UCLA
Dept. of Electrical Engineering
EE 114, Spring 2016
Computer Assignment 7: Image Enhancement
Due: May 26, 2016

Introduction: In this assignment, you will experiment with image enhancement tools.

Use the image from the previous assignment, `ca6_image.tif`:

```
U = imread(ca6_image.tif);
```

and generate noisy versions of it, using Gaussian noise:

```
Ug = imnoise(U,'gaussian',0,0.002);
```

and salt and pepper noise:

```
Us = imnoise(U,'salt & pepper');
```

Tasks:

1. **High-pass filtering**. Generate a high-pass filtered version of `U` by applying the high-pass filter:

$$h_{\mathrm{H}} = \frac{1}{7}\begin{bmatrix} -1 & -2 & -1 \\ -2 & 19 & -2 \\ -1 & -2 & -1 \end{bmatrix}.$$

   ```
   Uh = imfilter(U,h_H);
   ```

   Display the filtered image, compare with the original, and comment on what you see.

2. **Histogram equalization**. Generate a histogram-equalized version of `U` by applying Matlab's `histeq` function:

   ```
   Ue = histeq(U);
   ```

   Display the filtered image, compare with the original, and comment on what you see.

3. **Low-pass filtering**. Apply the low-pass filter:

$$h_{\mathrm{L}} = \frac{1}{10}\begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & 1 \\ 1 & 1 & 1 \end{bmatrix}$$

   to `Ug` using `imfilter`. Display the filtered image, compare with the original, and comment on what you see.

4. **Median filtering**. Apply Matlab's median filter `medfilt2` to `Us`:

   ```
   Um = medfilt2(Us);
   ```

   Display the filtered image, compare with the original, and comment on what you see.