R09945020 朱彥如

Homework 1

Part1. Write a program to do the following requirement.
(a) upside-down lena.bmp
(b) right-side-left lena.bmp
(c) diagonally flip lena.bmp

The requirements above are accomplished by Python and the process is done by for loops pixel by pixel with the assistance of numpy, matplotlib, and PIL. The results are shown in figure 1.

Figure 1. The left image is the upside-down version of lena.bmp. The middle image is the right-side-left version of lena.bmp. The left image is the diagonally flipped version of lena.bmp.

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Part2. Write a program or use software to do the following requirement.
(d) rotate lena.bmp 45 degrees clockwise
(e) shrink lena.bmp in half
(f) binarize lena.bmp at 128 to get a binary image

The requirements above are still accomplished by Python with libraries numpy, matplotlib, cv2, and PIL. The rotated image is made by rotate() function from PIL.Image, and the shrunk image is made by cv.resize() function with INTER_AREA method. All results are shown in figure 2.

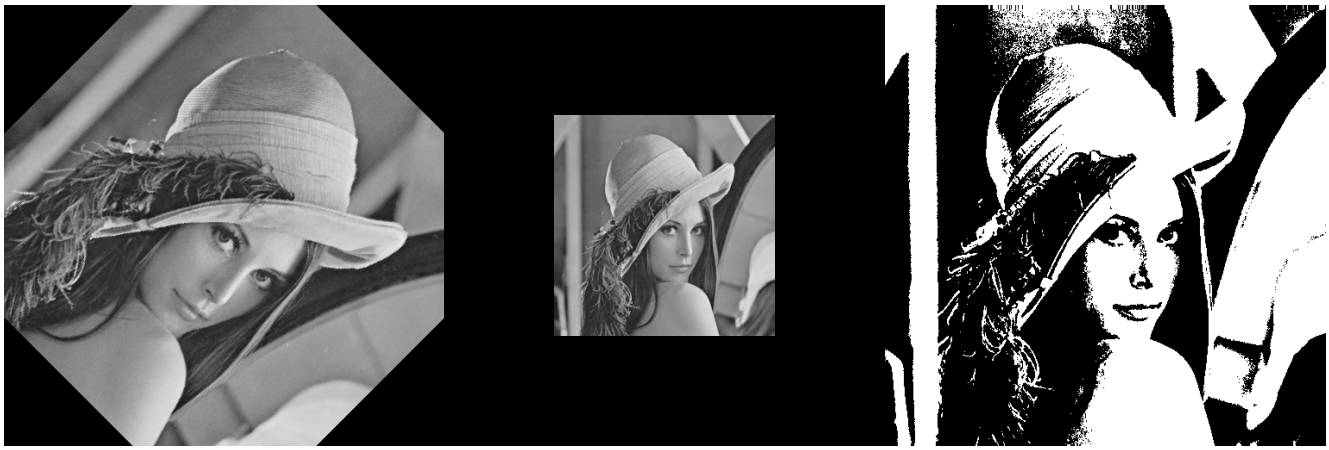

Figure 2. The left image is lena.bmp rotated 45 degree clockwise. The middle image is lena.bmp shrunk in half. The right image is lena.bmp binarized at 128.