```python
#ARDIANSYAH - 1207070018 - TEKNIK ELEKTRO (TSEB)
import matplotlib.pyplot as plt
%matplotlib inline
from skimage import data
from skimage.io import imread
from skimage.color import rgb2gray
from skimage.util import invert

import numpy as np


# Memuat citra astronaut
astronautImage = data.astronaut()

# Memuat citra kamera
cameraImage = data.camera()

# Memotong citra astronaut
astroCropped = astronautImage.copy()
astroCropped = astroCropped[0:256,64:320]

# Memotong citra kamera
cameraCropped = cameraImage.copy()
cameraCropped = cameraCropped[64:256,128:320]

# Menampilkan dimensi citra asli astronaut
print('Astro Ori Shape : ',astronautImage.shape)

# Menampilkan dimensi citra hasil pemotongan astronaut
print('Astro Crop Shape : ',astroCropped.shape)

# Menampilkan dimensi citra asli kamera
print('Camera Ori Shape : ',cameraImage.shape)

# Menampilkan dimensi citra hasil pemotongan kamera
print('Camera Crop Shape : ',cameraCropped.shape)

# Menampilkan citra-citra dalam subplot
fig, axes = plt.subplots(2, 2, figsize=(12, 12))
ax = axes.ravel()

ax[0].imshow(astronautImage)
ax[0].set_title("Citra Input 1")

ax[1].imshow(cameraImage, cmap='gray')
ax[1].set_title('Citra Input 2')

ax[2].imshow(astroCropped)
ax[2].set_title("Citra Output 1")

ax[3].imshow(cameraCropped, cmap='gray')
ax[3].set_title('Citra Output 2')

# Membalikkan citra astroCropped
inv = invert(astroCropped)

# Menampilkan dimensi citra input astroCropped
print('Shape Input : ', astroCropped.shape)

# Menampilkan dimensi citra output setelah dibalik
print('Shape Output : ',inv.shape)

# Menampilkan citra-citra hasil pemrosesan
fig, axes = plt.subplots(2, 2, figsize=(12, 12))
ax = axes.ravel()

ax[0].imshow(astroCropped)
ax[0].set_title("Citra Input")

ax[1].hist(astroCropped.ravel(), bins=256)
