مهدی محمدی

حل تکیف سری سه – سوال اول

```
clc;
close all;
clear all;

I=imread('egg1.gif');
subplot(1,2,1);
imshow(I);
SE=strel('disk',1);
J=imopen(I,SE);
J=imclose(J,SE);
K=medfilt2(J,[7 7]);
subplot(1,2,2);
imshow(K);
```

حل تکلیف سری سه – سوال دوم

```
clc;
close all;
clear all;

I1=imread('barbara.gif');
I2=imnoise(I1,'salt & pepper',0.02);
I3=imnoise(I1,'gaussian',0,0.02);

for I=1:3
    subplot(3,1,I);
    imshow(eval(strcat('I',int2str(I))));
end

for I=2:3
    figure
    Median_Filter(I1,eval(strcat('I',int2str(I))),3,3,1,1);
    Median_Filter(I1,eval(strcat('I',int2str(I))),5,3,1,2);
    Median_Filter(I1,eval(strcat('I',int2str(I))),7,3,1,3);
    figure;
    Mean_Filter(I1,eval(strcat('I',int2str(I))),3,3,1,1);
    Mean_Filter(I1,eval(strcat('I',int2str(I))),5,3,1,2);
    Mean_Filter(I1,eval(strcat('I',int2str(I))),7,3,1,3);
    figure;
    Gaussian_Filter(I1,eval(strcat('I',int2str(I))),5,0.3,3,1,1);
    Gaussian_Filter(I1,eval(strcat('I',int2str(I))),5,0.6,3,1,2);
    Gaussian_Filter(I1,eval(strcat('I',int2str(I))),5,0.9,3,1,3);
end

I1=imread('cameraman.tif');
I2=imnoise(I1,'salt & pepper',0.02);
I3=imnoise(I1,'gaussian',0,0.02);

for I=1:3
    subplot(3,1,I);
    imshow(eval(strcat('I',int2str(I))));
end
```

```
for I=2:3
    figure
    Median_Filter(I1,eval(strcat('I',int2str(I))),3,3,1,1);
    Median_Filter(I1,eval(strcat('I',int2str(I))),5,3,1,2);
    Median_Filter(I1,eval(strcat('I',int2str(I))),7,3,1,3);
    figure;
    Mean_Filter(I1,eval(strcat('I',int2str(I))),3,3,1,1);
    Mean_Filter(I1,eval(strcat('I',int2str(I))),5,3,1,2);
    Mean_Filter(I1,eval(strcat('I',int2str(I))),7,3,1,3);
    figure;
    Gaussian_Filter(I1,eval(strcat('I',int2str(I))),5,0.3,3,1,1);
    Gaussian_Filter(I1,eval(strcat('I',int2str(I))),5,0.6,3,1,2);
    Gaussian_Filter(I1,eval(strcat('I',int2str(I))),5,0.9,3,1,3);
end

function Median_Filter(I,NI,SoW,X,Y,Z)
L=medfilt2(NI,[SoW SoW]);
subplot(X,Y,Z);
imshow(L);
title(strcat('Median Filter
(',int2str(SoW),'*',int2str(SoW),'),','PSNR=',num2str(PSNR(I,L))));
end

function Mean_Filter(I,NI,SoW,X,Y,Z)
W=ones(SoW)/(SoW*SoW);
L=imfilter(NI,W);
subplot(X,Y,Z);
imshow(L);
title(strcat('Mean Filter
(',int2str(SoW),'*',int2str(SoW),'),','PSNR=',num2str(PSNR(I,L))));
end

function Gaussian_Filter(I,NI,hsize,sigma,X,Y,Z)
H=fspecial('gaussian',hsize,sigma);
L=imfilter(NI,H,'replicate');
subplot(X,Y,Z);
imshow(L);
title(strcat('Gaussian Filter
(',num2str(hsize),',',num2str(sigma),'),','PSNR=',num2str(PSNR(I,L))));
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 سه – سوال سوم

```
clc;
close all;
clear all;

W4=[0 1 0;1 -4 1;0 1 0];
W8=[1 1 1;1 -8 1;1 1 1];

I=imread('Baboon.tif');
f1=im2double(I);
```

```
subplot(1,2,1);
imshow(I);
g1=imfilter(f1,W4,'replicate');
subplot(1,2,2);
imshow(f1-g1);

figure;
subplot(1,2,1);
imshow(I);
g2=imfilter(f1,W8,'replicate');
subplot(1,2,2);
imshow(f1-g2);
```

حل تکلیف سری سه – سوال چهارم

```
clc;
close all;
clear all;

I=imread('ART2.gif');

F1=[-1 -2 -1;0 0 0;1 2 1];
F2=[-1 0 1;-2 0 2;-1 0 1];
F3=[2 1 0;1 0 -1;0 -1 -2];
F4=[0 1 2;-1 0 1;-2 -1 0];
for J=1:4
    figure;
    subplot(1,3,1);
    imshow(I,[]);
    G=imfilter(I,eval(strcat('F',int2str(J))),'replicate');
    subplot(1,3,2);
    imshow(G,[]);
    subplot(1,3,3);
    Edge(G);
end

function Edge(G)
[m,n]=size(G);
G=abs(G);
temp=false(m,n);
for i=2:m-1;
    for j=2:n-1;
        if G(i,j)>=0.85*(max(max(G)));
            temp(i,j)=1;
        else
            temp(i,j)=0;
        end
    end
end
imshow(bwmorph(temp,'skel',inf));
end
```