CV HW1 Report

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1 Programming

Figure 1: original lena picture

I use *Python* as my programming language and *Pillow* as my Image Library. At first, I read the image in, then load pixel data of the image into Python *list* by calling this function,

```
pixel_data = list(img.getdata())
```

1. Upside-down the image. The source code of this part is ***upside-down.py***.

```
for y in range(height):
  for x in range(width):
    result_data[y*width+x] = pixel_data[(height-y-1)*width+x]
```

Figure 2: upside-down lena picture

2. Right-side-left the image. The source code of this part is ***right-side-left.py***.

```
for y in range(height):
  for x in range(width):
    result_data[y*width+x] = pixel_data[y*width+(width-x-1)]
```

Figure 3: right-side-left lena picture

3. Diagonal mirror the image. The source code of this part is ***diagonal-mirror.py***.

```
for y in range(height):
  for x in range(width):
    result_data[y*width+x] = pixel_data[x*width+y]
```

Figure 4: diagonal-mirrored lena picture

2 Image Processing Software

I use GIMP to manipulate lena.bmp image.

1. rotate 45 degrees clockwise
   Use rotate tool to rotate image in 45 degrees.

Figure 5: rotated lena picture

2. shrink in half
   Use scale tool to scale image from 512×512 to 256×256.

Figure 6: half-shrinked lena picture

3. binarize at 128
   Use color tool and set up the threshold at 128 to binarized image.

Figure 7: binarized lena picture

3 How to Use

For running the three small program (*upside-down.py, right-side-left.py, diagonal-mirror.py*), you need to specify two parameters. The 1^{st} is the input image name, and the 2^{nd} is the output image name.

```
> python upside-down.py lena.bmp output.jpg
```