

Ćwiczenie 7

Wypróbuj działanie wyrównywania histogramu na przykładowych obrazach. By zaobserwować skuteczność procedury, poddaj wyrównywaniu obrazy zbyt ciemne i zbyt jasne.

Narysować histogramy obrazów przed i po wyrównaniu.

```
In [1]: import matplotlib.pyplot as plt
import tifffile as tiff
from skimage import exposure
import numpy as np
```

```
In [9]: # Załadowanie pliku .tiff
img_a = tiff.imread("src/chest-xray.tif")
img_b = tiff.imread("src/pollen-dark.tif")
img_c = tiff.imread("src/pollen-ligt.tif")
img_d = tiff.imread("src/pollen-lowcontrast.tif")
img_e = tiff.imread("src/pout.tif")
img_f = tiff.imread("src/spectrum.tif")
```

```
In [13]: def histOfImg(img,title,index):
    if len(img.shape)==3:
        vals = np.mean(img,axis=2).astype(np.uint8)
    else:
        vals = img

    counts, bins = np.histogram(vals, range(257))

    plt.subplot(2,2,index)
    plt.imshow(img)
    plt.title(title)

    plt.subplot(2,2,index+1)
    plt.bar(bins[:-1] - 0.5, counts, width=1, edgecolor='none')
    plt.xlim([-0.5, 255.5])
    plt.title("Histogram ")
```

```
In [17]: def hist(img):
    plt.figure(figsize=(10, 8))
    histOfImg(img,"Obraz oryginalny",1)
    equ = exposure.equalize_hist(img)
    equ_uint8 = (equ * 255).astype(np.uint8)
    histOfImg(equ_uint8,"Obraz wyrównany",3)
    plt.tight_layout()
    plt.show()
```

```
In [18]: print("Image: chest-xray.tif")
hist(img_a)

print("Image: pollen-dark.tif")
hist(img_b)

print("Image: pollen-ligt.tif")
hist(img_c)

print("Image: pollen-lowcontrast.tif")
hist(img_d)

print("Image: chest-pout.tif")
hist(img_e)

print("Image: chest-spectrum.tif")
hist(img_f)
```

