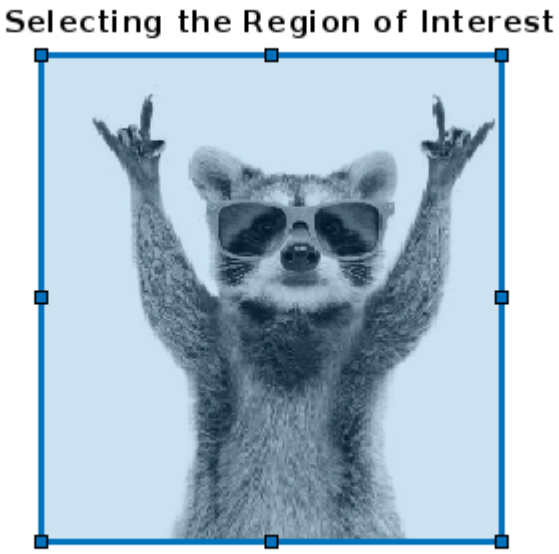
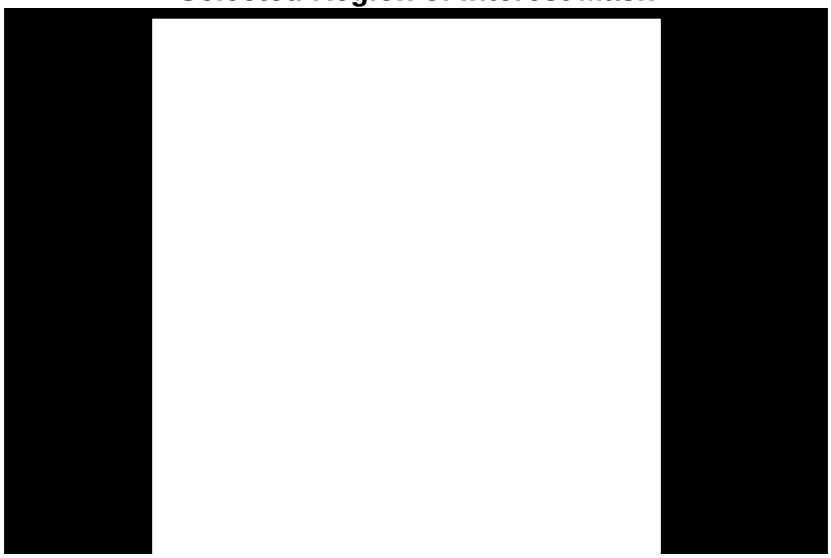
```
% Reading the image
img = imread('dip.jpg');
grayImg = rgb2gray(img);

% Display the image and let the user select an ROI
figure, imshow(grayImg), title('Selecting the Region of Interest');
roi = drawrectangle;
```




```
roiMask = createMask(roi);

figure, imshow(roiMask), title('Selected Region of Interest Mask');
```

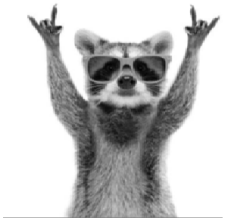
Selected Region of Interest Mask



```
% Apply Gaussian Filter
gaussianFiltered = imgaussfilt(grayImg, 2);
gaussianFiltered(~roiMask) = grayImg(~roiMask);

% Apply Average Filter (Low-pass) to the ROI
averageFiltered = filter2(fspecial('average', [3 3]), grayImg) / 255;
averageFiltered(~roiMask) = grayImg(~roiMask);
% Apply Laplacian Filter (High-pass) to the ROI
laplacianFilter = fspecial('laplacian', 0.2);
laplacianFiltered = imfilter(grayImg, laplacianFilter, 'replicate');
laplacianFiltered(~roiMask) = grayImg(~roiMask);

% Apply Prewitt Filter (High-pass) to the ROI
prewittFilterX = fspecial('prewitt');
prewittFiltered = imfilter(grayImg, prewittFilterX, 'replicate');
prewittFiltered(~roiMask) = grayImg(~roiMask);

% results
figure;
subplot(2,2,1), imshow(gaussianFiltered), title('Gaussian Filter on ROI');
subplot(2,2,2), imshow(averageFiltered), title('Average Filter on ROI');
subplot(2,2,3), imshow(laplacianFiltered, []), title('Laplacian Filter on
ROI');
subplot(2,2,4), imshow(prewittFiltered, []), title('Prewitt Filter on ROI');
```

Gaussian Filter on ROI

Average Filter on ROI



Laplacian Filter on ROI

Prewitt Filter on ROI