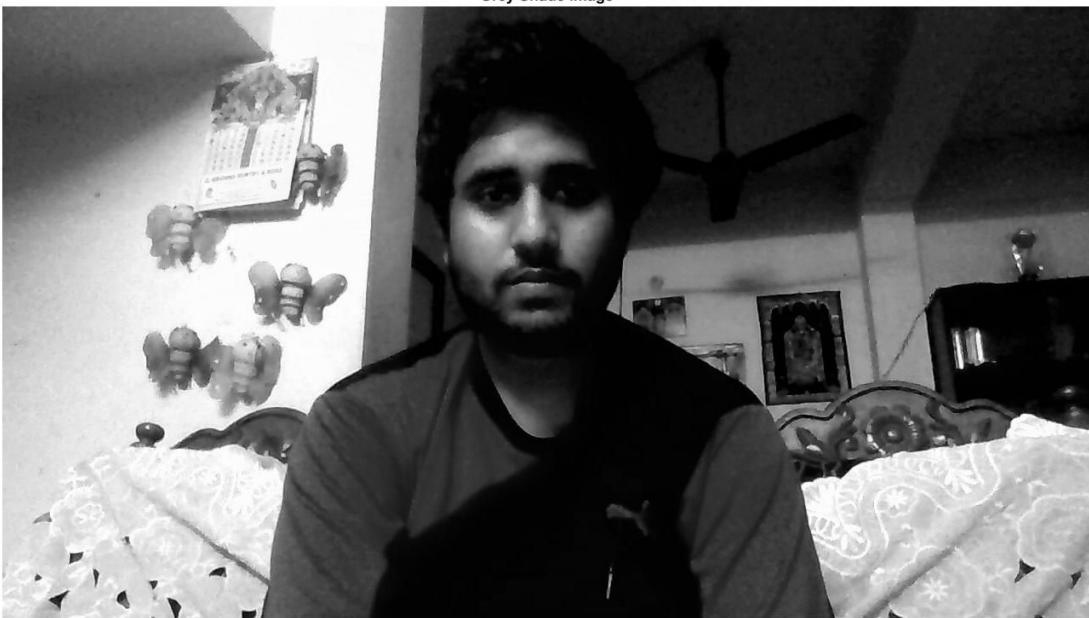


## Assignment 1

Original



Grey Shade Image



Bit Plane B1



Bit Plane B2



Bit Plane B3



Bit Plane B4



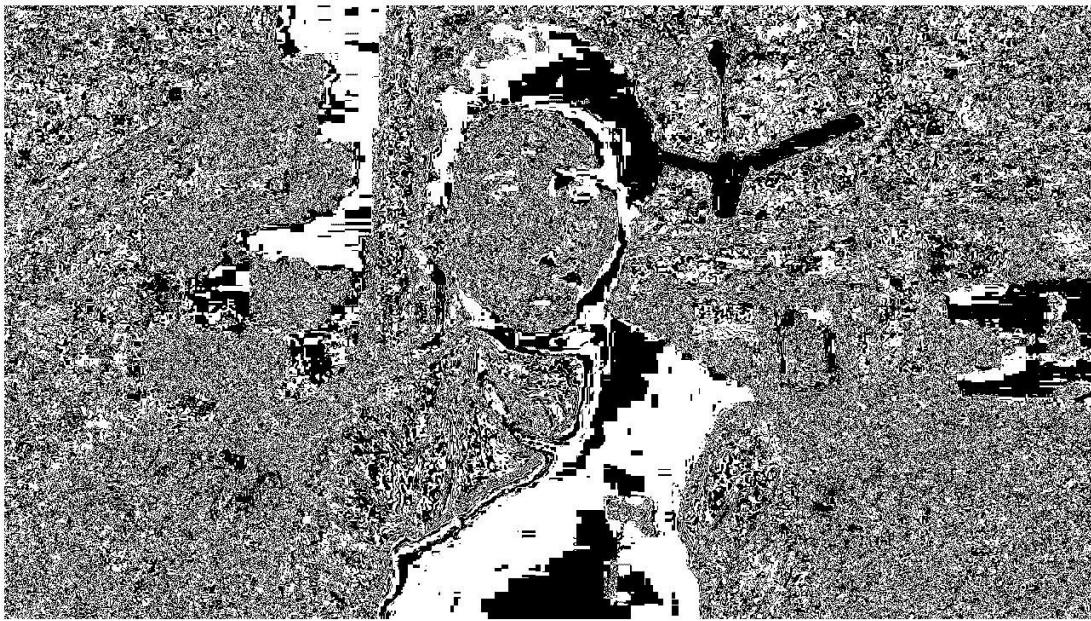
Bit Plane B5



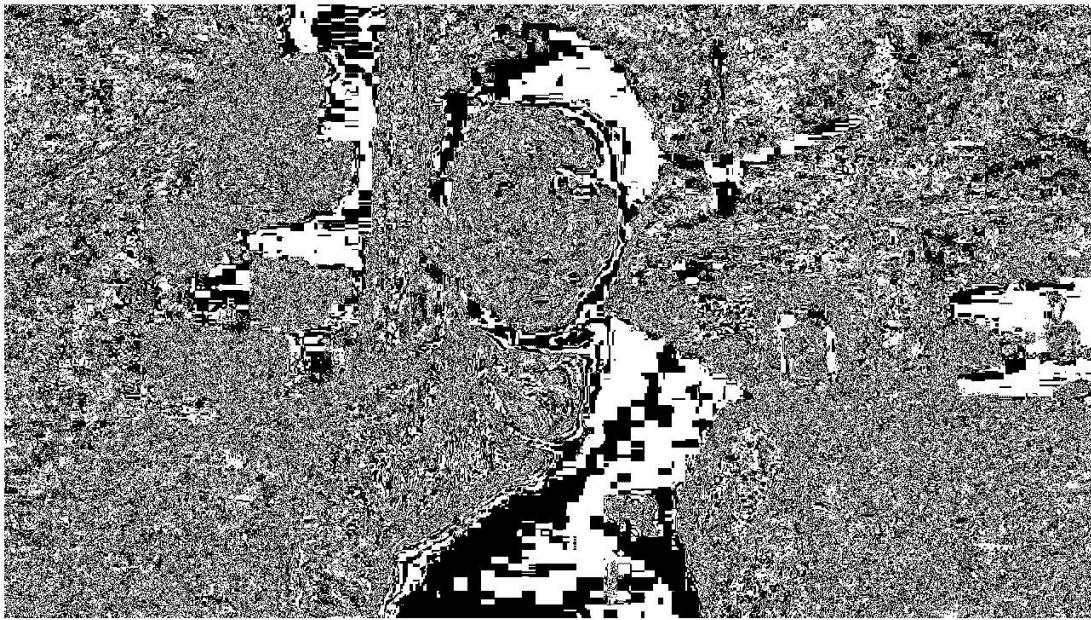
Bit Plane B6



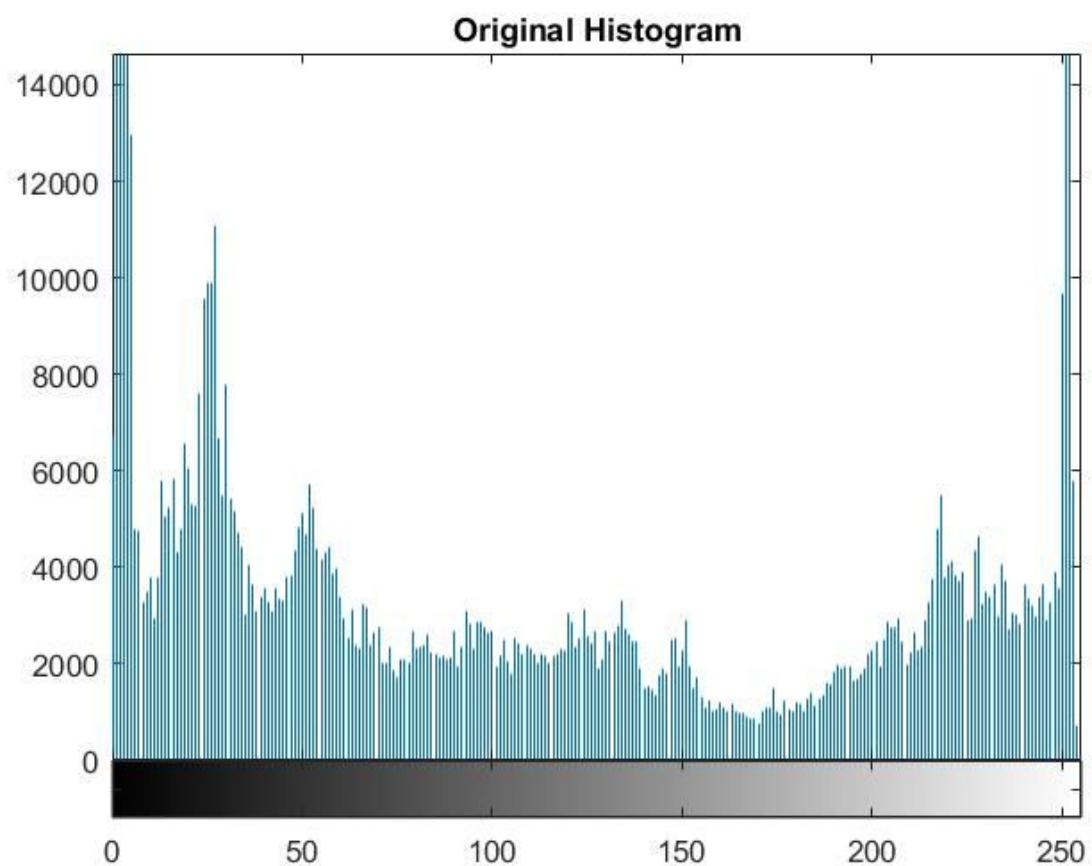
Bit Plane B7



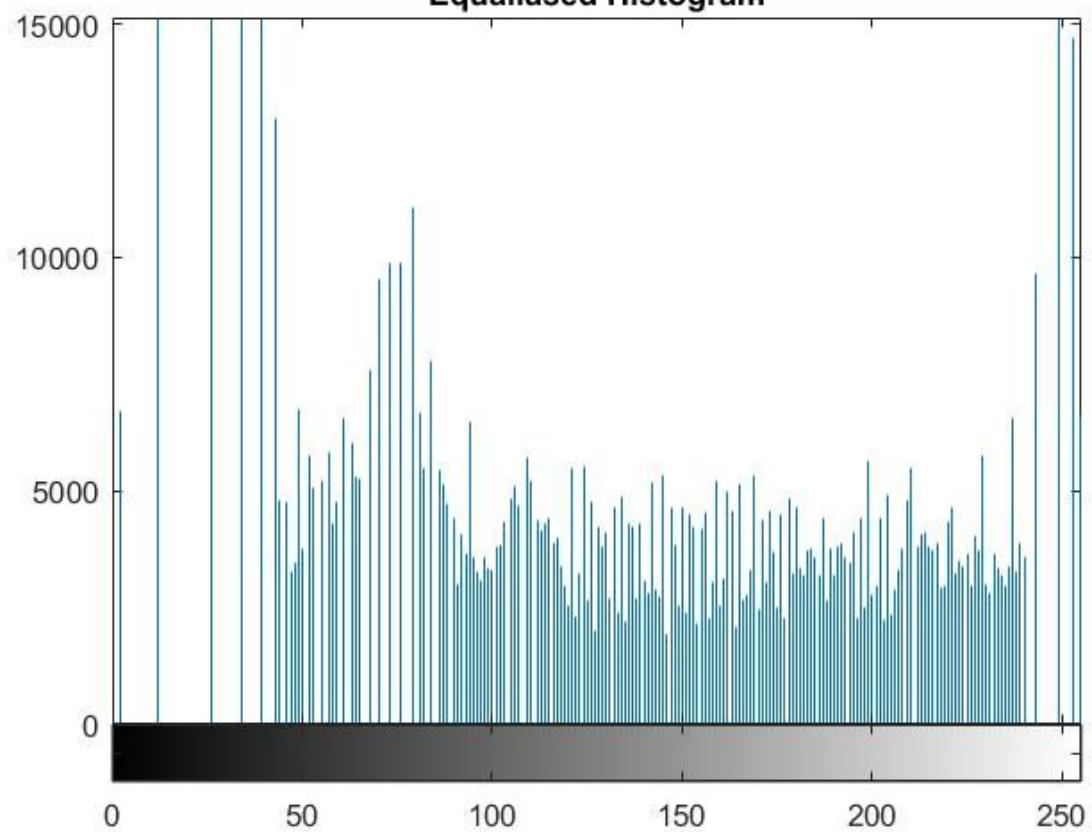
Bit Plane B8

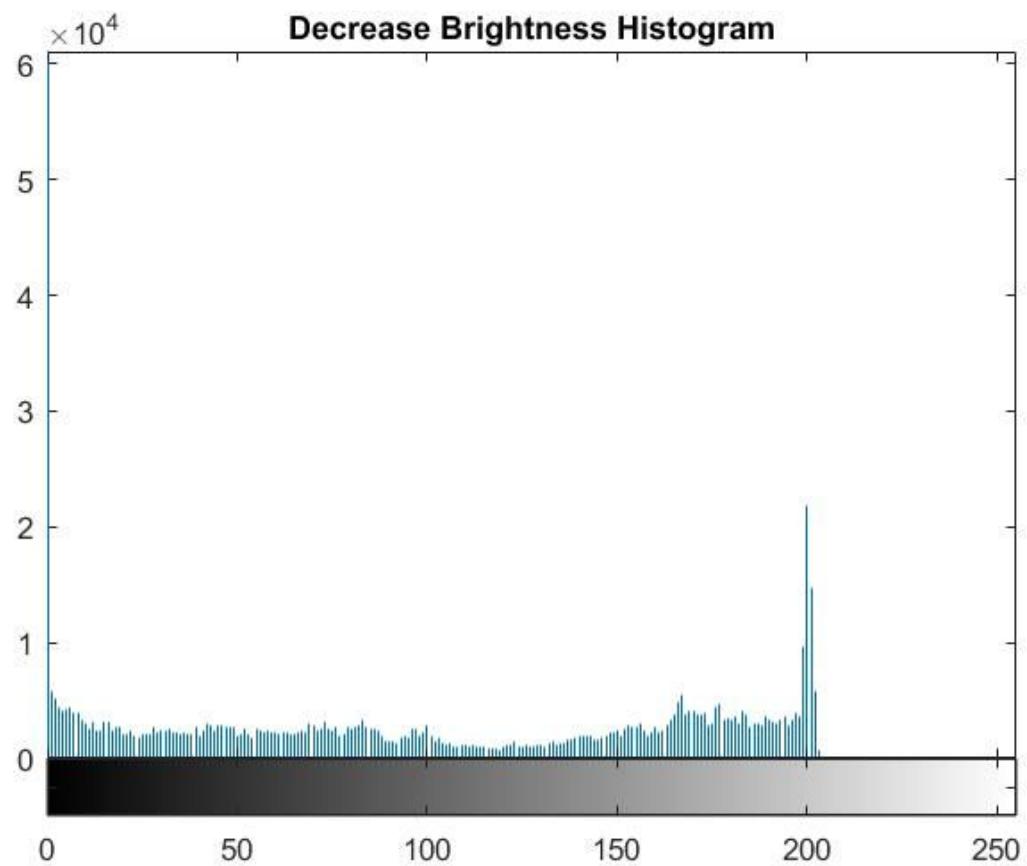


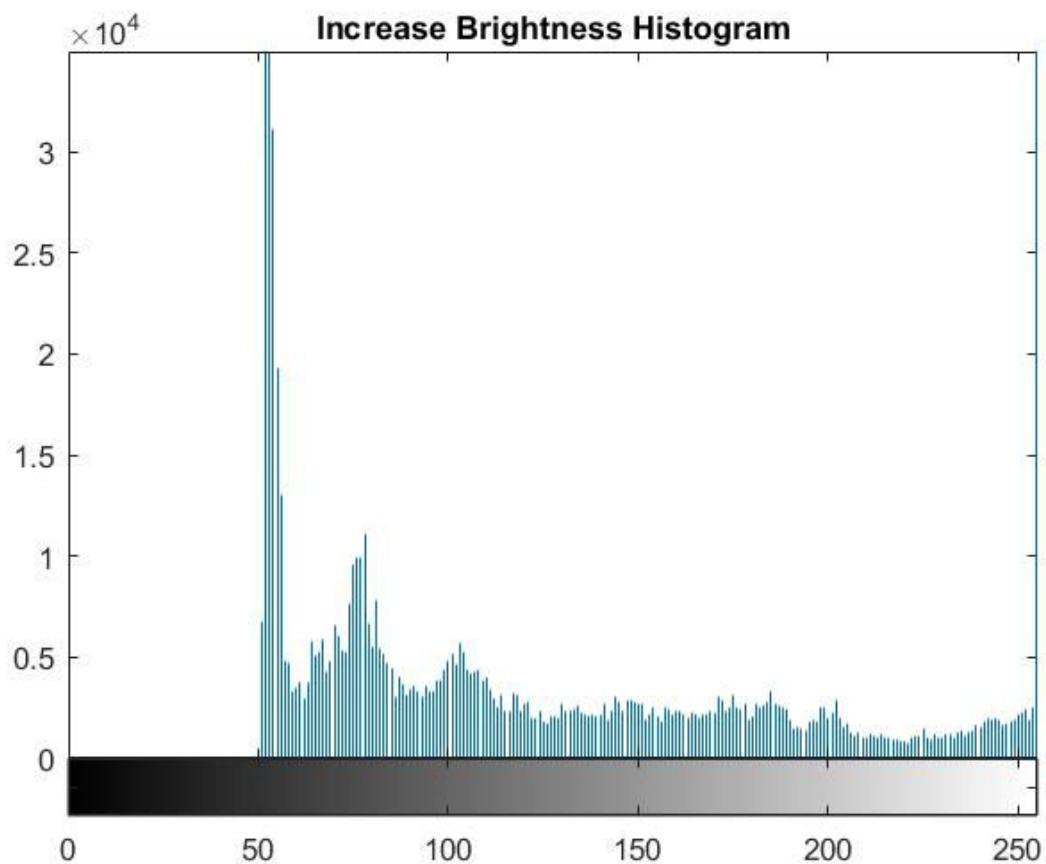
Assignment 2



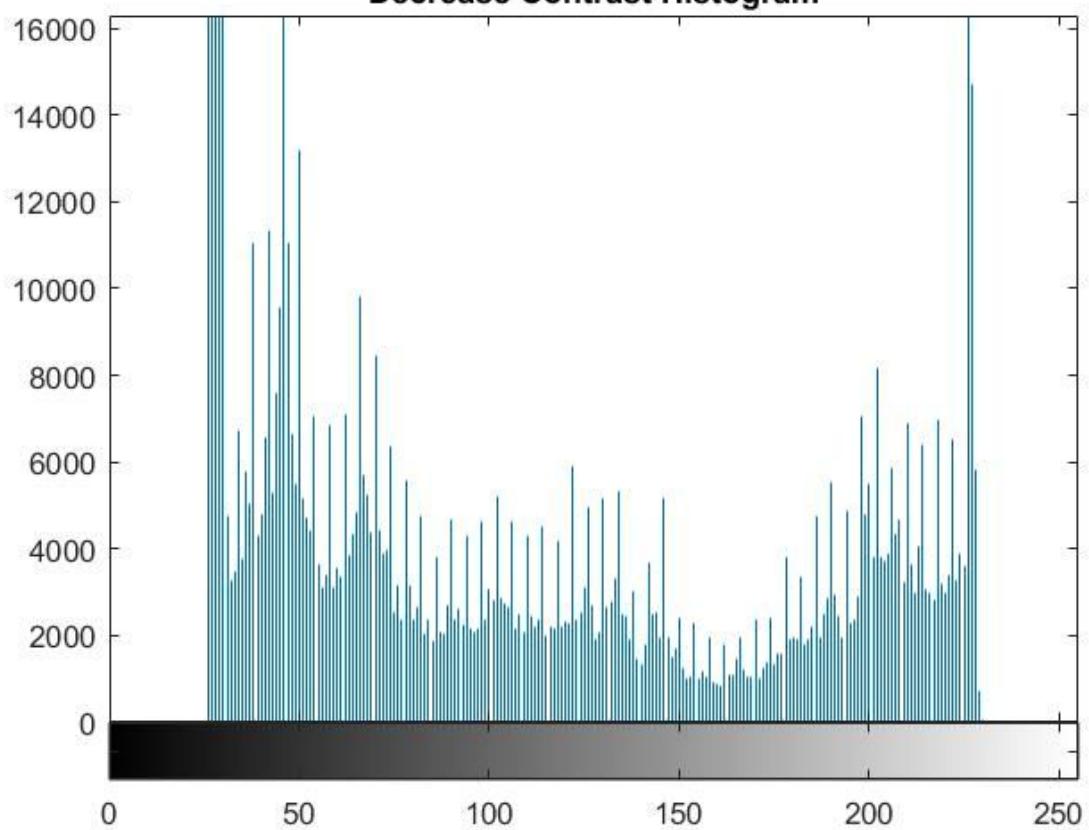
**Equalised Histogram**

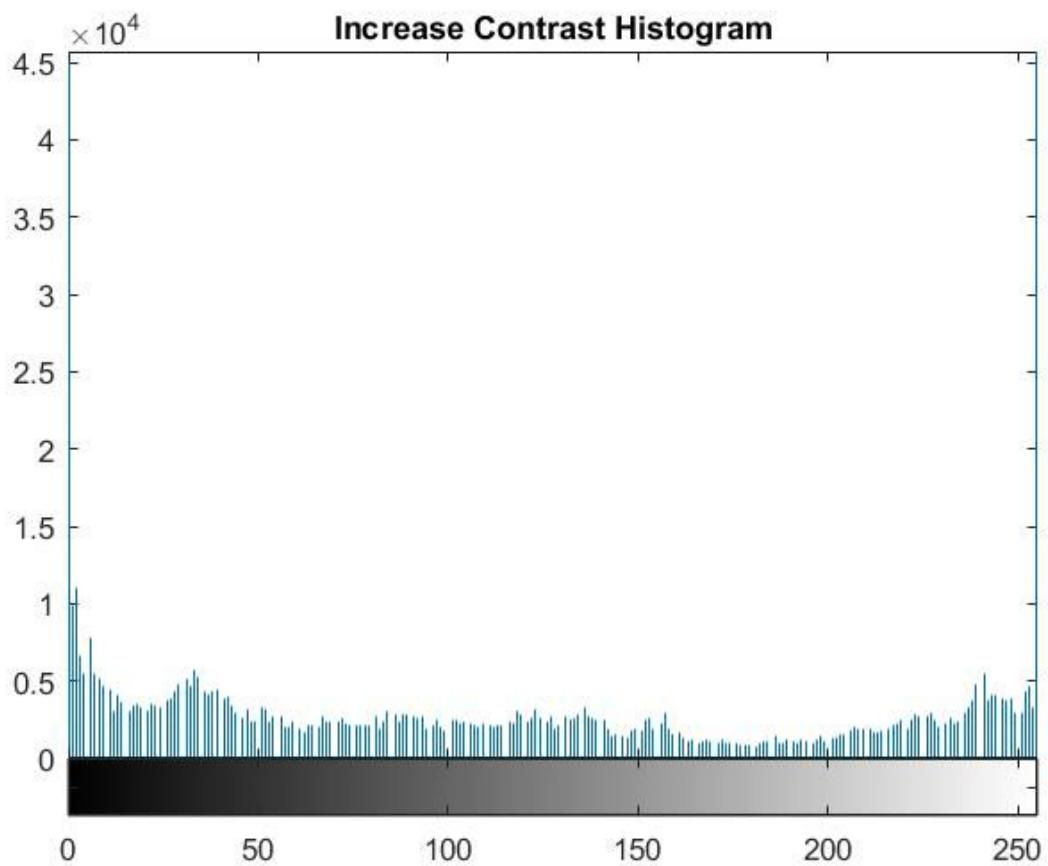


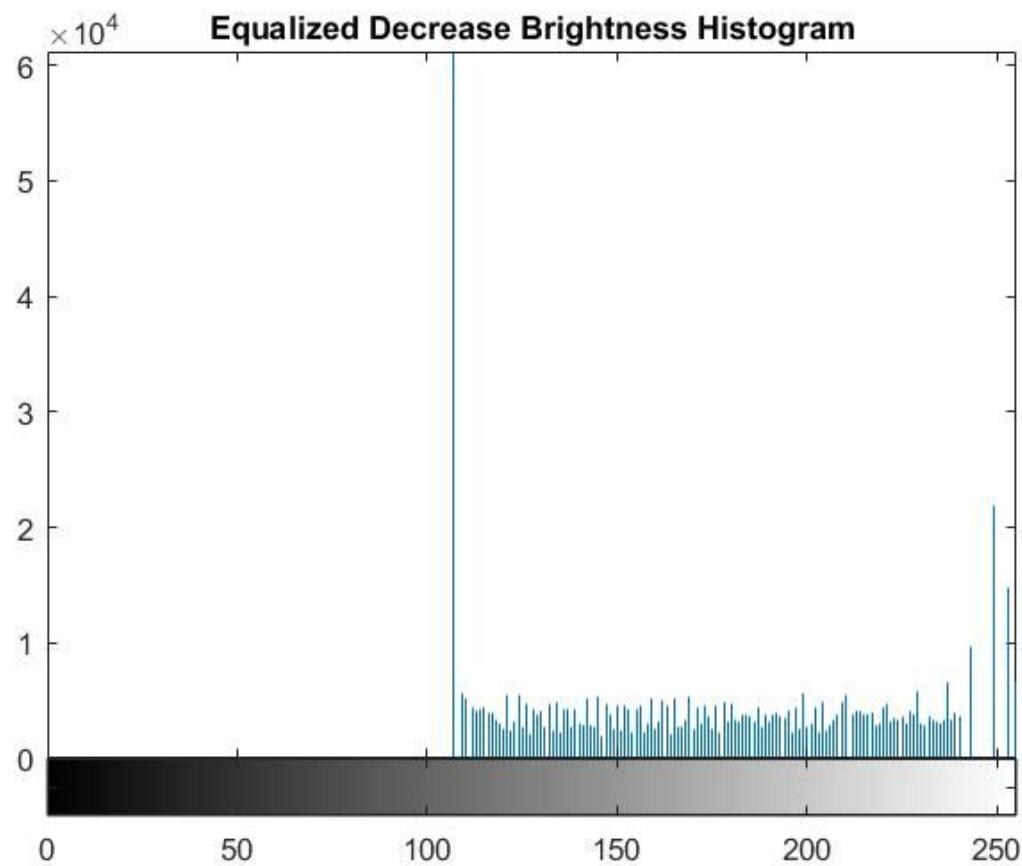


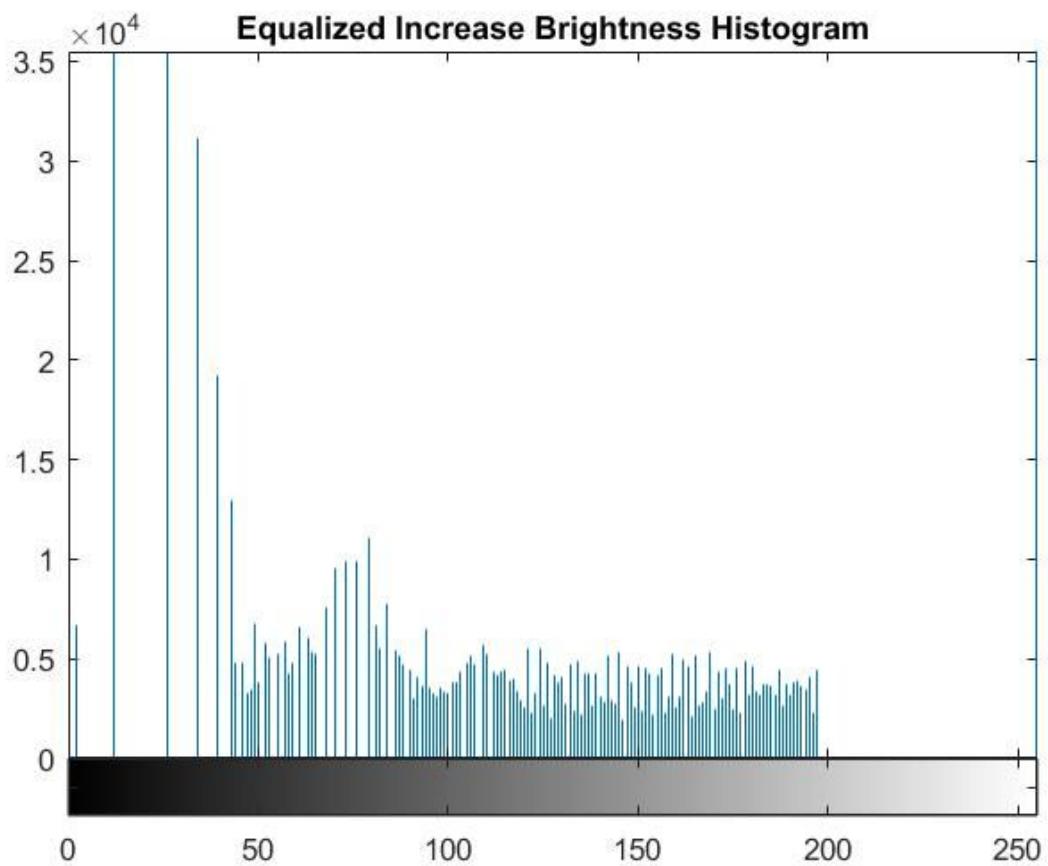


**Decrease Contrast Histogram**

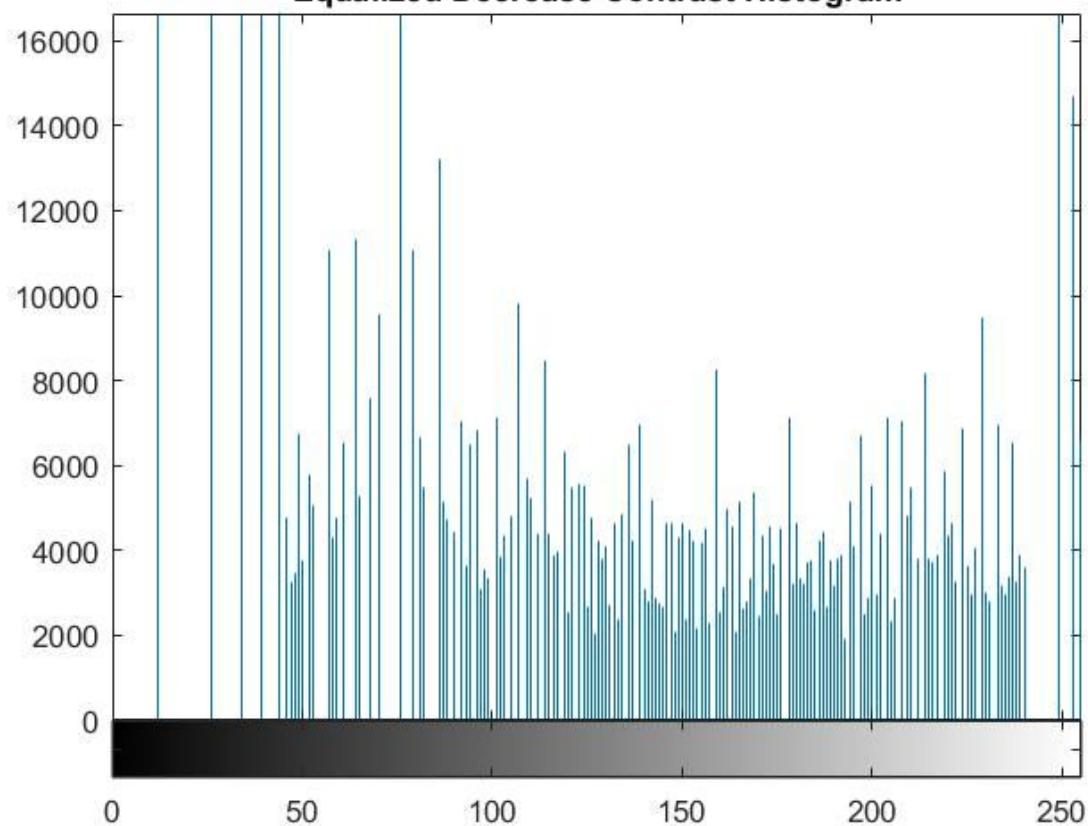


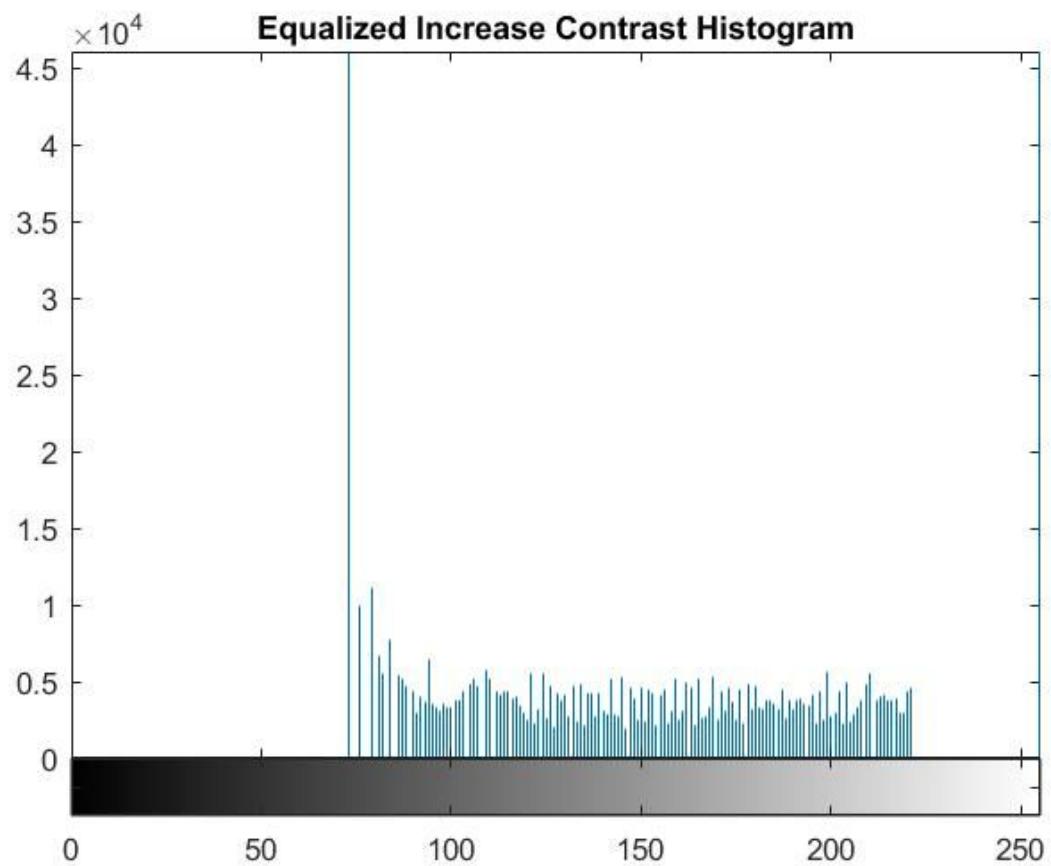






**Equalized Decrease Contrast Histogram**





**Equalized Image**



**Decrease Brightness**



**Increase Brightness**



**Decrease Contrast**



**Increase Contrast**



**Equalized Decrease Brightness**



**Equalized Increase Brightness**



**Equalized Decrease Contrast**



**Equalized Increase Contrast**



Code:

Assignment1.m

```
imdata = imread('Image.jpg');

figure;imshow(imdata);title('Original');

gydata = colortogray(imdata);

%A = gydata;

