1. **Conversion of color image into gray-scale image.**

   Background:

   Grayscale images are digital images that have only shades of gray and no color. A grayscale image is created by converting a color image to black and white or by using a grayscale filter. Grayscale images are a kind of black-and-white or gray monochrome, are composed exclusively of shades of gray. The contrast ranges from black at the weakest intensity to white at the strongest.

   Language: Python

   Source Code:
```python
import cv2
import numpy as np

img= cv2.imread('./Image_Processing/photo2.jpg')
image= cv2.resize(img,(400, 500))

gray_image = cv2.cvtColor(image, cv2.COLOR_BGR2GRAY)

# Conversion Image into 3 channel for concatenation process
img2 = np.zeros_like(image)
img2[:,:,0] = gray_image
img2[:,:,1] = gray_image
img2[:,:,2] = gray_image

both_image = np.hstack([image, img2])
cv2.imshow('Original&Grayimage',both_image)
cv2.waitKey(0)
cv2.destroyAllWindows()
```
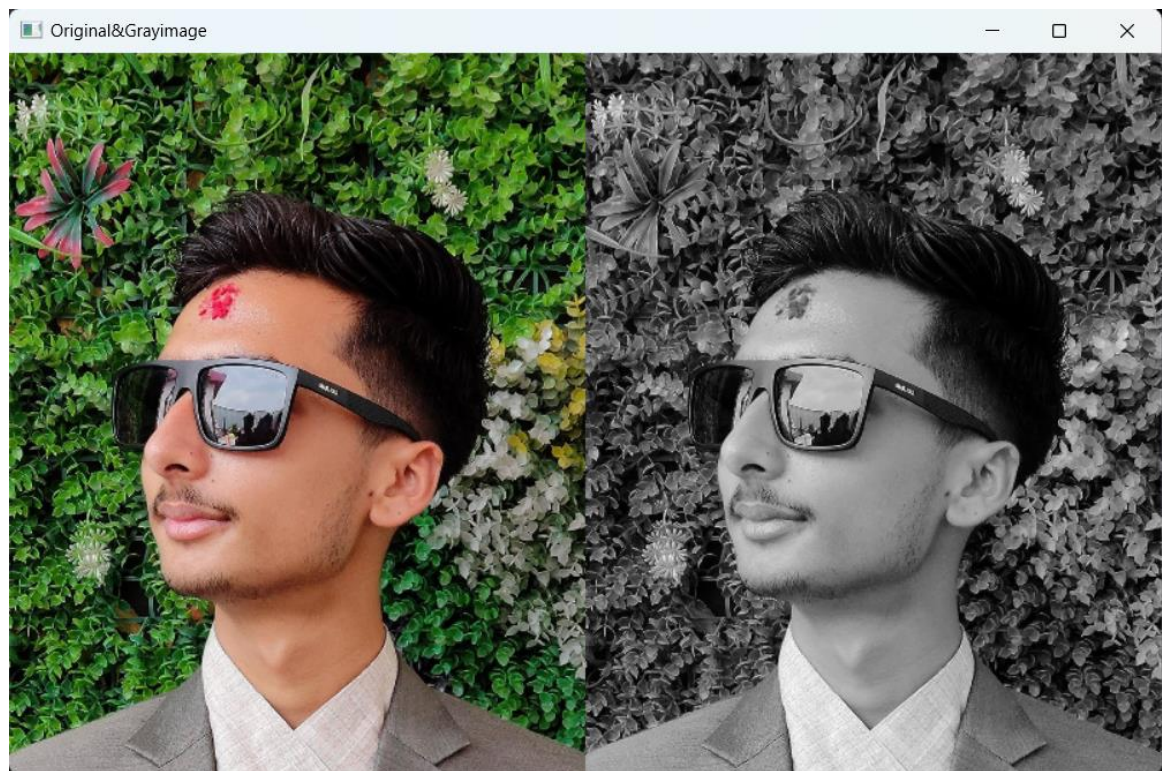
Output:

Conclusion:

In this lab work, we have learned how to convert a color (RGB) image into a grayscale image using OpenCV library. The process involves reading the original image using cv2.imread() function, converting it to grayscale using cv2.cvtColor() function with cv2.COLOR_BGR2GRAY flag, and displaying the grayscale image using cv2.imshow() function. In addition np.zeros_like() function is used to change the channel of image (i.e. 3 dimensional array)

2. Conversion of color image into black and white image

Background:
The image which consist of only black and white color is called BLACK AND WHITE IMAGE. The process of involves converting the color image into grayscale image and the grayscale image into binary, where each pixel is either black or white. Thresholding is the most common method for converting a grayscale image into a binary image.

Language: Python

Source Code:

```
import cv2
import numpy as np

img= cv2.imread('./Image_Processing/photo2.jpg')
img = cv2.resize(img,(400, 500))

image = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
(thresh, bimage1) = cv2.threshold(image, 127, 255, cv2.THRESH_BINARY)
(thresh, bimage2) = cv2.threshold(image, 150, 200, cv2.THRESH_BINARY)

both_image = np.hstack([image, bimage1, bimage2])

cv2.imshow('Black&White_image_with_different_threshold_values',both_image)
cv2.waitKey(0)
cv2.destroyAllWindows()
```

Output:

Conclusion:

In this lab work, we have learned how to convert a color (RGB) image into a black and white image using OpenCV library. The process involves reading the original image using cv2.imread() function, then converting it to grayscale using cv2.cvtColor() function with cv2.COLOR_BGR2GRAY flag, and then converting grayscale image into black and white using cv2.threshold() function and displaying the grayscale image using cv2.imshow() function.