Experiment – 9

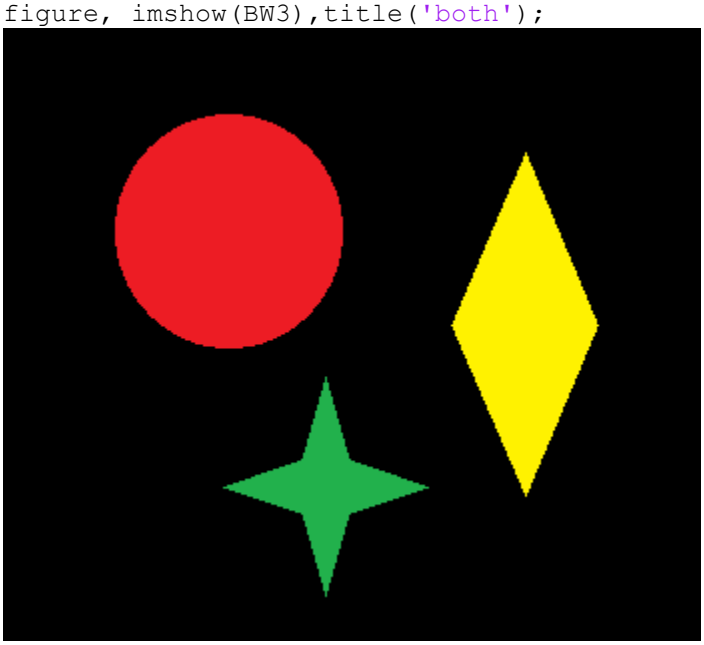
MCQs:

1. _____is set of connected pixel that lie on the boundary between two regions.
(a) Point (b)edge (c)colour (d) line
2. The Hough transform is used to fit points as _____
(a) line (b) edge (c)curve (d)ROI
3. Discontinuity approach of segmentation depends upon
(a) Low frequencies (b) smooth changes (c) abrupt changes (d) contrast

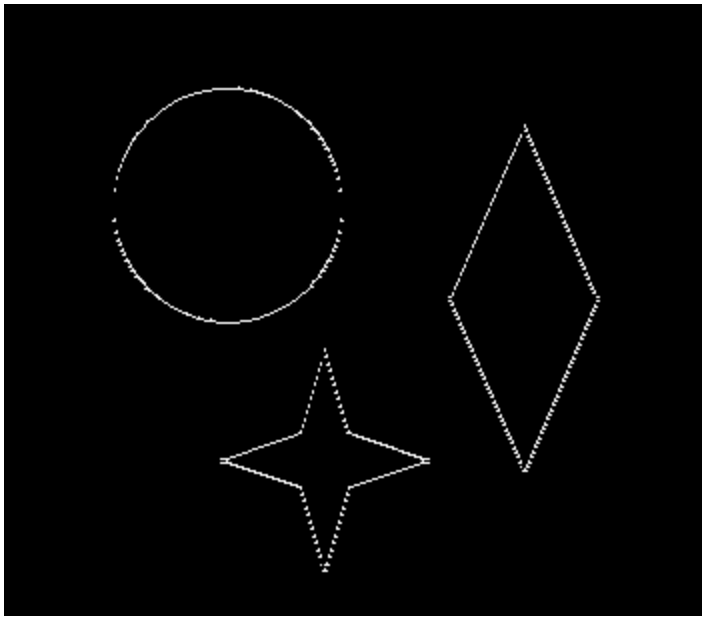
Answers: 1. b) edge, 2. C) curve 3. D) line

