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CSE 473 Programming Assignment #1
Due: 6/20/17

Problem #1 – 1D and 2D Convolution on Images

a) G_x:

G_y:

G:

b) G_x_2:

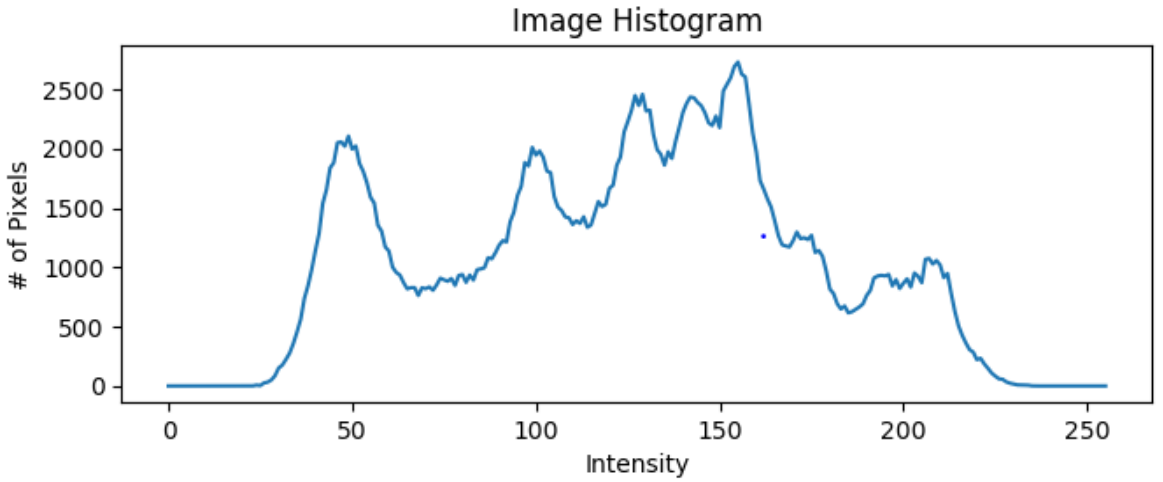
G_y_2:

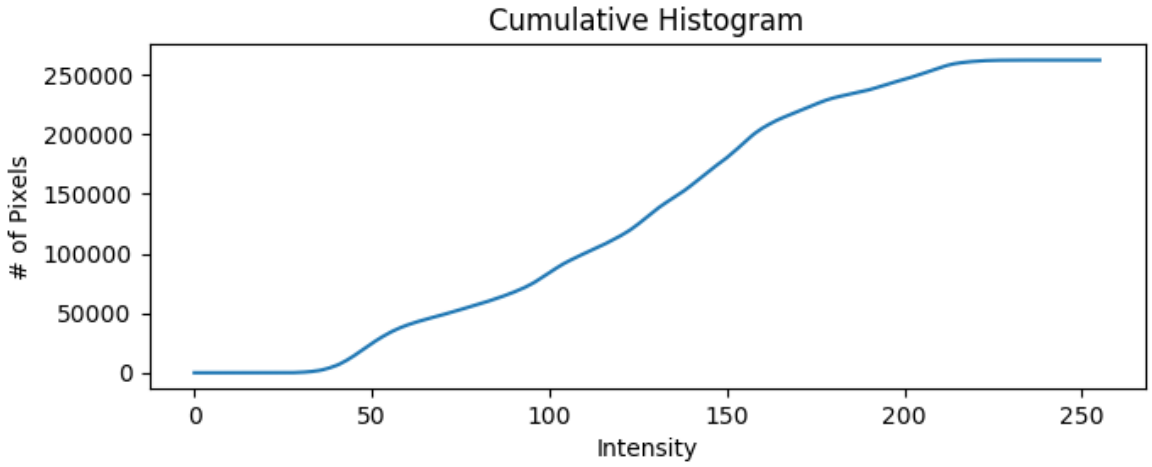
Comparing the results to the 2Dfilter application we can confirm that the 1D convolution is indeed equivalent to the 2D convolution.

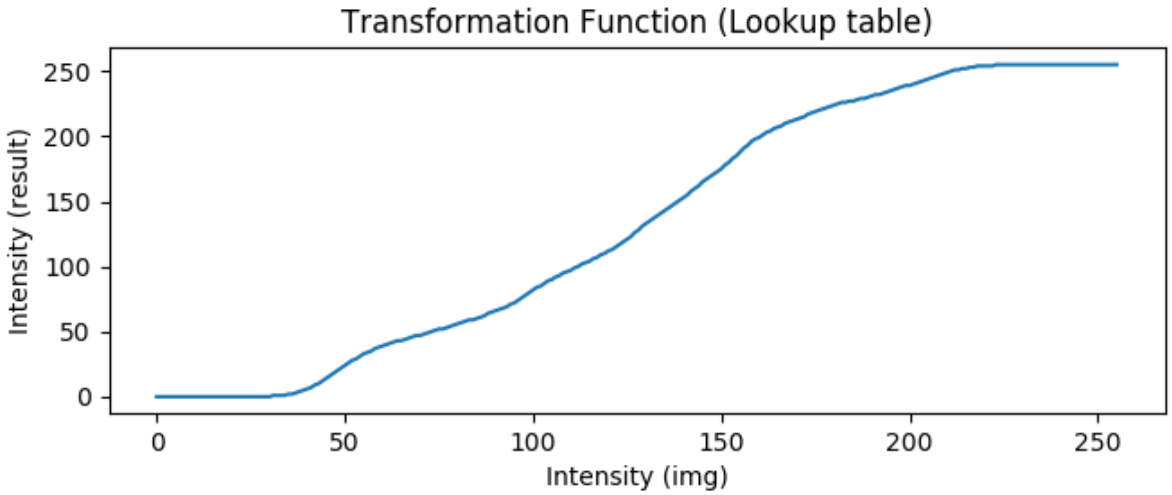
c) If we are given an M x N matrix and a P x Q filter we can clearly see which algorithm has a better time complexity. We can assume that 2D convolution runs in $O(M * N * P * Q)$ time, and in the average case we can expect square matrices for both input thus resulting in $O(M^2 * P^2)$ time. Separable 1D convolution can be assumed to run in $O(M * N * P)$ time ant using the same assumptions as 2D convolution we have $O(M^2 * P)$ which is most definitely faster than 2D.

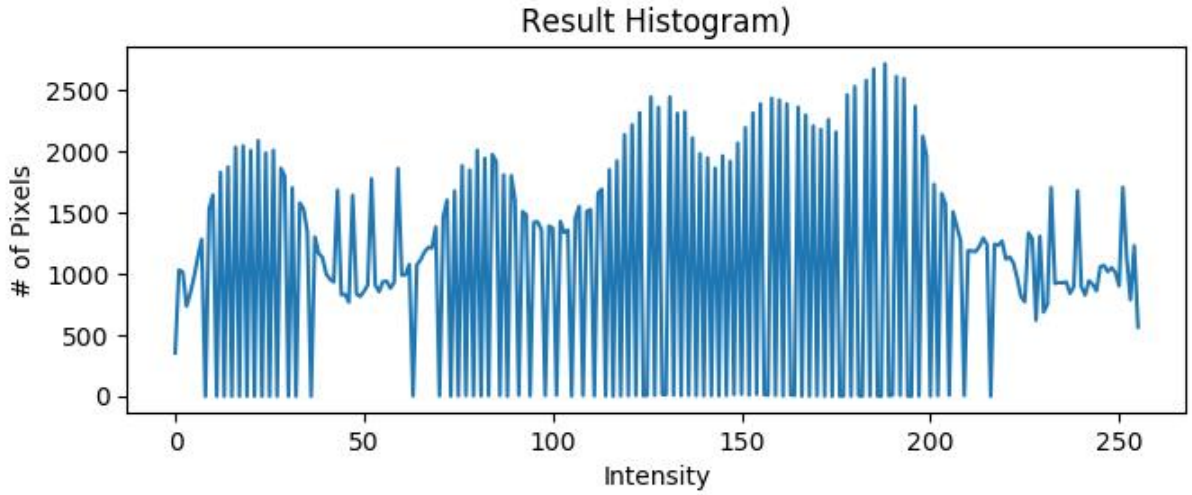
Problem #2: Histogram Equalization

Resulting images and plots are as follows:









Original

Enhanced