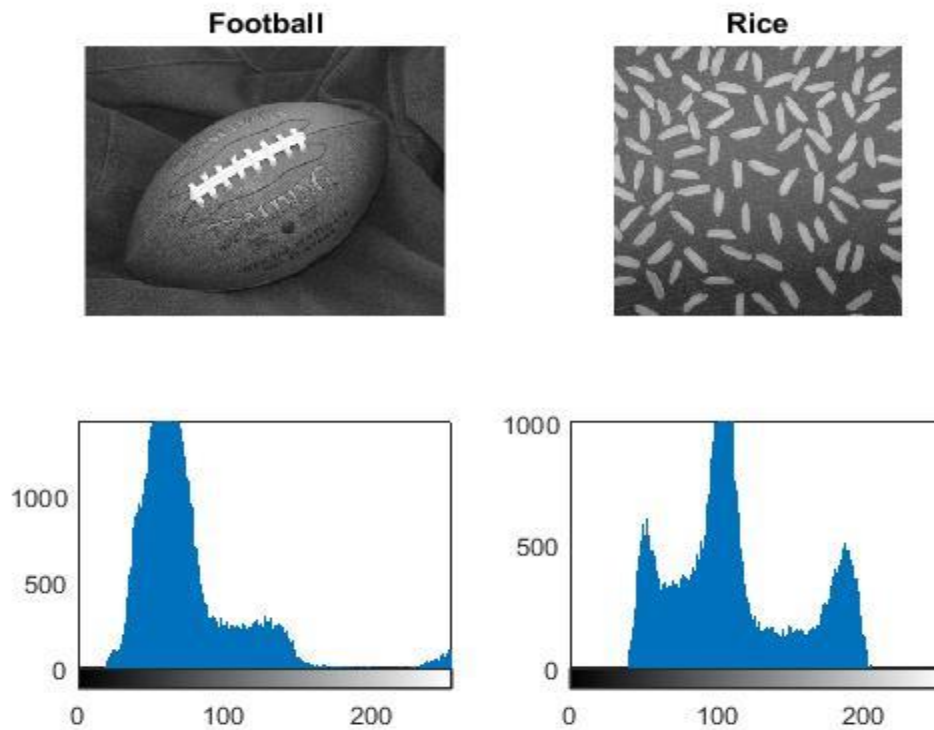# BASICS OF IMAGE PROCESSING

Q1: Histogram Comparison

```
clear all;close all;clc;
I1 = imread('football.jpg');
I1 = rgb2gray(I1);
I2 = imread('rice.png');
subplot(221);imshow(I1)
title('Football');
subplot(222);imshow(I2)
title('Rice')
subplot(223);imhist(I1)
subplot(224);imhist(I2)
```

OUTPUT:

Q2: DFT and IDFT of an Image (2-Dimensional)

```
clear all;close all;clc;
I2 = imread('rice.png');
N = 256;
w = exp(-pi*1i*2/N);
W = zeros(N,N);
for i = 0:N-1
    for j = 0:N-1
    W(i+1,j+1) = w^(j*i);
    end
end
I3 = (double(I2))*W;
I4 = (I3' * W)';
subplot(221);imshow(fftshift(I4));title('my fft')
I5 = fft2(double(I2)/255);
subplot(222);imshow(fftshift(I5));title('fft2');
I6 = ifft2(I4);
subplot(223);imshow(uint8(I6));title('my ifft');
subplot(224);imshow(ifft2(I5));title('ifft2');
```
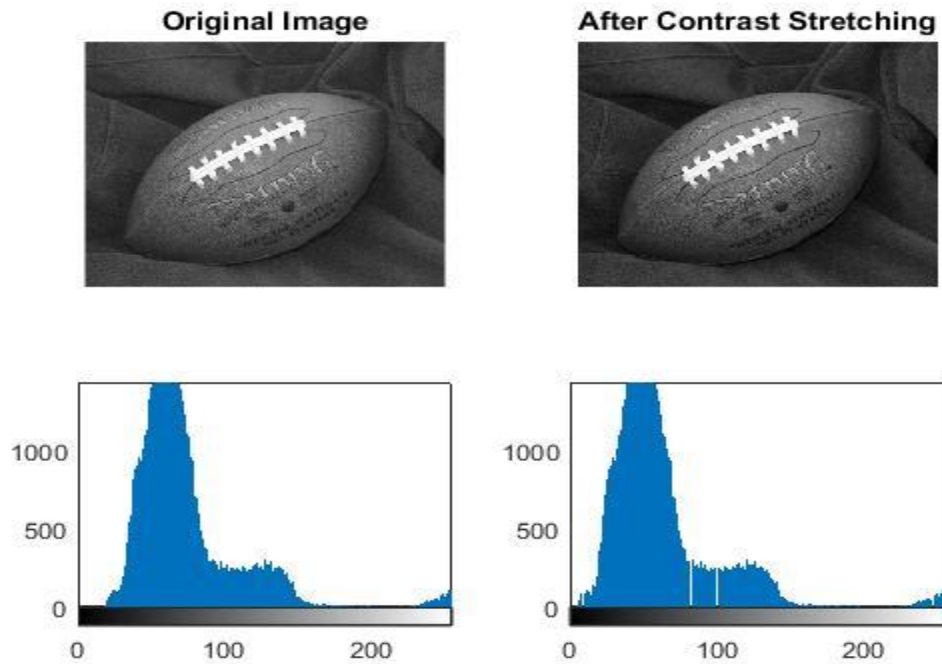
OUTPUT:
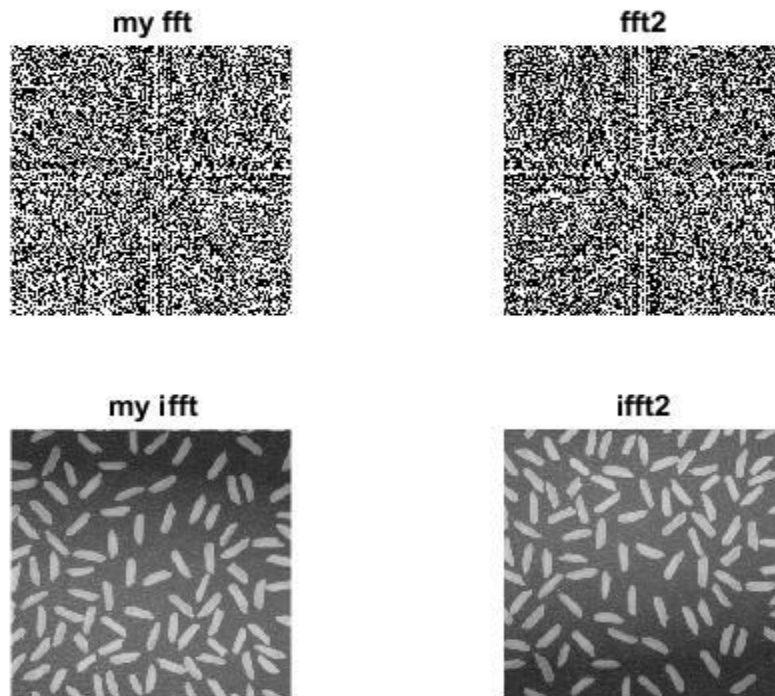
Q3: Contrast Stretching

```
clear all;close all;clc;
I = imread('football.jpg');
Ig = rgb2gray(I);
Igd = double(Ig);
c = min(min(Igd));
d = max(max(Igd));
a = 0;
b = 255;
In = ((Igd - c)/(d - c))*(b - a) + a;
Icsg = uint8(In);
subplot(221);imshow(Ig)
title('Original Image');
subplot(223);imhist(Ig)
subplot(222);imshow(Icsg)
title('After Contrast Stretching');
subplot(224);imhist(Icsg)
```

OUTPUT:

Q4: Piece Wise Linear Transfer Functions

```
clear all;close all;clc;
I = imread('football.jpg');
Ig = rgb2gray(I);
Igd = double(Ig);
[m,n] = size(Igd);
M = max(max(Ig));
a = input('Enter the values of x1 and x2:');
b = input('Enter the values of y1 and y2:');
alpha = b(1)/a(1);
beta = (b(2)-b(1))/(a(2)-a(1));
gamma = (255-b(2))/(M-a(2));

for x = 1:m
    for y = 1: n
        if(Ig(x,y) <= a(1))
            Ign(x,y) = alpha*Igd(x,y);
        elseif(Ig(x,y) >= a(2))
            Ign(x,y) = gamma*(Igd(x,y)-a(2)) + b(2);
        else
            Ign(x,y) = beta*(Igd(x,y) - a(1)) + b(1);
        end
    end
end


Imn = uint8(Ign);
subplot(221);imshow(Ig)
title('Original Grayscale Image');
subplot(222);imshow(Imn)
title('After Piece Wise Linear Transformation')
subplot(223);imhist(Ig)
subplot(224);imhist(Imn)
```

OUTPUT: For x1=50, x2=150, y1=30, y2=200

Original Grayscale Image   **After Piece Wise Linear Transformation**