In [1]:
```
import cv2
import numpy as np
from matplotlib import pyplot as plt
```

Function for Color Histogram Analysis for RGB Channels for an Image

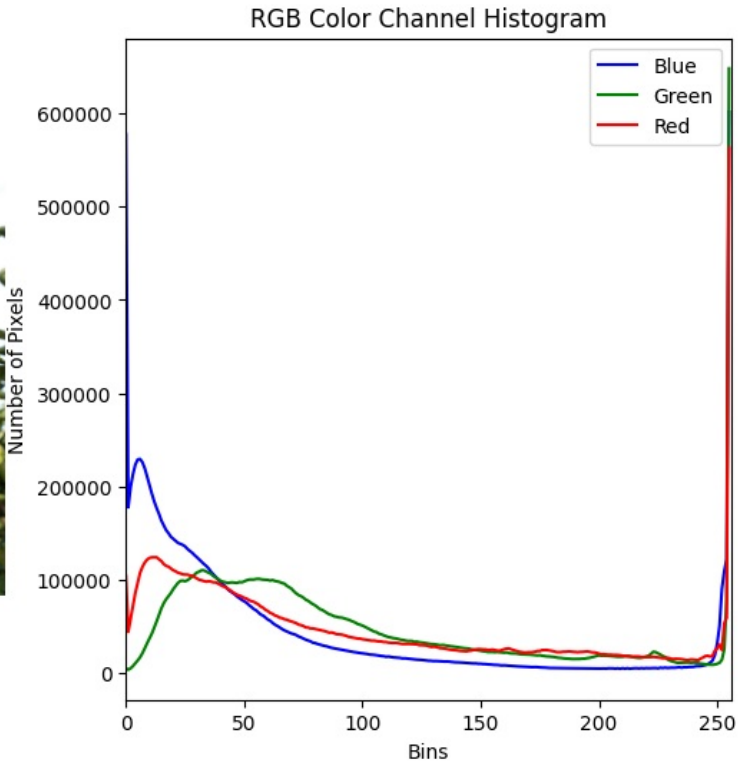
In [2]:
```
def plot_rgb_histogram(image_path):
    image = cv2.imread(image_path)
    if image is None:
        print("Error: Could not load image.")
        return

    # Converting the image from BGR to RGB for display
    image_rgb = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)

    # Splitting the image into its B, G, R channels
    channels = cv2.split(image)
    colors = ('b', 'g', 'r')
    channel_names = ('Blue', 'Green', 'Red')

    plt.figure(figsize=(12, 6))

    # Displaying the image
    plt.subplot(1, 2, 1)
    plt.imshow(image_rgb)
    plt.title("Image")
    plt.axis('off')

    # Plotting the histogram
    plt.subplot(1, 2, 2)
    plt.title("RGB Color Channel Histogram")
    plt.xlabel("Bins")
    plt.ylabel("Number of Pixels")

    for channel, color, name in zip(channels, colors, channel_names):
        hist = cv2.calcHist([channel], [0], None, [256], [0, 256])
        plt.plot(hist, color=color, label=name)
        plt.xlim([0, 256])

    plt.legend()
    plt.show()
```

Function for Gray Scale Histogram Analysis for an Image

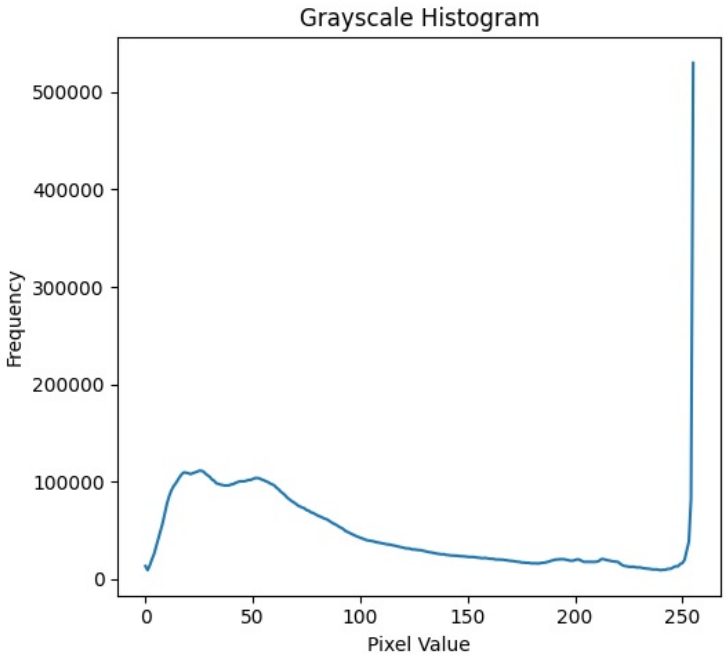
In [3]:
```
def plot_grayscale_histogram(image_path):
    img = cv2.imread(image_path, 0)
    if img is None:
        print("Error: Could not load image.")
        return

    # Displaying the image
    plt.figure(figsize=(10, 5))

    plt.subplot(1, 2, 1)
    plt.imshow(img, cmap='gray')
    plt.title('Grayscale Image')
    plt.axis('off')

    # Calculating frequency of pixels in range 0-255
    histg = cv2.calcHist([img], [0], None, [256], [0, 256])

    # Plotting the histogram
    plt.subplot(1, 2, 2)
    plt.plot(histg)
    plt.title('Grayscale Histogram')
    plt.xlabel('Pixel Value')
    plt.ylabel('Frequency')

    plt.tight_layout()
    plt.show()
```

In [4]:
```
path1 = '/content/apple.jpg'
```

In [5]:
```
plot_rgb_histogram(path1)
```



In [6]:
```
plot_grayscale_histogram(path1)
```



In [6]: