Haruka Kido
EE456: Digital Image Processing
Assignment 1

1. Gamma Correction using "forest_gray.png":
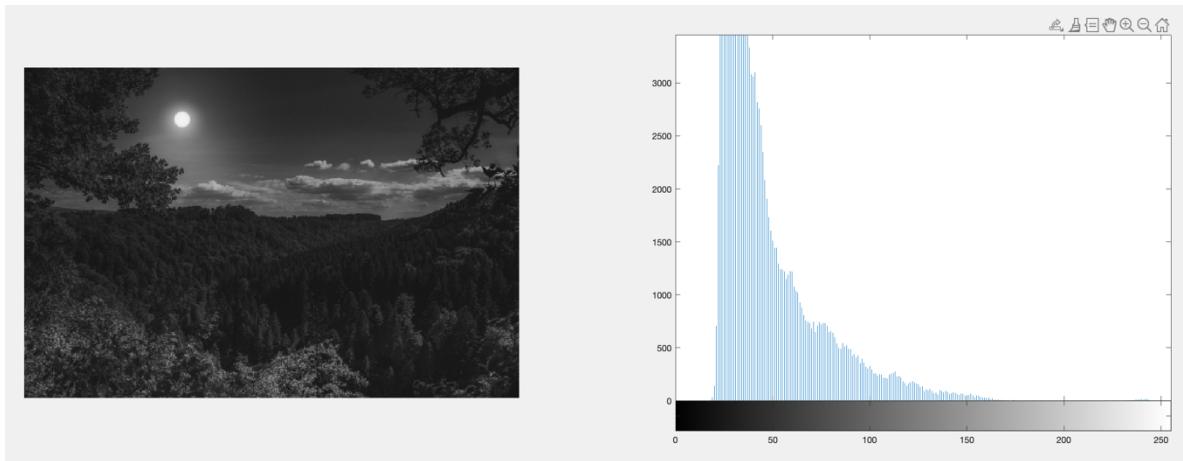
   a. Source Code:

```
clear;
A = imread("forest_gray.png");
subplot(4, 2, 1);
imshow(A);
subplot(4, 2, 2);
imhist(A);

G1 = imadjust(A, [], [], 0.75);
subplot(4, 2, 3);
imshow(G1);
subplot(4, 2, 4);
imhist(G1);

G2 = imadjust(A, [], [], 0.5);
subplot(4, 2, 5);
imshow(G2);
subplot(4, 2, 6);
imhist(G2);

G3 = imadjust(A, [], [], 0.25);
subplot(4, 2, 7);
imshow(G3);
subplot(4, 2, 8);
imhist(G3);
```
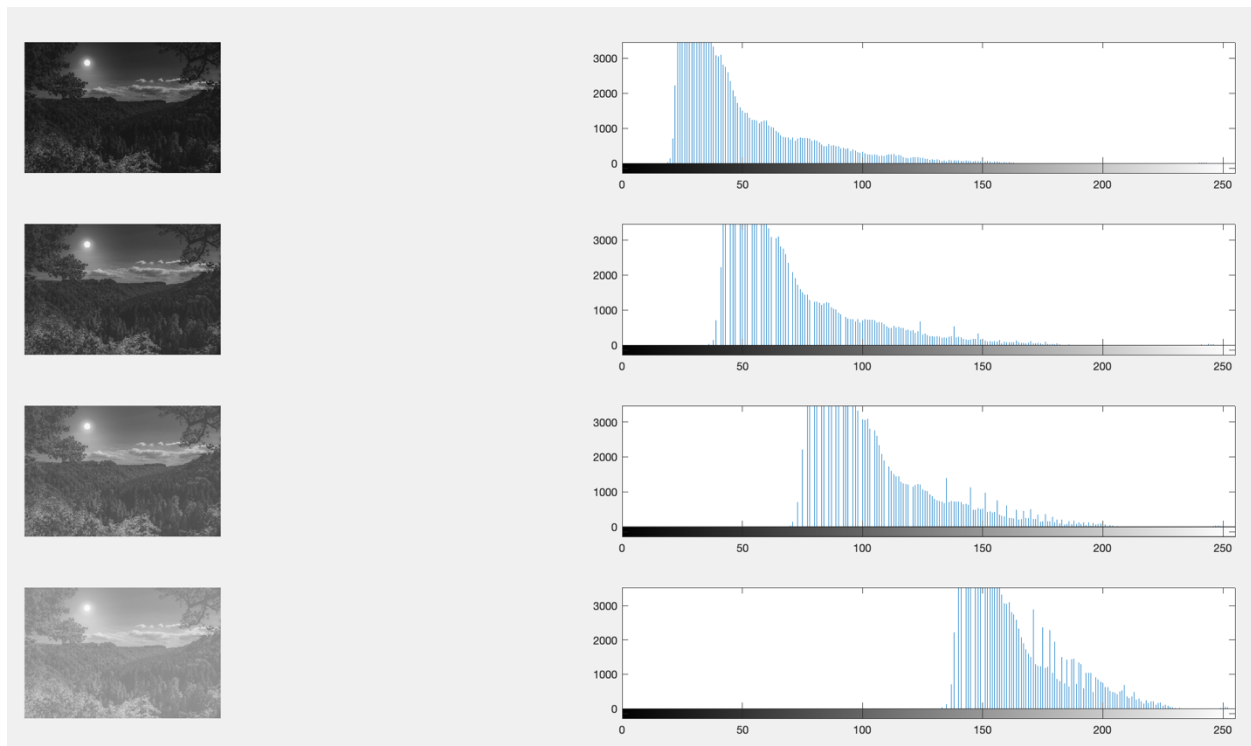
b. Original image and its histogram:

