Image Segmentation - 2

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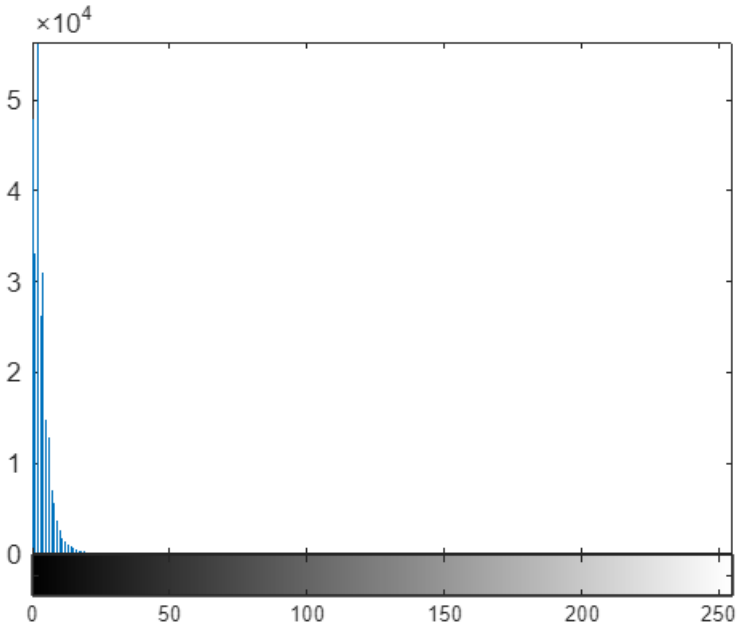
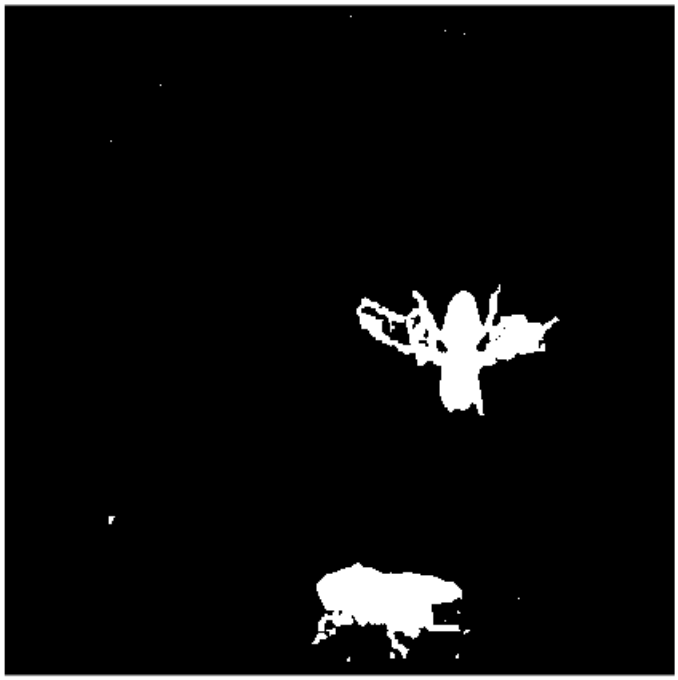
Exercise-6

```
clf('reset')
I = imread('./images/flyman/flymanBS.tif');

figure, imhist(I), axis tight
```

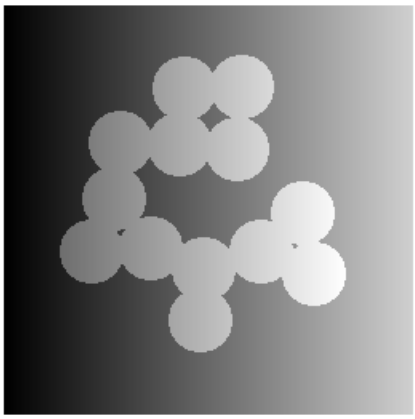



```
threshhold = 30;
figure, imshow(I > threshhold)
```

