Homework 1.　Basic Image Manipulation

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使用 Python 來實作

Part I

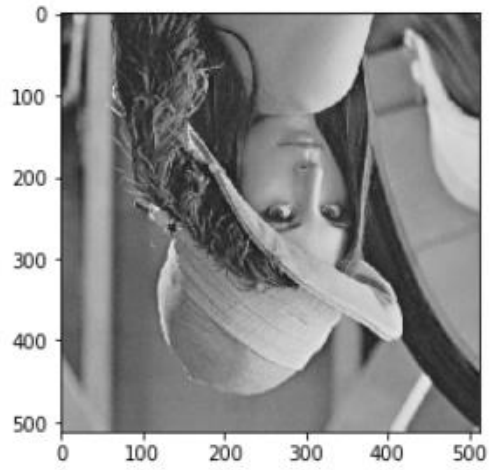
1. generate upside-down lena.im

做法: 將垂直方向的 pixel 顛倒過來

Code:

```
upsidedown_img = img[::-1]
```

輸出結果:



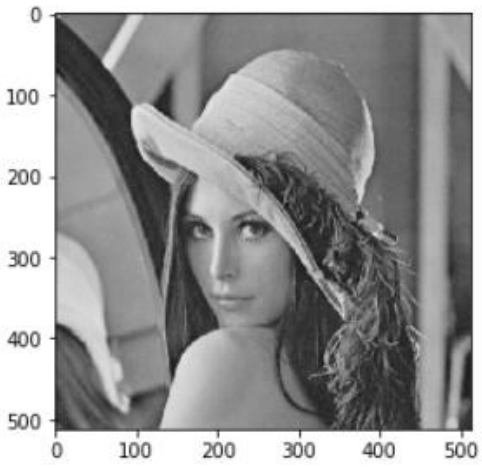
2. right-side-left lena.im

做法: 將水平方向的 pixel 顛倒過來

Code:

```
rightleft_img = img[::, ::-1]
```

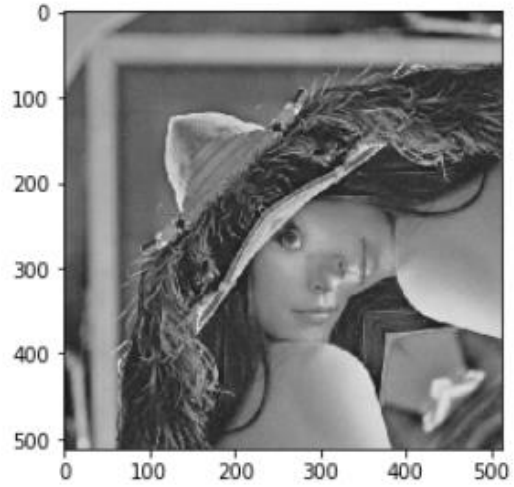
輸出結果:



3. diagonally mirrored lena.im
做法: 將對角的位置的數值設為一樣
Code:

```
for i in range(mirror1.shape[0]):
    for j in range(mirror1.shape[1]):
        mirror1[i][j]=mirror1[j][i]
```

輸出結果:

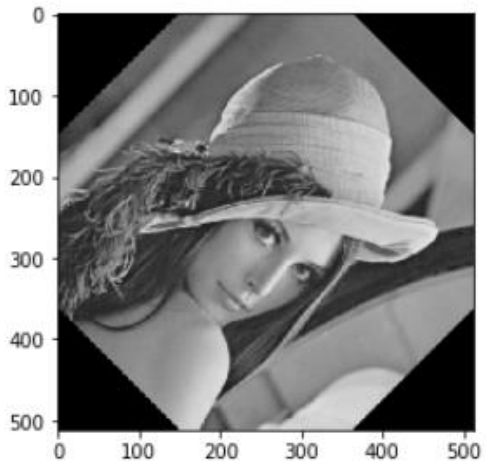


Part II

1. rotate lena.im 45 degrees clockwise
做法: 先計算出 image 的中心，接著使用 openCV 提供的 function "getrotationmatrix2d" 將塗沿著中心旋轉 45 度
Code:

```
image_center = tuple(np.array(img.shape[1::-1]) / 2)
rot_mat = cv2.getRotationMatrix2D(image_center, -45, 1.0)
rotate = cv2.warpAffine(img, rot_mat, img.shape[1::-1], flags=cv2.INTER_LINEAR)
```

輸出結果:



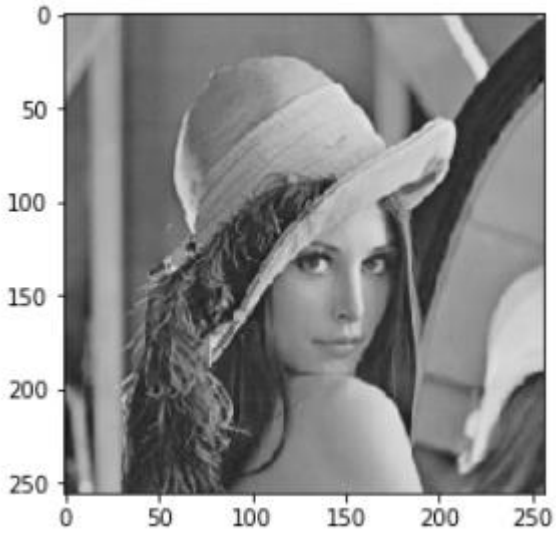
2. shrink lena.im in half

做法:使用 openCV 提供的 function “resize” 沿 X 軸和 Y 軸縮成 0.5 倍

Code:

half = cv2.resize(img, (0,0), fx=0.5, fy=0.5)

輸出結果:



3. binarize lena.im at 128 to get a binary image

做法:使用 openCV 提供的 function “threshold” 將數值大於或小於 128 pixel 做分割，並選用” THRESH_BINARY”參數

Code:

binary= cv2.threshold(img, 128, 255, cv2.THRESH_BINARY)[1]

輸出結果: