مهدی محمدی

حل تکلیف سری یک – سوال اول

```
clc;
close all;
clear all;

I=imread('leg1.gif');

figure;
subplot(1,3,1);
imshow(I);
title('Original Image');

I=im2single(I);

subplot(1,3,2);
imshow(gamma_correction(1,I,2));
title('Exponential Function');

subplot(1,3,3);
imshow(gamma_correction(1,I,0.5));
title('Logarithmic Function');

function [ S ] = gamma_correction(C,I,gamma)
S=(C*I).^(gamma);
end
```

حل تکلیف سری یک – سوال دوم

```
clc;
close all;
clear all;
I=0;

figure;
J=imread('barbara.gif');
for K=55:-10:5
    I=I+1;
    imwrite(J,strcat('barbara',int2str(K),'.jpeg'),'Quality',K);
    subplot(2,3,I);
    imshow(strcat('barbara',int2str(K),'.jpeg'));
    title(strcat('Quality=',int2str(K)));
end

for L=55:-10:5
    J = imread(strcat('barbara',int2str(L),'.jpeg'));
    h=imhist(J);
    figure;
    subplot(1,2,1);
    imshow(strcat('barbara',int2str(L),'.jpeg'));
    title(strcat('Quality=',int2str(L)));
    subplot(1,2,2);
    bar(h,'b');
end
```

حل تکلیف سری یک - سوال سوم

```
clc;
close all;
clear all;

I=imread('pool.png');
imshow(I);
title('RGB');

figure;
R=I(:,:,1);
imshow(R);
title('RED Channel');

figure;
G=I(:,:,2);
imshow(G);
title('Green Channel');

figure;
B=I(:,:,3);
imshow(B);
title('Blue Channel');

[m,n]=size(R);
RR=zeros(m,n);
RR=uint8(RR);
figure;
imshow(cat(3,RR,G,B));
title('Green Channel + Blue Channel');
Histogram(RR,G,B);

[m,n]=size(G);
RG=zeros(m,n);
RG=uint8(RG);
figure;
imshow(cat(3,R,RG,B));
title('Red Channel + Blue Channel');
Histogram(R,RG,B);

[m,n]=size(B);
RB=zeros(m,n);
RB=uint8(RB);
figure;
imshow(cat(3,R,G,RB));
title('Red Channel + Green Channel');
Histogram(R,G,RB);

function Histogram(X,Y,Z)
figure;
HR=imhist(X);
HG=imhist(Y);
HB=imhist(Z);
subplot(1,3,1);
bar(HR,'r');
subplot(1,3,2);
bar(HG,'g');
subplot(1,3,3);
```

```
bar(HB,'b');
end
```

حل تکلیف سری یک – سوال چهارم

```
clc;
close all;
clear all;

I=imread('pool.png');
for J=2:20:122
    figure;
    [x,map]=rgb2ind(I,J);
    imshow(x,map);
    title(strcat('Indexed image(',int2str(J),' Colors)'));
end
for J=2:20:122
    figure;
    [x,map]=rgb2ind(I,J);
    subplot(2,2,1);
    imshow(x);
    title('Image befor histogram equalization');
    subplot(2,2,2);
    bar(imhist(x),'b');
    title('Original Histogram');
    g=histeq(x);
    subplot(2,2,3);
    imshow(g);
    title('Image after histogram equalization');
    subplot(2,2,4);
    bar(imhist(g),'b');
    title('Equalized Histogram');
end
```

