**Computing Assignment 3 (B)**

**Image Filtering**

**Aim:**

To appreciate the effects of processing an image with “low-pass” and “high- pass” filters. You can observe the effects in both the spatial domain and the (2D) Fourier spectrum.

**Problem Statement:**

1. Read and display an image (If the image is a color image, convert it in to a grayscale image since here we are not interested in color dependent properties)
2. Find DFT (2D) of the image.
3. Now consider a “kernel” (H1) that represents a 2D filter, as given below

Perform spatial convolution between the image and the kernel and plot the output image. Observe the differences between the original image and the output image. If you feel that there is no difference, then do the same convolution more times (say 3 or 4) and try to observe the difference.

1. Next find DFT of the output image and compare the spectra of input and output images to interpret the filtering effect. Comment on the output image features w.r.t. the input image.
2. Repeat the above steps with a new kernel , H2, as given below
3. Based on your observations, can you suggest useful image applications for each of the filter types?

Reference : 'Digital Image Processing' by Rafael C. Gonzalez and Richard E. Woods (2nd edition), Chapter 4, Section 4.2