DIP Homework Assignment #1

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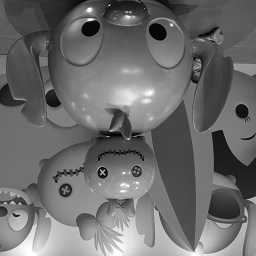
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**Warm-Up: Simple Manipulation**

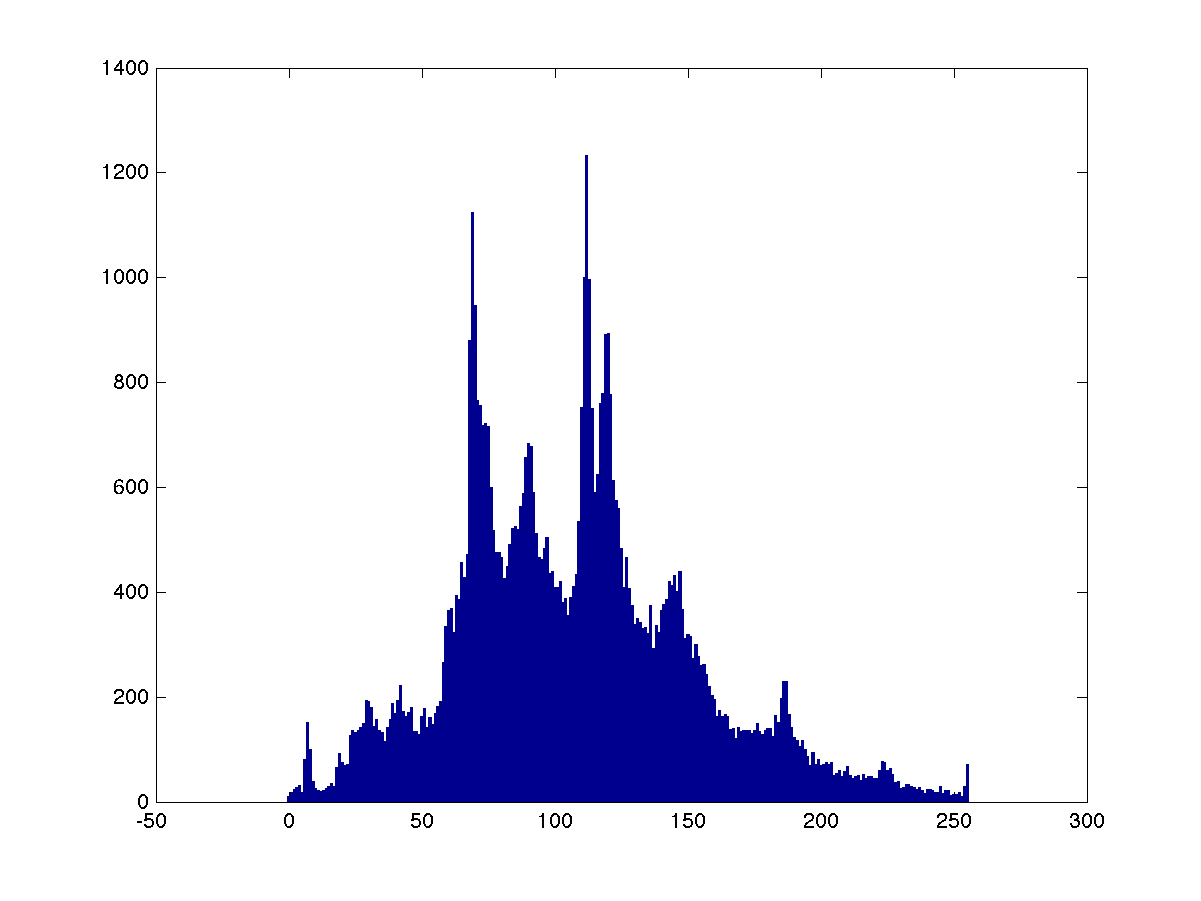
Flipped I vertically and horizontally. The resultant images were displayed as follows.

