EXPT 6: Thresholding and K-means Clustering

Thresholding (0-4) Program:

```
import cv2
import numpy as np
import matplotlib .pylab as plt

abc=cv2.imread("E:/(impv_46)/b99fa1e379380937d25b6953d7b83c8d.jpg",0)

plt.subplot(3,2,1)
plt.title('orignal image')
plt.imshow(abc,cmap ='gray')

x,xyz=cv2.threshold(abc,127,255,0)

plt.subplot(3,2,2)
plt.title('threshold image_0')
plt.imshow(xyz,cmap ='gray')


x,xyz=cv2.threshold(abc,127,255,1)

plt.subplot(3,2,3)
plt.title('threshold image_1')
plt.imshow(xyz,cmap ='gray')

x,xyz=cv2.threshold(abc,127,255,2)

plt.subplot(3,2,4)
plt.title('threshold image_2')
plt.imshow(xyz,cmap ='gray')

x,xyz=cv2.threshold(abc,127,255,3)

plt.subplot(3,2,5)
plt.title('threshold image_3')
plt.imshow(xyz,cmap ='gray')

x,xyz=cv2.threshold(abc,127,255,4)

plt.subplot(3,2,6)
plt.title('threshold image_4')
plt.imshow(xyz,cmap ='gray')
plt.show()
```
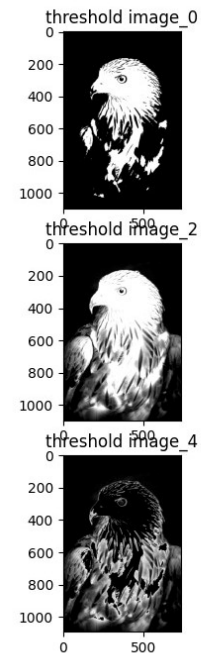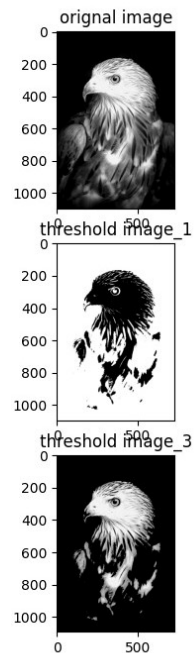
Output:

K-Means Clustering Program:

```
exp no 7a.py - E:\(impv_46)\exp no 7a.py (3.11.1)                                    —  □  X
File  Edit  Format  Run  Options  Window  Help
import cv2
import numpy as np
import matplotlib .pylab as plt

abc=cv2.imread("E:/(impv_46)/sunset-over-a-river-landscape-francis-danby.jpg",1)

abc=cv2.cvtColor(abc,cv2.COLOR_BGR2RGB)

plt.subplot(3,2,1)
plt.title('original image')
plt.imshow(abc)

pixel_vals=abc.reshape((-1,3))


pixel_vals=np.float32(pixel_vals)


criteria=(cv2.TERM_CRITERIA_EPS+cv2.TERM_CRITERIA_MAX_ITER,100,0.85)

k=3
retval,labels,centers=cv2.kmeans(pixel_vals,k,None,criteria,10,cv2.KMEANS_RANDOM_CENTERS)

centers=np.uint8(centers)
segmented_data=centers[labels.flatten()]

segmented_image=segmented_data.reshape((abc.shape))
plt.subplot(3,2,2)
plt.title('k=1')
plt.imshow(segmented_image)


k=6
retval,labels,centers=cv2.kmeans(pixel_vals,k,None,criteria,10,cv2.KMEANS_RANDOM_CENTERS)

centers=np.uint8(centers)
segmented_data=centers[labels.flatten()]

segmented_image=segmented_data.reshape((abc.shape))
plt.subplot(3,2,3)
plt.title('k=6')
plt.imshow(segmented_image)




k=20
retval,labels,centers=cv2.kmeans(pixel_vals,k,None,criteria,10,cv2.KMEANS_RANDOM_CENTERS)

centers=np.uint8(centers)
segmented_data=centers[labels.flatten()]

segmented_image=segmented_data.reshape((abc.shape))
plt.subplot(3,2,4)
plt.title('k=20')
plt.imshow(segmented_image)
plt.show()
```

Output: