In [4]:
```
#EXPERIMENT 1
!pip install opencv-python matplotlib
```

```
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: opencv-python in c:\users\student\appdata\roaming
\python\python39\site-packages (4.10.0.84)
Requirement already satisfied: matplotlib in c:\programdata\anaconda3\lib\site-p
ackages (3.5.1)
Requirement already satisfied: numpy>=1.19.3 in c:\programdata\anaconda3\lib\sit
e-packages (from opencv-python) (1.21.5)
Requirement already satisfied: fonttools>=4.22.0 in c:\programdata\anaconda3\lib
\site-packages (from matplotlib) (4.25.0)
Requirement already satisfied: cycler>=0.10 in c:\programdata\anaconda3\lib\sit
e-packages (from matplotlib) (0.11.0)
Requirement already satisfied: pillow>=6.2.0 in c:\programdata\anaconda3\lib\sit
e-packages (from matplotlib) (9.0.1)
Requirement already satisfied: python-dateutil>=2.7 in c:\programdata\anaconda3
\lib\site-packages (from matplotlib) (2.8.2)
Requirement already satisfied: packaging>=20.0 in c:\programdata\anaconda3\lib\s
ite-packages (from matplotlib) (21.3)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\programdata\anaconda3\lib
\site-packages (from matplotlib) (1.3.2)
Requirement already satisfied: pyparsing>=2.2.1 in c:\programdata\anaconda3\lib
\site-packages (from matplotlib) (3.0.4)
Requirement already satisfied: six>=1.5 in c:\programdata\anaconda3\lib\site-pac
kages (from python-dateutil>=2.7->matplotlib) (1.16.0)
```

In [5]:
```
#EXPERIMENT 1 PART A

import cv2
from matplotlib import pyplot as plt
# Path to the image file
image_path = "C:/Users/Student/Documents/Exp1image.jpg"
# Read the image
image = cv2.imread(image_path)
# Check if the image is loaded successfully
if image is None:
    print("Error: Could not read the image. Check the file path.")
else:
    # Convert the image from BGR to RGB for displaying with matplotlib
    image_rgb = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)
    # Display the image using matplotlib
    plt.imshow(image_rgb)
    plt.axis('off') # Turn off axis
    plt.title("Image")
    plt.show()
```

In [6]:
```
#EXPERIMENT 1 PART B METHOD 1
import cv2
# Load an image
image_path = "C:/Users/Student/Documents/Exp1image.jpg"
image = cv2.imread(image_path,1)
px=image[100,100]
print(px)
blue = image[:,:,0]
print(blue)
print(image.shape)
print(image.size)
```

```
[218 218 218]
[[218 218 218 ... 218 218 218]
 [218 218 218 ... 218 218 218]
 [218 218 218 ... 218 218 218]
 ...
 [218 218 218 ... 218 218 218]
 [218 218 218 ... 218 218 218]
 [218 218 218 ... 218 218 218]]
(316, 404, 3)
382992
```

In [7]:
```python
#EXPERIMENT 1 PART B METHOD 2
import cv2
import numpy as np
from matplotlib import pyplot as plt
# Load an image
image_path = "C:/Users/Student/Documents/Exp1image.jpg"
image = cv2.imread(image_path)
# Check if the image is loaded successfully
if image is None:
    print("Error: Could not load the image.")
else:
    # Convert the image from BGR to RGB for displaying in Jupyter Notebook
    image_rgb = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)
    # Display the original image
    plt.figure(figsize=(8, 6))

    plt.imshow(image_rgb)
    plt.axis('off')
    plt.title("Original Image")
    plt.show()
    # Get image dimensions
    height, width, channels = image.shape
    print(f"Image Dimensions: {height}x{width}, Channels: {channels}")
    # Access a specific pixel
    row, col = 100, 150 # Example pixel location
    pixel_value = image[row, col]
    print(f"Pixel value at ({row}, {col}): {pixel_value} (BGR Format)")
    # Modify a specific pixel
    image[row, col] = [0, 255, 0] # Change the pixel to green
    print(f"Modified pixel value at ({row}, {col}): {image[row, col]} (BGR Forma
    # Access individual color planes (Blue, Green, Red)
    blue_plane = image[:, :, 0] # Blue channel
    green_plane = image[:, :, 1] # Green channel
    red_plane = image[:, :, 2] # Red channel
    # Display the color planes
    plt.figure(figsize=(12, 8))
    plt.subplot(1, 3, 1)
    plt.imshow(blue_plane, cmap='gray')
    plt.axis('off')
    plt.title("Blue Plane")
    plt.subplot(1, 3, 2)
    plt.imshow(green_plane, cmap='gray')
    plt.axis('off')
    plt.title("Green Plane")
    plt.subplot(1, 3, 3)
    plt.imshow(red_plane, cmap='gray')
    plt.axis('off')
    plt.title("Red Plane")
    plt.show()
```

Original Image


```
Image Dimensions: 316x404, Channels: 3
Pixel value at (100, 150): [218 218 218] (BGR Format)
Modified pixel value at (100, 150): [  0 255   0] (BGR Format)
```

Blue Plane

Green Plane

Red Plane

In [ ]: