```
I_orig = imread("cat_driving.jpg");
I = rgb2gray(I_orig);
disp("Chosen Image:")
```

```
Chosen Image:
```

```
imshow(I)
title("Original")
```


```
disp('Question 4:')
```

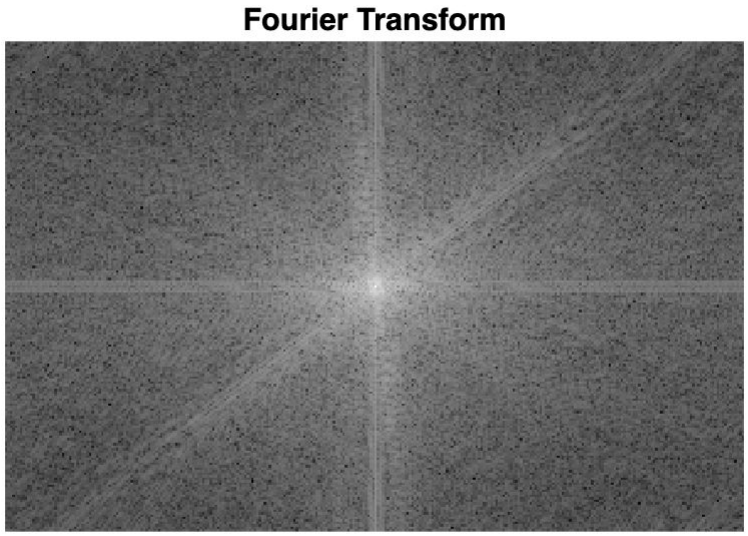
```
Question 4:
```

```
disp('Butterworth Filter:')
```

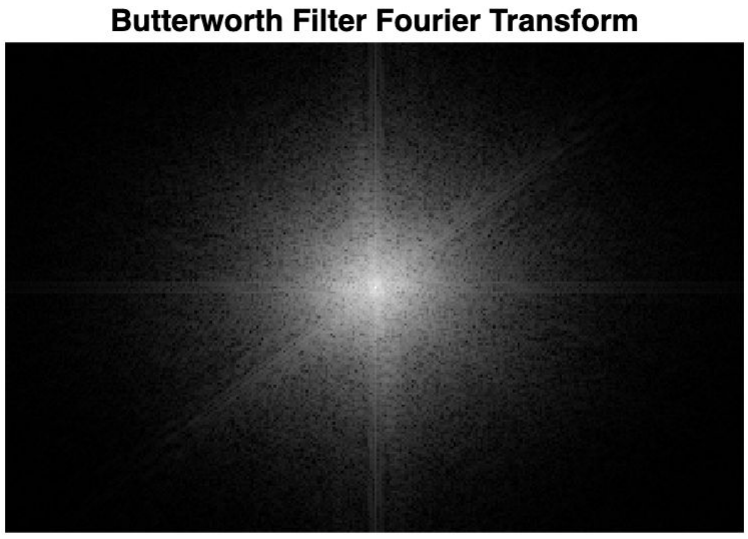
```
Butterworth Filter:
```

```
cat = I;
cat_f = fftshift(fft2(cat));

height = size(I, 1);
width = size(I, 2);
[X, Y] = meshgrid(1:width, 1:height);
centerX = width / 2;
centerY = height / 2;

mesh = sqrt((X - centerX).^2 + (Y - centerY).^2);
D = 15;
```

```
H_butterworth = 1 ./ (1 + (mesh ./ D).^(4));
imshow(mat2gray(log(1+abs(cat_f))));
title('Fourier Transform')
```

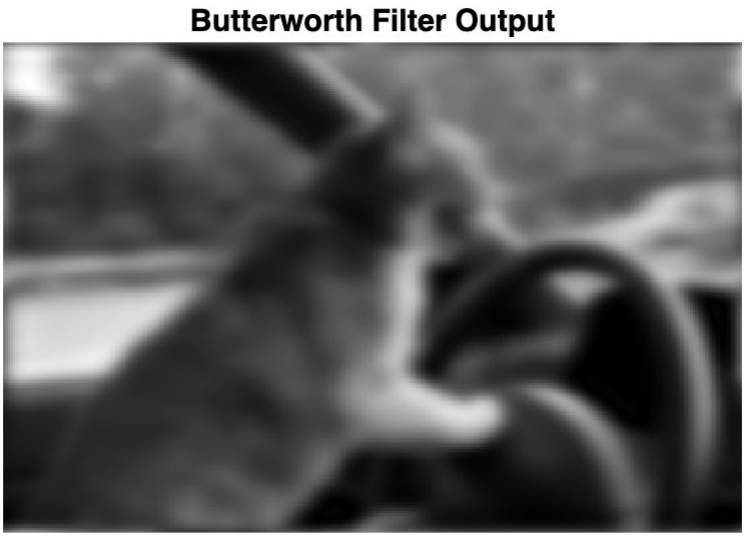



```
cat_fl_butterworth = cat_f .* H_butterworth;
imshow(mat2gray(log(1+abs(cat_fl_butterworth))));
title('Butterworth Filter Fourier Transform')
```




```
cat_cfli_butterworth = ifft2(cat_fl_butterworth);
imshow(mat2gray(abs(cat_cfli_butterworth)))
```

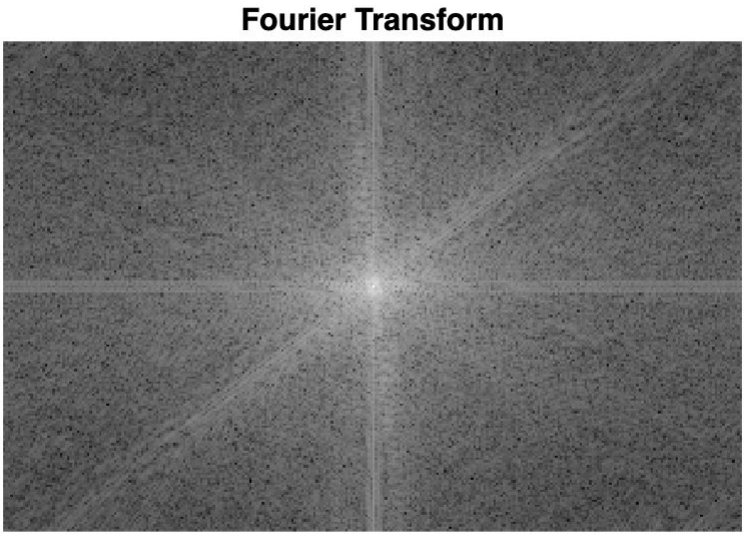
```
title('Butterworth Filter Output')
```



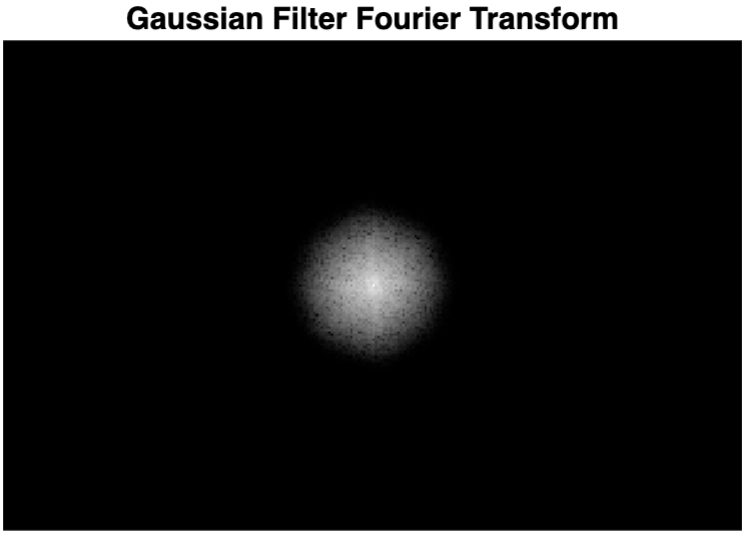

```
disp('Gaussian Filter:')
```

```
Gaussian Filter:
```

```
cat = I;
cat_f = fftshift(fft2(cat));

height = size(I, 1);
width = size(I, 2);
[X, Y] = meshgrid(1:width, 1:height);
centerX = width / 2;
centerY = height / 2;

g = sqrt((X - centerX).^2 + (Y - centerY).^2);
sigma = 10;

gaussian = exp(-(g.^2) / (sigma^2));
imshow(mat2gray(log(1+abs(cat_f))));
title('Fourier Transform')
```




```
cat_fl_gaussian = cat_f .* gaussian;
imshow(mat2gray(log(1+abs(cat_fl_gaussian))));
title('Gaussian Filter Fourier Transform')
```




```
cat_cfli_gaussian = ifft2(cat_fl_gaussian);
imshow(mat2gray(abs(cat_cfli_gaussian)))
title('Gaussian Filter Output')
```

Gaussian Filter Output