ax[1].set_title('Histogram Input')

ax[2].imshow(inv)
ax[2].set_title('Citra Output (Inverted Image)')

ax[3].hist(inv.ravel(), bins=256)
ax[3].set_title('Histogram Output')
```
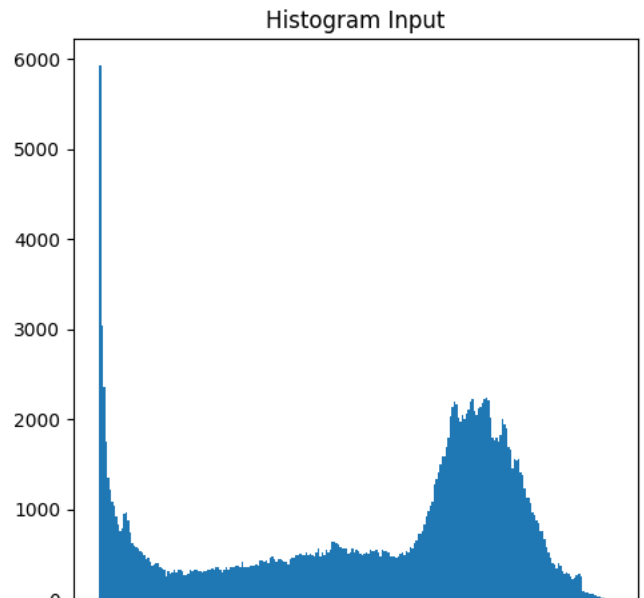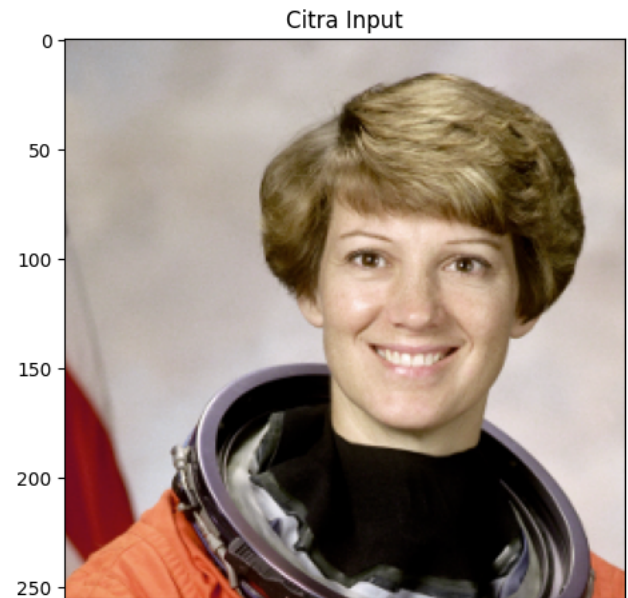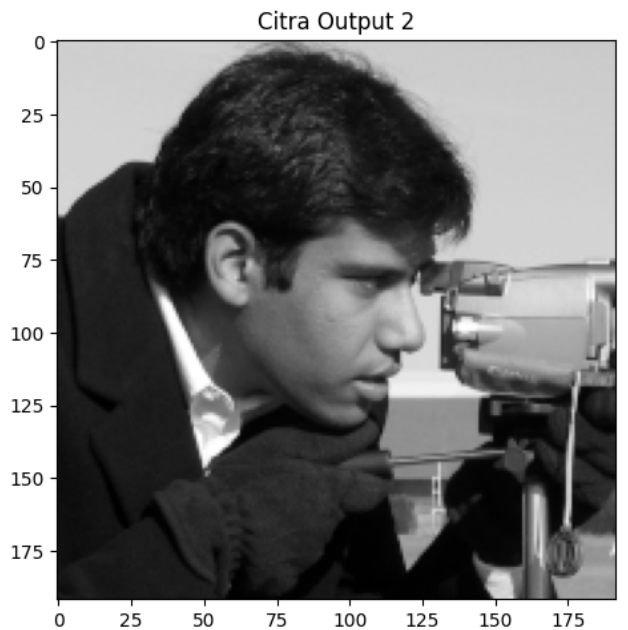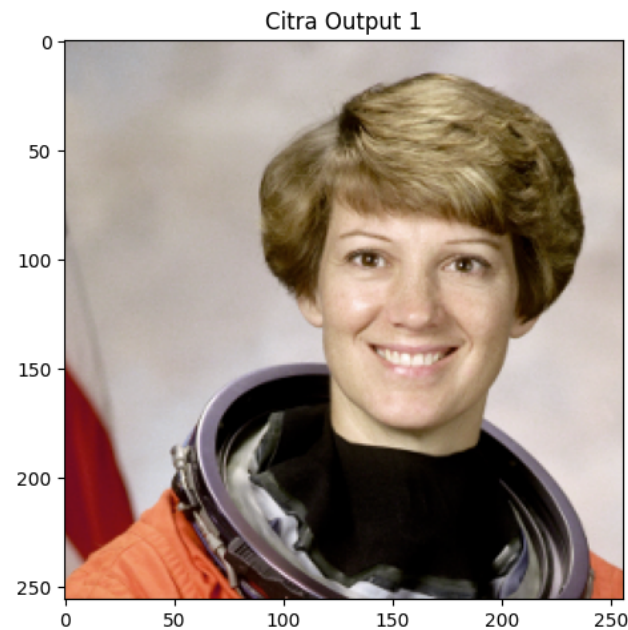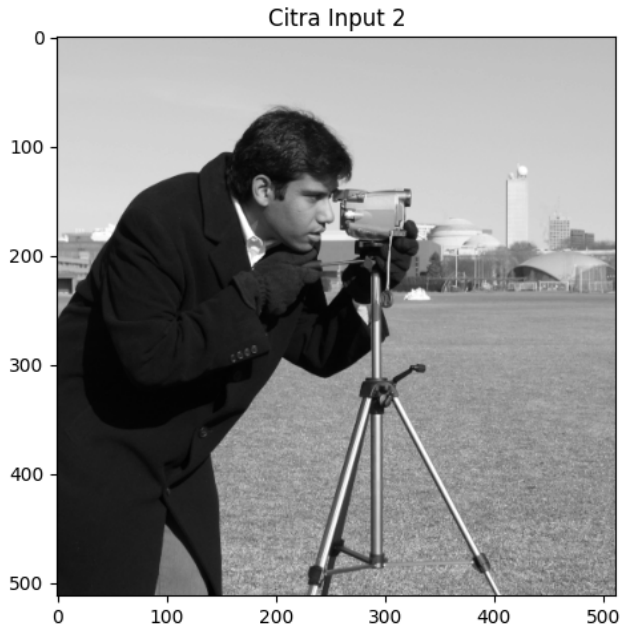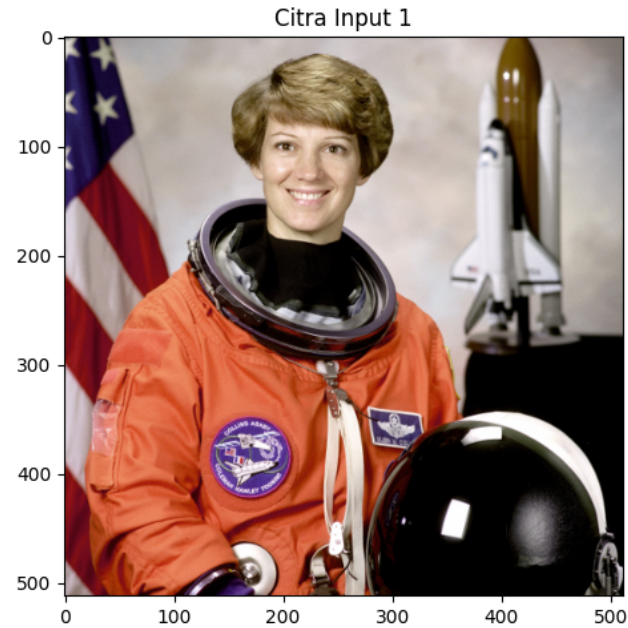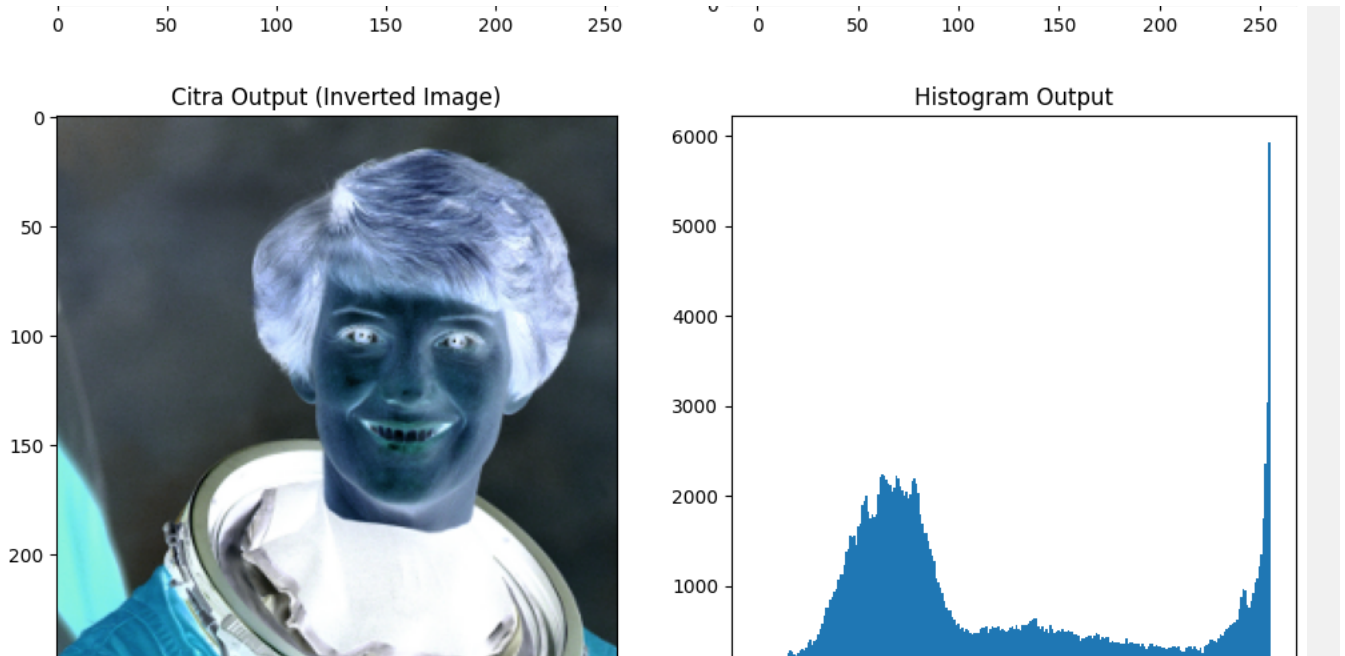
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```
Astro Ori Shape :  (512, 512, 3)
Astro Crop Shape :  (256, 256, 3)
Camera Ori Shape :  (512, 512)
Camera Crop Shape :  (192, 192)
Shape Input :  (256, 256, 3)
Shape Output :  (256, 256, 3)
Text(0.5, 1.0, 'Histogram Output')
```


Citra Input 1

Citra Input 2

Citra Output 1

Citra Output 2

Citra Input

Histogram Input

Citra Output (Inverted Image)

Histogram Output