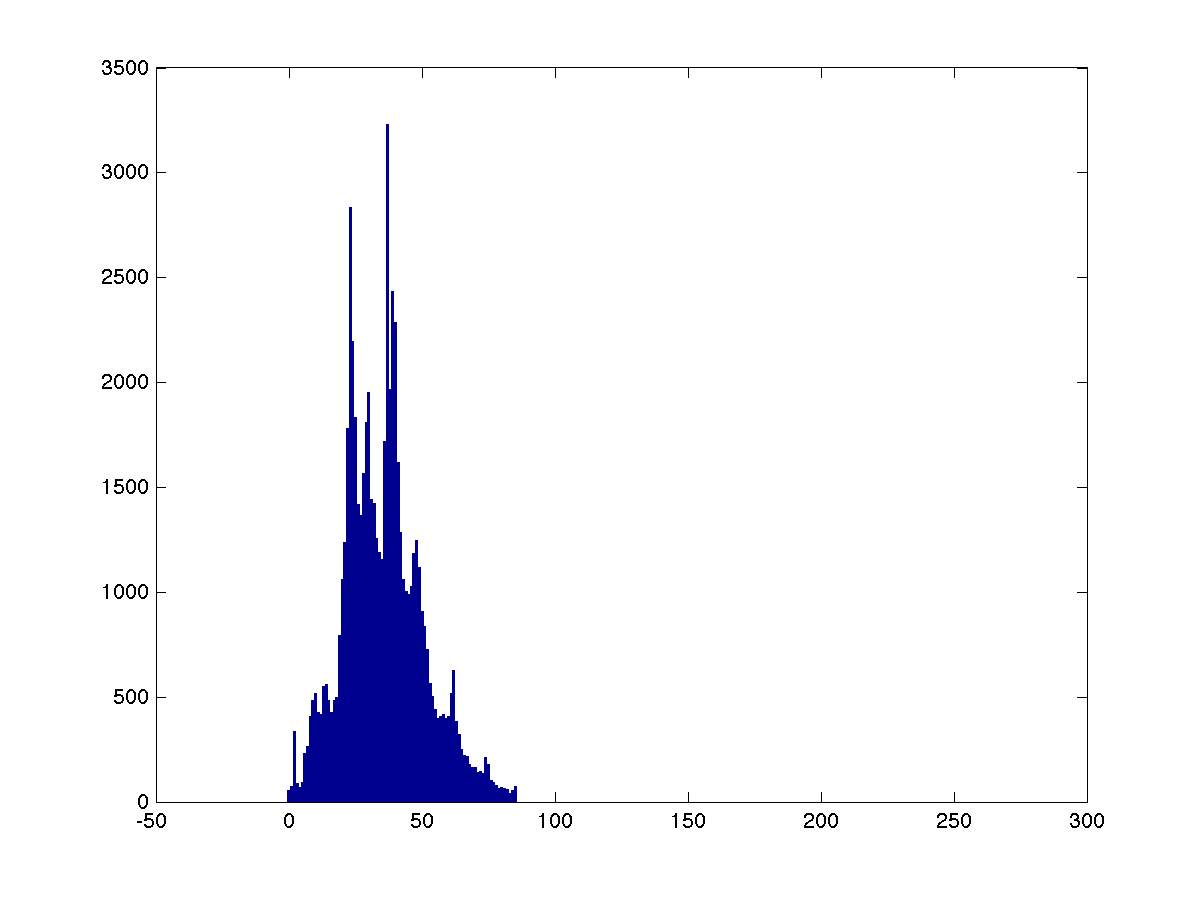
sample1.vertical.png: Flipped I vertically sample1.horizontal.png: Flipped I horizontally

**Problem 1: Image Enhancement**

1. Plot the histograms of I and D. What can you observe from these two histograms? What can you do to make D look like I?