figure;imshow(gydata);title('Grey Shade Image');

bitplane1 = bitplane(imdata);

for i = 1:8
    figure;imshow(bitplane1(:,:,9-i));title(strcat('Bit Plane B',int2str(i)));
end
```

## Assignment2.m

```
imdata = imread('Image.jpg');

gydata = colortogray(imdata);

increasebrightness = brightness(gydata,0.2);
decreasebrightness = brightness(gydata,-0.2);

increasecontrast = contrast(gydata,0.2);
decreasecontrast = contrast(gydata,-0.2);

figure;imhist(gydata);title('Original Histogram');
figure;imhist(equalization(gydata));title('Equalised Histogram');
figure;imhist(decreasebrightness);title('Decrease Brightness Histogram');
figure;imhist(increasebrightness);title('Increase Brightness Histogram');
figure;imhist(decreasecontrast);title('Decrease Contrast Histogram');
figure;imhist(increasecontrast);title('Increase Contrast Histogram');
figure;imhist(equalization(decreasebrightness));title('Equalized Decrease Brightness Histogram');
figure;imhist(equalization(increasebrightness));title('Equalized Increase Brightness Histogram');
figure;imhist(equalization(decreasecontrast));title('Equalized Decrease Contrast Histogram');
figure;imhist(equalization(increasecontrast));title('Equalized Increase Contrast Histogram');

figure;imshow(gydata);title('Original Image');