حل تکلیف سری یک – سوال پنجم

```
clc;
close all;
clear all;

K=imread('house.tif');
imshow(K);
title('Original Image');
K=double(K);
[m n]=size(K);
L=256;

% Lecture #6 - Slide #16 %
P1=round(0.3*L);
P2=round(0.6*L);
S1=round(0.3*P1);
S2=round(1.2*P2);
m1=((S1-0)/(P1-0));
m2=((S2-S1)/(P2-P1));
m3=(((L-1)-S2)/((L-1)-P2));
temp=zeros(m,n);
for I=1:m
    for J=1:n
        if K(I,J)<=P1
            temp(I,J)=F(K(I,J),m1,P1,S1);
        elseif K(I,J)>P1 && K(I,J)<=P2
            temp(I,J)=F(K(I,J),m2,P2,S2);
```

```
        elseif K(I,J)>P2
            temp(I,J)=F(K(I,J),m3,L-1,L-1);
        end
    end
end
figure;
imshow(uint8(temp));
title('Lecture #6 - Slide #16');
%------------------------%

% Lecture #6 - Slide #17 %
T1=50;
T2=100;
T3=150;
T4=200;
a=50;
b=100;
c=150;
d=200;
temp=zeros(m,n);
for I=1:m
    for J=1:n
        if K(I,J)<T1
            temp(I,J)=0;
        elseif (K(I,J)>=T1 && K(I,J)<T2)
            temp(I,J)=a;
        elseif (K(I,J)>=T2 && K(I,J)<T3)
            temp(I,J)=b;
        elseif (K(I,J)>=T3 && K(I,J)<T4)
            temp(I,J)=c;
        else
            temp(I,J)=d;
        end
    end
end
figure;
imshow(uint8(temp));
title('Lecture #6 - Slide #17');
%------------------------%

% Lecture #6 - Slide #18 %
P1=0;
S1=0;
P2=round(0.8*L);
S2=round(0.6*L);
m1=(S2-S1)/(P2-P1);
temp=zeros(m,n);
for I=1:m
    for J=1:n
        if (K(I,J)>50 && K(I,J)<130)
            temp(I,J)=S2;
        else
            temp(I,J)=F(K(I,J),m1,P1,S1);
        end
    end
end
figure;
imshow(uint8(temp));
title('Lecture #6 - Slide #18');
%------------------------%
```

```
% Lecture #6 - Slide #19 %
P1=round(0.2*L);
P2=round(0.5*L);
P3=round(0.9*L);
S1=round(0.07*L);
S2=round(0.35*L);
S3=0;
temp=zeros(m,n);
for I=1:m;
    for J=1:n;
        if (K(I,J)<P1 || (K(I,J)>P2 && K(I,J)<P3))
            temp(I,J)=S1;
        elseif K(I,J)>P3
            temp(I,J)=S3;
        else
            temp(I,J)=S2;
        end
    end
end
figure;
imshow(uint8(temp));
title('Lecture #6 - Slide #19');
%------------------------%

function [ F ] = F(r,m,P,S)
F=m*(r-P)+S;
end
```

حل تکلیف سری یک – سوال ششم

```
close all hidden;
clear all;
clc;
I=imread('cameraman.tif');
imshow(I);
title('Original Image')
I=double(I);

b0=rem((fix(I/1)),2);
b1=rem((fix(I/2)),2);
b2=rem((fix(I/4)),2);
b3=rem((fix(I/8)),2);
b4=rem((fix(I/16)),2);
b5=rem((fix(I/32)),2);
b6=rem((fix(I/64)),2);
b7=rem((fix(I/128)),2);

figure;
for I=1:8
    subplot(2,4,I);
    imshow(eval(strcat('b',int2str(I-1))));
    title(strcat('b',int2str(I-1)));
end

Original_Picture=uint8((b7*(2^7))+(b6*(2^6))+(b5*(2^5))+(b4*(2^4))+(b3*(2^3
))+(b2*(2^2))+(b1*(2^1))+(b0*(2^0)));
figure;
imshow(Original_Picture);
title('Reconstructed Original Picture');
```

حل تکلیف سری یک – سوال هفتم

```
clc;
close all;
clear all;

I=imread('peppers.gif');
for K=1:5
    J=imread(strcat('peppers',int2str(K),'.gif'));
    figure;
    subplot(1,2,1);
    imshow(I);
    title('Original Image');
    subplot(1,2,2);
    imshow(J);
    title(strcat('MSE=',num2str(MSE(I,J)),',','PSNR=',num2str(PSNR(I,J))));
end

function [ mse ] = MSE(I,J)
mse=sum(sum((double(I)-double(J)).^2))/numel(J);
end

function [ psnr ] = PSNR(I,J)
psnr=10*log10(256^2/MSE(I,J));
end
```

حل تکلیف سری یک – سوال هشتم

```
clc;
close all;
clear all;

I=imread('lake.tif');
H0=imhist(I);
H1=H0;
H2=H0;
H3=H0;
H1([1:100 200:256])=0;
H2([50:100 150:200])=0;
H3([1:20 60:80 120:140 180:200 220:240])=0;

for J=1:3
    figure;
    subplot(3,2,1);
    imshow(I);
    title('Image befor histogram equalization');
    subplot(3,2,2);
    bar(H0,'b');
    title('Original Histogram');
    subplot(3,2,4);
    plot(eval(strcat('H',int2str(J))),'r');
    title('Histogram Specification');
    K=histeq(I,eval(strcat('H',int2str(J))));
    subplot(3,2,5);
    imshow(K);
    title('Image after histogram equalization');
    subplot(3,2,6);
    bar(imhist(K),'r');
    title('Equalized Histogram');
end
```