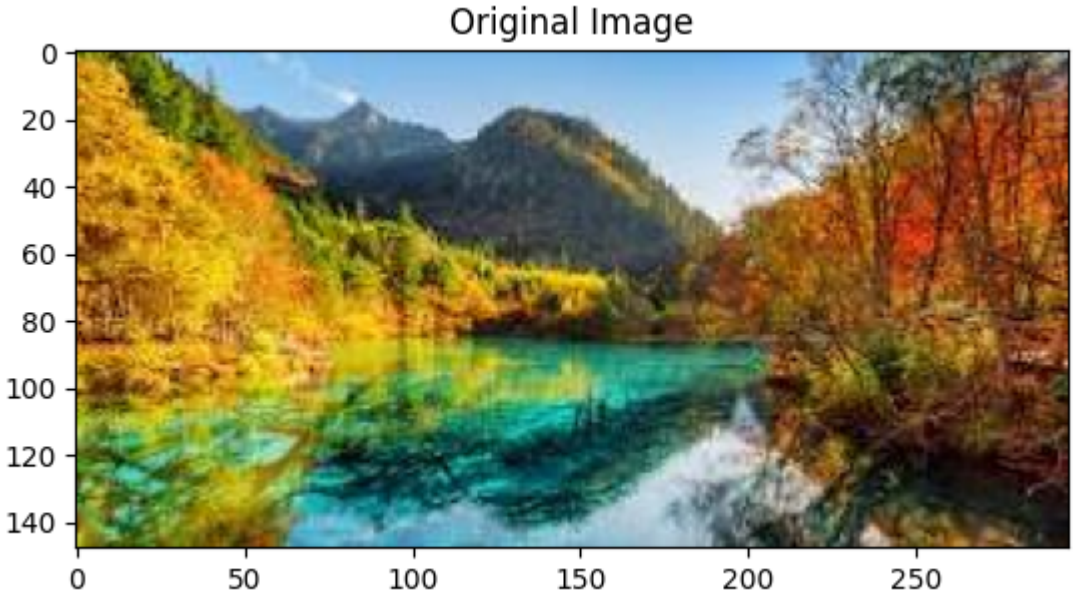
In [1]:
```
import cv2
import numpy as np
import matplotlib.pyplot as plt
```

Original image

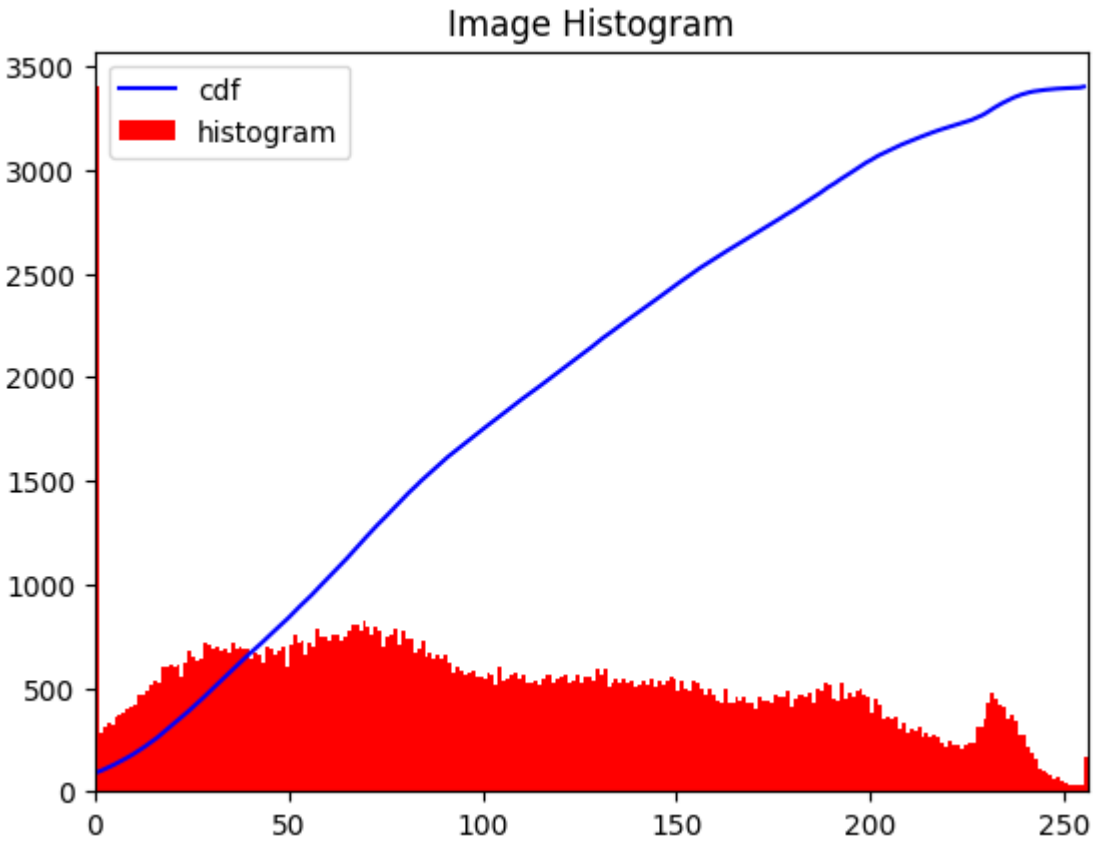
In [2]:
```
img = cv2.imread("random.jpg")
img = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)
```

In [3]:
```
plt.imshow(img)
plt.title("Original Image")
plt.show()
```



Histogram

In [4]:
```
hist, bins = np.histogram(img.flatten(), 256, [0,256])
cdf = hist.cumsum()
cdf_normalized = cdf * float(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("Image Histogram")
plt.show()
```



Equalized histogram

In [5]:
```
gray_img = cv2.cvtColor(img, cv2.COLOR_RGB2GRAY)
img_equ = cv2.equalizeHist(gray_img)
```

In [6]:
```
hist,bins = np.histogram(img_equ.flatten(), 256, [0,256])
cdf = hist.cumsum()
cdf_normalized = cdf * float(hist.max()) / cdf.max()
plt.plot(cdf_normalized, color = 'b')
plt.hist(img_equ.flatten(), 256, [0,256], color = 'r')
plt.xlim([0,256])
plt.legend(('cdf','histogram'), loc = 'upper left')
plt.title("Equalized Histogram")
plt.show()
```

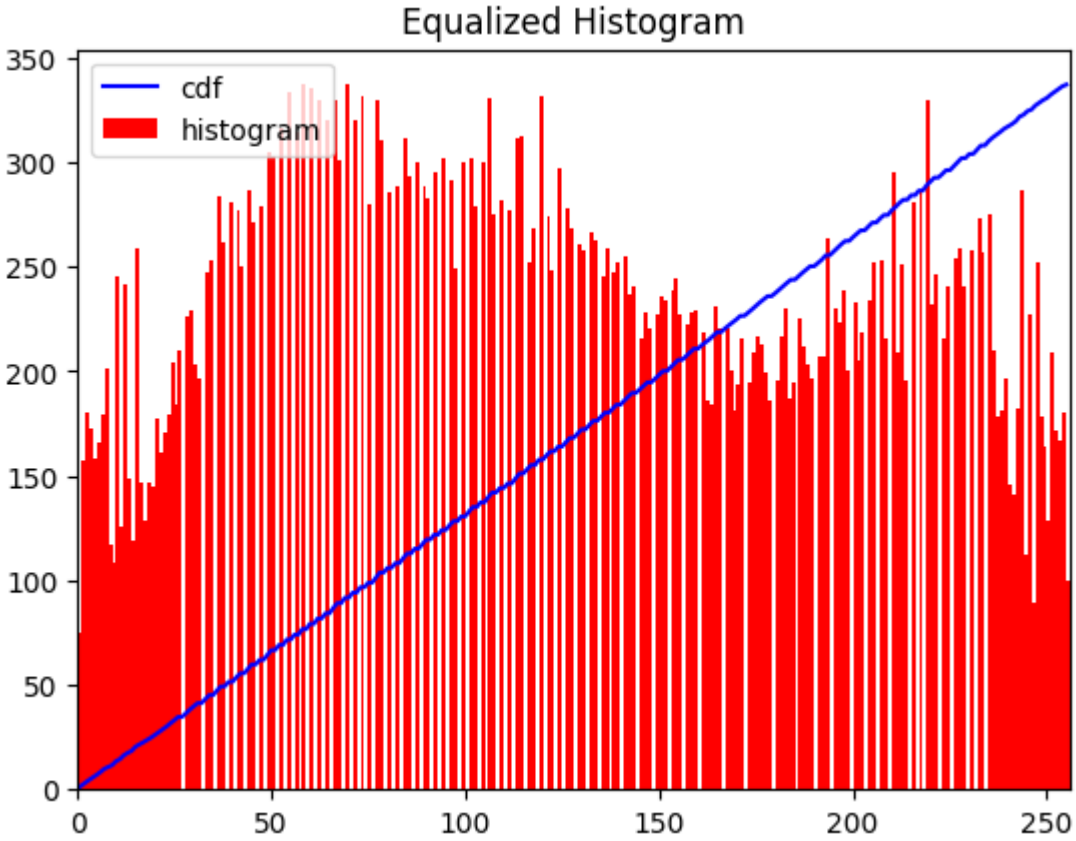


Image with equalized histogram

In [7]:
```
res = np.hstack((gray_img, img_equ))
```

In [8]:
```
plt.imshow(res)
plt.title("Grayscale image VS Equalized histogram grayscale image")
plt.show()
```