Homework is due next Thursday, please email a script that does the below tasks to [sara@ucsc.edu](mailto:sara@ucsc.edu).

We can go through everything again in the next Lecture and Lab class to work out and resolve any problems or difficulties!

1. Fourier transform

Using MATLAB, use the code below to open the image M and inspect the real and imaginary part of its Fourier transform:

M = imread('MushroomDownload.jpg');

Mbw=(M(:,:,1));

imagesc(fftshift(log(imag(fft2(Mbw)).^2)))

imagesc(fftshift(log(real(fft2(Mbw)).^2)))

Familiarize yourself with the command fftshift

(The fftshift command displays the data properly, and the log scale lets us see the information.)

* 1. Implement a high spatial frequency filter by Fourier transforming an image, applying a binary mask, and inverse filtering the image.
  2. Implement a low spatial frequency filter by Fourier transforming an image, applying a binary mask, and inverse filtering the image.
  3. Use a better mask (e.g. butterworth) to reduce the ringing caused by the sharp edge of the mask.
  4. Test how your filters perform on a few different images (download from the internet, or use one from your laptop) and test different cutoff frequencies.

1. Create your own Laplacian of Gaussian (LoG) filter and try this out on the images. Now, find an image (e.g. an image of a zebra) that you can try out the edge finding property of this filter on.