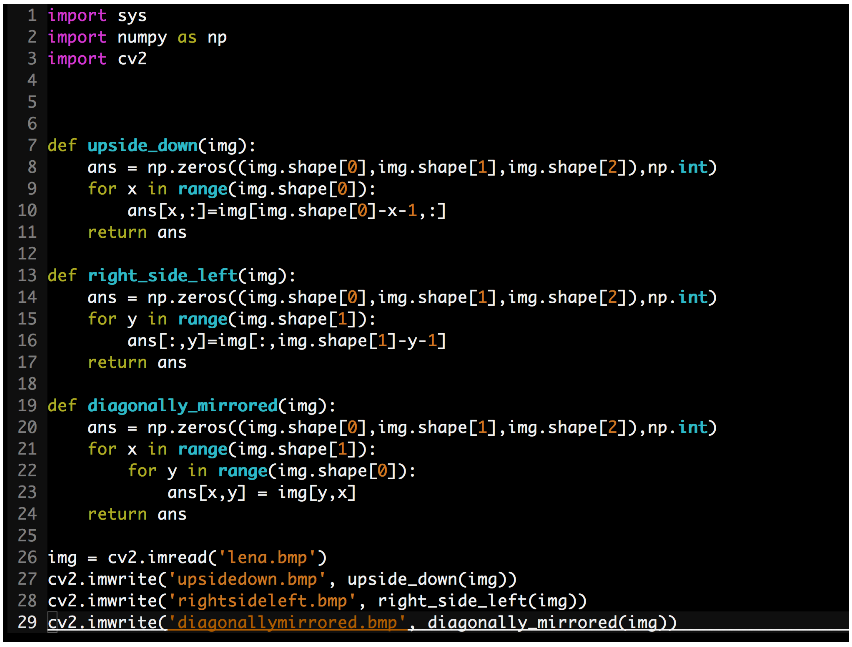
B05902111 婁敦傑

Computer Vision HW1

Part1: write a program to generate

(a) upside-down lena.im
(b) right-side-left lena.im
(c) diagonally mirrored lena.im

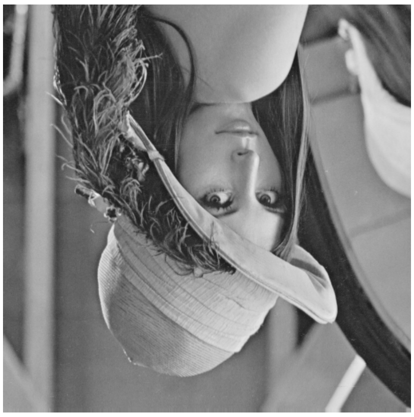
這個部分的程式，我是使用python3.7.0的版本，圖片的部分使用OpenCV去做基本的I/O，程式碼的部分如下圖，三個函式都是利用for迴圈去實作。upside-down和right-side-left是長和寬分別減去當前的座標去達到上下交換和左右交換的圖像，diagonally mirrored則是交換xy座標達成鏡射的效果。
執行時的指令為 pyhton3 cv_hw1.py



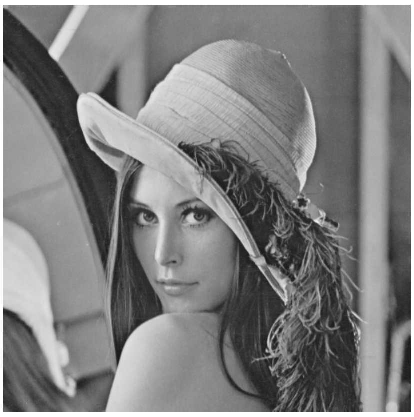
```python
import sys
import numpy as np
import cv2



def upside_down(img):
    ans = np.zeros((img.shape[0],img.shape[1],img.shape[2]),np.int)
    for x in range(img.shape[0]):
        ans[x,:]=img[img.shape[0]-x-1,:]
    return ans

def right_side_left(img):
    ans = np.zeros((img.shape[0],img.shape[1],img.shape[2]),np.int)
    for y in range(img.shape[1]):
        ans[:,y]=img[:,img.shape[1]-y-1]
    return ans

def diagonally_mirrored(img):
    ans = np.zeros((img.shape[0],img.shape[1],img.shape[2]),np.int)
    for x in range(img.shape[1]):
        for y in range(img.shape[0]):
            ans[x,y] = img[y,x]
    return ans

img = cv2.imread('lena.bmp')
cv2.imwrite('upsidedown.bmp', upside_down(img))
cv2.imwrite('rightsideleft.bmp', right_side_left(img))
cv2.imwrite('diagonallymirrored.bmp', diagonally_mirrored(img))
```

lena.bmp

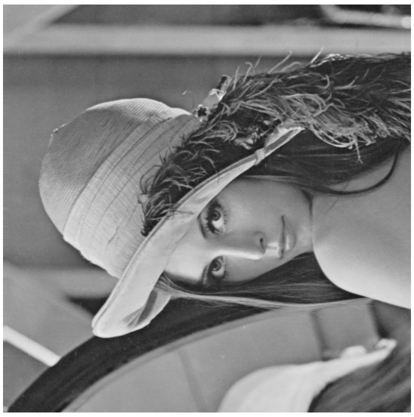
(a)upside-down



b)right-side-left



(c)diagonally mirrored



Part2: Use Photoshop to

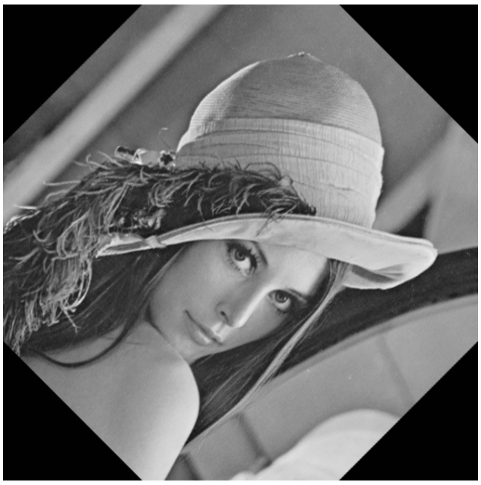
(a) rotate lena.im 45 degrees clockwise
(b) shrink lena.im in half
(c) binarize lena.im at 128 to get a binary image
註：(a)和(b)都有先在圖片加上背景

(a) 影像 -> 影像調整 -> 任意 -> 45度

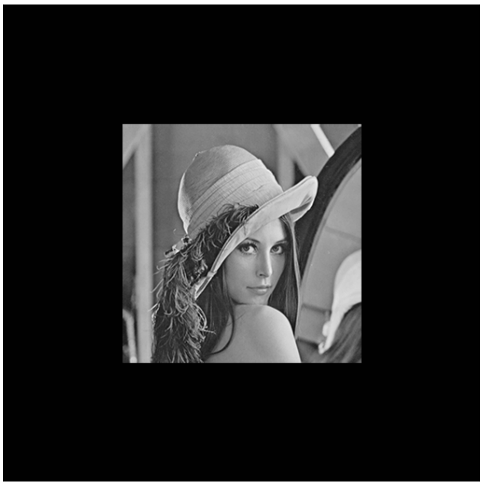
(b) 影像 -> 影像尺寸 -> 將長寬改成256*256

(c) 影像 -> 調整 -> 臨界值 -> 改成128

(a) rotate 45 degrees



(b) shrink in half



(c) binarize at 128