Lab 3: Linear Filters, Due Friday January 30th
At the begining of the class

Primary Goal: Learn how to apply selective filtering to a color image.
Secondary Goal: Practice using different types of filters.

Download the two image files for Lab 3 from our course website. Each of the images is a photograph of objects in motion. This means the image contains some motion blur. We can make it appear that the object is moving faster by increasing the motion blur. Conversely, we can make it appear that the object is moving slower by decreasing the motion blur.

The first image is **run.jpg**. Your goal is to filter just the cadet in the foreground to make it look like this cadet is running faster than the others. Then filter the cadet in a different way to make it appear that the cadet is running slower than the rest of the group.

The second image **water.jpg** is a photograph of a waterfall taken at a fast shutter speed of 1/125 second. Your goal is to produce one image that makes the water look like it is falling faster and a second image where it appears the water is falling slower.

For each image, you should manually select just the region you want to filter using the `roipoly` command. In the first image, you should select the cadet in the foreground. In the second image, you should select the falling water. You can filter just the selected region using the command `roifilt2`. Note that unlike `imfilter`, the `roifilt2` command only works on grayscale images. So you will have to process each RGB channel separately.

```
for i=1:3;  B(:,:,i) = roifilt2(w, A(:,:,i), D);  end;
```

What to Include in Your Report

1. *[8 points]* Describe carefully what filters and parameters you used to prepare each of the 4 filtered images. Your text should reference your figures.

2. *[6 points]* Create a figure labeled **Figure 1** that shows the following 3 images side-by-side in an appropriate subplot:
   a. The original **run.jpg** image.
   b. The image you prepared where the cadet appears to be running faster.
   c. The image you prepared where the cadet appears to be running slower.
   Be sure to put a title on each image and a caption on your figure.

3. *[6 points]* Create a figure labeled **Figure 2** that shows the 3 versions of **water.jpg** in a format similar to the first figure.

Extra Credit *[+2 points]* Insert a *translucent* rainbow into the waterfall image by manipulating the RGB values in Matlab. *(Do not just copy and paste a picture of a rainbow on top of the waterfall.)* Include your Matlab code and the image you produce.