sample1.hist.png: The histogram of image I



sample2.hist.png: The histogram of image D

// TODO

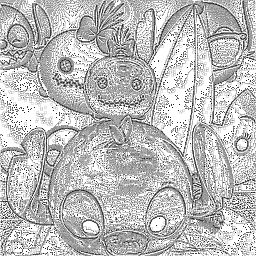
1. Perform histogram equalization on D and out the result as H.



sample2.hist.equal.png: The histogram equalized image D

// TODO

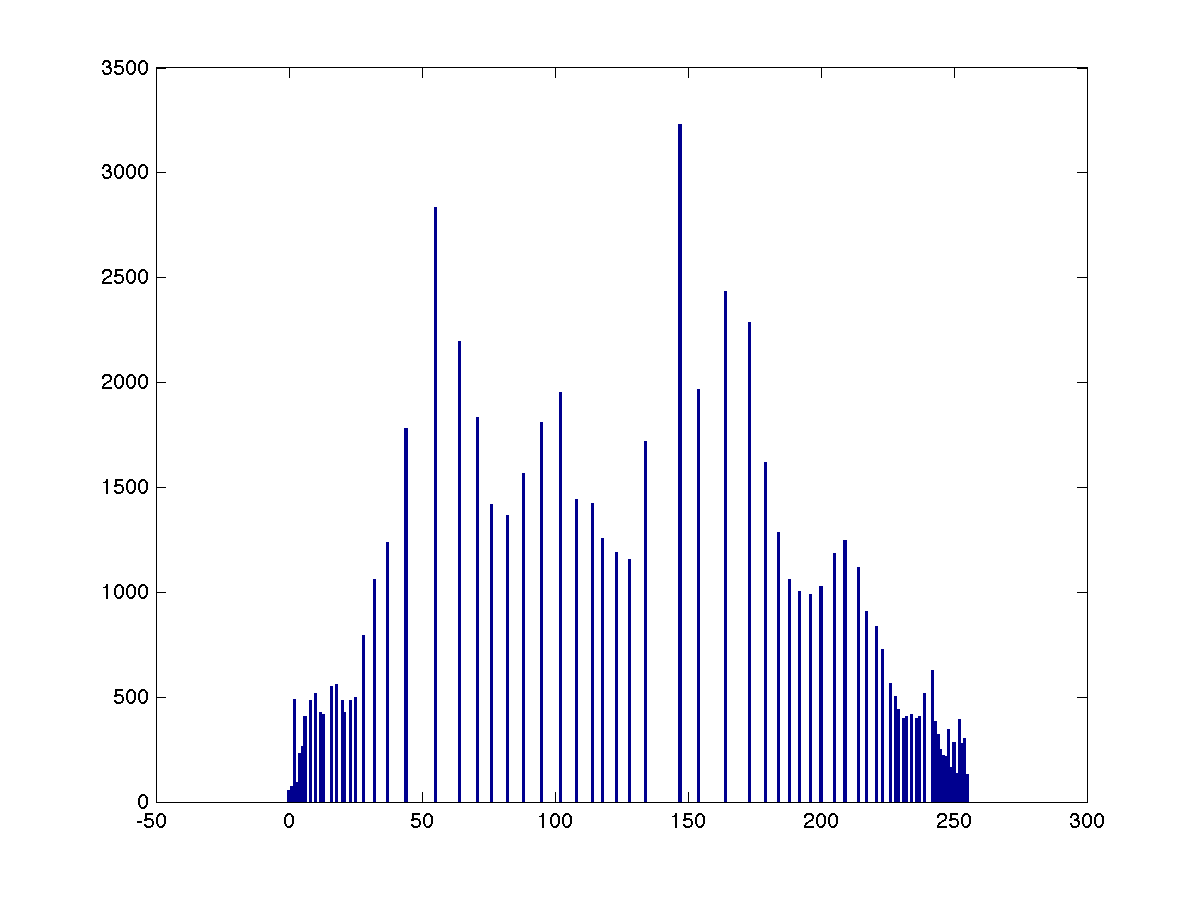
1. Perform local histogram equalization on image D and output the result as L.



