1. Read an image from a stored file and display the image using OpenCV.
2. Read an image from a stored file and display the image using PIL.
3. Read an image from a stored file and display the image using Matplotlib.
4. Read an image from a stored file and display the image using scikit-image.
5. Extract information like size, shape, data type of an image using OpenCV.
6. Split an RGB image into three channels and display each channel using OpenCV.
7. Split an RGB image into three channels and merge the channels as [B,G,R] and [G,B,R] format. Display the two merged images. (use OpenCV)
8. Extract information like size, format, mode of an image using PIL.
9. Read an image and rotate the image in 30, 60, 90, 120, 150 degree using PIL. Display all rotated images.
10. Read an image and flip the image Horizontally and Vertically. Display all result images.

# Assignment 2

## Image Basics

**1.** Read an image from a stored file and display the image using OpenCV.

```
import cv2
from google.colab.patches import cv2_imshow
# Read the image
image = cv2.imread('example.jpg')
# Display the image
cv2_imshow(image)
```

**Output:**

**2.** Read an image from a stored file and display the image using PIL.

```
from PIL import Image
import matplotlib.pyplot as plt
image = Image.open('example.jpg')
# Display the image using Matplotlib
plt.imshow(image)
plt.axis('off')  # Hide axis
plt.show()
```

**Output:**

**3.** Read an image from a stored file and display the image using Matplotlib.

```
import matplotlib.pyplot as plt
import matplotlib.image as mpimg
# Read the image
image = mpimg.imread('example.jpg')
# Display the image
plt.imshow(image)
plt.axis('off')  # Hide axis
plt.show()
```

**Output:**

**4.** Read an image from a stored file and display the image using scikit-image.

```
from skimage import io
import matplotlib.pyplot as plt
# Read the image
image = io.imread('example.jpg')
# Display the image
plt.imshow(image)
plt.axis('off')  # Hide axis
plt.show()
```

**Output:**

**5.** Extract information like size, shape, data type of an image using OpenCV.

```
import cv2

# Read the image
image = cv2.imread('example.jpg')
# Extract information
height, width, channels = image.shape
data_type = image.dtype
# Print information
print(f"Size: ({width}, {height})")
print(f"Shape: {image.shape}")
print(f"Data Type: {data_type}")
```

**Output:**

```
Size: (6048, 4032)
Shape: (4032, 6048, 3)
Data Type: uint8
```

**6.** Split an RGB image into three channels and display each channel using OpenCV.

```
import cv2
import numpy as np
from google.colab.patches import cv2_imshow

# Read the image
image = cv2.imread('example.jpg')
# Split the image into B, G, R channels
b, g, r = cv2.split(image)
# Display the channels
cv2_imshow(b)
cv2_imshow(g)
cv2_imshow(r)
```

**Output:**

**7.** Split an RGB image into three channels and merge the channels as [B,G,R] and [G,B,R] format. Display the two merged images. (use OpenCV)

```
import cv2
import numpy as np
from google.colab.patches import cv2_imshow

# Read the image
image = cv2.imread('example.jpg')
# Split the image into B, G, R channels
b, g, r = cv2.split(image)
# Merge channels as [B, G, R]
bgr_merged = cv2.merge([b, g, r])
# Merge channels as [G, B, R]
gbr_merged = cv2.merge([g, b, r])
# Display the merged images
cv2_imshow(bgr_merged)
cv2_imshow(gbr_merged)
```

**Output:**

**8.** Extract information like size, format, mode of an image using PIL.

```
from PIL import Image
# Read the image
```

```
image = Image.open('example.jpg')
# Extract information
size = image.size
format = image.format
mode = image.mode
# Print information
print(f"Size: {size}")
print(f"Format: {format}")
print(f"Mode: {mode}")
```

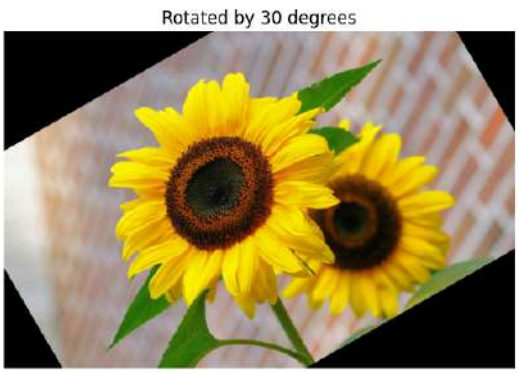
**Output:**

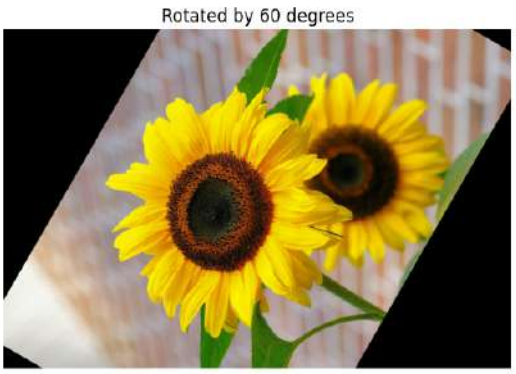
```
Size: (6048, 4032)
Format: JPEG
Mode: RGB
```

