```
%Question 1 :


% Step 1: Loading the image
img = imread('IMAGE_HW2.jpeg');
imshow(img);
title('Homework-2 Image');
```


```
% Step 2: Converting to grayscale because it is a color image
if size(img, 3) == 3
    imgGray = rgb2gray(img);
else
    imgGray = img;  % If the image is already grayscale, we use it as it is
end

figure; imshow(imgGray);
title('Grayscale Homework-2 Image');
```

Grayscale Homework-2 Image

```
% Step 3: Creating a binary mask using roipoly
disp('Select the region of interest');
```

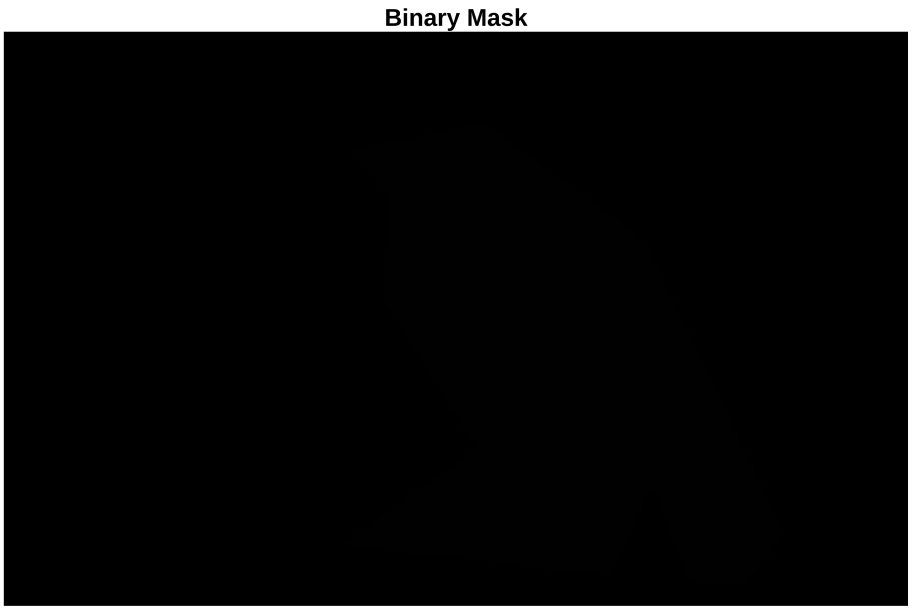
```
Select the region of interest
```

```
roi = roipoly(imgGray);  % Creating binary mask from ROI
```

```
binaryMask = uint8(roi);  % Converting it to uint8 format

binaryMask = imresize(binaryMask, size(imgGray));

figure; imshow(binaryMask);
title('Binary Mask');
```




```
% Step 4: Applying the Laplacian filter
laplacianFilter = fspecial('laplacian');
laplacianFiltered = imfilter(imgGray, laplacianFilter);
laplacianMasked = laplacianFiltered .* binaryMask;  % Apply binary mask

figure; imshow(laplacianMasked, []);
title('Laplacian Filtered Masked Homework-2 Image');
```

Laplacian Filtered Masked Homework-2 Image

```
% Step 5: Applying the Prewitt filter
prewittFilterX = fspecial('prewitt');
prewittFilteredX = imfilter(double(imgGray), prewittFilterX);

prewittFilterY = prewittFilterX';
prewittFilteredY = imfilter(double(imgGray), prewittFilterY);

% Combining both directions using absolute values
prewittFiltered = sqrt(abs(prewittFilteredX).^2 + abs(prewittFilteredY).^2);

prewittMasked = prewittFiltered .* double(imresize(binaryMask,
size(imgGray)));

figure;
imshow(prewittMasked, []);
title('Prewitt Filtered Masked Homework-2 Image');
```

Prewitt Filtered Masked Homework-2 Image