Exercise – 1

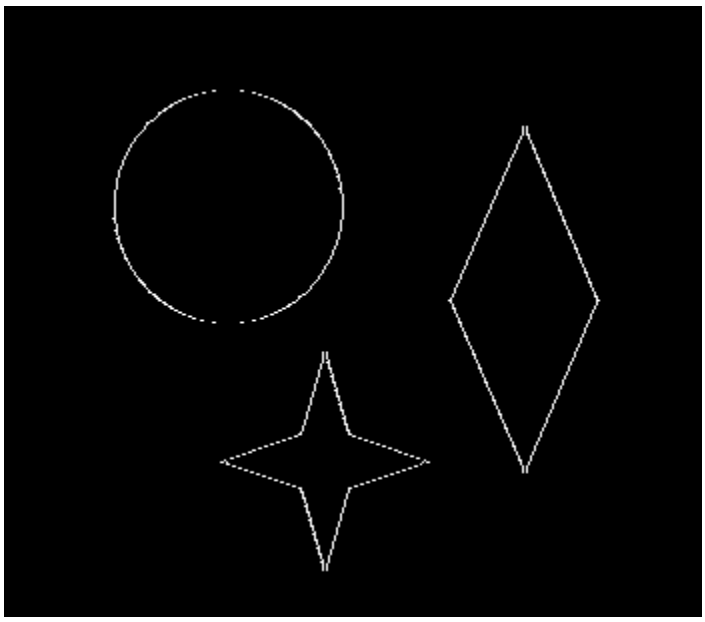
```
clc;
clear variables;
close all;
I = imread('Exp8 Image1.png');
G = rgb2gray(I);
BW1 = edge(G,'Sobel',[],'horizontal');
BW2 = edge(G,'Sobel',[],'vertical');
BW3 = edge(G,'Sobel',[],'both');
figure, imshow(BW1),title('horizontal detection');
figure, imshow(BW2),title('vertical detection');
figure, imshow(BW3),title('both');
```



