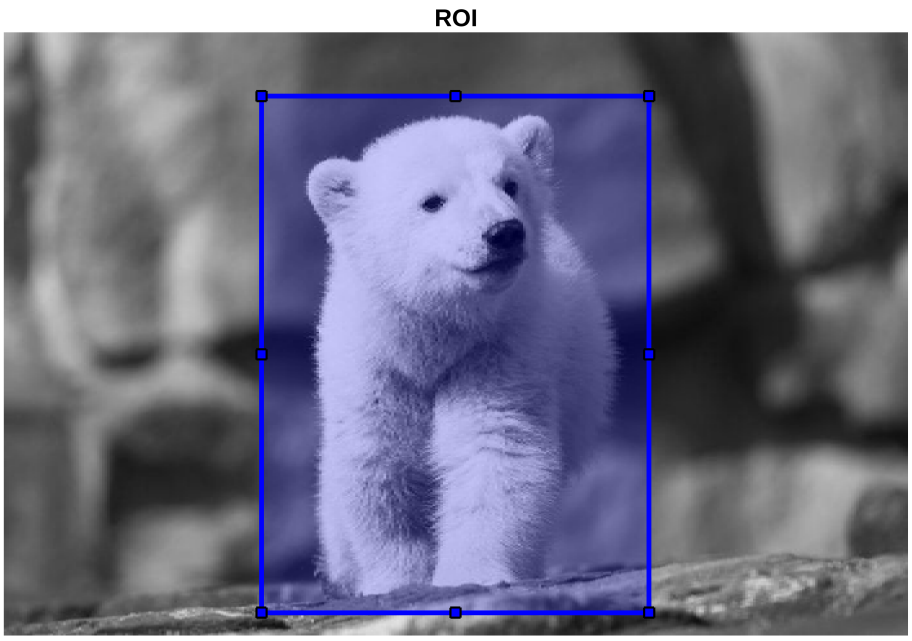
```
clear all;
img = imread("/MATLAB Drive/bear.jpg");
figure;
imshow(img);
title('Image');
```

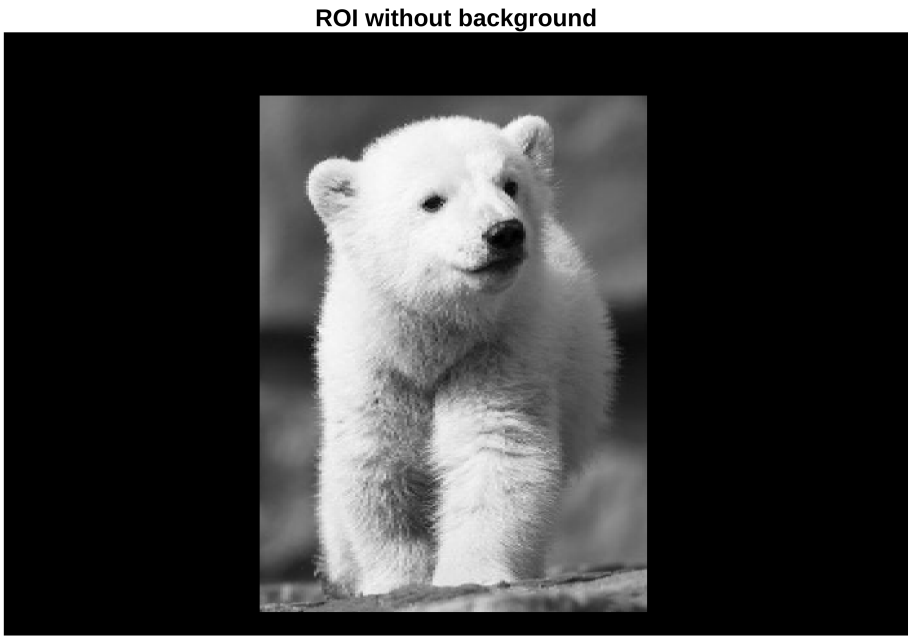
1. Create a binary mask for the region of interest in the image, then apply low-pass filters (Gaussian and Average filters) and high-pass filters (Laplacian and Prewitt filters)

```
gray_img = rgb2gray(img);
figure;
imshow(gray_img);
title('Gray Image');
```

