In [1]:

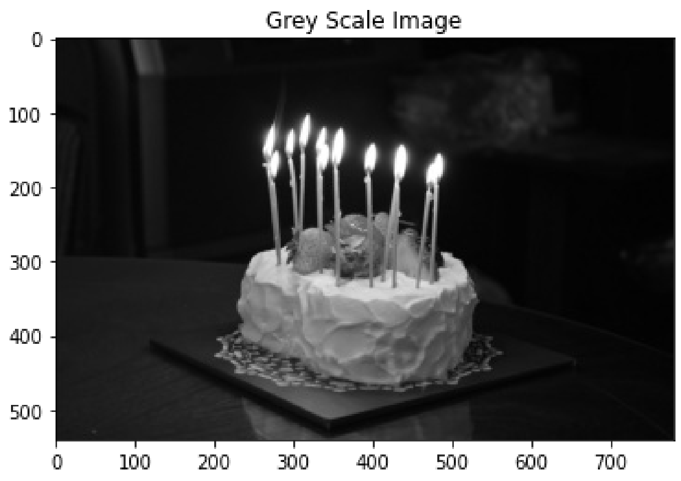
```
import matplotlib.pyplot as plt
import time
import cv2
import numpy as np
%matplotlib inline
```

In [2]:

```
img = cv2.imread("img5.jpg",0)
img = cv2.resize(img, (780, 540),
interpolation = cv2.INTER_NEAREST)
plt.imshow(img,aspect="auto" ,cmap = 'gray')
plt.title("Grey Scale Image")
```

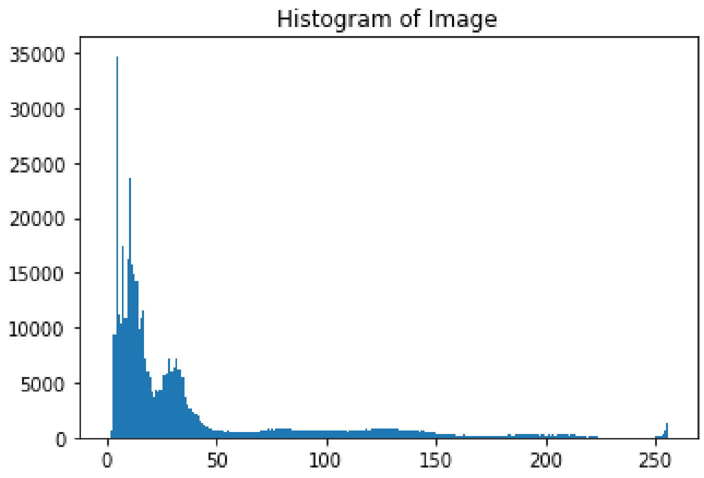
Out[2]:

```
Text(0.5, 1.0, 'Grey Scale Image')
```



In [4]:

```
plt.hist(img.ravel(),256,[0,256])
plt.title("Histogram of Image")
plt.show()
```



Histogram Equalization

In [8]:

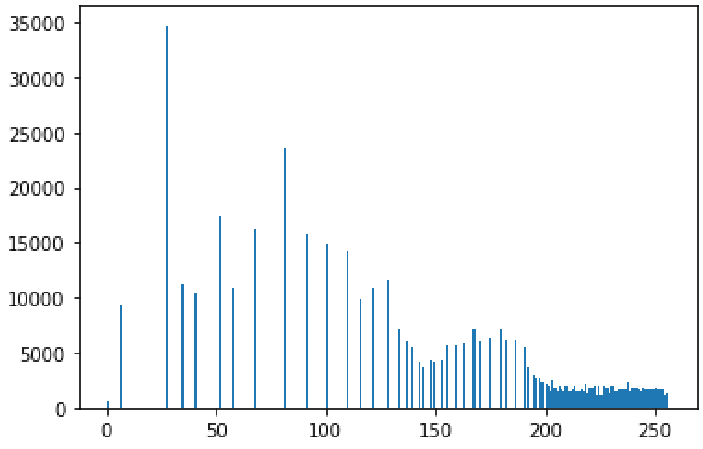
```
#apply transformation
def hisEqualization(image):

    olddim = image.shape
    img = image.ravel()
    value , rev_index, counts = np.unique(img,return_inverse=True,return_counts=True)
    sk = np.cumsum(counts).astype(np.float64)
    sk/=sk[-1]
    sk = np.around(sk*255)
    return sk[rev_index].reshape(olddim)
```

In [9]:

```
eqal_img = hisEqualization(img)
```

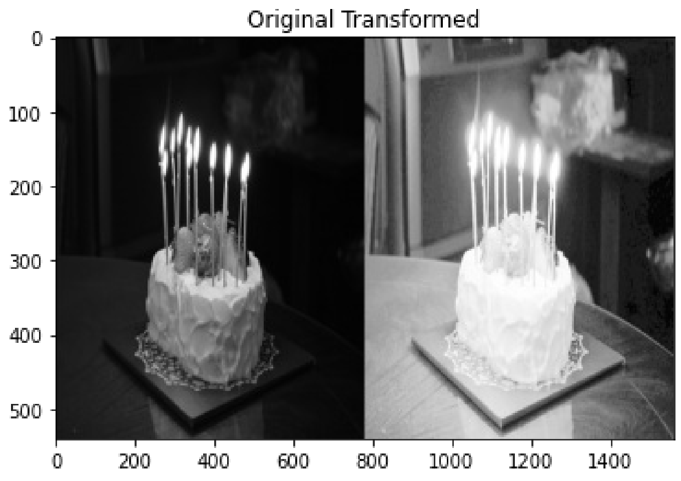
In [10]:

```
plt.hist(eqal_img.ravel(),256,[0,256])
plt.show()
```



In [11]:

```
result = np.hstack((img,eqal_img))
plt.imshow(result,aspect="auto" ,cmap='gray')
plt.title("Original Transformed")
plt.show()
# cv2.imshow("Image",result)
# cv2.waitKey(0)
# cv2.destroyAllWindows()
```



In [ ]:

```

```

Histogram Matching

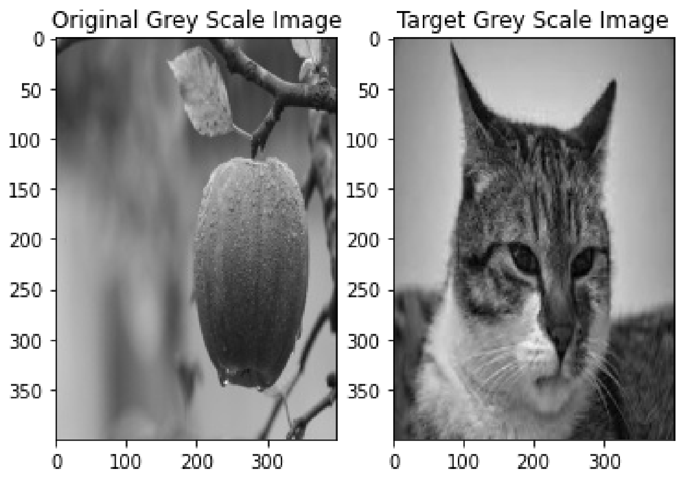
In [13]:

```
image = cv2.imread("img6.jpeg",0)
target = cv2.imread("img9.jpg",0)
image = cv2.resize(image, (400, 400),interpolation = cv2.INTER_NEAREST)
target = cv2.resize(target, (400, 400),interpolation = cv2.INTER_NEAREST)
# image = hisEqualization(image)
```

```
plt.subplot(1,2,1)
plt.imshow(image,aspect="auto" ,cmap ='gray')
plt.title("Original Grey Scale Image")
plt.subplot(1,2,2)
plt.imshow(target,aspect="auto",cmap='gray')
plt.title("Target Grey Scale Image")
```

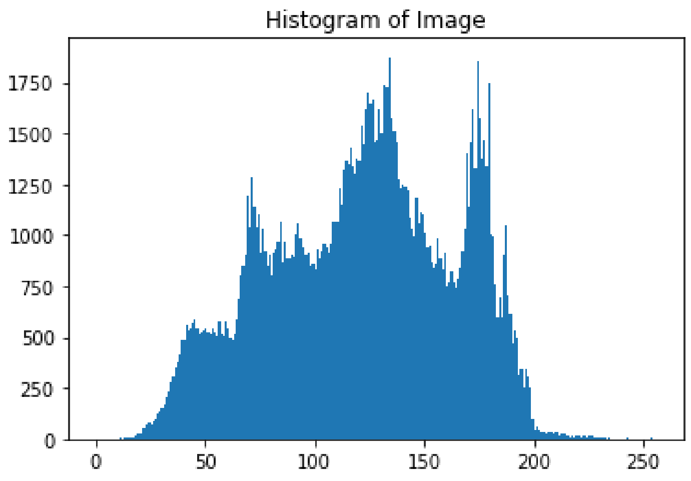
Out[13]:

```
Text(0.5, 1.0, 'Target Grey Scale Image')
```



