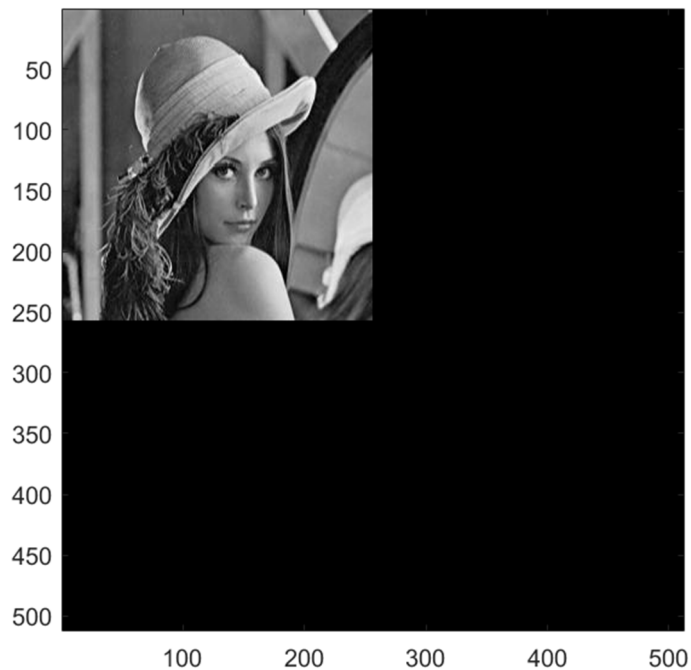```matlab
% Filtering in the frequency domain (Ideal Lowpass Filter)

f = imread('lenna256.jpg'); % Unsigned 8-bit integer for storage
f = double(f); % double precision variable for floating point operations

f_P = padarray(f, [256,256], 'post');

imagesc(f_P)
colormap(gray (256))
axis image
```



```matlab
F = fftshift(fft2(f_P));


H = zeros(512);


% Construct Ideal Lowpass Filter, H


D_0 = 40;
n = 1;


for u = 1:512
    for v = 1:512
        D = sqrt(((u-256)^2)+((v-256)^2));
        if D < D_0
            H(u,v) = 1;
        end
    end
end
```
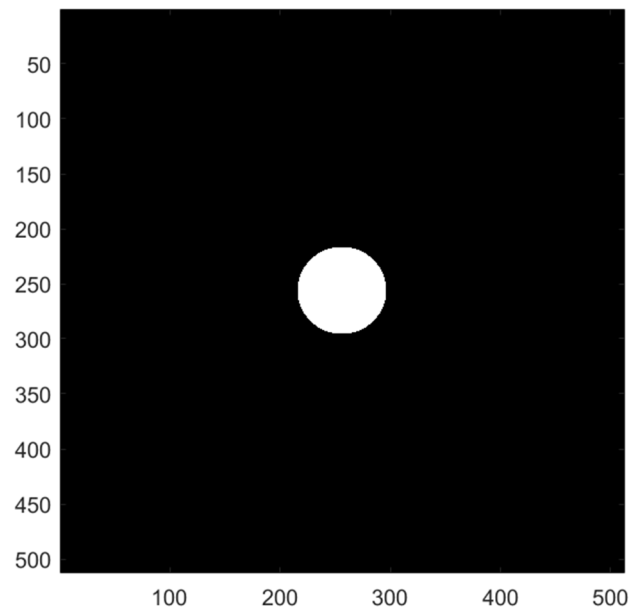
```
imagesc( H )
colormap( gray ( 256 ) )
axis image
```



```
G = H.*F;

g_P = real(ifft2(fftshift(G)));

g = g_P(1:256,1:256);

imagesc( g )
colormap( gray ( 256 ) )
axis image
```