

Lab #5

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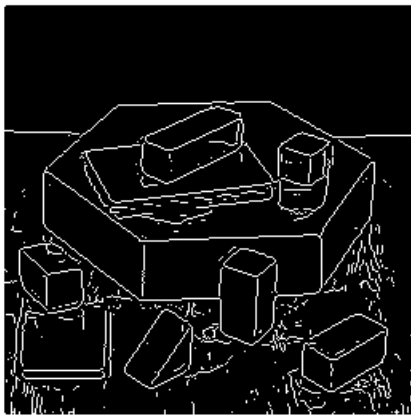
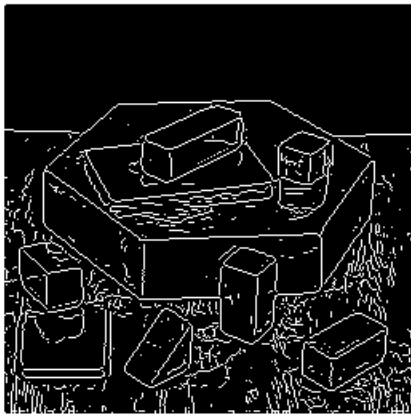
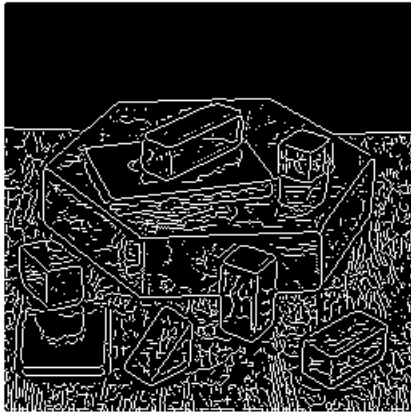
EE146 Section (022)

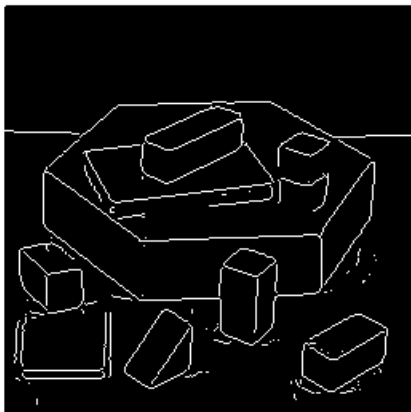
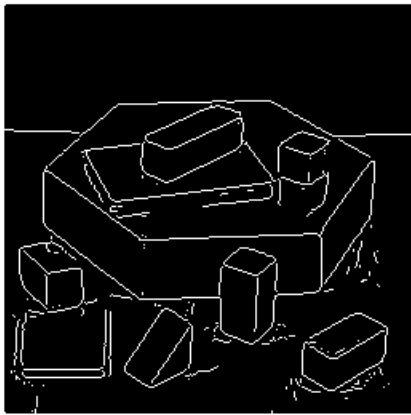
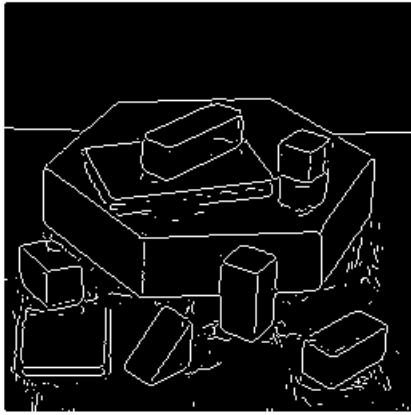
Problem 1

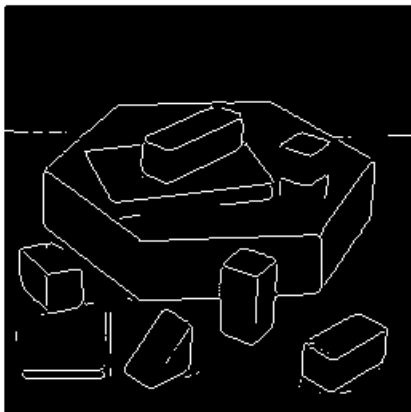
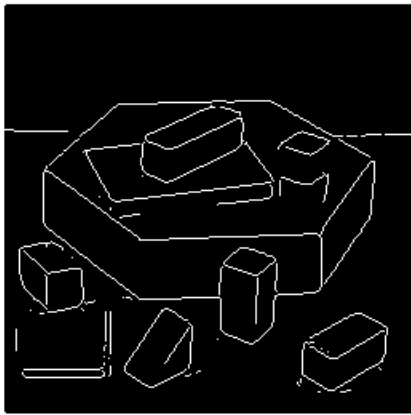
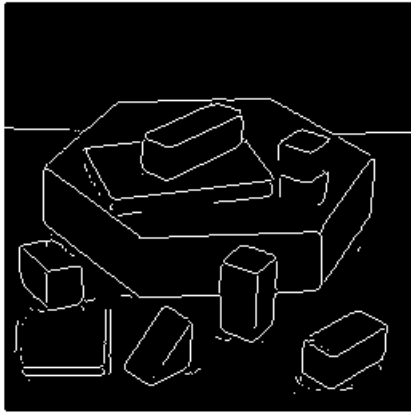
```
clear all;  
close all;  
I=imread('shapesCorner.tif');  
imshow(I)
```

