**Lab 4**

**Speech and Image Processing**

Using MATLAB, perform the following tasks

**Part (a)** 4 marks

Take a 300x300 pixel photo jpeg image and

read it in MATLAB using imread() function and display it using imshow() function

now convert it to double using double() and again display it using imshow() (note: for double image the color range is from 0 to 1 and not from 0 to 255)

convert this 300x300x3 RGB image array into 300x300 grayscale array and display it

**Part (b)** 3 marks

Now take 2-dimensional Fourier transform of the grayscale image using fft2() function. The output is a complex numbered array. Take the magnitude of this frequency spectrum and display it on screen as an intensity image. (hint: in MATLAB it is possible to give intensity level range e.g. imshow(img, [0 10] while displaying a grayscale image)

Now take the inverse fourier transform using ifft2() function, and show that the original image and fft2 followed by ifft2 yield the same result.

**Part (c)** 2 marks

On the fourier transform array, remove high frequencies by setting them to zero. The high frequency values are the ones near the center of image away from corners. Now take ifft2 and compare the result with the original image. It should be a blurred version.

**Part (d)** 1 marks

On the fourier transform array, remove low frequencies by setting them to zero. The low frequency values are the ones near the corners of image. Now take ifft2 and compare the result with the original image. It should contain only edges and corners.

**Deliverables:** MATLAB code and images created and saved at various stages.