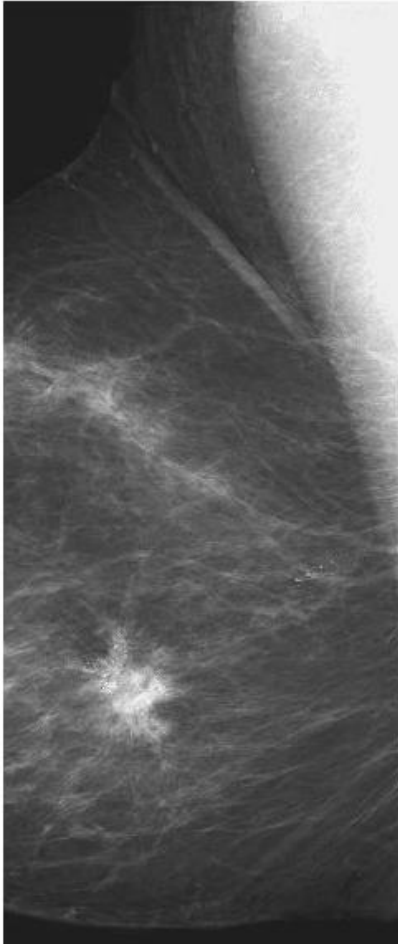Task 1 -

1 Right half of the breast image



```
clear all
imfinfo('assets/breastXray.tif')
f = imread('assets/breastXray.tif');
imshow(f)

f(3,10)                    % print the intensity of pixel(3,10)
imshow(f(1:241,:))  % display only top half of the image

[fmin, fmax] = bounds(f(:))% find the maximum and minimum intensity values of the image
%{
bounds returns the maximum and minimum values in the entire image f.
The index ( : ) means every columns. If this is not specified,
Matlab will return the max and min values for each column as 2 row vectors.
%}
imshow(f(:,241 : 482)) % Display the right half of the image.
```
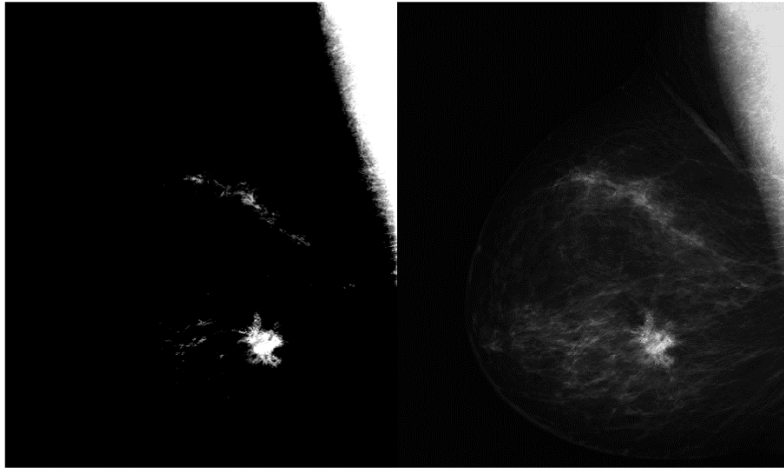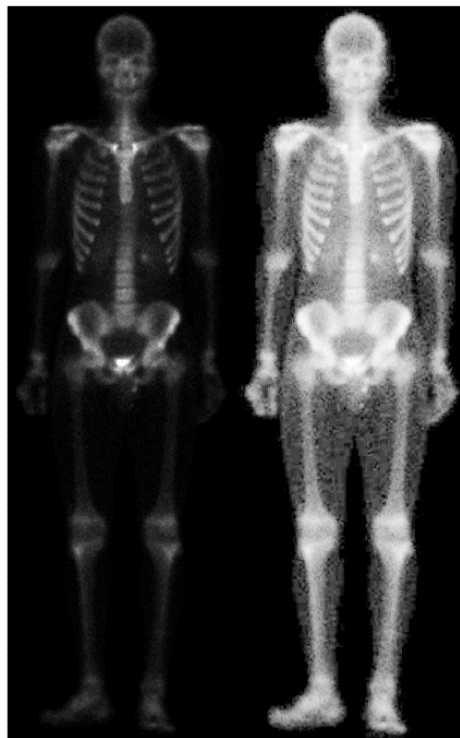
2 Negative image
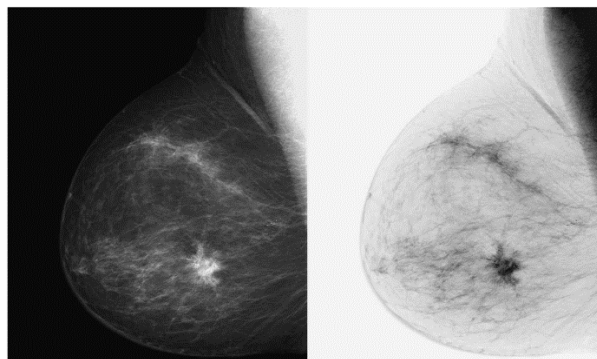
3 Gamma Correction
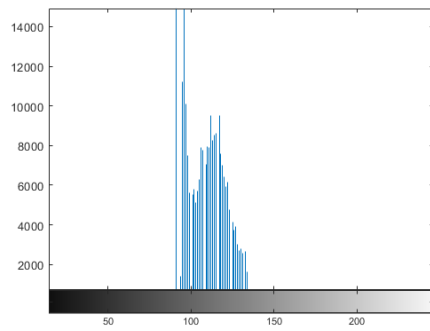

Task 2

Contrast stretching
In the result pic, areas darker than the mean are made lighter, and areas lighter than the mean are made darker, enhancing overall detail, making previously indistinct details more visible.
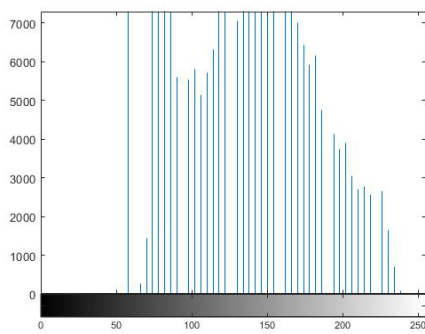The overall image appear brighter as the output range is wider than the input range, the contrast is enhanced.
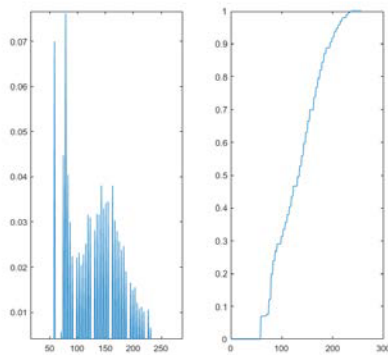
Task 3
Histogram

A more spread out histogram

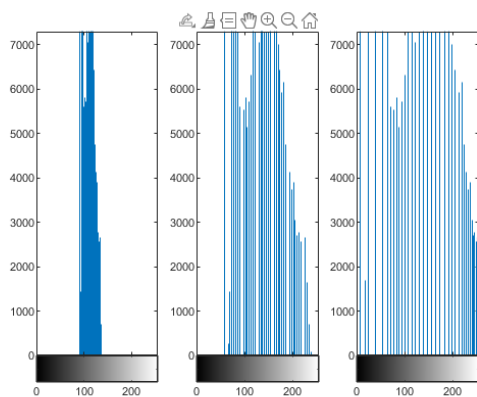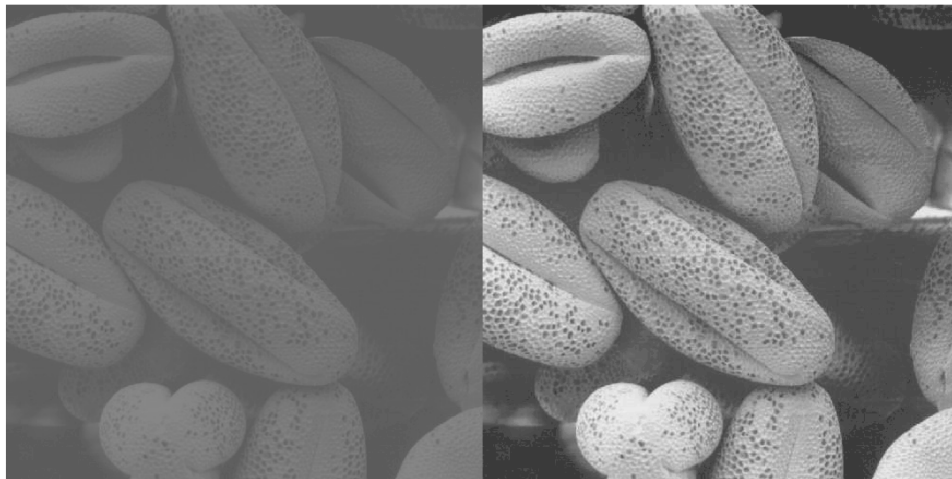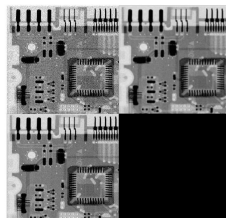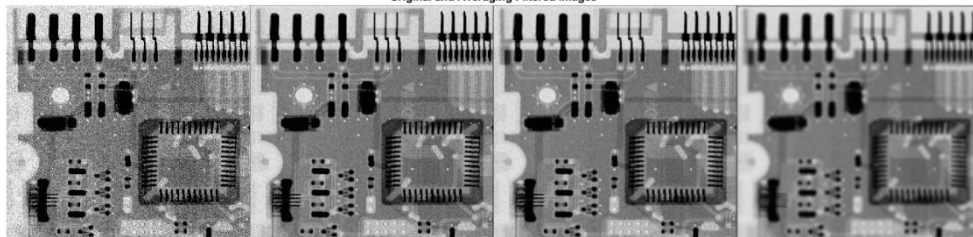PDF and CDF

Final flattened histogram

Image enhanced by histogram
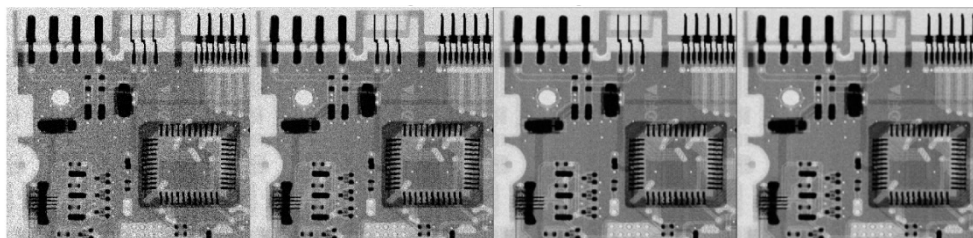

Task 4

Original and Averaging Filtered Images


```