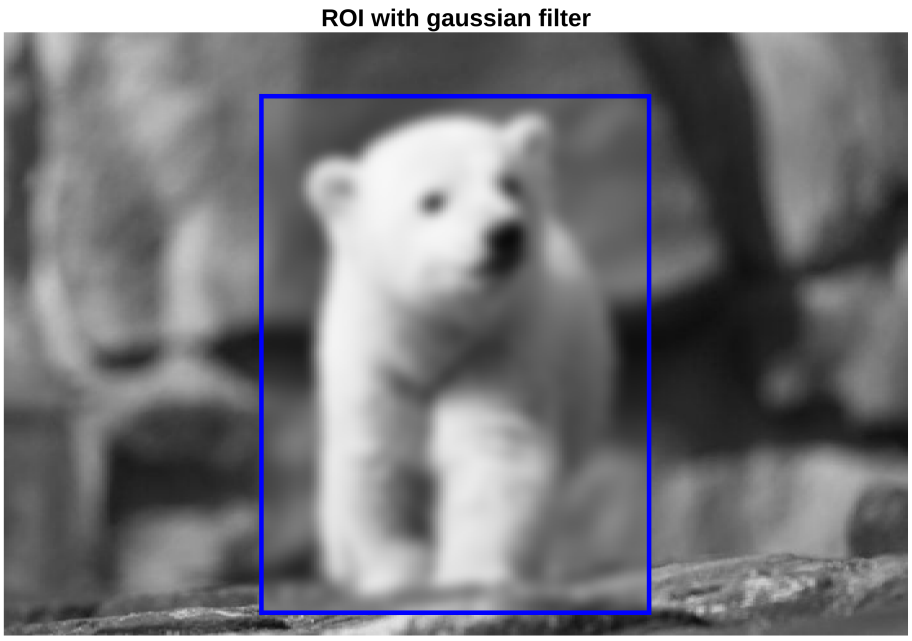

```
figure;
imshow(gray_img);
%ref :  https://in.mathworks.com/help/images/ref/drawrectangle.html
drawrectangle('Position',[200,50,300,400],'Color','b');
title('ROI');
```



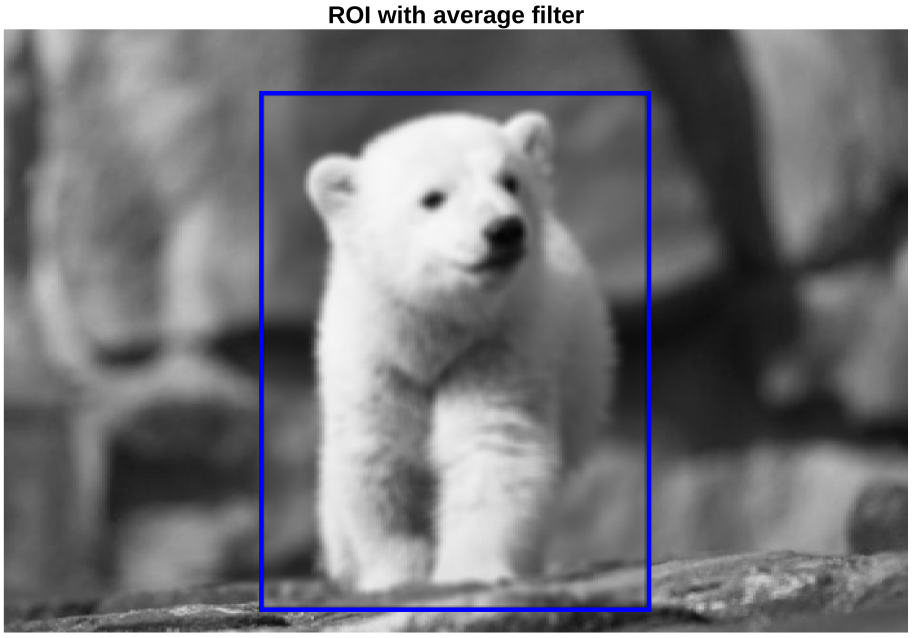

```
x_min = 200;
y_min = 50;
width = 300;
height = 400;

empty = zeros(size(gray_img), 'like', gray_img);
cropped_img = gray_img(y_min:(y_min+height-1), x_min:(x_min+width-1), :);
empty(y_min:(y_min+height-1), x_min:(x_min+width-1), :) = cropped_img;
figure;
imshow(empty);
title('ROI without background');
```



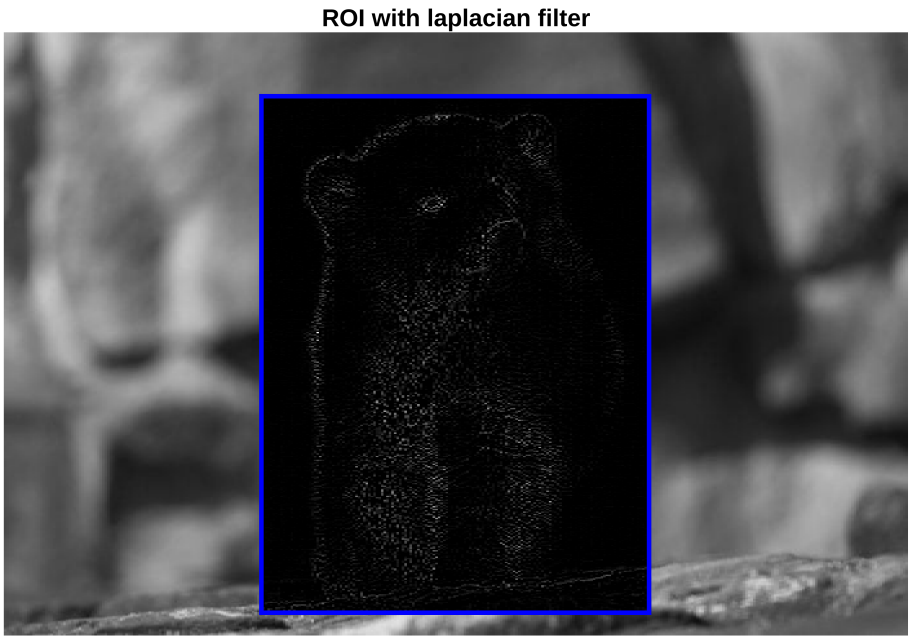

```
gaussian_filter = imgaussfilt(cropped_img, 5);
gray_img(y_min:(y_min+height-1), x_min:(x_min+width-1), :) = gaussian_filter;
figure;
imshow(gray_img);
rectangle('Position', [200, 50, 300, 400], 'EdgeColor', 'b', 'LineWidth', 2,
'FaceColor', 'none');
title('ROI with gaussian filter');
```




```
kernel = ones(7) / (7 * 7);
average_filtered = imfilter(cropped_img, kernel);
gray_img(y_min:(y_min+height-1), x_min:(x_min+width-1), :) =
average_filtered;
figure;
imshow(gray_img);
rectangle('Position', [200, 50, 300, 400], 'EdgeColor', 'b', 'LineWidth', 2,
'FaceColor', 'none');
title('ROI with average filter');
```