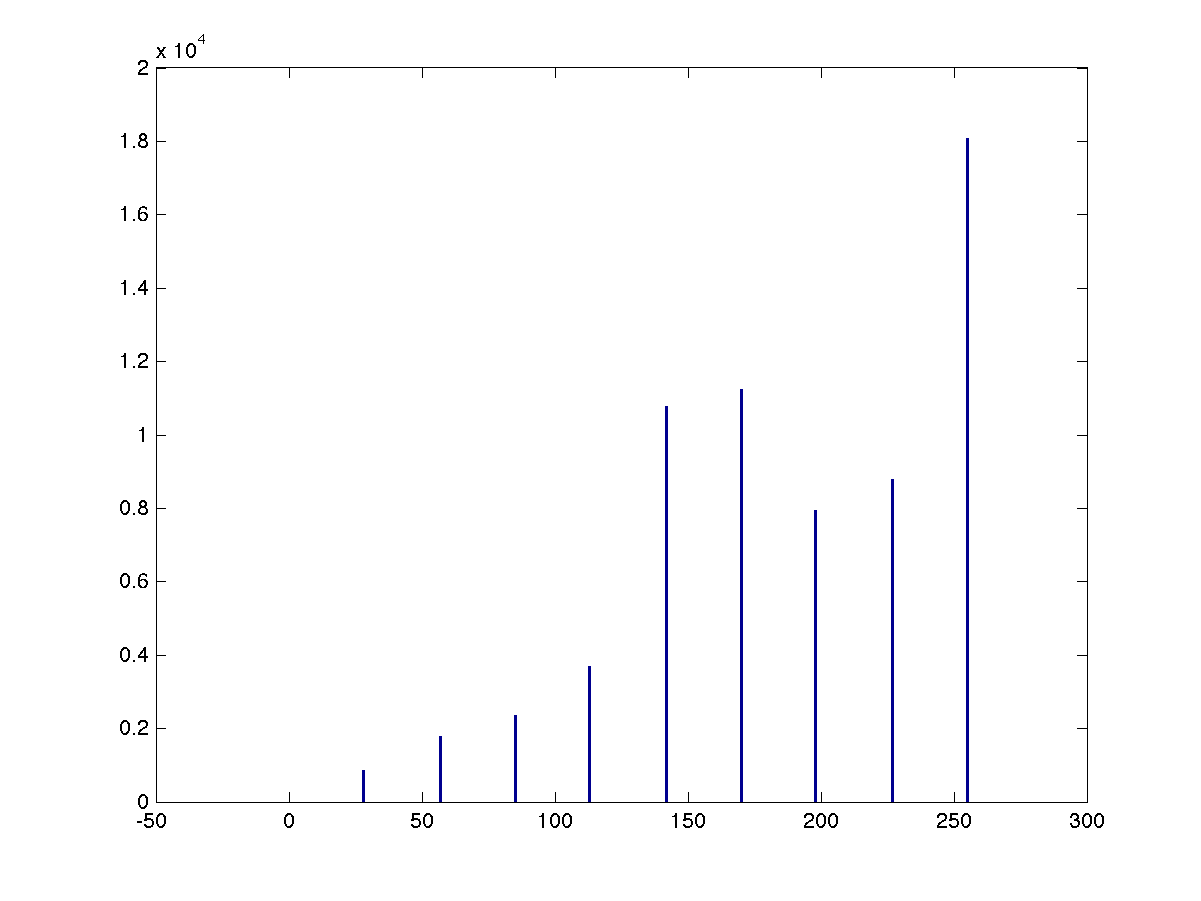
sample2.local.hist.equal.png: The local histogram equalized image D

// TODO

1. Plot the histograms of H and L. What’s the main difference between local and global histogram equalization?



sample2.hist.equal.hist.png: The histogram of the histogram equalized image D



sample2.local.hist.equal.hist.png: The histogram of the local histogram equalized image D

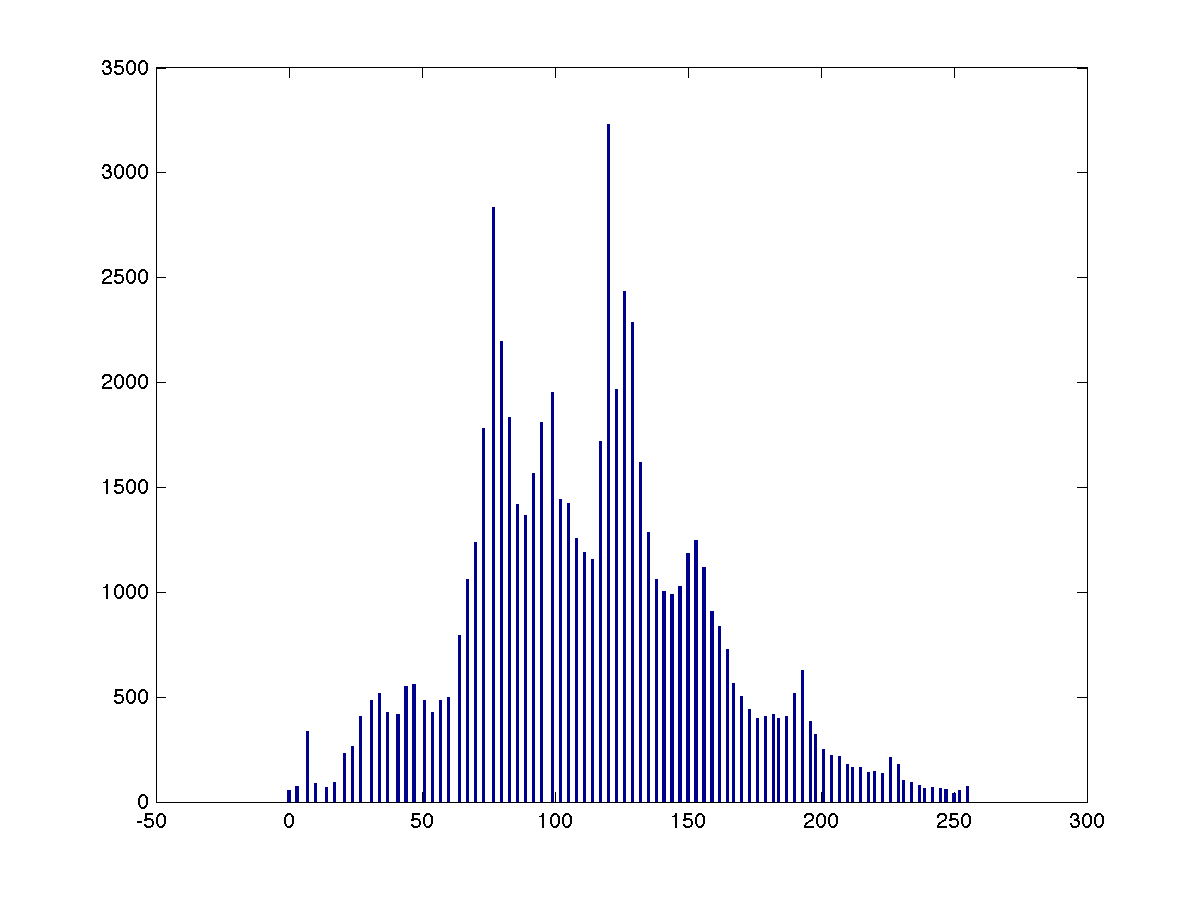
// TODO

1. Perform the log transform, inverse log transform and power-law transform to enhance image D. Please adjust the parameters as best as you can. Show the parameters, output images and corresponding histograms. Provide some discussions on the results as well.

