Lab Exercises: LAB 7
(Order-statistics Filtering)

General guidance:

1. Download the template code to make menus and demonstrate how to read, write and manipulate images.
2. All the images you use can be downloaded from the course website: http://www.eecs.qmul.ac.uk/~phao/IP/Images/
3. For RAW images, the files have no head data, just the image data as matrices stored. For our RAW images, we do not provide the colour components, and all the data are gray-scale values, a one-byte unsigned integer per pixel, value from 0 to 255.
4. The size of image Cameraman is of 128x128. Other images are of 512x512.

Exercise 1.
Salt-and-Pepper Noise

To add some salt-and-paper noise into an image. Salt noise is of white pixels, pixel value 255. Pepper noise is of black pixels, value 0. Noise positions can be given by using the pseudo-random number generating function, rand().

Exercise 2.
Min Filtering

To find the minimum gray value in a neighbourhood of a pixel (e.g. 3x3) and use it for the pixel.

Exercise 3.
Max Filtering

To find the maximum gray value in a neighbourhood of a pixel (e.g. 3x3) and use it for the pixel.

Exercise 4.
Midpoint Filtering

To find the minimum and the maximum gray values in a neighbourhood of a pixel (e.g. 3x3) and use the midpoint of the two values for the pixel.

Exercise 5.
Median Filtering

To find the median value in a neighbourhood of a pixel (e.g. 3x3) and use it for the pixel. A sorting algorithm may be needed for this filtering purpose.

Questions: What method is good for removing salt noise? What method is good for removing pepper noise? Are the images the same if a Min/Max/Midpoint/Median filter is applied twice?