Question 1

```
% Load the image
img = imread('IMAGES/Screenshot_2.jpg');
grayImg = rgb2gray(img);
imshow(img);
```

```
% Create a polygonal mask
h = drawpolygon('Color','r');
```

```
% Create a mask based on the polygon
mask = createMask(h);
```

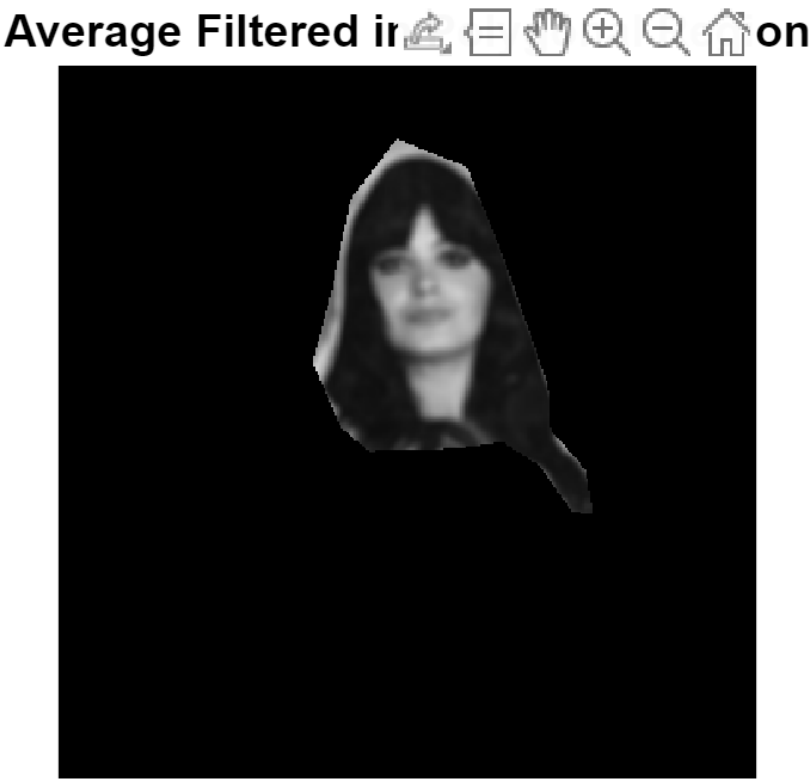
```
% Display the mask
figure;
imshow(mask);
title('Polygonal Binary Mask');
```

```
% Create a filtered image for Gaussian
sigma = 2;
gaussian_filtered = imgaussfilt(grayImg, sigma);
```

```
% Create a filtered image for Gaussian
sigma = 2; % Standard deviation
gaussian_filtered = imgaussfilt(grayImg, sigma);

% Convert filtered image to double
```

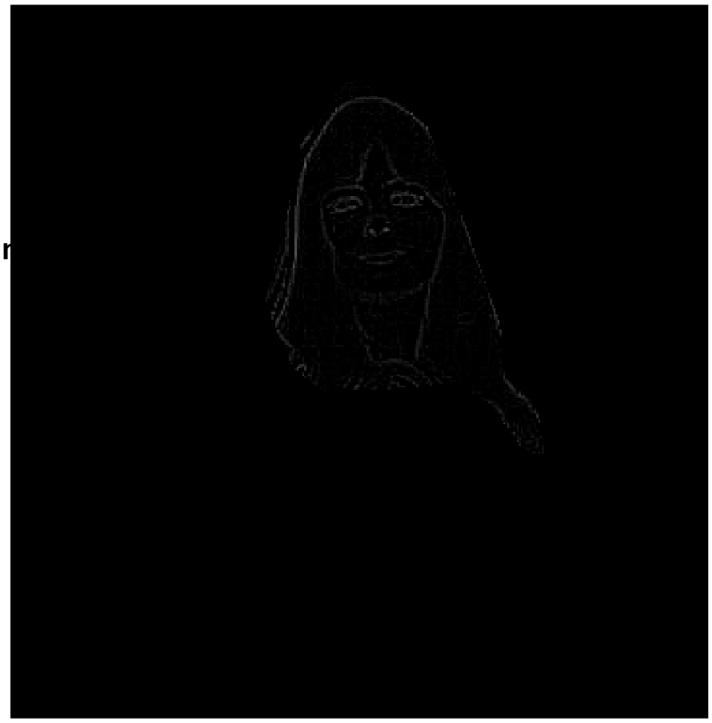
```
gaussian_filtered = im2double(gaussian_filtered);

% Apply the mask
gaussian_masked = gaussian_filtered .* mask;

% Display the result
figure;
imshow(gaussian_masked);
title('Gaussian Filtered in Polygonal Region');
```


```
% Create a filtered image for Average filter
average_filtered = imfilter(grayImg, fspecial('average', [5 5]));

% Convert filtered image to double
average_filtered = im2double(average_filtered);

% Apply the mask
average_masked = average_filtered .* mask;

% Display the result
figure;
imshow(average_masked);
title('Average Filtered in Polygonal Region');
```




```
% Create a filtered image for Laplacian
laplacian_filter = fspecial('laplacian', 0.2);
laplacian_filtered = imfilter(grayImg, laplacian_filter);

% Convert filtered image to double
laplacian_filtered = im2double(laplacian_filtered);

% Apply the mask
laplacian_masked = laplacian_filtered .* mask;

% Display the result
figure;
imshow(laplacian_masked);
title('Laplacian Filtered in Polygonal Region');
```

Laplacian



```
% Create a filtered image for Prewitt
prewitt_filter = fspecial('prewitt');

% Apply the Prewitt filter in both directions
prewitt_filtered_x = imfilter(im2double(grayImg), prewitt_filter);
prewitt_filtered_y = imfilter(im2double(grayImg), prewitt_filter');

% Combine the two directional responses
prewitt_filtered = sqrt(prewitt_filtered_x.^2 + prewitt_filtered_y.^2);

% Ensure the combined filtered image is of type double
prewitt_filtered = im2double(prewitt_filtered);

% Apply the mask
prewitt_masked = prewitt_filtered .* mask;

% Display the result
figure;
imshow(prewitt_masked);
title('Prewitt Filtered in Polygonal Region');
```

Prewitt