figure;imshow(equalization(imdata));title('Equalized Image');
figure;imshow(decreasebrightness);title('Decrease Brightness');
figure;imshow(increasebrightness);title('Increase Brightness');
figure;imshow(decreasecontrast);title('Decrease Contrast');
figure;imshow(increasecontrast);title('Increase Contrast');
figure;imshow(equalization(decreasebrightness));title('Equalized Decrease Brightness');
figure;imshow(equalization(increasebrightness));title('Equalized Increase Brightness');
figure;imshow(equalization(decreasecontrast));title('Equalized Decrease Contrast');
figure;imshow(equalization(increasecontrast));title('Equalized Increase Contrast');
```

bitplane.m

```
function output = bitplane(input)
    [x,y,z] = size(input);
    if z == 3
        input = colortogray(input);
    end
    output = zeros(x,y,8,'uint8');
    for i = 1:8
        output(:,:,i) = bitget(input, i)*255;
    end
```

brightness.m

```
function output = brightness(input,k)
    [~,~,z] = size(input);
    if z == 3
        input = colortogray(input);
    end
    output = input + 255*k;
```

colortogray.m

```
function output = colortogray(input)
    [x,y,~] = size(input);
    output = zeros(x,y,'uint8');
    for i = 1:x
        for j = 1:y
