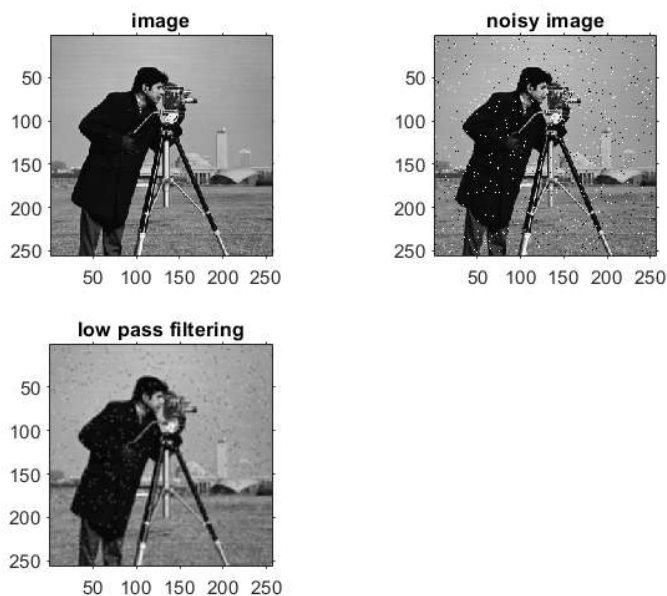# FILTERS

Low pass filtering (aka smoothing), is employed to remove high spatial frequency noise from a digital image. The low-pass filters usually employ moving window operator which affects one pixel of the image at a time, changing its value by some function of a local region (window) of pixels. The operator moves over the image to affect all the pixels in the image.

```matlab
a = imread('cameraman.tif');
im = im2double(a);
im2 = imnoise(im,'salt & pepper', 0.02); % in this stem I'm inducing some salt and pepper or grain noise to the image
filt = ones(3,3)/9; % here we create a filter values
% here the inbuilt filter code of filter2 is used which performs an inbuilt
% coded FIR filter operation
img1 = filter2(filt,im2);

subplot(2,2,1),imshow(a), axis on, title('image');
subplot(2,2,2), imshow(im2), axis on, title('noisy image');
subplot(2,2,3),imshow(img1), axis on, title('low pass filtering');
```



```matlab
figure();
```

High pass filters (Edge Detection, Sharpening)

A high-pass filter can be used to make an image appear sharper. These filters emphasize fine details in the image - the opposite of the low-pass filter. High-pass filtering works in the same way as low-pass filtering; it just uses a different convolution kernel.

```matlab
img2 = medfilt2(im2);
subplot(1,2,1),imshow(im2), axis on, title('image');
subplot(1,2,2),imshow(img2), axis on, title('high pass filtering');
```

image   high pass filtering