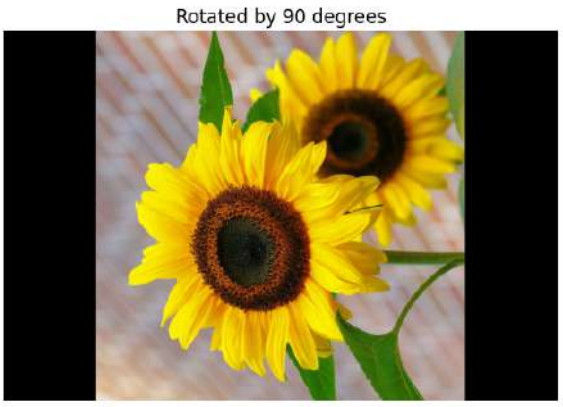
**9.** Read an image and rotate the image in 30, 60, 90, 120, 150 degree using PIL. Display all rotated images.

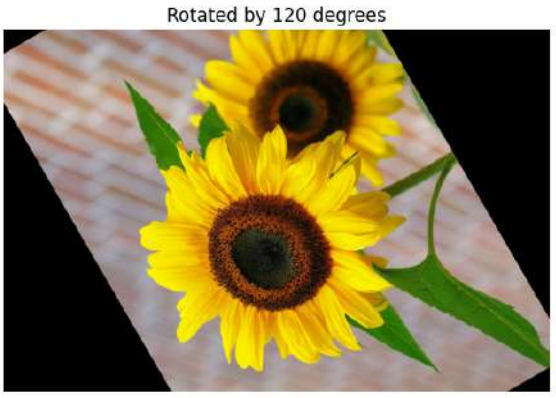
```
from PIL import Image
import matplotlib.pyplot as plt
# Read the image
image = Image.open('example.jpg')
# Rotate the image
angles = [30, 60, 90, 120, 150]
rotated_images = [image.rotate(angle) for angle in angles]
# Display the rotated images
for angle, rotated_image in zip(angles, rotated_images):
    plt.figure()
    plt.title(f'Rotated by {angle} degrees')
    plt.imshow(rotated_image)
    plt.axis('off')
    plt.show()
```

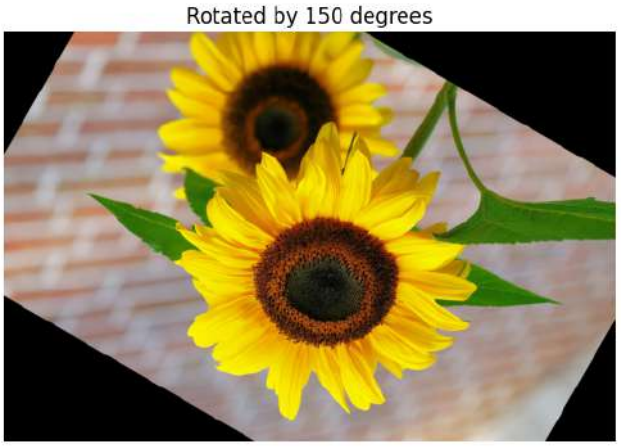
**Output:**






**10.** Read an image and flip the image Horizontally and Vertically. Display all result images.

```
from PIL import Image
import matplotlib.pyplot as plt

# Read the image
image = Image.open('example.jpg')
# Flip the image
horizontal_flip = image.transpose(Image.FLIP_LEFT_RIGHT)
vertical_flip = image.transpose(Image.FLIP_TOP_BOTTOM)
# Display the flipped images
plt.figure()
plt.title('Original Image')
plt.imshow(image)
plt.axis('off')
plt.figure()
plt.title('Horizontal Flip')
plt.imshow(horizontal_flip)
plt.axis('off')
plt.figure()
plt.title('Vertical Flip')
plt.imshow(vertical_flip)
```

```
plt.axis('off')
plt.show()
```

**Output:**