% Averaging Filters with Different Kernel Sizes
w_box_small = fspecial('average', [3 3]);
w_box_medium = fspecial('average', [5 5]);
w_box_large = fspecial('average', [15 15]);
```
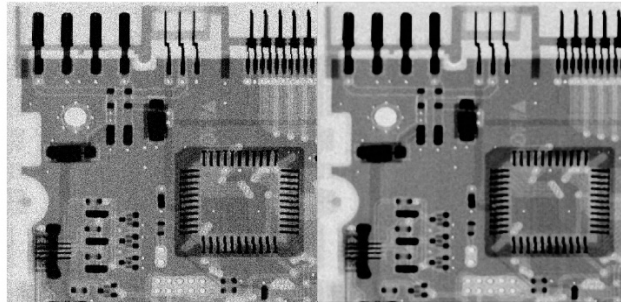


```
% Gaussian Filters with Different Sigma Values
w_gauss_small = fspecial('Gaussian', [7 7], 0.5);
w_gauss_medium = fspecial('Gaussian', [7 7], 1.5);
w_gauss_large = fspecial('Gaussian', [7 7], 3.0);
```

Comments: For averaging filters, the bigger the kernal, the more blurry the image gets, the complete elimination of the background noise happened when kernel size equals to [5 5]

For Gaussian, more detail of the original pic is preserved, and it gets better with bigger sigma value without obvious loss on the details. It's the better method for this job

Task 6