Image: chest-xray.tif

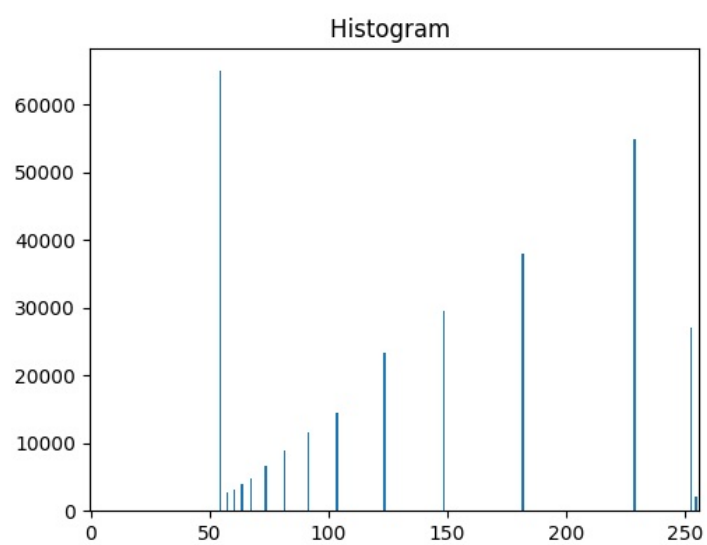
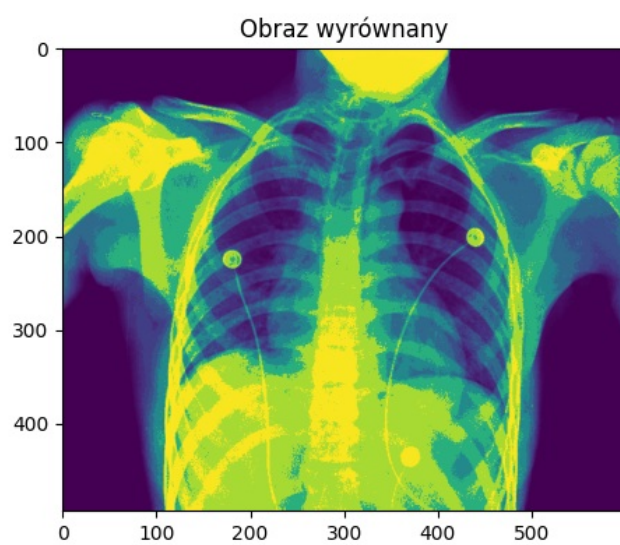
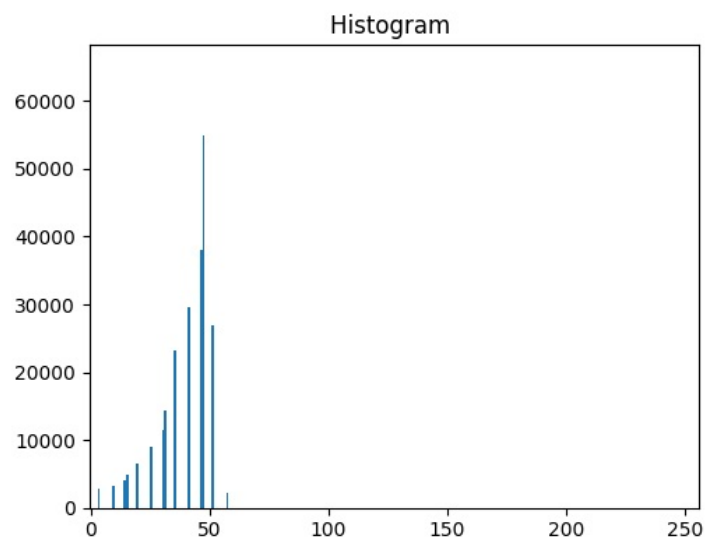
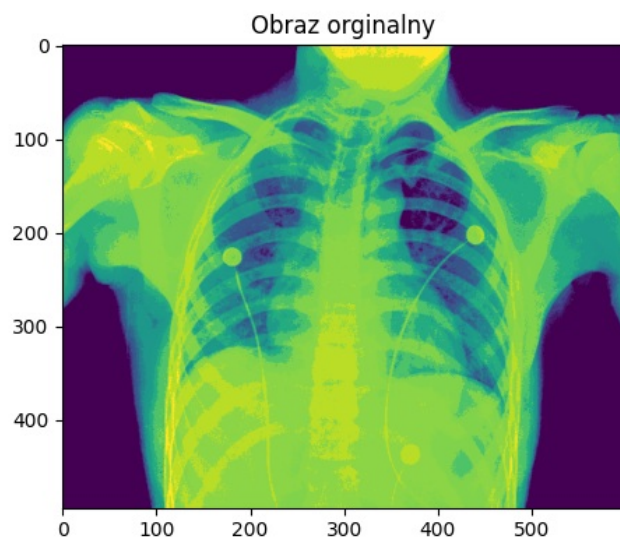


Image: pollen-dark.tif

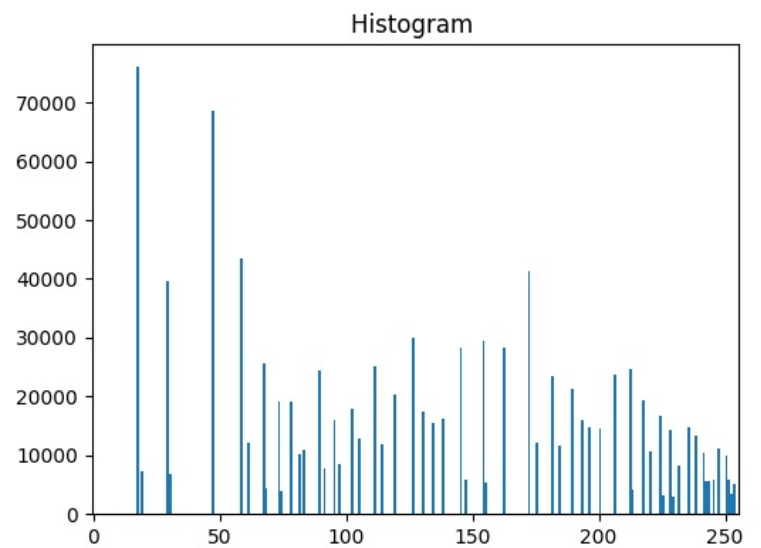
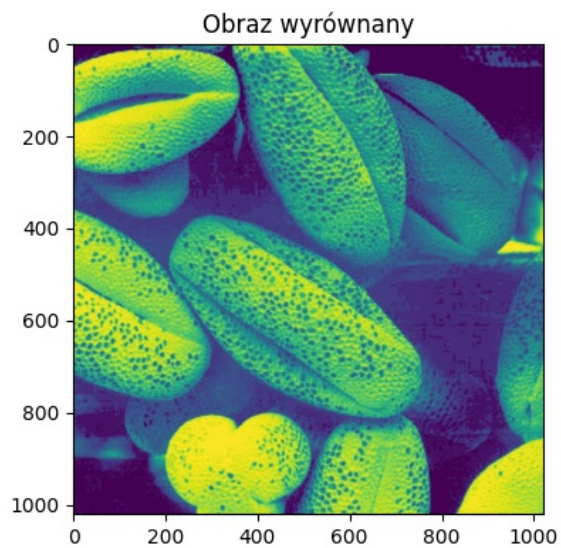
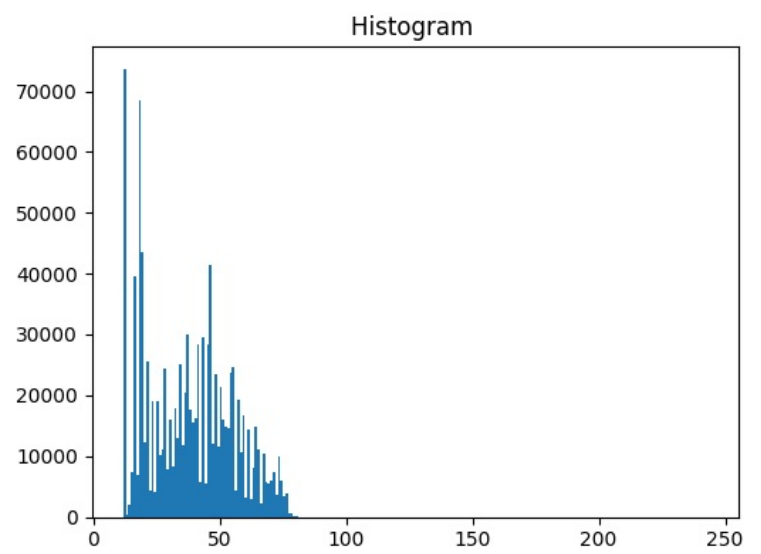
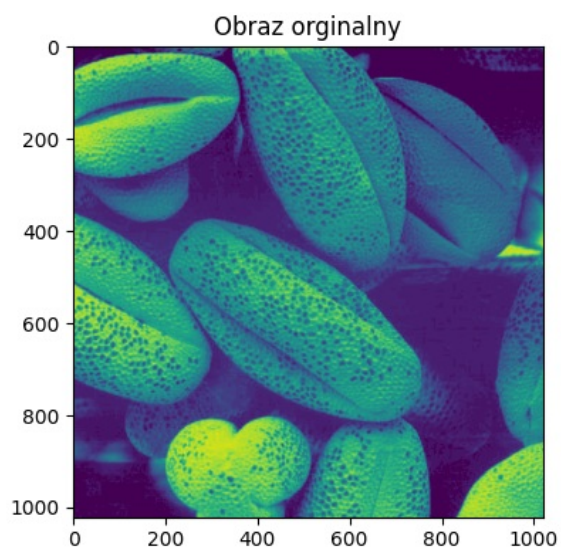


Image: pollen-ligt.tif

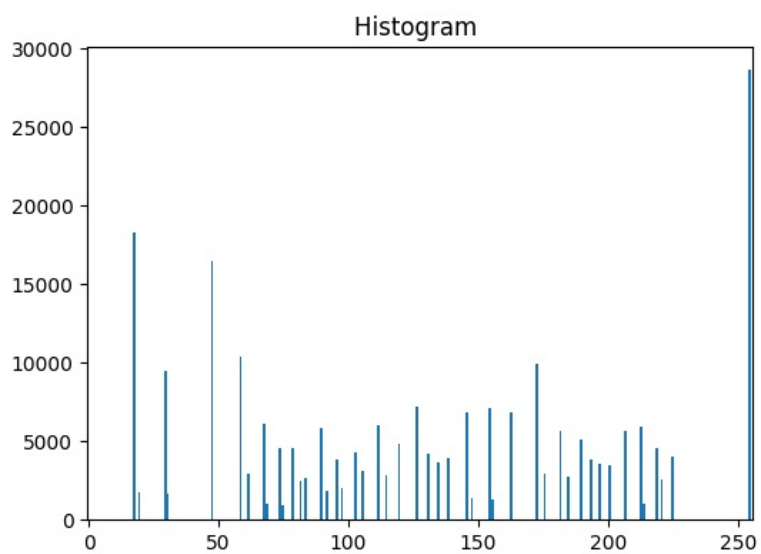
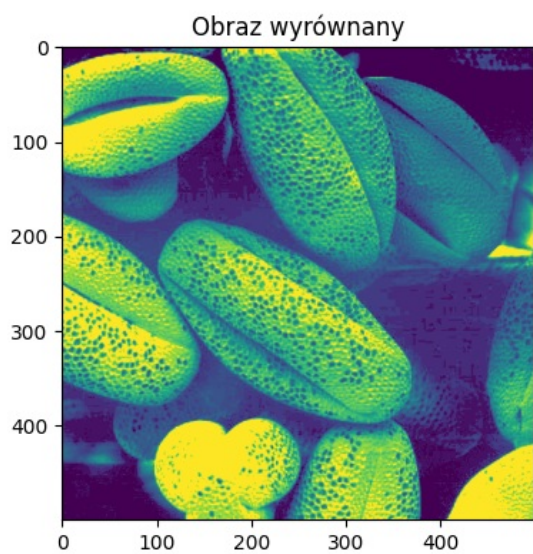
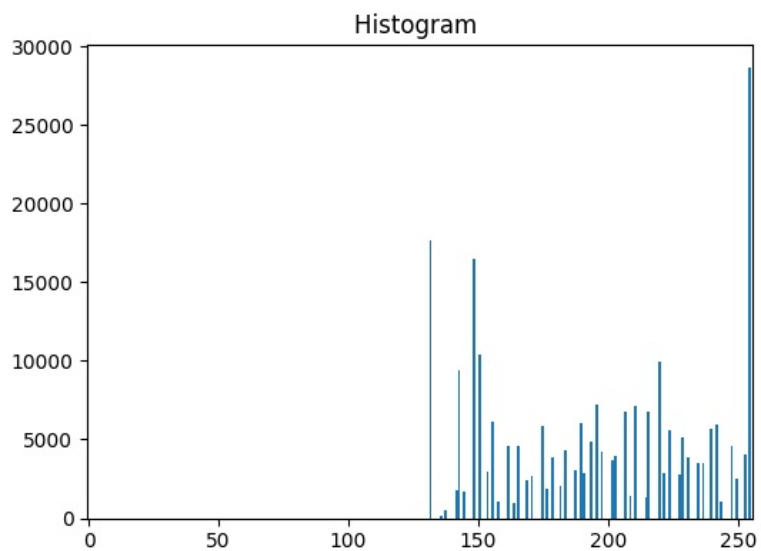
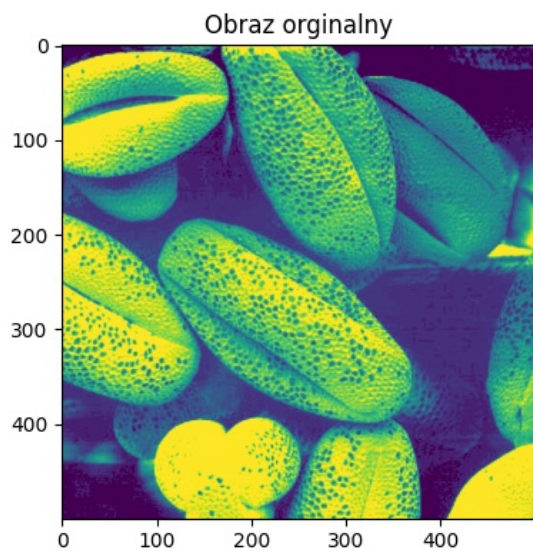


