ENEE 2530 – Homework 3 – Fall 2020
MATLAB Assignment

NOTES:

** Please include comments in your codes. The comments do not have to be excessive, but they have to be sufficient to explain the key points in your codes.*

** Please include all your code in a single file that has an extension ***.m**.*

** Name your file using your first name and last name, and the homework number. For example, for John Smith, the file should be named: **John_Smith_HW3.m**.*

** Upload your file on Moodle in the folder called **Homework 3 Submission Folder**.*

** After you write your code, display the results to ensure that it works properly.*

1. Create a color image of size 200 × 200. The image should have a blue background.

2. Create **100 yellow** regions within the image that have a variable size. More specifically, their width should be an odd number and vary between **3** and **7** and their height should also be an odd number and vary between **3** and **7**. For example, you may get rectangular regions of size 3 × 3, 3 × 5, 5 × 3, 5 × 5, 7 × 5, etc. These 100 yellow regions should be placed at random locations within the 200 × 200 image, but we should make sure that they do not overlap with each other. **Important:** These regions should be created by modifying the image pixels, and not as plots on top of the image. In other words, these regions should be part of the image.

3. Plot horizontal and vertical white lines on top of the image for every 40 pixel rows and every 40 pixel columns. Now, these white lines will not be part of the image, but an extra layer on top of the image. You may use **hold on** and **hold off**, and also **plot** to achieve this. Display the image with the yellow regions and the white lines in **figure(1)**.

4. Use **filter2** to filter the color image using a moving average of size 5 × 5 and a moving average of size 9 × 9. Please remember that you need to filter each of the three channels of the image (red, green, and blue) independently, and then put the results together to obtain the final filtered color image. After you filter the image, plot again the horizontal and vertical white lines on top of the filtered images. Display the results in **figure(2)** and **figure(3)**, respectively.

5. Create a cell array of size 5 × 5. Each location in the cell array should be a regular array. The array should hold the areas of those yellow regions whose center is found in the corresponding 40 × 40 image block. This is demonstrated in the figure below (the yellow regions are not shown).