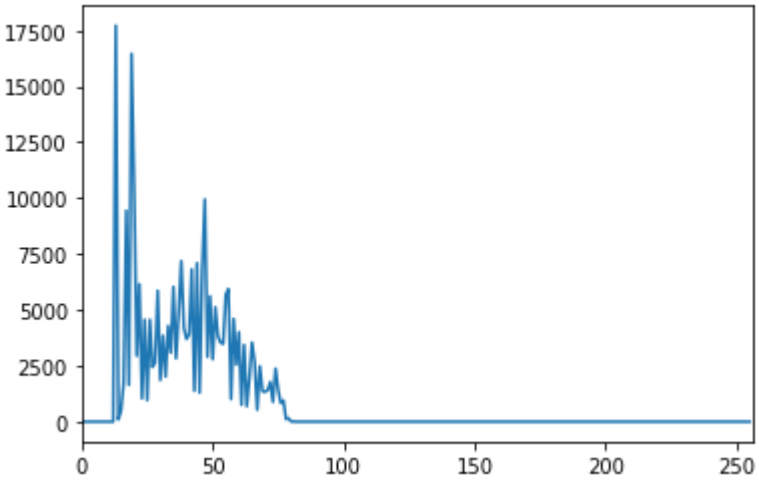
```
transformed = cv.LUT(img_orig,t)



f, axarr = plt.subplots()
axarr.imshow(transformed)
```

Out[ ]:
```
<matplotlib.image.AxesImage at 0x1b991b47f10>
```

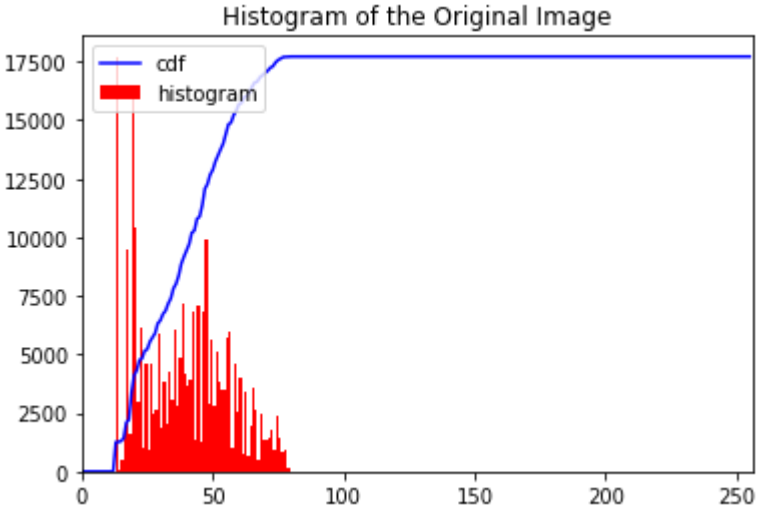




In [ ]:
```
import cv2 as cv
import numpy as np
import matplotlib.pyplot as plt
img = cv.imread('shells.tif', cv.IMREAD_GRAYSCALE)
hist = cv.calcHist([img], [0], None, [256], [0,256])
plt.plot(hist)
plt.xlim([0,256])
plt.show()
```

