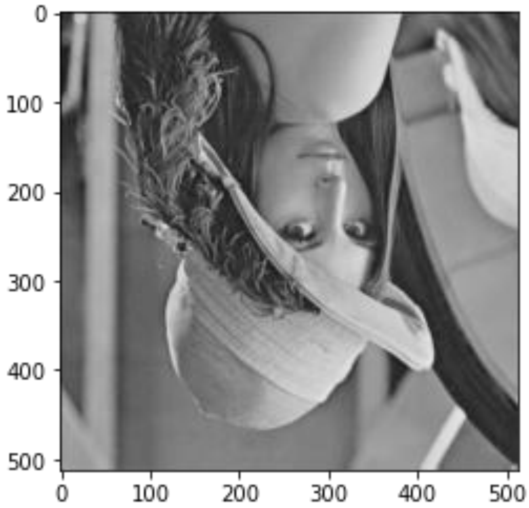
電腦視覺 hw1 資工所碩一 R09922127 林聖哲

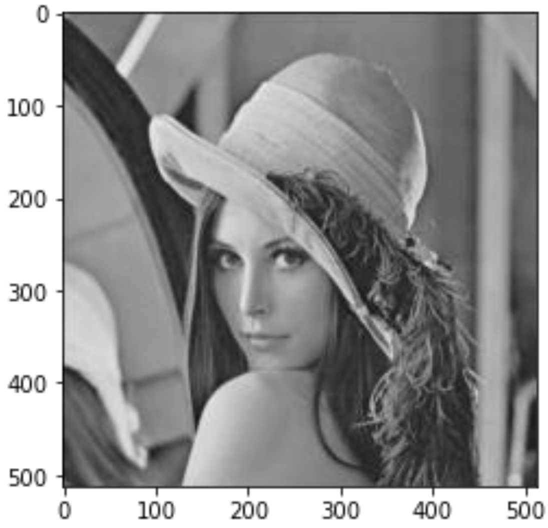
Part1. Write a program to do the following requirement.

original

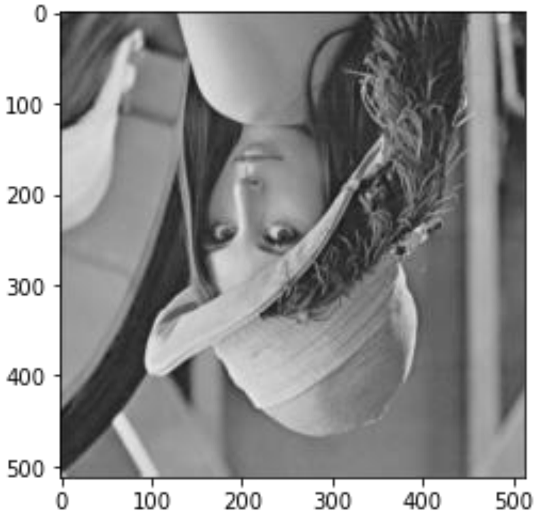
(a) upside-down lena.bmp



(b) right-side-left lena.bmp



(c) diagonally flip lena.bmp



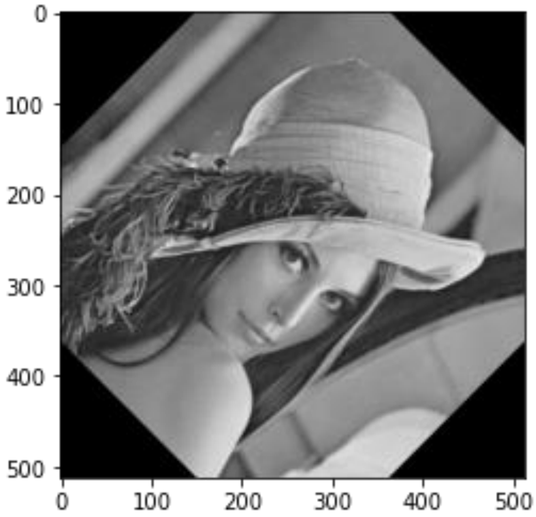
利用 python 的 OpenCV 讀檔 得到三維的 numpy array (縱軸, 橫軸, RGB)

主要利用以下迴圈分別得到上面的結果

```
for i in range(s[2]):
        for j in range(s[0]):
                for k in range(s[1]):
                        ud[j,k,i] = img[s[0]-j-1,k,i]
                        rl[j,k,i] = img[j,s[1]-k-1,i]
                        df[j,k,i] = img[s[0]-j-1,s[1]-k-1,i]
```

Part2. Write a program or use software to do the following requirement.

(d) rotate lena.bmp 45 degrees clockwise

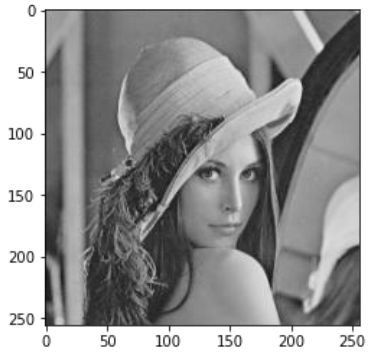


主要利用 OpenCV 裡面的函式 getRotationMatrix2D 來做旋轉

第一個參數是 center 第二個參數是逆時針轉幾度 第三個參數是 scale

```
h, w = img.shape[:2]
M = cv2.getRotationMatrix2D((w//2, h//2), -45, 1)
rot = cv2.warpAffine(img, M, (w, h))
```

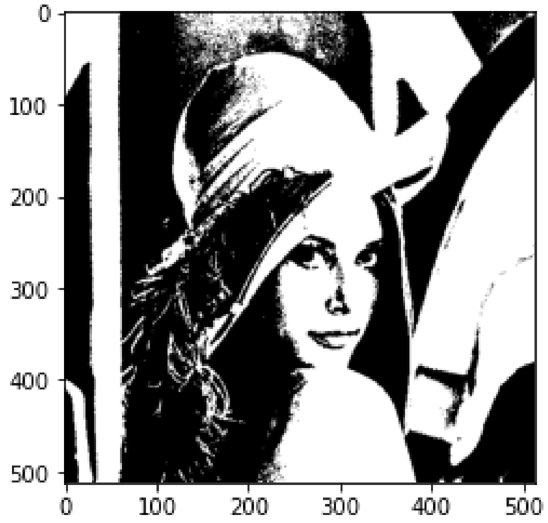
(e) shrink lena.bmp in half



取偶數行偶數列的元素

```
shr = np.zeros((img.shape[0]//2,img.shape[1]//2,img.shape[2]))
for i in range(s[2]):
        for j in range(s[0]//2):
                for k in range(s[1]//2):
                        shr[j,k,i] = img[j*2,k*2,i]
```

(f) binarize lena.bmp at 128 to get a binary image



把大於 128 的設為 255  小於等於的設為 0

```
bn = np.zeros(img.shape)
for i in range(s[2]):
    for j in range(s[0]):
        for k in range(s[1]):
            if img[j,k,i]>128:
                bn[j,k,i] = 255
            else:
                bn[j,k,i] = 0
```