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In [4]: import cv2
import matplotlib.pyplot as plt
import numpy as np
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In [13]: def extract_and_plot_histogram(image_path):
# Load image
img = cv2.imread(image_path)
if img is None:
    print("Error: Could not load image.")
    return

# Convert BGR → RGB
img_rgb = cv2.cvtColor(img, cv2.COLOR_BGR2RGB)

channels = ('Red', 'Green', 'Blue')
colors = ('r', 'g', 'b')

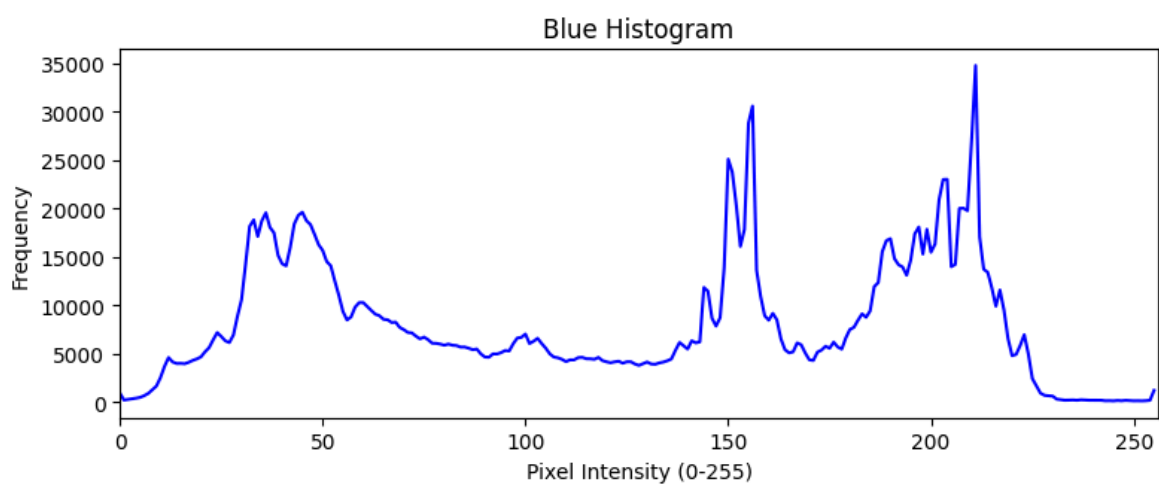
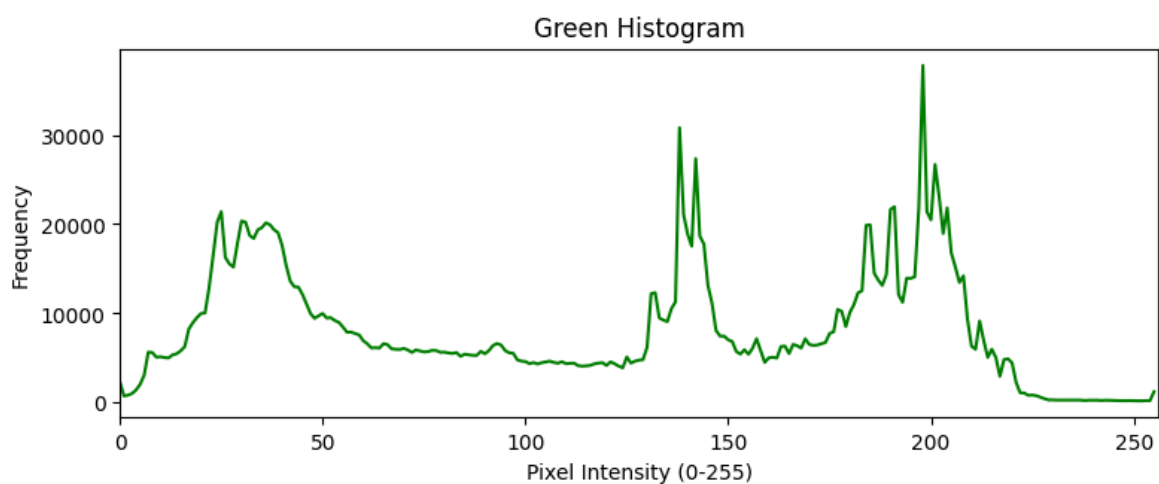
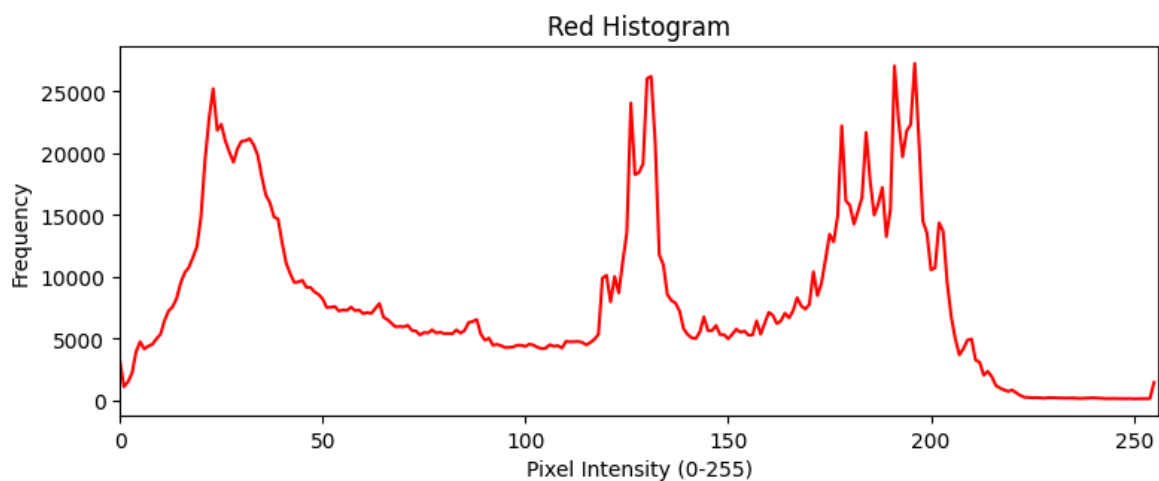
plt.figure(figsize=(8, 10))

for i, col in enumerate(channels):
    hist = cv2.calcHist([img_rgb], [i], None, [256], [0, 256])

    plt.subplot(3, 1, i+1)
    plt.plot(hist, color=colors[i])
    plt.xlim([0, 256])
    plt.title(f"{col} Histogram")
    plt.xlabel("Pixel Intensity (0-255)")
    plt.ylabel("Frequency")

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

```
In [14]: # ---- Example Usage ----
features = extract_and_plot_histogram("./input/sample.png")
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In [ ]: