Part.1

`Language: Python3.8.3  Modules: OpenCV(cv2)`

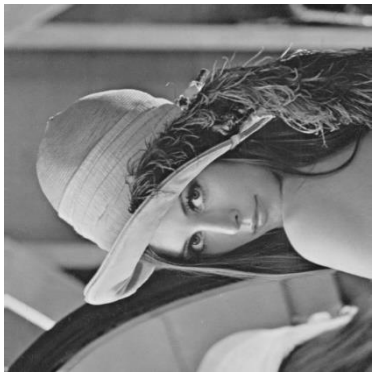
(a) upside-down lena.bmp

Algorithm: For each pixel, exchange it with the pixel in the same column but reverse row, so we can get the upside-down image.

(b) right-side-left lena.bmp

Algorithm: For each pixel, exchange it with the pixel in the same row but reverse column, so we can get the right-side-left image

(c) diagonally flip lena.bmp



Algorithm: For each pixel, exchange it with the pixel that exchange its row and column coordinate, so we can realize “diagonally flipping” (Just like a transpose of matrix)

Part.2

`Language: Python3.8.3  Modules: OpenCV(cv2), imutils`

(d) rotate lena.bmp 45 degrees clockwise

Algorithm: We use the method "rotate_bound()" in the module "imutils" to rotate the image 45 degree clockwise.

(e) shrink lena.bmp in half

Algorithm: We use the method "resize()" in the module "imutils" to shrink the image in half.

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

Algorithm: We traverse all the pixel, if its value is higher than or equal to 128, then raise it to 255 (brightest). Otherwise, reduce it to 0 (darkest).