Digital Image Processing (1082)

Homework #2 (DUE: 2020.04.06)

(Please note that you have to upload your source codes (and a brief description about your codes or algorithms, optional) to the server before the deadline. Please check the course website for more details.)

Construct a simple image processing tool with GUI, providing the following functionalities:
(you can either use the one you constructed in HW#1 or create a new one.)

1. 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.
2. 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.
3. 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.
4. Display the Fourier Transformed images by taking "log|F(u,v)|". (Bonus: if you write the FFT function on your own instead of using built-in functions, you will get extra points.)
5. Amplitude and Phase images: Do 2D-FFT to obtain the amplitude and the phase. Then apply amplitude only and phase only spectrum, respectively, to the inverse 2DFFT in order to display the "amplitude image" and "phase image".