```
# Inversi citra menggunakan fungsi 'invert'
inv = invert(astroCropped)

# Menampilkan bentuk (shape) citra input
print('Shape Input : ', astroCropped.shape)

# Menampilkan bentuk (shape) citra output
print('Shape Output : ', inv.shape)

# Membuat subplot untuk menampilkan citra dan histogram
fig, axes = plt.subplots(2, 2, figsize=(12, 12))
ax = axes.ravel()

# Menampilkan citra input
ax[0].imshow(astroCropped)
ax[0].set_title("Citra Input")

# Menampilkan histogram citra input
ax[1].hist(astroCropped.ravel(), bins=256)
ax[1].set_title('Histogram Input')

# Menampilkan citra output (inverted image)
ax[2].imshow(inv)
ax[2].set_title('Citra Output (Inverted Image)')

# Menampilkan histogram citra output
ax[3].hist(inv.ravel(), bins=256)
ax[3].set_title('Histogram Output')
```
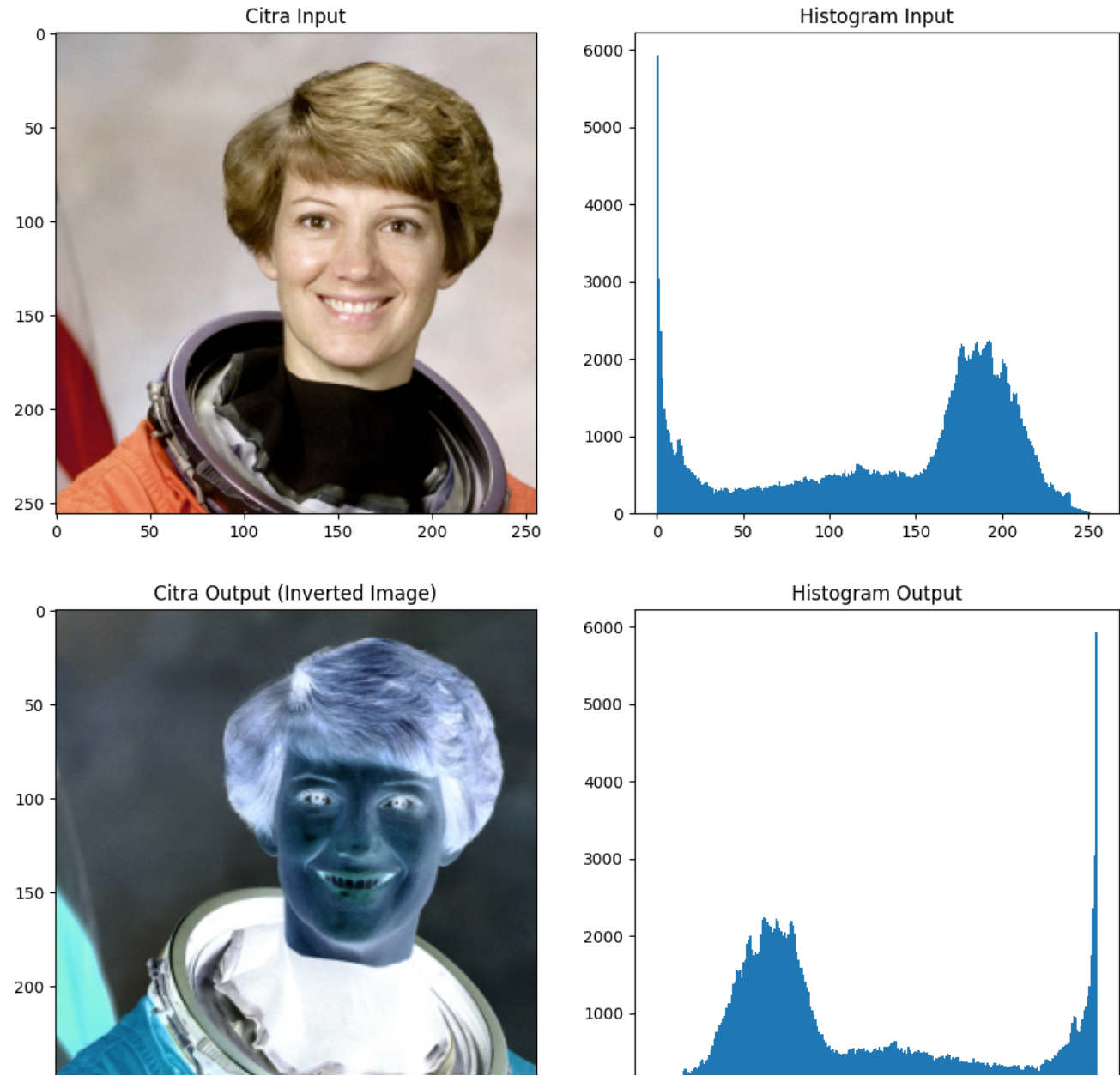
```
Shape Input :  (256, 256, 3)
Shape Output :  (256, 256, 3)
Text(0.5, 1.0, 'Histogram Output')
```


Citra Input

Histogram Input

Citra Output (Inverted Image)

Histogram Output

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