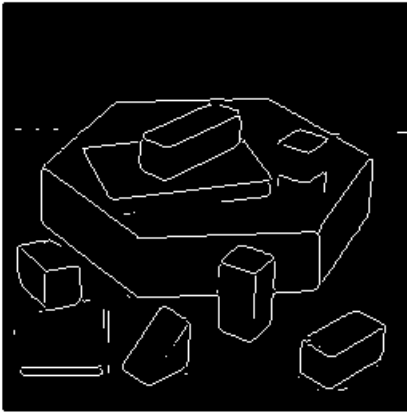


```
for C=1:10  
    IE=edge(I,'prewitt',0.005*C);  
    [IH,IT,IR]=hough(IE);  
    figure  
    imshow(IE)  
end
```









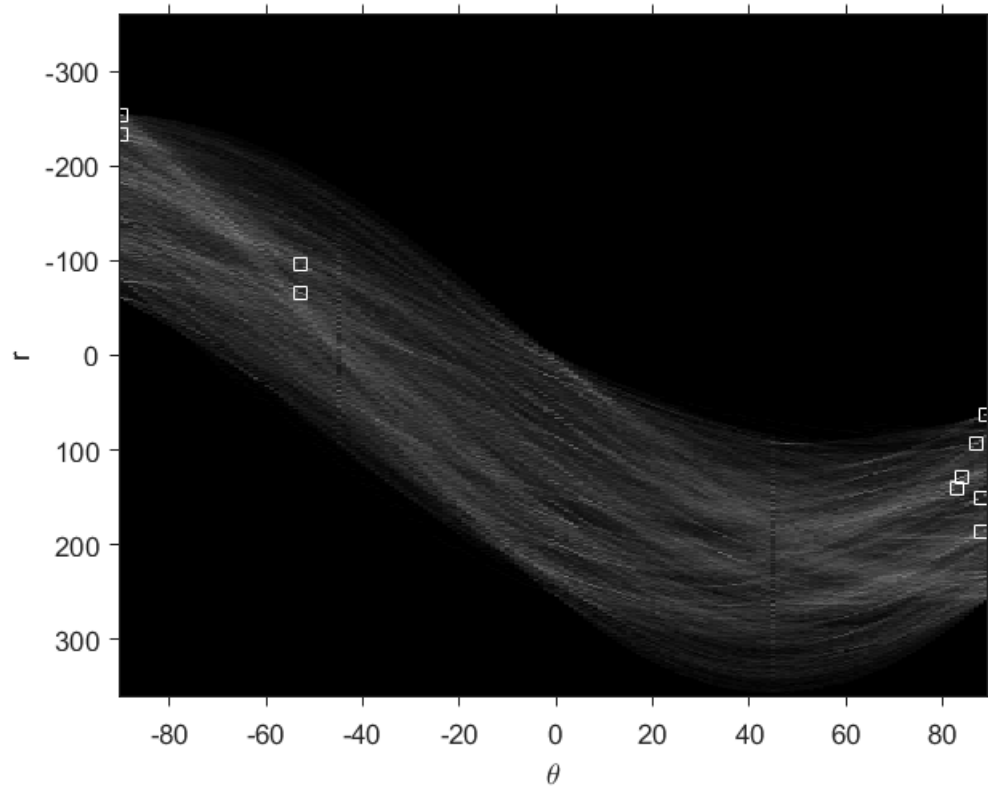
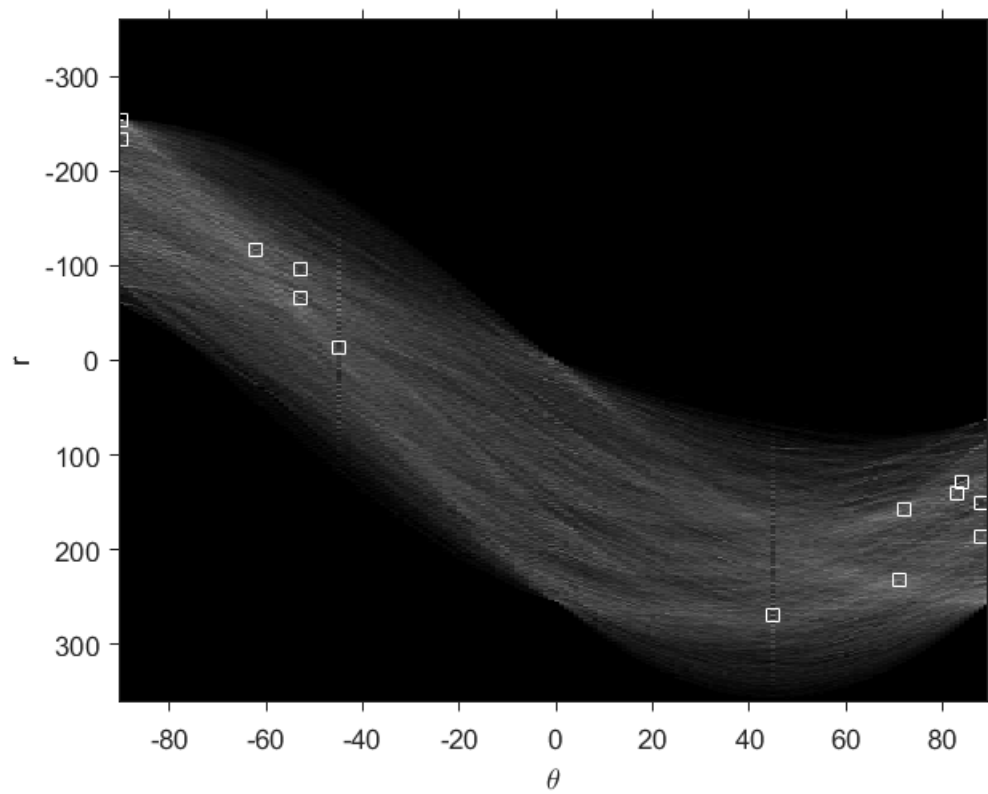
```

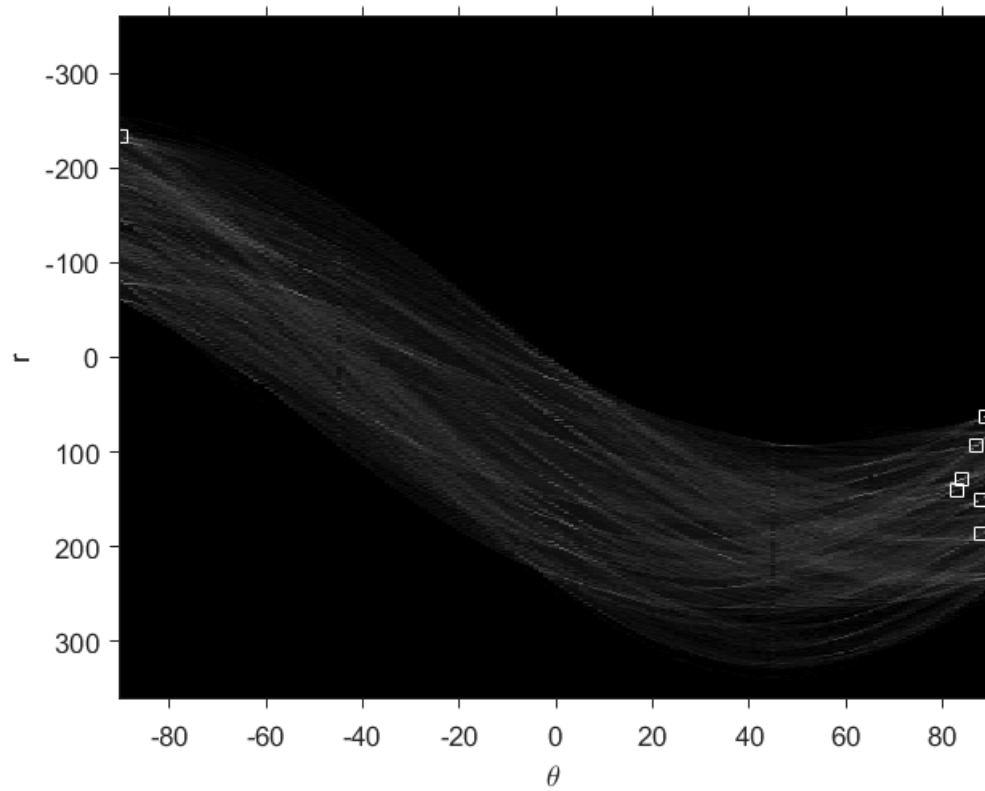
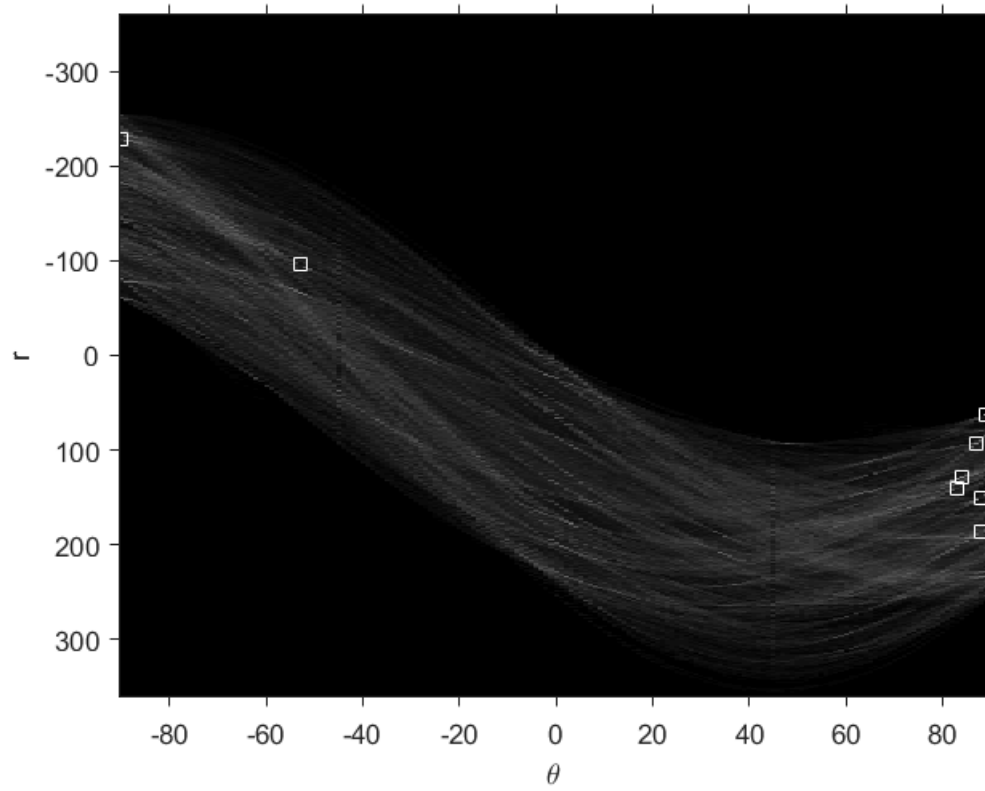
for C=1:10
    IE=edge(I, 'prewitt',0.005*C);

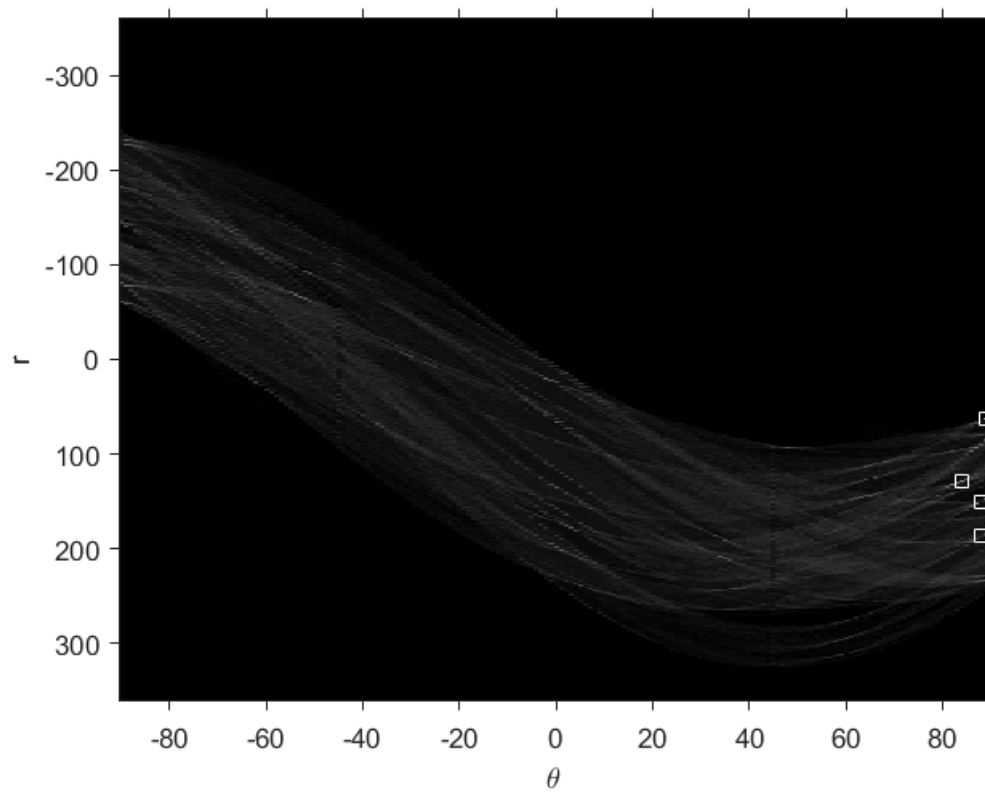
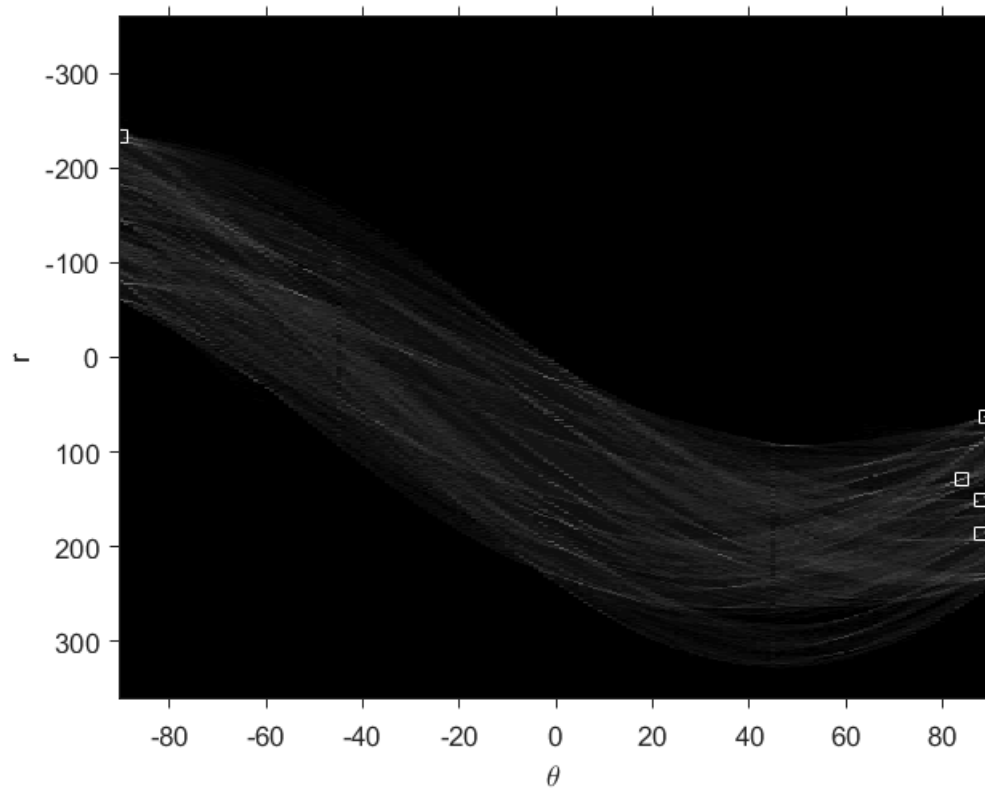
    [IH,IT,IR]=hough(IE);

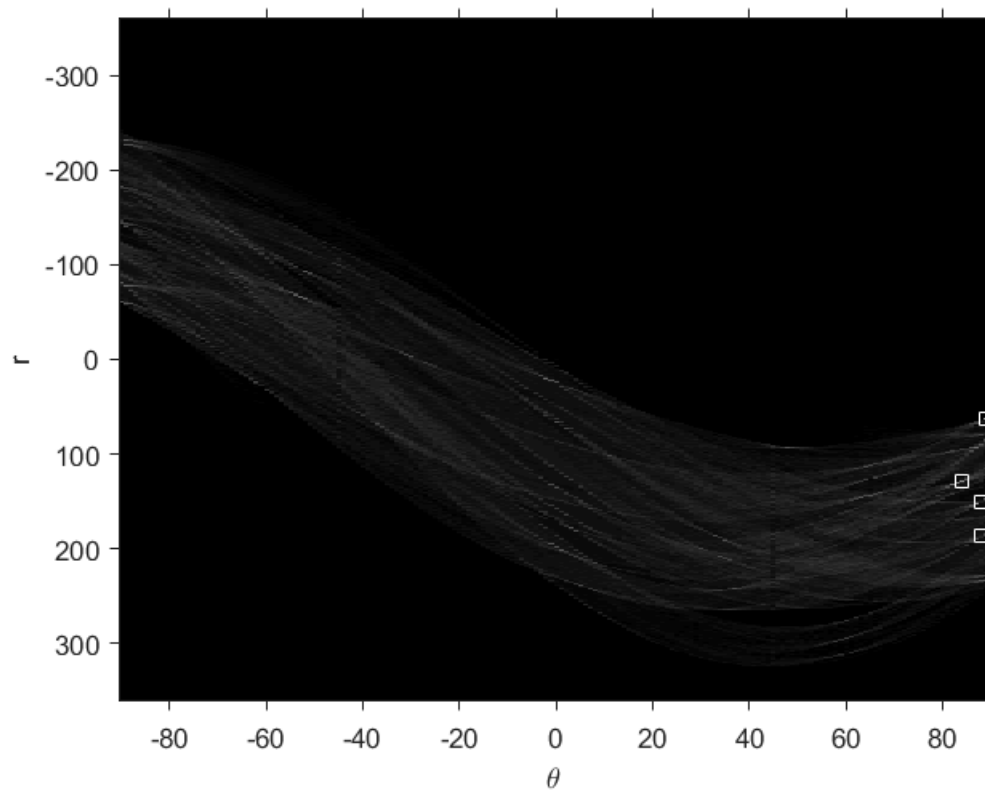
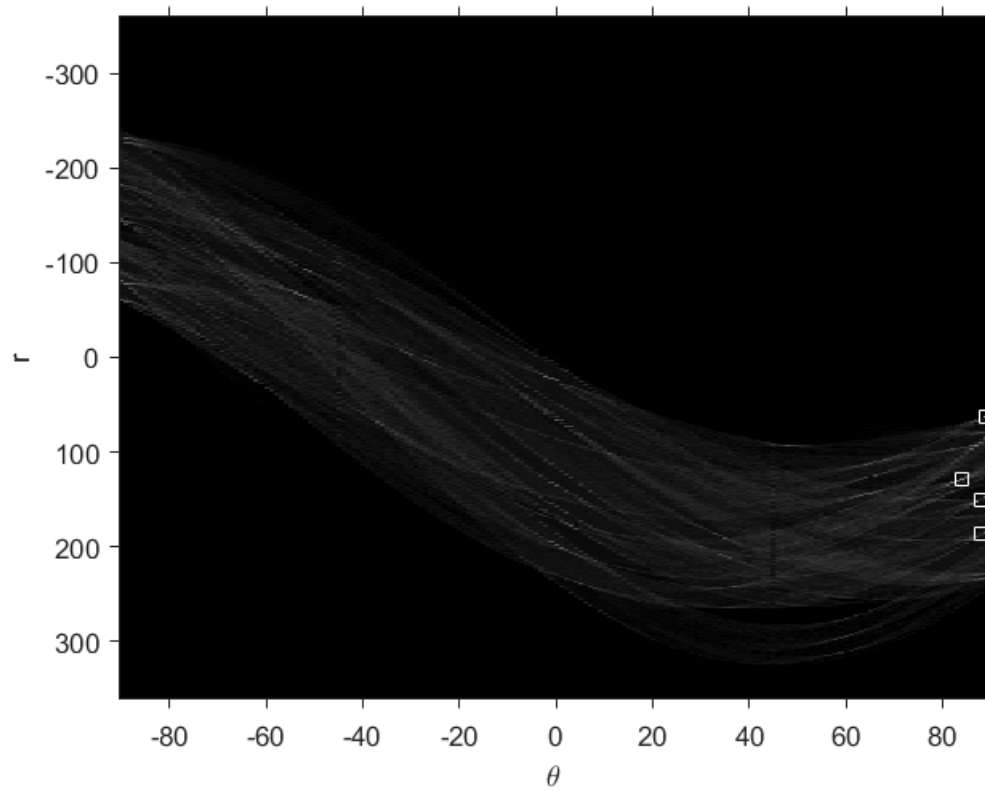
    figure
    IP=houghpeaks(IH,100);
    imshow(IH,[], 'XData',IT, 'YData',IR, 'InitialMagnification','fit');
    xlabel('\theta'),ylabel('r');
    axis on, axis normal, hold on;
    plot(IT(IP(:,2)),IR(IP(:,1)), 's', "Color", 'white')
end

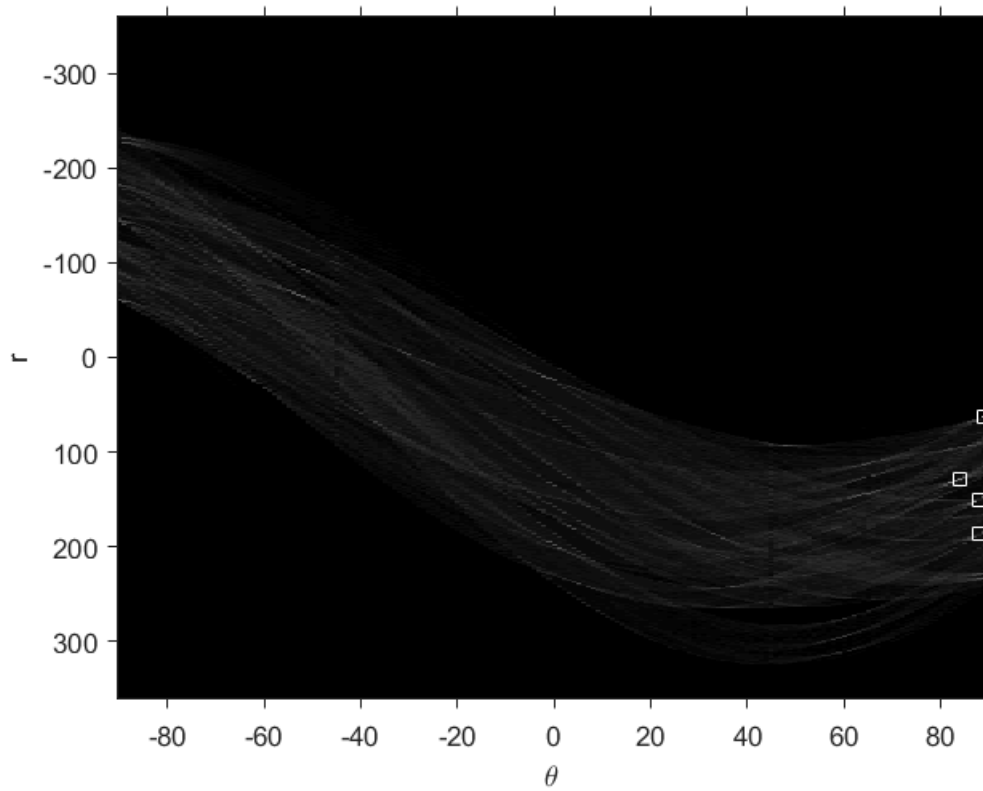
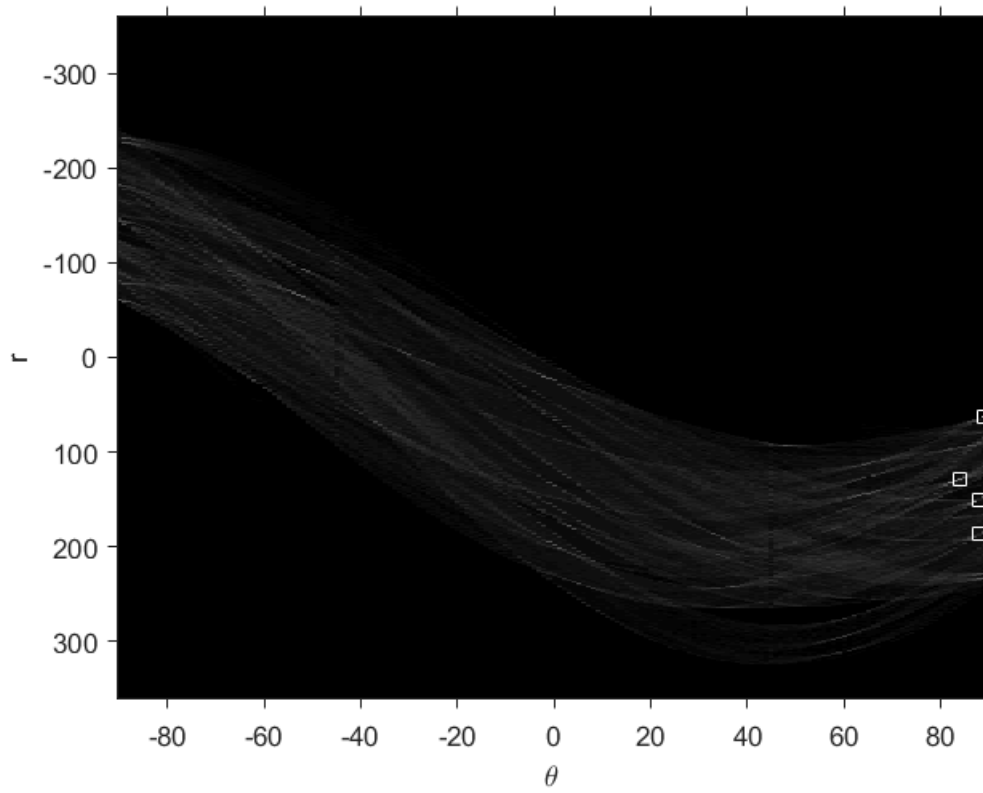
```











There appears to be several parallel lines because the hough peaks are vertically aligned.

```

for C=1:10
IE=edge(I,'prewitt',0.005*C);

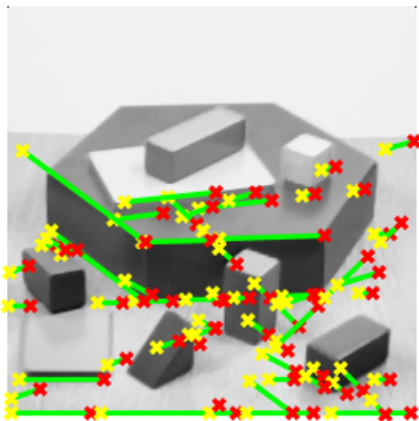
[IH,IT,IR]=hough(IE);
IP=houghpeaks(IH,100);
lines = houghlines(IE,IT,IR,IP,'FillGap',5,'MinLength',7);
figure, imshow(I), hold on
max_len = 0;
min_len = 100;
for k = 1:length(lines)
    xy = [lines(k).point1; lines(k).point2];
    plot(xy(:,1),xy(:,2),'LineWidth',2,'Color','green');

    % Plot beginnings and ends of lines
    plot(xy(1,1),xy(1,2),'x','LineWidth',2,'Color','yellow');
    plot(xy(2,1),xy(2,2),'x','LineWidth',2,'Color','red');

    % Determine the endpoints of the longest line segment
    len = norm(lines(k).point1 - lines(k).point2);
    if ( len > max_len)
        max_len = len;
        xy_long = xy;
    end
    if ( len < min_len)
        min_len = len;
        xy_short = xy;
    end
end

end
display(max_len)
display(min_len)
end

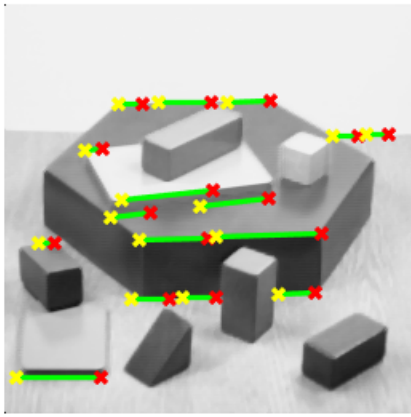
```



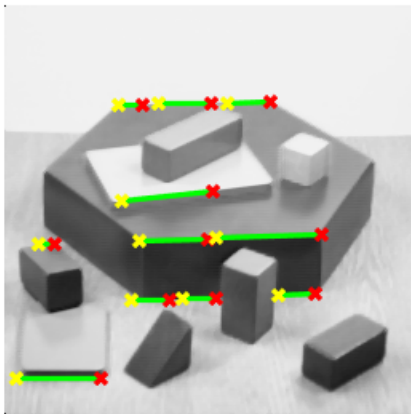
```

max_len = 95.8019
min_len = 7.0711

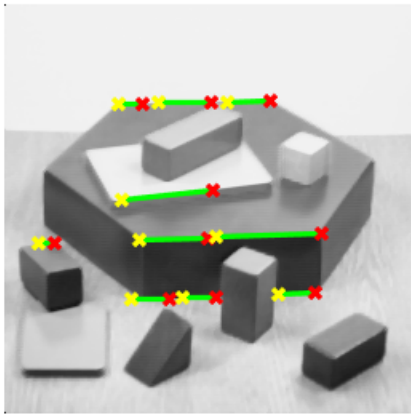
```

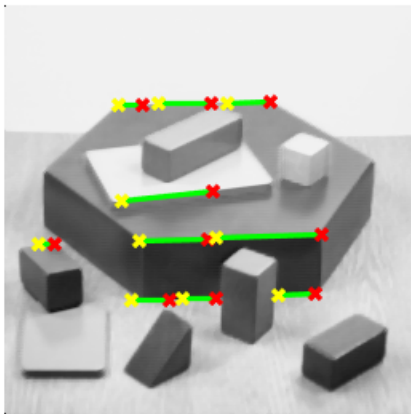
```
max_len = 66.0303
min_len = 10
```



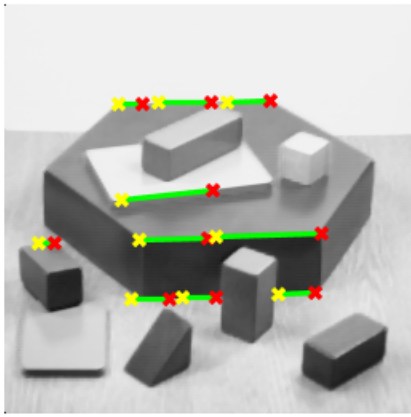
```
max_len = 66.0303
min_len = 10
```



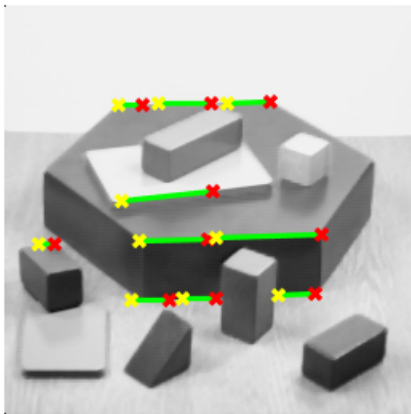
```
max_len = 66.0303  
min_len = 10
```



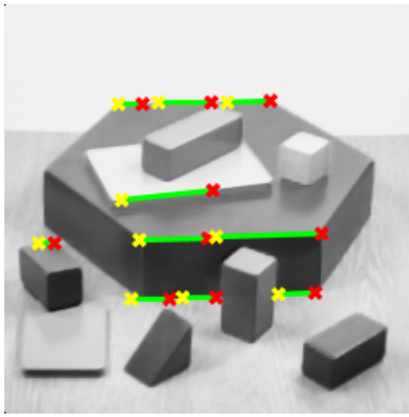
```
max_len = 66.0303  
min_len = 10
```



```
max_len = 66.0303
min_len = 10
```



```
max_len = 66.0303
min_len = 10
```



```
max_len = 66.0303
min_len = 10
```

The quality of lines detected appears to be quite poor.

Higher threshold values for the prewitt edge detection decrease the amount of individual lines detected.

Problem 2

```
I=imread('shapesCorner.tif');
imshow(I)
```

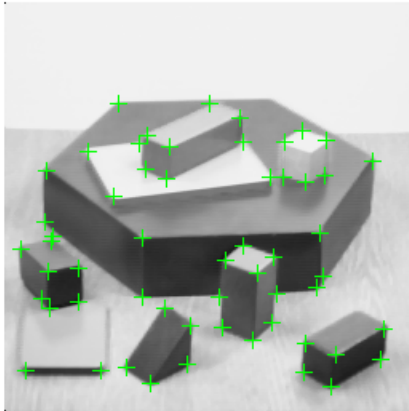


```
for C=7:2:11
    disp("radius")
    disp(C)
    IC=detectHarrisFeatures(I,"FilterSize",C);
```

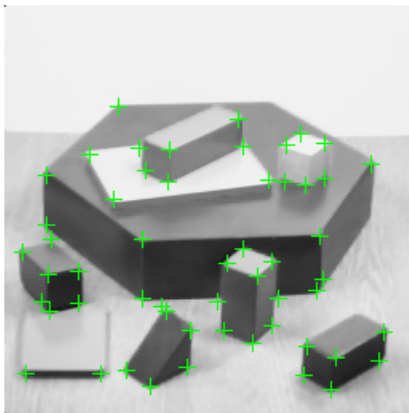


```
figure
imshow(I); hold on;
plot(IC.selectStrongest(60));
end
```

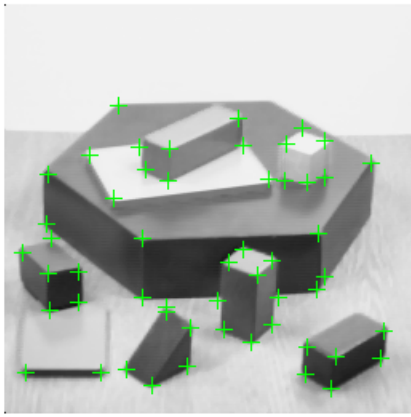
radius
7



radius
9



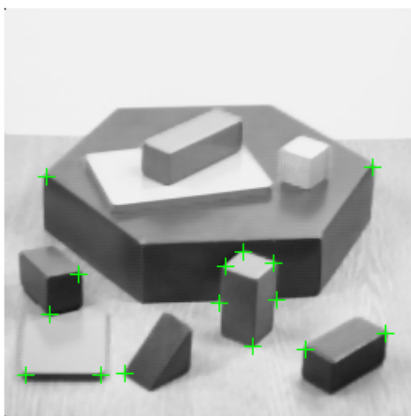
radius
11



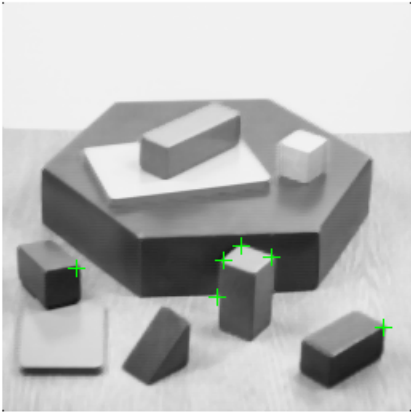
This parameter determines the filter size used.

```
for C=1:4
disp("MinQuality")
disp(C)
IC=detectHarrisFeatures(I, 'MinQuality', C*0.2);
figure
imshow(I); hold on;
plot(IC.selectStrongest(60));
end
```

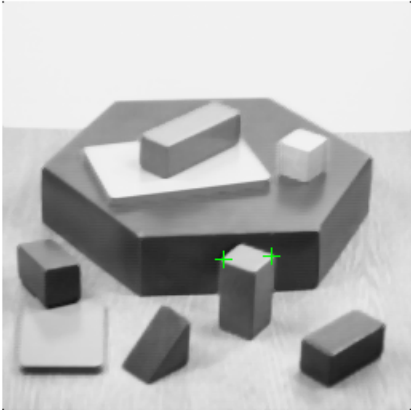
MinQuality
1



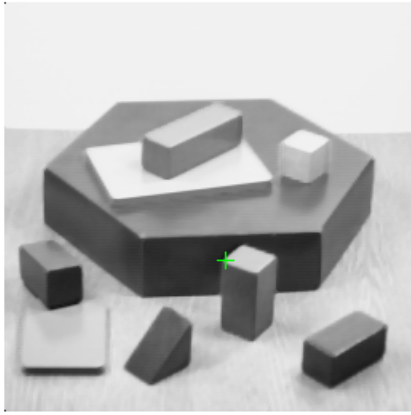
MinQuality
2



MinQuality
3



MinQuality
4

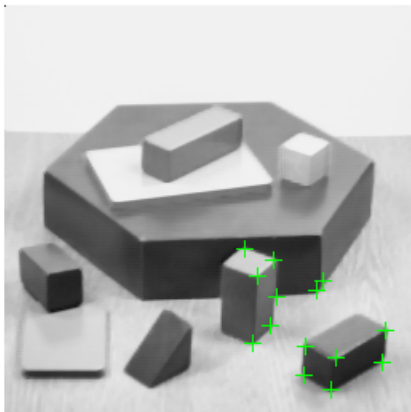


This parameter determines the minimum quality of the corners

```
disp("ROI bottom left")
```

```
ROI bottom left
```

```
IC=detectHarrisFeatures(I, 'ROI',[150,150,100,100]);  
figure  
imshow(I); hold on;  
plot(IC.selectStrongest(60));
```



This parameter determines the location of the corner detection.