Lab 3

Description

This lab aims at helping you get familiar with image processing.

There is an encryption program that takes a string with the length of 3, and it will generate three numbers corresponding to various inputs, and encrypt these three numbers into a ".bmp" image.

You are provided with a set of images (in the folder "lab3_encrypt_image"), which are the outputs of the encryption program. The file name is the input string of the encryption program. For example, "Aa0.bmp" is the output image when the encryption program takes the input 'Aa0'. The original image of the ".bmp" is "origin.bmp", you may extract information by comparing the output ".bmp" file and "origin.bmp".

Task

You need to write a program (or a few programs if necessary) to process the output images of the encryption program, and make the three encrypted numbers visible, i.e. you can tell what three numbers are when look at the processed image(s) by naked eye.

You are not required to totally crack how the encryption program maps the input string to the three numers, but the input string of the encryption program will be the hint for you to choose how to process the output of the encryption program.

In the cases that you write several programs to do different kinds of processing, as long as you can tell the results from one of processed images, you will get full marks.

Input/Output

Input

The input of your program is the input string and the output images of the encryption program. You may read the image by the input string and do further manipulation.

Note that, the input string should be a string with the length 3. The first char is from 'A' to 'Z', the second char is from 'a' to 'z', the third char is from '0' to '9'.

Output

In this lab, output format doesn't matter. Given the inputs specified above, your program should process the image to make the three numbers visible.

During grading in lab time, you will be given a string and the corresponding image, then you run your program(s) to process the image. After processing, you just look at the image you processed and

tell TAs what the corresponding three numbers are.

Example

Here are some examples:

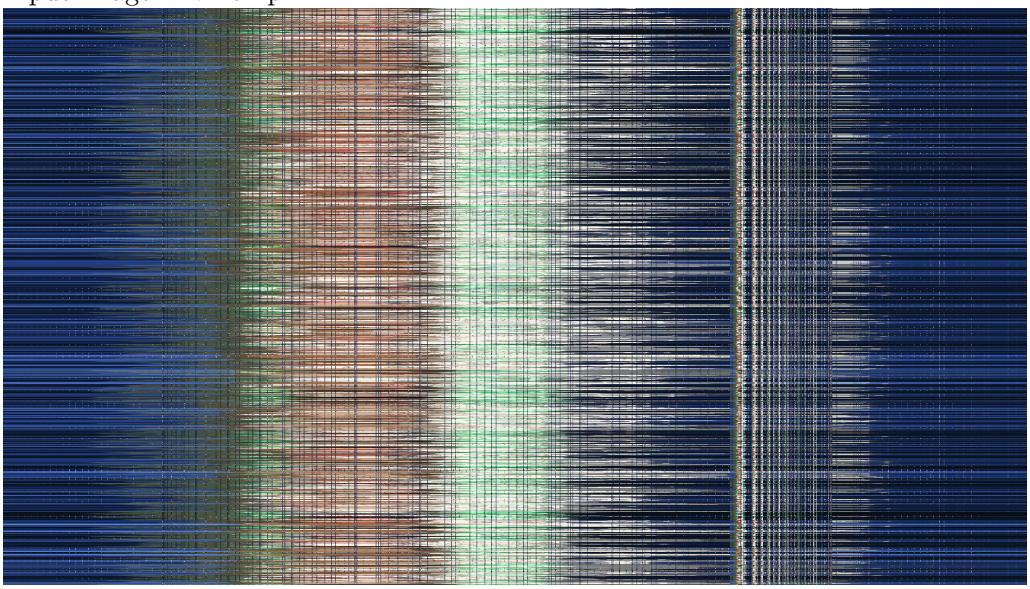
Input string: 'Aa0'

Input image: "Aa0.bmp":

Obviously, the result is "451", you can tell directly even without processing.

Input string: 'Kv2'

Input image:"Kv2.bmp":



The image processing result: (Of course, what your processed image looks like depends on you. As long as you can tell what the numbers are by your result image, you will get score.)

Hints

Here are some hints to make your life easier:

1. We encourgae you to try some matrix manipulations to find the right ways to process the images (and it is exactly what we expect you to learn and practice in this lab).
2. The function "reshape" may be used in this lab (once).
3. When you read the image in your matlab, please use "[img,a]=imread('lab3.bmp')". The "img" is the matrix you need to process, and the "a" is the colorbar, you don't need to do anything with it. When you output the image, please use "imwrite(img,a,'temp.bmp')" (what the file name is depends on you). Then you can get a colored image. If you use "imwrite(img,'temp.bmp')", you will get a grey scale image. Don't worry about the colorbar, I have made every image in this lab have the same colorbar. You only need to use it in the "imread" and "imwrite" functions.

Have fun (hopefully).