            output(i,j) = input(i,j,1)*0.2989+input(i,j,2)*0.5870+input(i,j,3)*0.114;
        end
    end
```

contrast.m

```
function output = contrast(input, k)
    [~,~,z] = size(input);
    if z == 3
        input = colortogray(input);
    end
    m = 255/2;
    if k<0
        k = -k*m;
        %disp(k);
        input = double(input);
        output = input*((m-k)/m) + k;
        output = uint8(output);
    elseif k>0
        k = k*m;
        %disp(k);
        input = double(input);
        output = (m/(m-k))*(input - k);
        output = uint8(output);
    else
        output = input;
    end
```

equalization.m

```
function output = equalization(input)
[x,y,z] = size(input);
if z == 3
    input = colortogray(input);
end
freq = histtoref(input);
for i = 2:256
    freq(i) = freq(i-1)+freq(i);
end
tot = x*y;
newscale = zeros(1,256, 'uint8');
for i = 1:256
    newscale(i) = (freq(i)*255)/tot;
end
output = zeros(x, y, 'uint8');
for i = 1:x
    for j = 1:y
        output(i,j) = newscale(input(i,j)+1);
    end
end
```

histtofreq.m

```
function output = histtofreq(input)
[x,y,z] = size(input);
if z == 3
    input = colortogray(input);
end
output = zeros(1,256,'uint64');
for i = 1:x
    for j = 1:y
        output(input(i,j)+1) = output(input(i,j)+1) + 1;
    end
end
```