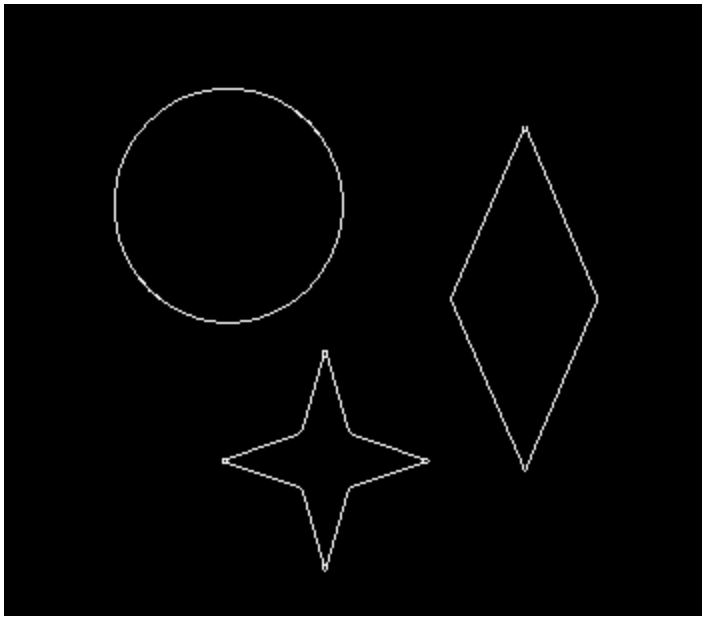
horizontal detection



vertical detection

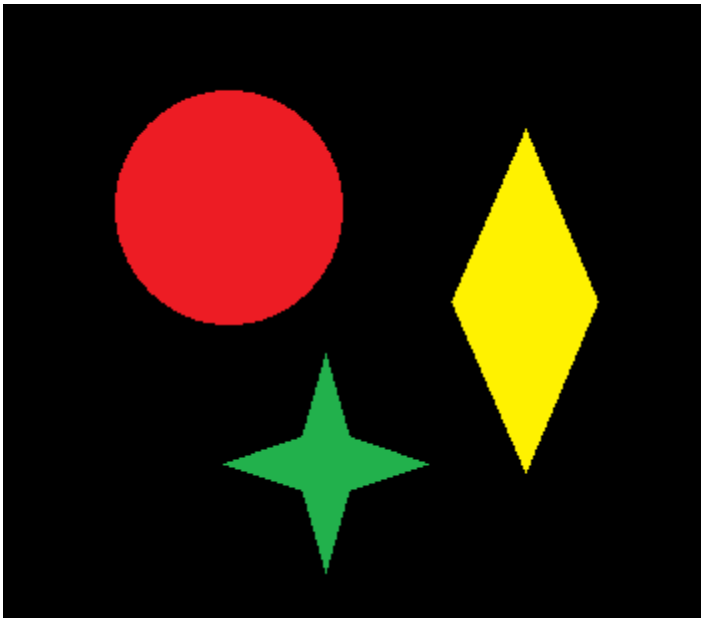


both

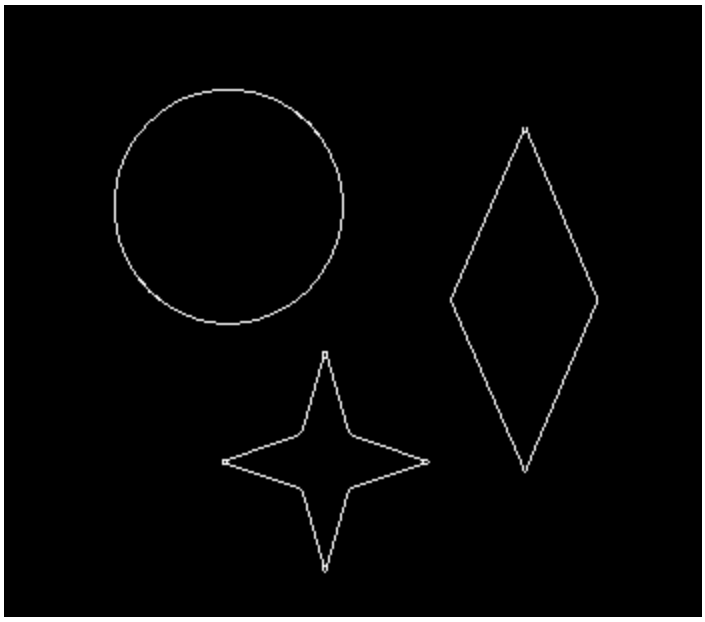


Exercise – 2

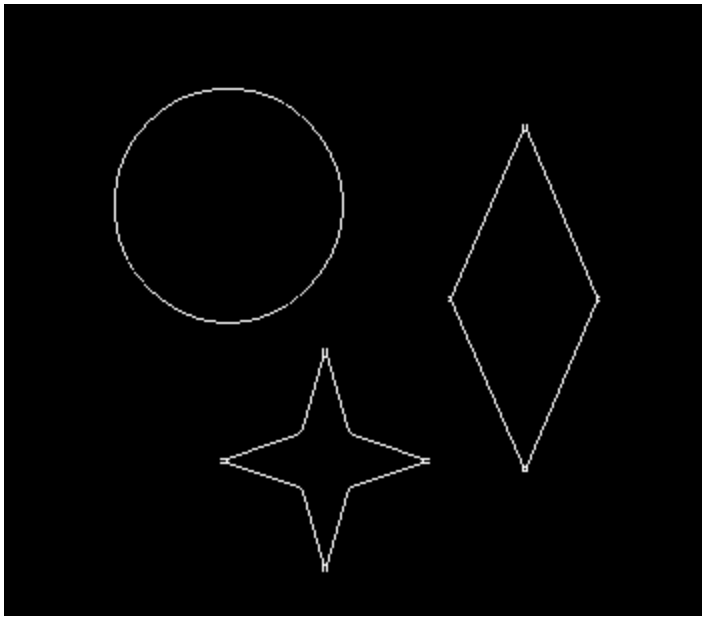
```
clc;
clear variables;
close all;
I = imread('Exp8 Image1.png');
G = rgb2gray(I);
BW1 = edge(G,'Sobel',[]);
figure, imshow(BW1),title('Sobel detection');
BW2 = edge(G,'Prewitt',[]);
BW3 = edge(G,'Roberts',[]);
BW4 = edge(G,'Canny',[]);
figure, imshow(BW2),title('Prewitt detection');
figure, imshow(BW3),title('Roberts detection');
figure, imshow(BW4),title('Canny detection');
```



