

The objective of this assignment is to test your understanding of the content of Lab-1, and Lab-2 lecture based on MATLAB. Due date of the homework is: **Friday, November 6th, 2020**. You have to upload a scanned version of your solutions on Blackboard. If you don't have a scanner around you, you can use Cam Scanner—a mobile app that scans images in a neat way, as if they're scanned through a copier. Also, you can upload the PDF version converted from a word file of your report.

For questions related to the homework, please email the two teaching assistants: (a) Wasim (email: wasim.dipon@my.utsa.edu) and (b) Yuvaraj (email: yuvaraj.munian@my.utsa.edu).

You can send your question to both of them in the same email. Feel free to CC me as well, but that is not necessary.

1. Write the MATLAB script to load the image and add “salt and pepper” noise to the image (you choose the level of noise density added(d)). Then filter the image using “imfilter” built-in function and display the input image, noisy image, and filtered image. [Hint: `imnoise (image, 'salt & pepper', d)` and `imfilter (image, h)`, use “peppers.png” as input. Use **d=0.05** and **h=ones (3,3)/27**. (Image is provided in Lab-4 Image folder)]
2. Write the MATLAB code to, [Hint: use `cat.png` as input image provided in Lab-4 Image folder]
 - a. Load the image. [Hint: use the command `imread`]
 - b. Display the information of the image into the command window. [Hint: use the command `imfinfo`]
 - c. Rotates the image clockwise by 90 degrees. [Hint: use the command `imrotate(I,-90)`]
 - d. Show the rotated image. [Hint: use the command `imshow`]
3. An image is represented by $I = \begin{bmatrix} 1 & 4 & 5; 2 & 4 & 5; 6 & 7 & 8 \end{bmatrix}$. The correlation kernel is $h = \begin{bmatrix} 8 & 1 & 6; 3 & 5 & 7; 4 & 9 & 2 \end{bmatrix}$. Read the link below carefully and use the Correlation Filtering Technique to calculate the (3,2) output pixel from the correlation. Also, do the same using the Convolution Filtering Technique. [Hint: You don't have to use MATLAB, just hand calculation is fine.]

<https://www.mathworks.com/help/images/what-is-image-filtering-in-the-spatial-domain.html>