Display an image and extract feature using colour histogram

The objective of the experiments are

1. Objective 1:
2. Objective 2:

%reset

In [1]:
```
from PIL import Image
import matplotlib.pyplot as plt
import numpy as np
# import torch.nn.functional as F
# from torch import nn
import os

os.chdir(r'/Users/jeremywan/Desktop/MMTech/lab1_cbir_student')
imgpath = r'./images'
```

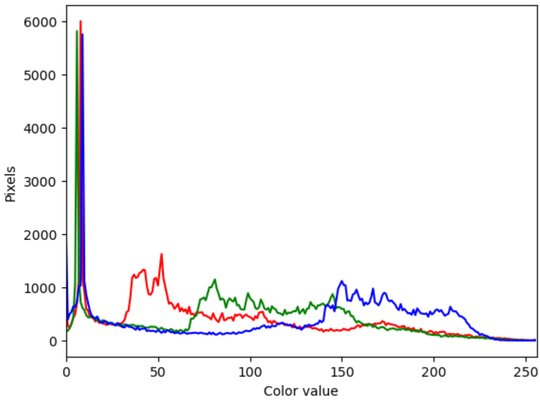
In [2]:
```
%pwd
```

Out[2]:
```
'/Users/jeremywan/Desktop/MMTech/lab1_cbir_student'
```

In [3]:
```
#%% Select image to preview
filename = '215.jpg'
filename_ = os.path.join(imgpath, filename)
im = Image.open(filename_)
plt.figure(figsize=(8,6))
plt.imshow(im) , plt.axis('off')
titleStr = " Image {}".format(filename)
plt.title(titleStr,  fontsize=20)
```

Out[3]:
```
Text(0.5, 1.0, ' Image 215.jpg')
```

In [4]:
```
# Extract RGB colour histogram
im = np.array( Image.open(filename_) )

# create the histogram plot, with three lines, one for
# each color
colors = ("r", "g", "b")
channel_ids = (0, 1, 2)
plt.figure()
plt.xlim([0, 256])

histL = []
for channel_id, c in zip(channel_ids, colors):
    histogram, bin_edges = np.histogram(
        im[:, :, channel_id], bins=256, range=(0, 256)
    )

    plt.plot(bin_edges[0:-1], histogram, color=c)
    histogram_n = histogram / np.sum(histogram)
    histL.extend(histogram_n)

hist_feat = np.array(histL)  # hist is the histogram vector that represent the image im

plt.xlabel("Color value")
plt.ylabel("Pixels")

plt.show()

#%%

print("Histogram feature vector has dimension ", hist_feat.shape)
```




```
Histogram feature vector has dimension  (768,)
```

Question 1 : Write a short Python code to count the number of jpeg images in the \images folder

In [5]:
```
# Your answer to Q1 (Insert your code )

fileList=[]

for file in os.listdir(imgpath):
        if file.endswith(".jpg"):
            fileList.append(os.path.join(imgpath, file))

print("\n The number of images in the folder used for image database = " , len(fileList))
```

```
 The number of images in the folder used for image database =  1000
```

Question 2 : Compare the difference between retrieval in traditional database with content based image retrieval (CBIR). What is the benefit of CBIR.

Traditional database query techniques is based on attaching textual metadata to each image and retrieve them by keywords. In CBIR, image procesing algorithm are used to extract feature vectors that represent the image properties

The benefit of CBIR is it required less time to find related images and feature extraction methods are easy, effective and less expensive. Also, it is possible to retrieve a very similar image to the one choose by the user.