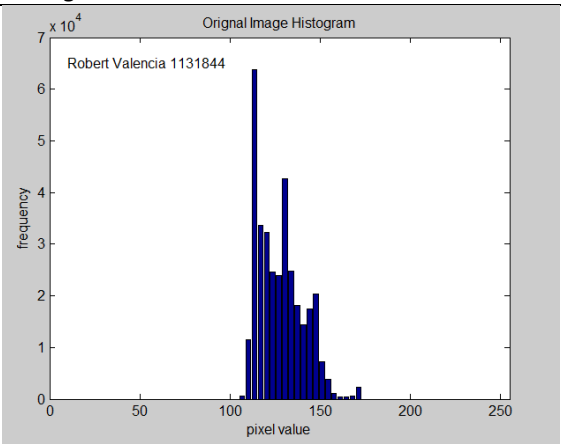
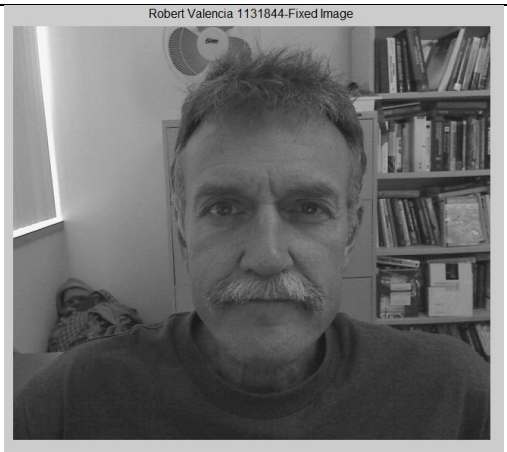
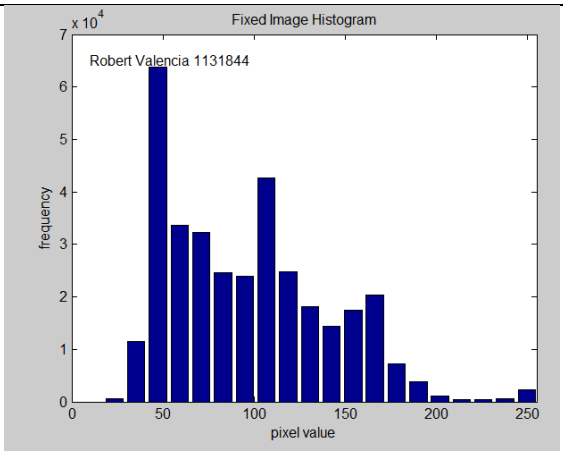
Robert Valencia
EE 3TP4 Lab 1

Matlab Code

```
%import image to matlab
image=imread('ee3tp4picture.png');
%convert pixel data typ to double-precision data type
image_of_doubles=double(image);
%plot pixel values histogram of original image
figure(1)
[n_elements,centers]=hist(image_of_doubles(:),20);
bar(centers,n_elements);
xlim([0 255]);
text(10,6.5*10^4, 'Robert Valencia 1131844')
title('Orignal Image Histogram');
xlabel('pixel value');
ylabel('frequency');
%show original image (low contrast))
figure(2)
imshow(uint8(image_of_doubles));
title('Robert Valencia 1131844-Original Image')
% image transformation
a=3.5;
b=-350;
fixed_image=a.*image_of_doubles+b;
%plot pixel values histogram of fixed image
figure(3)
[n_elements,centers]=hist(fixed_image(:),20);
bar(centers,n_elements);
xlim([0 255]);
text(10,6.5*10^4, 'Robert Valencia 1131844')
title('Fixed Image Histogram');
xlabel('pixel value');
ylabel('frequency');
%show fixed image (low contrast))
figure(4)
imshow(uint8(fixed_image));
title('Robert Valencia 1131844-Fixed Image')
%save fixed image
image_to_save=uint8(fixed_image);
imwrite(image_to_save,'C:\Users\Robert\Google Drive\University-Fourth Year\EE 3TP4 Labs\Lab 1\saved_image.png');
```

In this problem, a low contrast image was given and had to be processed with MATLAB using the equation ***(fixed image pixel values) = a*(original image pixel values)+b*** by manipulating the values of a and b to create an image with a higher amount of contrast. To have a high amount of contrast, the distribution of pixel values has to be more spread out i.e. the image histogram should be more horizontally stretched. Having a value of **a>1** stretches the histogram horizontally, but shifts the histogram to the right more, causing parts of it to be cut-off, which creates a faded image. To counteract this shift, a **b<0** has to be chosen to create a left shift. After a few trials, the values **a=3.5** and **b=-350** created an image with a significant improvement in contrast and was chosen as the final a and b values.

	Image	*Histogram*
Original		

Fixed	 Robert Valencia 1131844-Fixed Image	 Fixed Image Histogram x 10^4 Robert Valencia 1131844 frequency pixel value 0 1 2 3 4 5 6 7 0 50 100 150 200 250