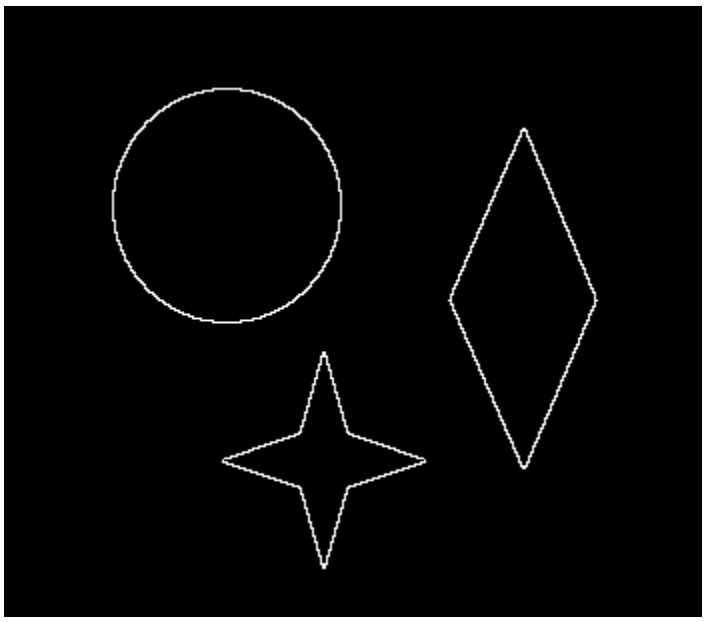
Sobel detection



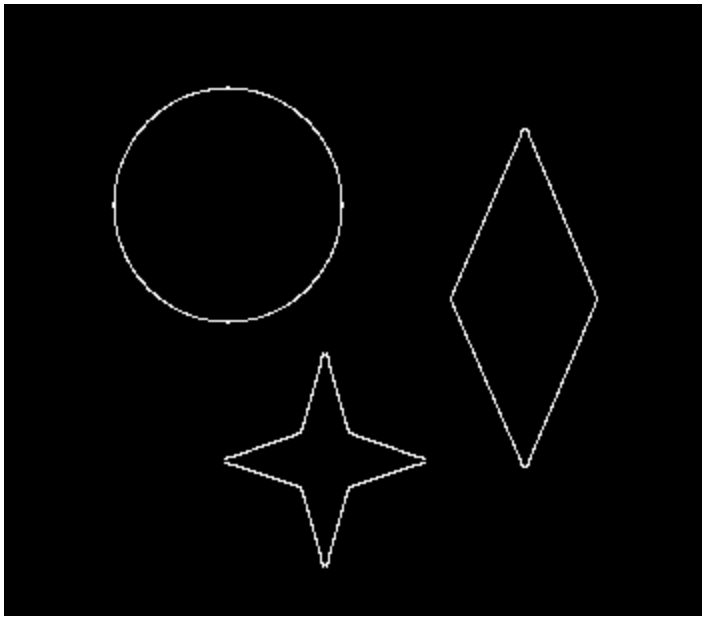
Prewitt detection



Roberts detection

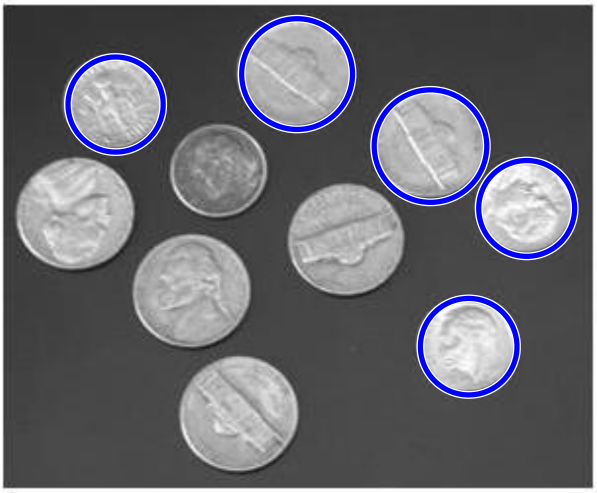


Canny detection



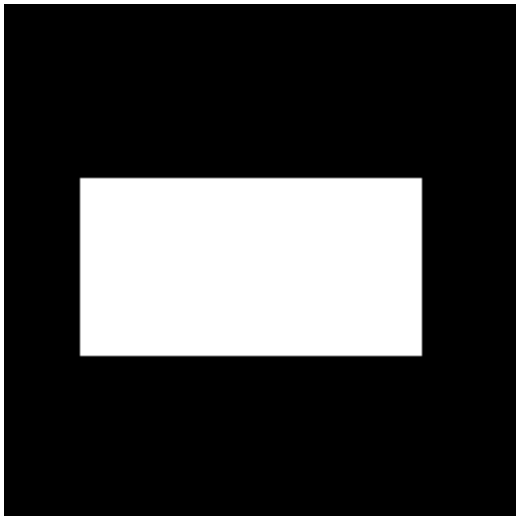
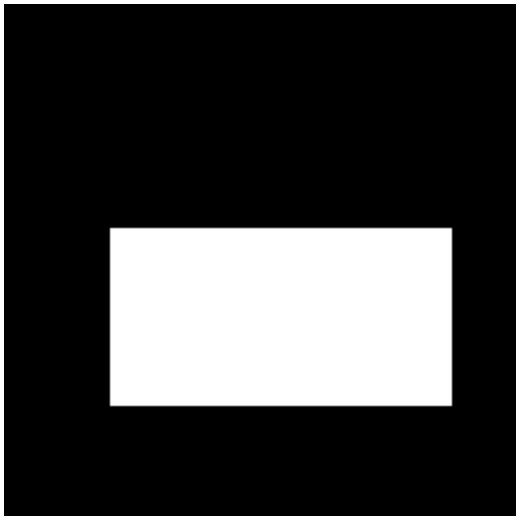
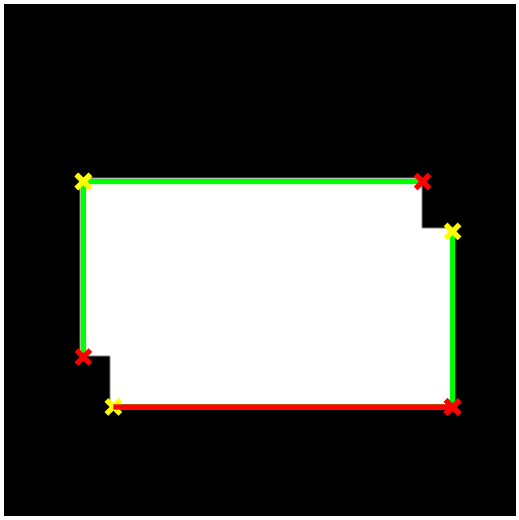
Exercise – 3

```
clc;
clear variables;
close all;
I = imread('labeled_regions_grayscale_01.jpg');
G = rgb2gray(I);
imshow(G);
%Find all the circles with radius r pixels in the range [15, 30].
[centers, radii, metric] = imfindcircles(G,[15 30]);
%Retain the five strongest circles according to the metric values.
centersStrong5 = centers(1:5,:);
radiiStrong5 = radii(1:5);
metricStrong5 = metric(1:5);
%Draw the five strongest circle perimeters over the original image.
viscircles(centersStrong5, radiiStrong5,'EdgeColor','b');
```



Exercise – 4

```
clc;
clear variables;
close all;
I = imread('art5.bmp');
G = rgb2gray(I);
figure, imshow(G);
J = imtranslate(G,[15, 25]);
figure, imshow(J);
K=G+J;
L = edge(K,'Canny',[]);
figure, imshow(L);
[H,theta,rho] = hough(L);
P = houghpeaks(H,5,'threshold',ceil(0.3*max(H(:))));
x = theta(P(:,2));
y = rho(P(:,1));
plot(x,y,'s','color','black');
lines = houghlines(L,theta,rho,P,'FillGap',5,'MinLength',7);
figure, imshow(K), hold on
max_len = 0;
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
end
% highlight the longest line segment
plot(xy_long(:,1),xy_long(:,2),'LineWidth',2,'Color','red');
```