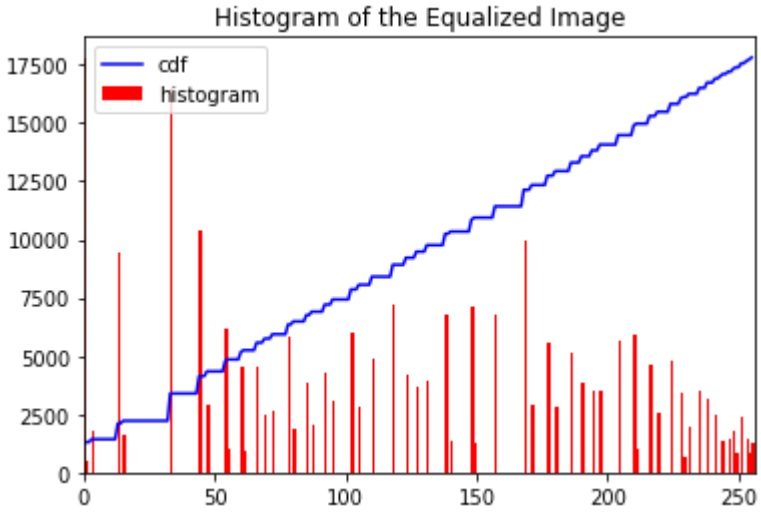


In [ ]:
```
import cv2 as cv
import numpy as np
from matplotlib import pyplot as plt
img = cv.imread('shells.tif',cv.IMREAD_GRAYSCALE)
hist,bins = np.histogram(img.ravel(),256,[0,256])
cdf = hist.cumsum()
cdf_normalized = cdf * hist.max()/ cdf.max()
plt.plot(cdf_normalized, color = 'b')
plt.hist(img.flatten(),256,[0,256], color = 'r')
plt.xlim([0,256])
plt.legend(('cdf','histogram'), loc = 'upper left')
plt.title('Histogram of the Original Image')
plt.show()
```

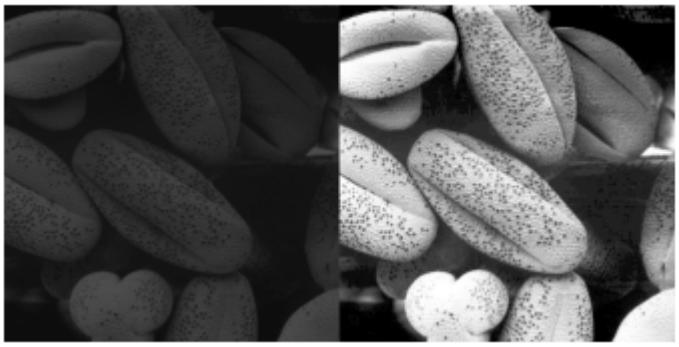


In [ ]:
```
equ = cv.equalizeHist(img)
hist,bins = np.histogram(equ.ravel(),256,[0,256])
cdf = hist.cumsum()
cdf_normalized = cdf * hist.max()/ cdf.max()
plt.plot(cdf_normalized, color = 'b')
plt.hist(equ.flatten(),256,[0,256], color = 'r')
plt.xlim([0,256])
plt.legend(('cdf','histogram'), loc = 'upper left')
plt.title('Histogram of the Equalized Image')
plt.show()
res = np.hstack((img,equ)) #stacking images side-by-side
```

```
plt.axis('off')
plt.imshow(res, cmap='gray')
```

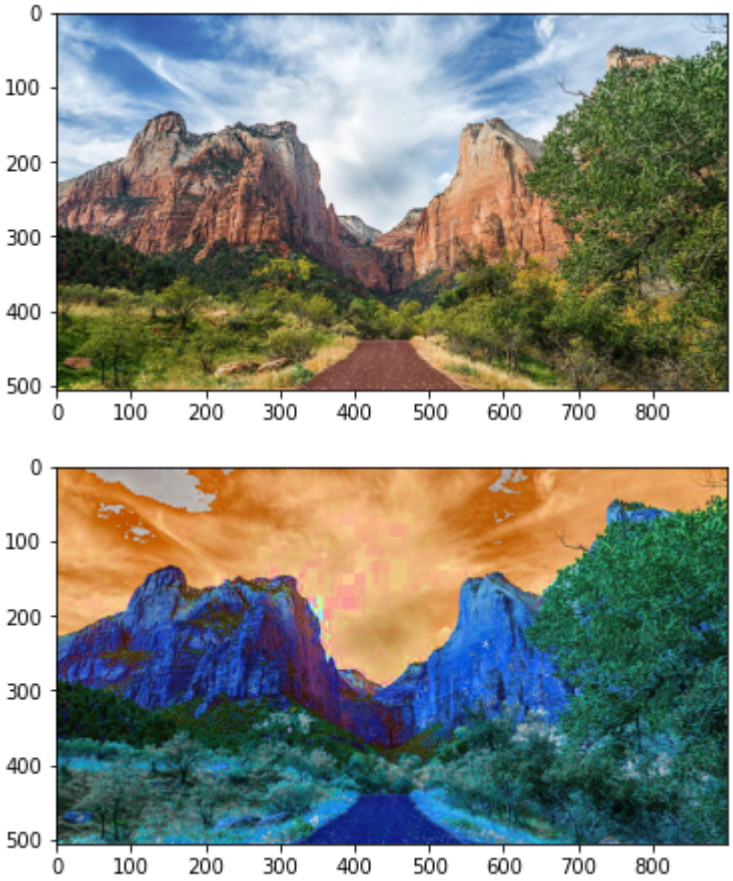


Out[ ]: <matplotlib.image.AxesImage at 0x1b991b89c90>



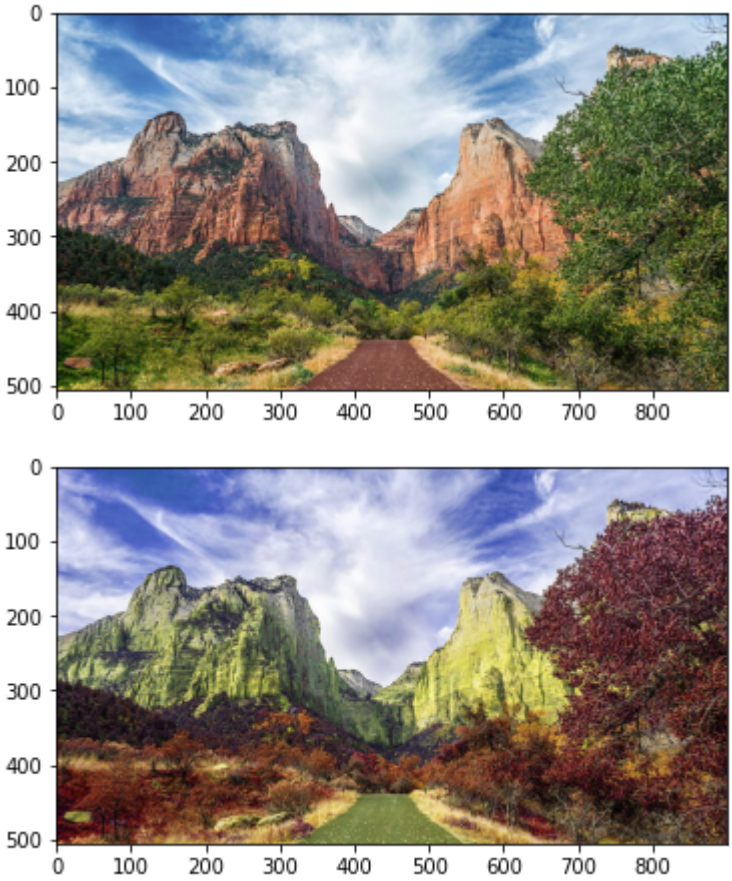
In [ ]:
```
%matplotlib inline
import cv2 as cv
import matplotlib.pyplot as plt
import numpy as np

img = cv.imread(r'zion_pass.jpg')
img = cv.cvtColor(img, cv.COLOR_BGR2RGB)

f, axarr = plt.subplots()
axarr.imshow(img)

hsv = cv.cvtColor(img, cv.COLOR_BGR2HSV)

for x in range(0, len(hsv)):
    for y in range(0, len(hsv[0])):
        hsv[x, y][1] += 100       # Enhansing saturation

img = cv.cvtColor(hsv, cv.COLOR_HSV2BGR)

img = cv.cvtColor(img, cv.COLOR_BGR2RGB)

f, axarr = plt.subplots()
axarr.imshow(img)
```

Out[ ]: <matplotlib.image.AxesImage at 0x1b99182c7f0>



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

img = cv.imread(r'zion_pass.jpg')
img = cv.cvtColor(img, cv.COLOR_BGR2RGB)

f, axarr = plt.subplots()
axarr.imshow(img)

hsv = cv.cvtColor(img, cv.COLOR_BGR2HSV)

for x in range(0, len(hsv)):
    for y in range(0, len(hsv[0])):
        hsv[x, y][0] += 100                #incresing hue

img = cv.cvtColor(hsv, cv.COLOR_HSV2BGR)

img = cv.cvtColor(img, cv.COLOR_BGR2RGB)

f, axarr = plt.subplots()
axarr.imshow(img)
```

Out[ ]:
```
<matplotlib.image.AxesImage at 0x1b9903920b0>
```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