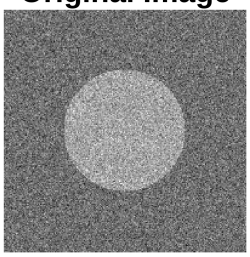
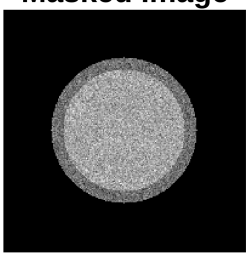
```
img_size = 200;
[X, Y] = meshgrid(1:img_size, 1:img_size);
center = img_size/2;
radius = img_size/4;
img = double(sqrt((X-center).^2 + (Y-center).^2) <= radius);
img = img + 0.5*randn(img_size);
img = mat2gray(img);  % Normalize to [0, 1]

% Create a binary mask for the region of interest (ROI)
mask = sqrt((X-center).^2 + (Y-center).^2) <= radius*1.2;

% Apply the mask to the original image
masked_img = img .* mask;

% Low-pass filters
% Gaussian filter
gaussian_filter = fspecial('gaussian', [5 5], 2);
gaussian_filtered = imfilter(masked_img, gaussian_filter, 'replicate');

% Average filter
average_filter = fspecial('average', [5 5]);
average_filtered = imfilter(masked_img, average_filter, 'replicate');

% High-pass filters
% Laplacian filter
laplacian_filter = fspecial('laplacian', 0.2);
laplacian_filtered = imfilter(masked_img, laplacian_filter, 'replicate');

% Prewitt filter
prewitt_horizontal = fspecial('prewitt');
prewitt_vertical = prewitt_horizontal';
prewitt_filtered_h = imfilter(masked_img, prewitt_horizontal, 'replicate');
prewitt_filtered_v = imfilter(masked_img, prewitt_vertical, 'replicate');
prewitt_filtered = sqrt(prewitt_filtered_h.^2 + prewitt_filtered_v.^2);

% Display results
figure;

subplot(2,3,1), imshow(img), title('Original Image');
subplot(2,3,2), imshow(masked_img), title('Masked Image');
subplot(2,3,3), imshow(gaussian_filtered), title('Gaussian Filter');
subplot(2,3,4), imshow(average_filtered), title('Average Filter');
subplot(2,3,5), imshow(laplacian_filtered, []), title('Laplacian Filter');
subplot(2,3,6), imshow(prewitt_filtered, []), title('Prewitt Filter');
```

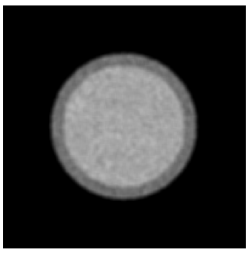
Original Image



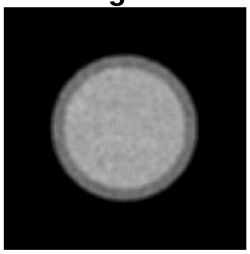
Masked Image



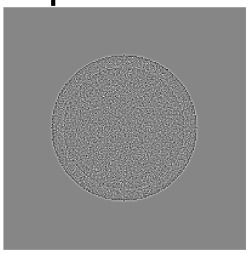
Gaussian Filter



Average Filter



Laplacian Filter



Prewitt Filter