Image: pollen-lowcontrast.tif

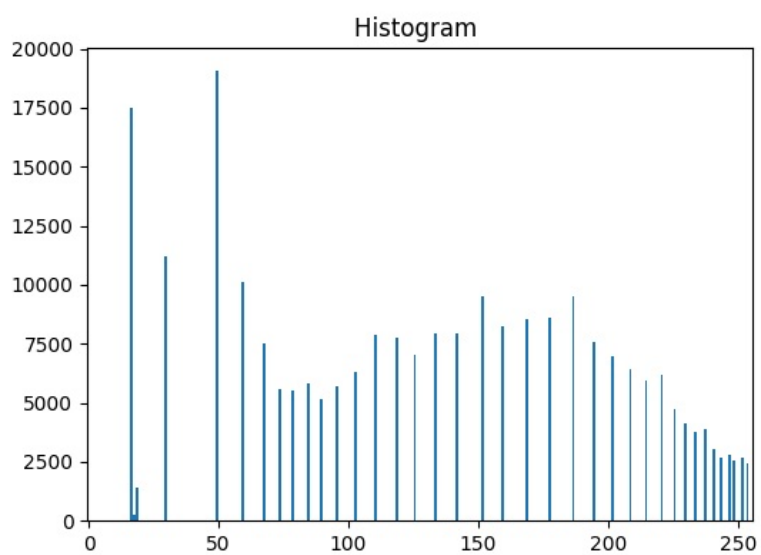
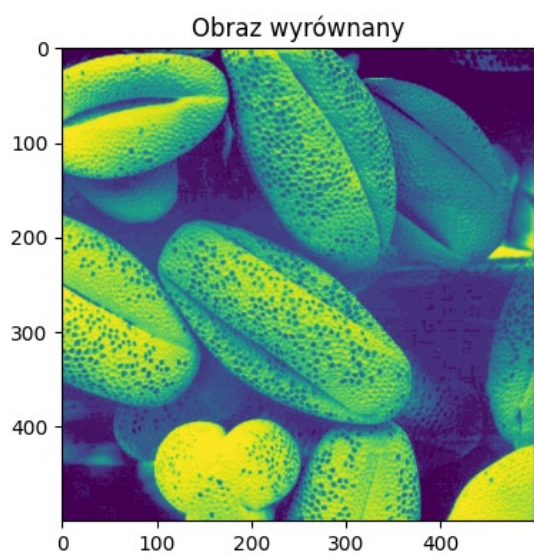
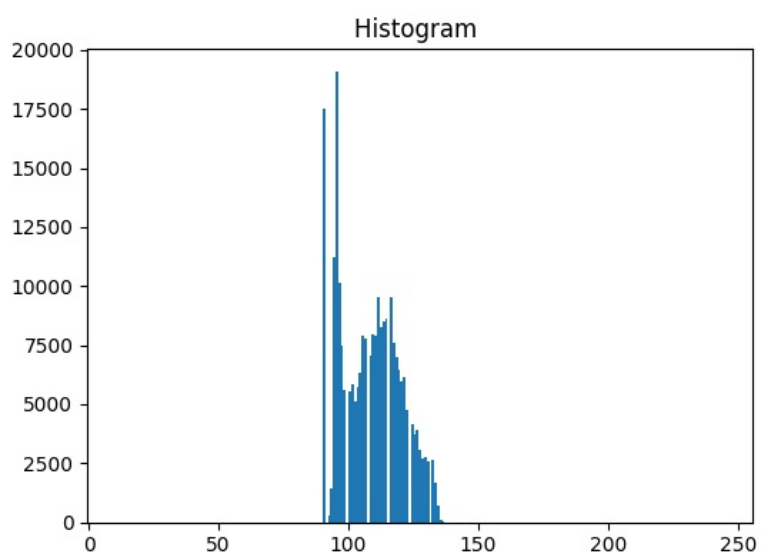
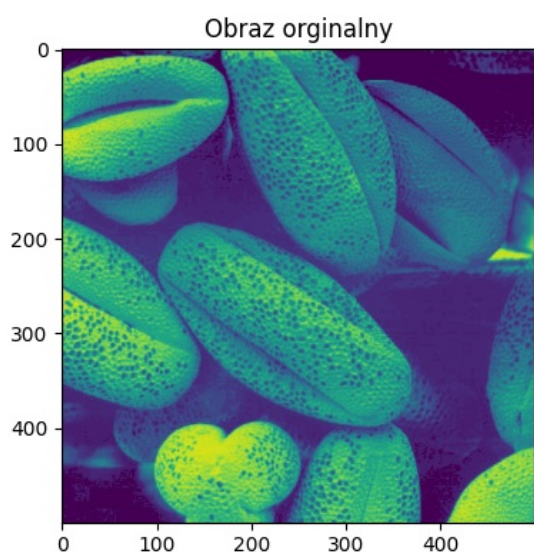


Image: chest-pout.tif

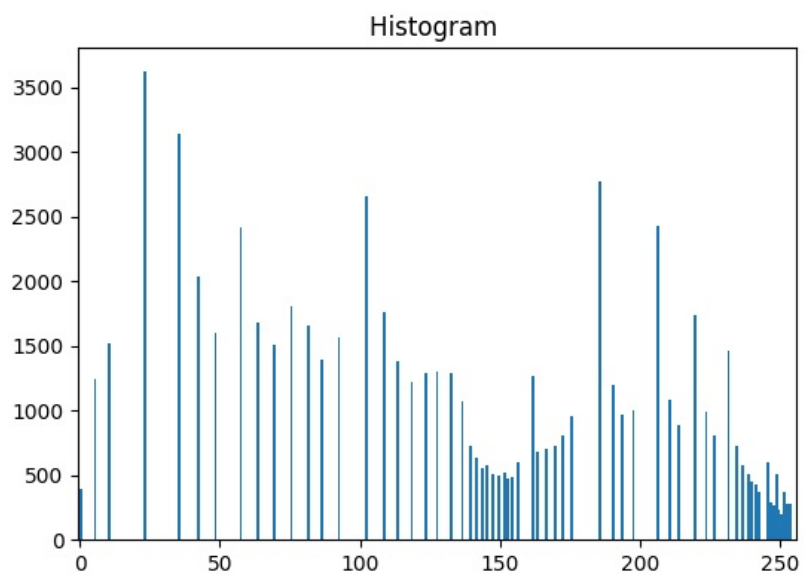
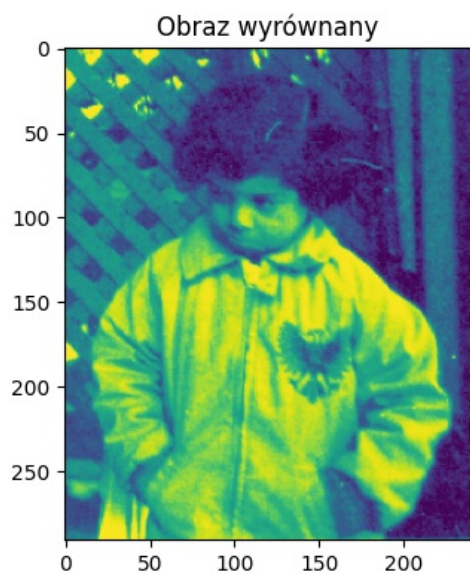
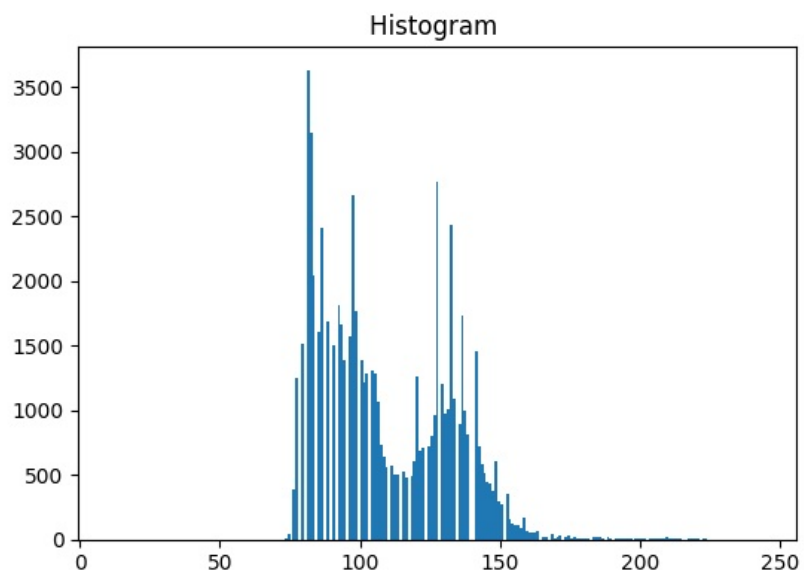
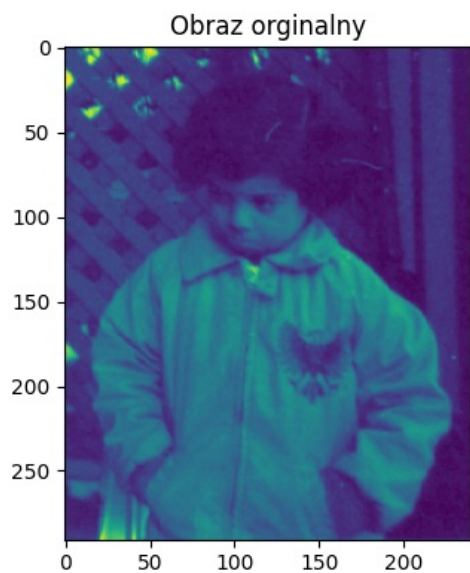


Image: chest-spectrum.tif

