Homework Project # 4A (5 points)   **Due Date: 02-14-19**

In Homework Project # 4, you will implement a filtering operation in the spatial domain. As a preliminary exercise this week, you are to write a MATLAB program that processes a grayscale image of dimensions m x n in neighborhoods of size k x k, with the assumption that the kernel size should be smaller than the image size (you may wish to perform a check during script execution).

Your code should be able to handle any image size and any kernel size, so user input is needed. The neighborhood should slide, pixel-by-pixel, across the entire image. You must allow border processing via each of the following options: no processing of border pixels, padding with a fixed value, and padding with image reflection. Prompt your user for their desired option and associated parameters. Include a default option and parameters.

You may also wish to consider how even-sized versus odd-sized kernels are handled.

Next, demonstrate the effectiveness of your code by processing two grayscale images of your choice, Image A and Image B. Edit the images to each be of size 100 x 100 pixels.

Part I.
Load Image A and perform a simple neighborhood-based averaging using the neighborhood size selected by the user. Display the input image, the padded image, and the final result.

Part II.
Display Image A and gradually transition to Image B using two methods a) block updating in a raster fashion using a n x n neighborhood (n = 1….100); and 2) pixel-by-pixel updating of random-ordered pixels until every pixel in the image has transitioned to the spatially-corresponding Image B value (similar to a PowerPoint "dissolve" transition).

In order to visualize the process, it may be necessary to include a pause statement within the updating loop. The command

  pause(n);

where n is the time in seconds (fractions of seconds are permitted), will be helpful.

Submit your input images and code via Pilot as *BME7112_HW4A_YLN_ImageFilename.ext* and *BME7112_HW3A_YLN_PartX_CodeFilename.m*, respectively. No report is required this week.