In this assignment students have to compress racoon grey scale image into 5 clusters.

In the end, visualize both raw and compressed image and look for quality difference.

The raw image is available in spicy.misc package with the name face.

Hint:

import numpy as np

from sklearn import cluster, datasets

from scipy import misc

In [1]:
```
#Importing libraries
import numpy as np
from sklearn.cluster import KMeans
from sklearn import datasets
from scipy import misc
import matplotlib.pyplot as plt
```

In [2]:
```
face =misc.face(gray=True)
print("face:-\n",face)
print("\nface.shape:- ",face.shape)
```

```
face:-
 [[114 130 145 ... 119 129 137]
 [ 83 104 123 ... 118 134 146]
 [ 68  88 109 ... 119 134 145]
 ...
 [ 98 103 116 ... 144 143 143]
 [ 94 104 120 ... 143 142 142]
 [ 94 106 119 ... 142 141 140]]

face.shape:-  (768, 1024)
```

In [3]:
```
k_Means= KMeans(n_clusters = 5)
np.random.seed(10)
X = face.reshape((-1,1))
print("X:-\n",X)
print("\nX.shape:- ",X.shape)

#fitting value of X
k_Means.fit(X)


values = k_Means.cluster_centers_
print("Values :-",values)

labels = k_Means.labels_
print("Labels :-",labels)
```

```
X:-
 [[114]
 [130]
 [145]
 ...
 [142]
 [141]
 [140]]

X.shape:-  (786432, 1)
Values :- [[114.99362851]
 [ 27.62031146]
 [194.13840989]
 [ 75.41095451]
 [153.31393344]]
Labels :- [0 0 4 ... 4 4 4]
```

In [4]:
```
#Create an array from label and values
face_compressed = np.choose(labels , values)
face_compressed.shape = face.shape

vmin = face.min()
vmax = face.max()

print("Vmin :-{}\t Vmax :-{}".format(vmin , vmax))
```

```
Vmin :-0         Vmax :-250
```

In [5]:
```
#Original Face
plt.figure(figsize = (6,6))
plt.imshow(face,cmap= plt.cm.gray)

#Compressed Face
plt.figure(figsize = (6,6))
plt.imshow(face_compressed,cmap= plt.cm.gray,vmin = vmin,vmax= vmax)
```

Out[5]: <matplotlib.image.AxesImage at 0x290a6160a60>