c. 3 contrast-enhanced images and their histograms. Use *imhist* command to plot histograms. <u>Do NOT use built-in MATLAB command for gamma correction</u>:
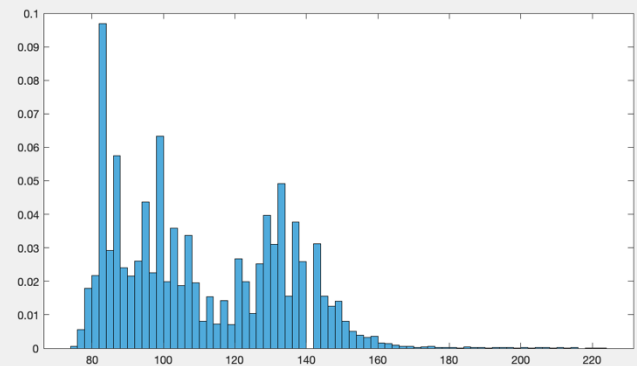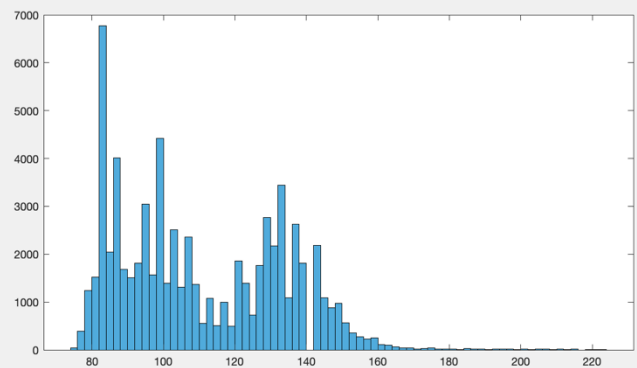
2. Histogram and Normalized Histogram of a Gray-Level Image using "pout.tif":

a. Source Code:

```matlab
clear;
A = imread("pout.tif");
subplot(2, 2, 1);
imshow(A);
subplot(2, 2, 2);
H1 = histogram(A);
subplot(2, 2, 3);
imshow(A);
subplot(2, 2, 4);
H2 = histogram(A, 'Normalization', 'probability');
```

b. Histogram and normalized histogram. <u>Do NOT use built-in MATLAB command *imhist* for histogram</u>:
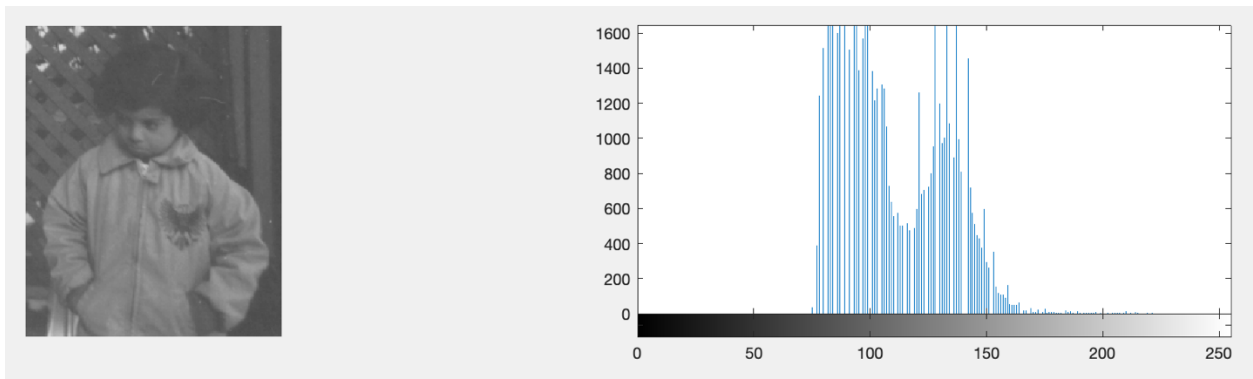
3. Histogram Equalization of Gray-Level Image using "pout.tif":

    a. Source Code:

```matlab
clear;
A = imread('pout.tif');
subplot(3, 2, 1);
imshow(A);
subplot(3, 2, 2);
imhist(A);
num_bin = 256;
B = reshape(A, [], 1);
B = double(B);
H2 = hist(B, 0:(num_bin));
C = H2/numel(A);
CS = cumsum(C);
EH = CS(A + 1);
EH = uint8(EH * (num_bin));
subplot(3, 2, 3);
imshow(EH);
subplot(3, 2, 4);
imhist(EH);
```

    b. Original image and its histogram:

c. Histogram equalized image and its histogram. <u>Do NOT use built-in MATLAB command</u> <u>*histeq* for histogram equalization</u>: