Contents

```
% Yeshwantrao Chavan College of Engineering, Nagpur
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% Session ODD 2024-25
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% Sec: 5-ET-A
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```
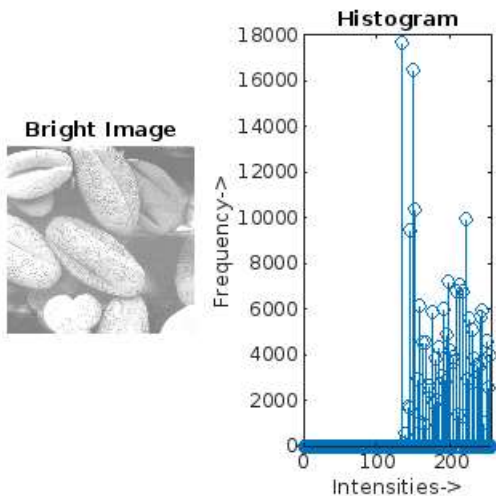
Experiment 5 : Histogram Processing

```
clc; close all; clear;
```
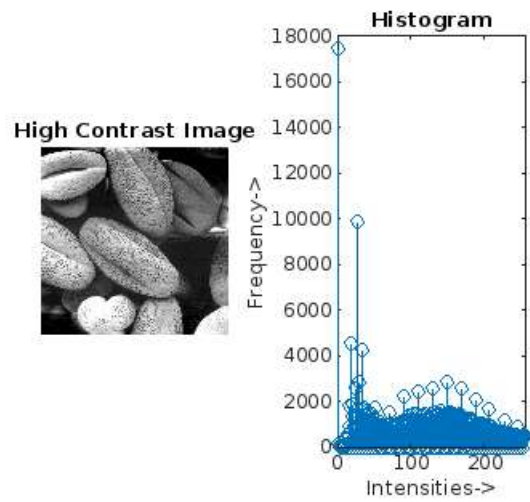
Histogram

```
I = imread('Images3/light.tif');

figure,
subplot(1, 2, 1), imshow(I), title("Bright Image");
subplot(1, 2, 2),
stem(imhist(I)), xlim([0 255]);
title("Histogram");
xlabel("Intensities->");
ylabel("Frequency->");
```
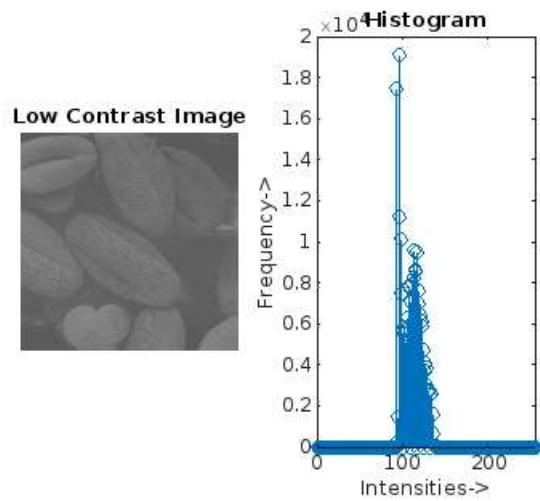


```
I1 = imread('Images3/high_con.tif');

figure,
subplot(1, 2, 1), imshow(I1), title("High Contrast Image");
subplot(1, 2, 2),
stem(imhist(I1)), xlim([0 255]);
title("Histogram");
xlabel("Intensities->");
ylabel("Frequency->");
```

High Contrast Image

Histogram

```
I2 = imread('Images3/low_con.tif');

figure,
subplot(1, 2, 1), imshow(I2), title("Low Contrast Image");
subplot(1, 2, 2),
stem(imhist(I2)), xlim([0 255]);
title("Histogram");
xlabel("Intensities->");
ylabel("Frequency->");
```


Low Contrast Image

Histogram

```
I3 = imread('Images3/dark.tif');

figure,
subplot(1, 2, 1), imshow(I3), title("Dark Image");
subplot(1, 2, 2),
stem(imhist(I3)), xlim([0 255]);
title("Histogram");
xlabel("Intensities->");
ylabel("Frequency->");
```
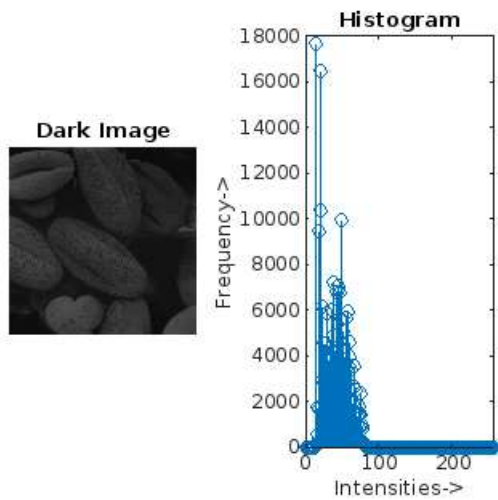
Historgam Equalization

```matlab
I1 = imread('Images3/low_con.tif');
H1 = imhist(I1);
[G1, T1] = histeq(I1);
HG1 = imhist(G1);

figure,
subplot(3, 2, 1), imshow(I1), title({"Original Image", "(Low Contrast)"});
subplot(3, 2, 2), stem(H1), title({"Histogram for", "Original Image"}), xlabel("Intensities->"), ylabel("Frequency->"), xlim([0 255]);
subplot(3, 2, 3), imshow(G1), title("Equalized Image");
subplot(3, 2, 4), stem(HG1), title({"Histogram for", "Equalized Image"}), xlabel("Intensities->"), ylabel("Frequency->"), xlim([0 255]);
subplot(3, 2, [5 6]), plot(T1), title({"Transfer Function for", "Equalized Image"}), xlabel("Input Intensities->"), ylabel("Mapping->");

I2 = imread('Images3/high_con.tif');
H2 = imhist(I2);
[G2, T2] = histeq(I2);
HG2 = imhist(G2);

figure,
subplot(3, 2, 1), imshow(I2), title({"Original Image", "(High Contrast)"});
subplot(3, 2, 2), stem(H2), title({"Histogram for", "Original Image"}), xlabel("Intensities->"), ylabel("Frequency->"), xlim([0 255]);
subplot(3, 2, 3), imshow(G2), title("Equalized Image");
subplot(3, 2, 4), stem(HG2), title({"Histogram for", "Equalized Image"}), xlabel("Intensities->"), ylabel("Frequency->"), xlim([0 255]);
subplot(3, 2, [5 6]), plot(T2), title({"Transfer Function for", "Equalized Image"}), xlabel("Input Intensities->"), ylabel("Mapping->");

I3 = imread('Images3/light.tif');
H3 = imhist(I3);
[G3, T3] = histeq(I3);
HG3 = imhist(G3);

figure,
subplot(3, 2, 1), imshow(I3), title({"Original Image", "(Bright)"});
subplot(3, 2, 2), stem(H3), title({"Histogram for", "Original Image"}), xlabel("Intensities->"), ylabel("Frequency->"), xlim([0 255]);
subplot(3, 2, 3), imshow(G3), title("Equalized Image");
subplot(3, 2, 4), stem(HG3), title({"Histogram for", "Equalized Image"}), xlabel("Intensities->"), ylabel("Frequency->"), xlim([0 255]);
subplot(3, 2, [5 6]), plot(T3), title({"Transfer Function for", "Equalized Image"}), xlabel("Input Intensities->"), ylabel("Mapping->");

I4 = imread('Images3/dark.tif');
H4 = imhist(I4);
[G4, T4] = histeq(I4);
HG4 = imhist(G4);

figure,
subplot(3, 2, 1), imshow(I4), title({"Original Image", "(Dark)"});
subplot(3, 2, 2), stem(H4), title({"Histogram for", "Original Image"}), xlabel("Intensities->"), ylabel("Frequency->"), xlim([0 255]);
subplot(3, 2, 3), imshow(G4), title("Equalized Image");
subplot(3, 2, 4), stem(HG4), title({"Histogram for", "Equalized Image"}), xlabel("Intensities->"), ylabel("Frequency->"), xlim([0 255]);
subplot(3, 2, [5 6]), plot(T4), title({"Transfer Function for", "Equalized Image"}), xlabel("Input Intensities->"), ylabel("Mapping->");
```
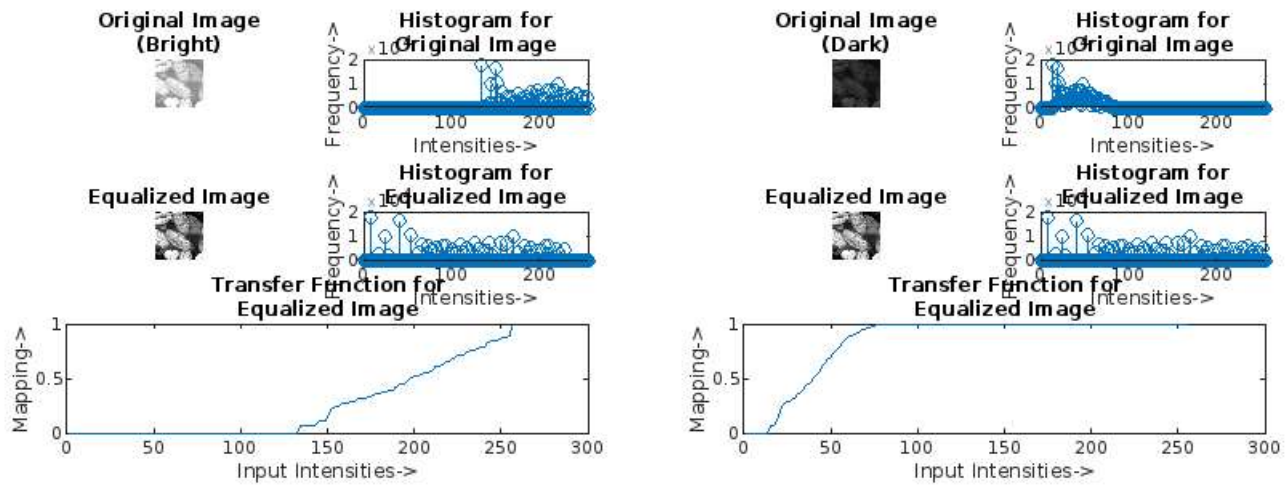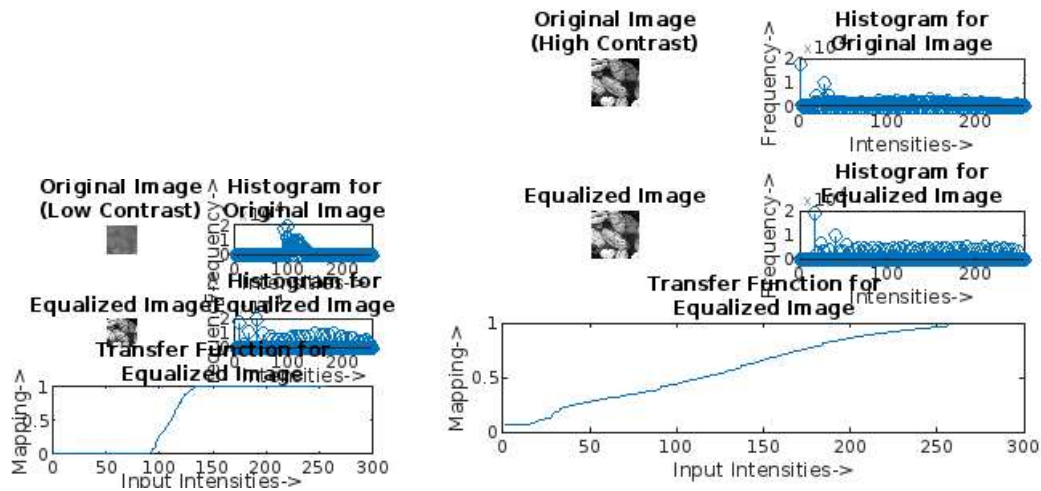
Conclusion

The histograms of all the images are imperfect i.e they are not spread over the complete range of intensities. Histogram for a bright image is accumulated at high intensities, for a dark image it is accumulated at low intensities, for a low contrast image it is accumulated at the middle and for a high contrast image it is spread. Therefore, we need to equalize these histograms to get high contrast images. After equalization, the histograms are fully spread over the range of intensities.

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