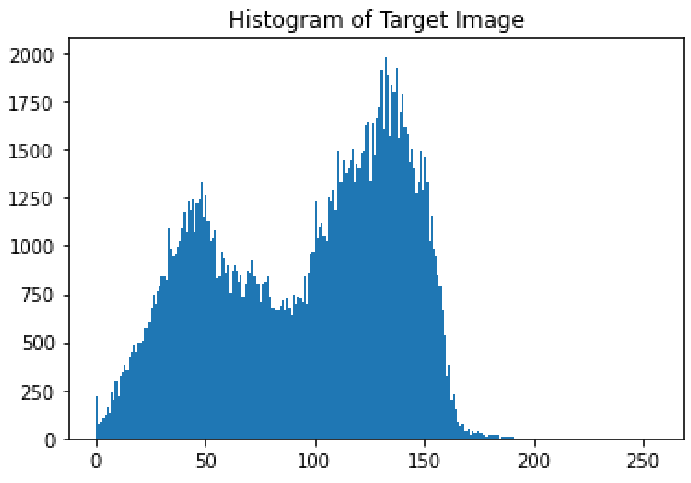
In [15]:

```
plt.hist(image.ravel(),256,[0,256])
plt.title("Histogram of Image")
plt.show()
```



In [16]:

```
plt.hist(target.ravel(),256,[0,256])
plt.title("Histogram of Target Image")
plt.show()
```



In [22]:

```
def findNearestInteger(arr,target):
    diff = arr-target
    mask = np.ma.less_equal(diff,-1)
    if np.all(mask):
        c = np.abs(diff).argmin()
        return c
    mask_arr = np.ma.masked_array(diff,mask)
    return mask_arr.argmin()
```

In [23]:

```
def hisTogramSpecification(image, target):
    sk = hisEqualization(image)
    zk = hisEqualization(target)
    shapeofImage = image.shape
    image = image.ravel()
# target = target.ravel()
    value, revIndex = np.unique(image,return_inverse=True)
    sk = sk.ravel()
    zk = zk.ravel()
    result = []
    for data in sk[:]:
        c = findNearestInteger(zk,data)
        result.append(c)
    print("I am here")
    result= np.array(result,dtype='uint8')
    return result[revIndex].reshape(shapeofImage)
```

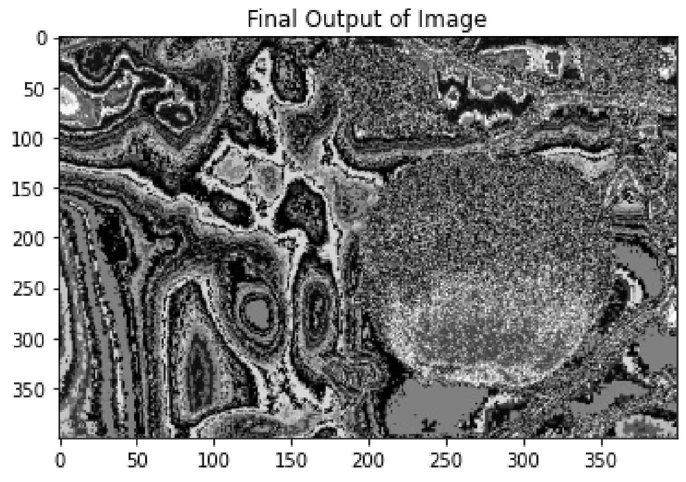
In [24]:

```
result = hisTogramSpecification(image,target)
```

```
I am here
```

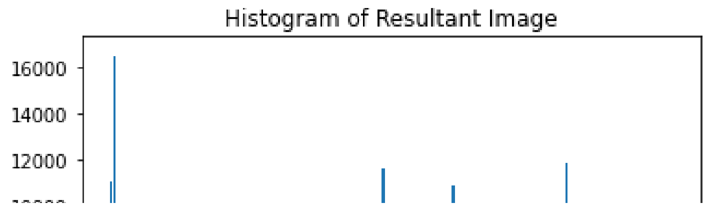
In [25]:

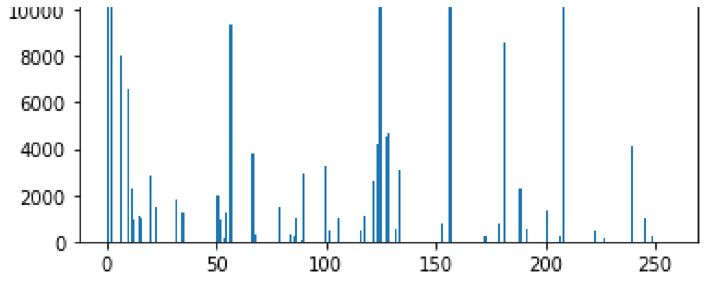
```
plt.imshow(result , cmap='gray',aspect="auto")
plt.title("Final Output of Image")
plt.show()
```



In [26]:

```
plt.hist(result.ravel(),256,[0,256])
plt.title("Histogram of Resultant Image")
plt.show()
```




10000
8000
6000
4000
2000
0
0
50
100
150
200
250