

## Digital Image Processing (1101) Homework #2

Due: 2021/11/15

評分標準

Note:

1. 上傳一個 zip 檔，檔名：學號\_姓名\_HW2.zip
2. 請將要執行的程式命名為 hw2.py
3. 沒寫註解者一律扣 10 分
4. Image 開啟請用「相對路徑」
5. 請註明額外使用的套件及安裝方法(可額外寫在 .txt 附上)
6. 請注意執行環境為 Linux 及 python3.5 以上

A1. Gray-level slicing: display images from certain range of gray levels given by users. Requirements: (1) users can define the range of gray level to be displayed; (2) users can choose either preserve original values of unselected area or display them as black color.	16 points ( Requirement : 6 points per item )
A2. Bit-Plane images: display the bit-plane images for the input image. Requirements: users should be able to select which bit-plane image to be displayed.	16 points ( Requirement : 6 points )
A3. Smoothing and sharpening: providing smoothing and sharpening options for the input images by using spatial filters. Requirements: users should be able to decide the degree of smoothing/sharpening from GUI.	18 points ( Requirement: 8 points )
B1. Download the images 'pirate_a.raw' and 'pirate_b.raw' as shown the above (512x512, 256 grayscale). Apply a 3x3 averaging mask to both of the images and make a comparison according to your result.	16 points ( Display : 6 points, explain : 10 points )
B2. Repeat (a), but apply a 3x3 median filter rather than the averaging mask to both of the images. Again, compare these two resultant images and explain it.	16 points ( Display : 6 points, explain : 10 points )
B3. Choose the best improved image you can obtain from (a) and (b), and apply the Laplacian mask of Figure 3.37(b) to this image. Display the filtered result and compare with the original image.	18 points ( Display : 6 points, explain : 12 points )

(This de-noising function can be merged into the GUI tool in Part A. )

**Bonus 5 points**