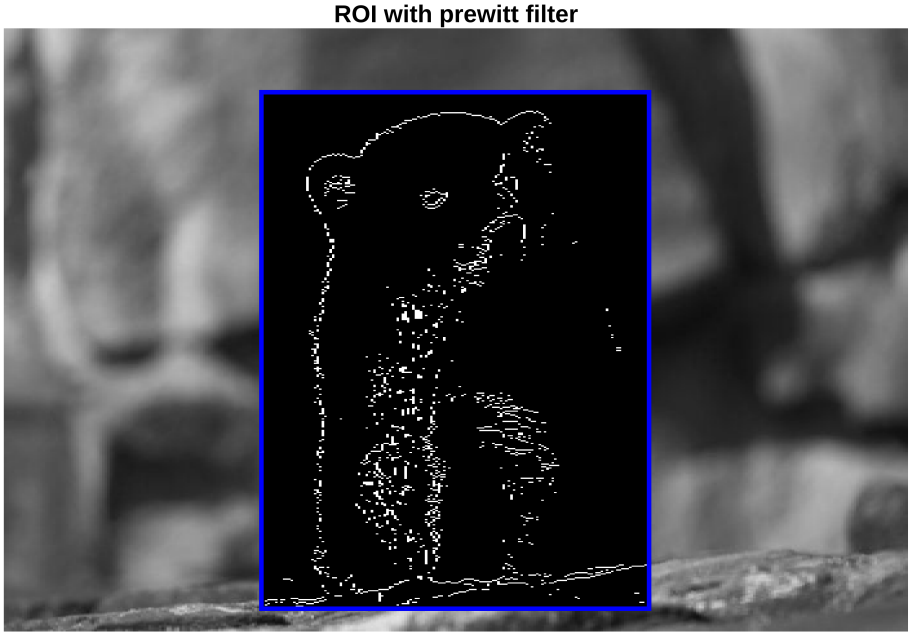



```
laplacian=[0 1 0; 1 -4 1; 0 1 0];
laplacian_edges=conv2(cropped_img, laplacian, 'same');
gray_img(y_min:(y_min+height-1), x_min:(x_min+width-1), :) = laplacian_edges;
figure;
imshow(gray_img);
rectangle('Position', [200, 50, 300, 400], 'EdgeColor', 'b', 'LineWidth', 2,
'FaceColor', 'none');
title('ROI with laplacian filter');
```



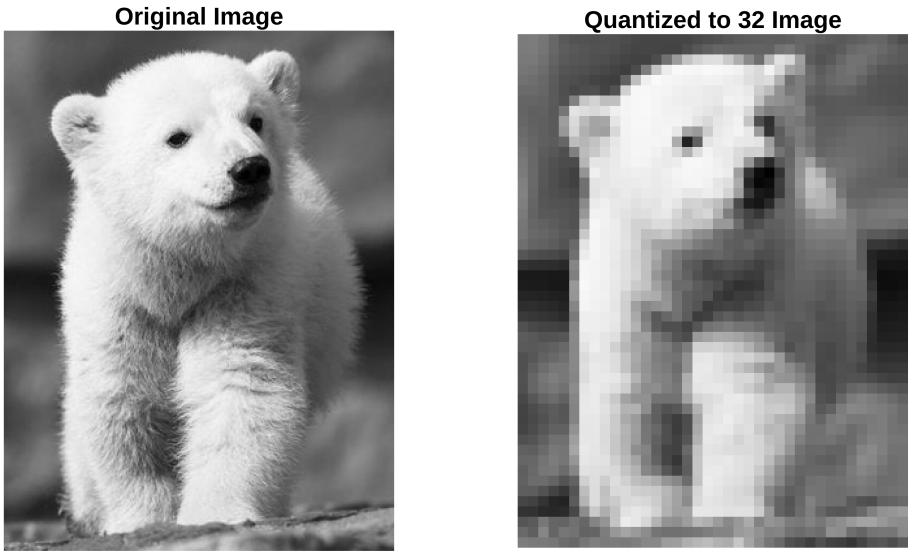

```
prewitt_edges = edge(cropped_img, 'prewitt');
gray_img(y_min:(y_min+height-1), x_min:(x_min+width-1), :) =
uint8(prewitt_edges * 255);
figure;
imshow(gray_img);
rectangle('Position', [200, 50, 300, 400], 'EdgeColor', 'b', 'LineWidth', 2,
'FaceColor', 'none');
title('ROI with prewitt filter');
```

ROI with prewitt filter



5. Take an image and quantize it to 32 grayscale levels using only the imresize function and write the steps you followed in the process.

```
result = imresize(imresize(cropped_img,1/8),8,'nearest');
figure;
subplot(1, 2, 1);
imshow(cropped_img);
title('Original Image');
subplot(1, 2, 2);
imshow(result);
title('Quantized to 32 Image');
```



- Resize the image down by 1/8, then up to original size using 'nearest' interpolation.
- Create a figure and display both images side by side with titles.