**Log transform**



sample2.log.png: The log transformed image D



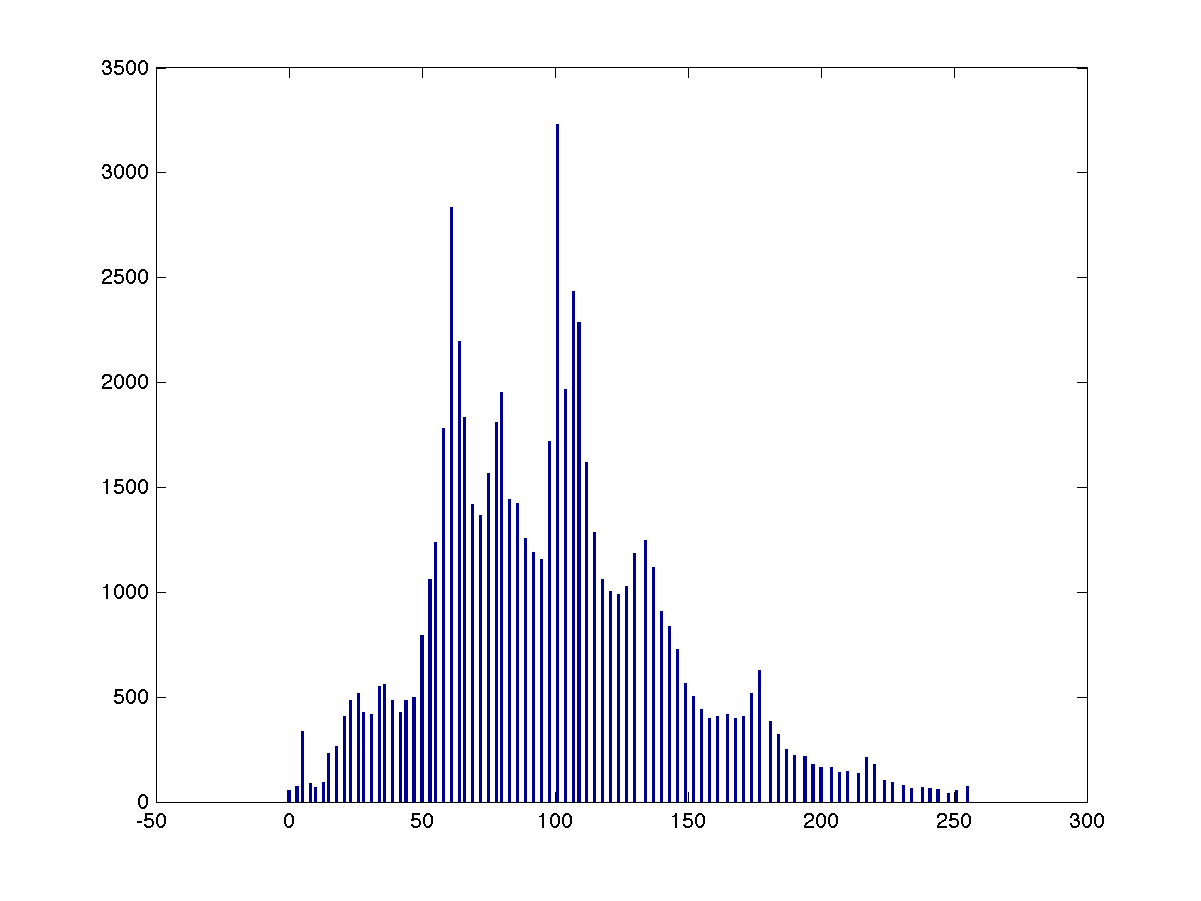
sample2.log.hist.png: The histogram of the log transformed image D

// TODO

**Inverse log transform**



sample2.inv.log.png: The inverse log transformed image D



sample2.inv.log.hist.png: The histogram of the inverse log transformed image D

// TODO

**Power-law transform**

**Problem 2: Noise Removal**

1. Add the same kind of noise as in sample3.raw to image I and denote the result as .
2. Add the same kind of noise as in sample4.raw to image I and the output is denoted as .
3. Choose proper filters and parameters to remove the noise in and , and denote the resultant images as and , respectively. Please specify the steps of your de-noise process and provide some discussions about the reason why those filters and parameters are chosen.
4. Compute the PSNR values of and and provide some discussions.