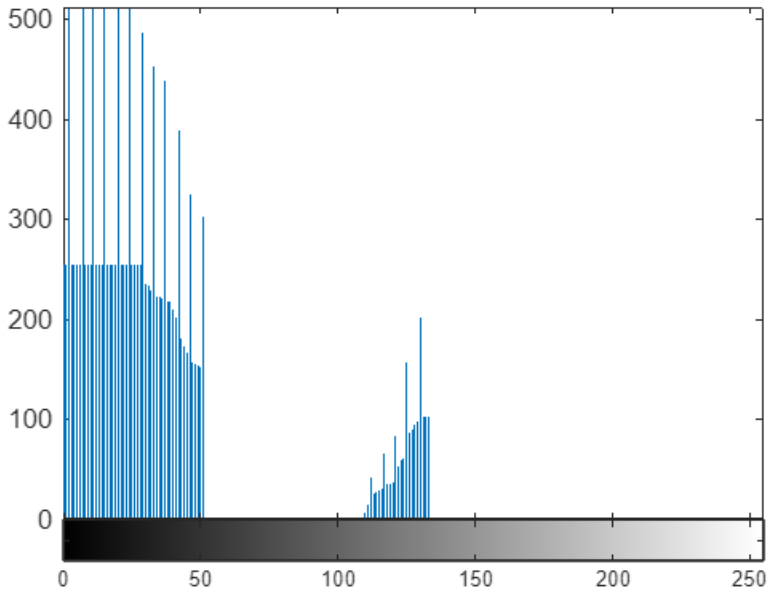


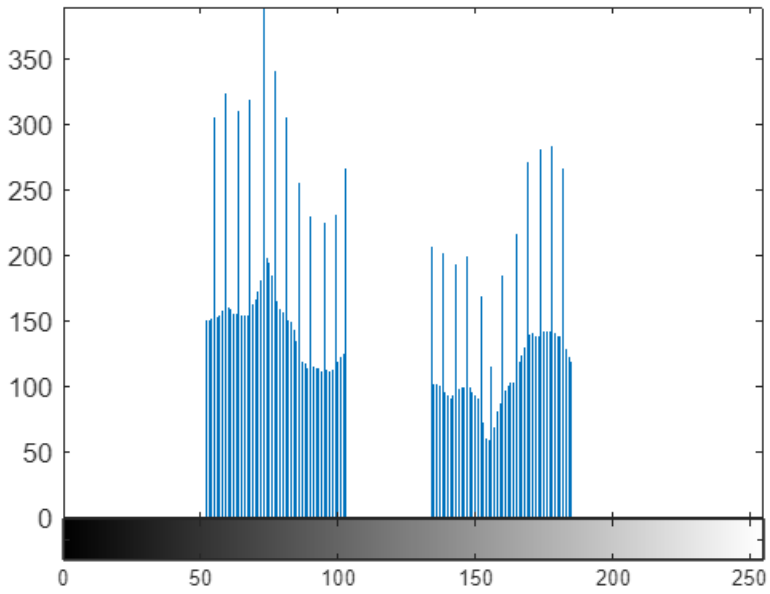
Exercise-7

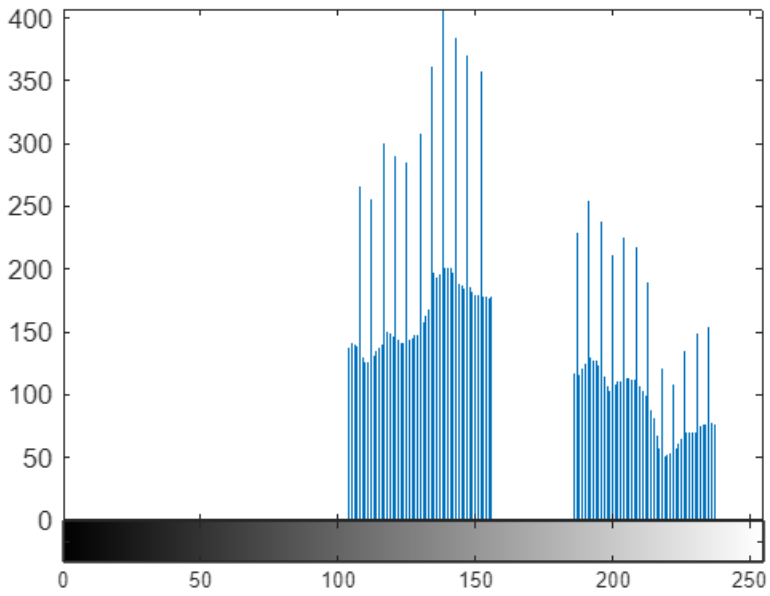
```
clf('reset')
C = imread('./images/circles.tif');
X = ones(256, 1) * [1:256];
C2 = double(C) .* (X / 2 + 50) + (1 - double(C)) .* X / 2;
C3 = uint8(255 * mat2gray(C2));

imshow(C3)
```

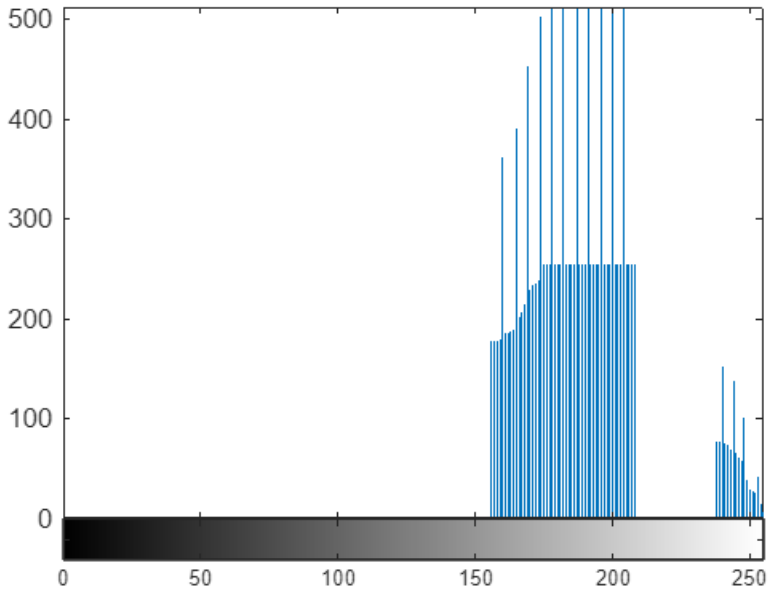


```
% observation
for i = 1:4
    width = size(C3, 2);
    dvide_value = width / 4;
    D = C3(:, 1 + (i - 1) * dvide_value:i * dvide_value);
    figure, imhist(D), axis tight
    figure, imshow(D)
end
```



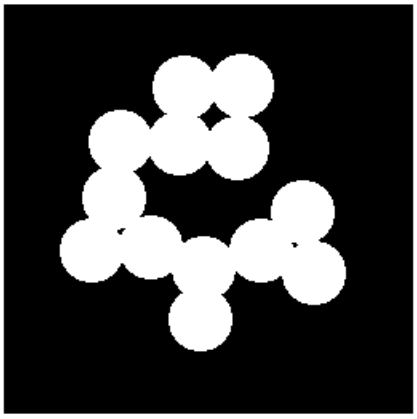

350
300
250
200
150
100
50
0
0
50
100
150
200
250


400
350
300
250
200
150
100
50
0
0
50
100
150
200
250



```
threshhold = [80, 120, 170, 225];
merge = [];

for i = 1:4
    width = size(C3, 2);
    dvide_value = width / 4;
    D = C3(:, 1 + (i - 1) * dvide_value:i * dvide_value);
    figure, imshow(D > threshhold(i))
    merge = [merge, D > threshhold(i)];
end
```

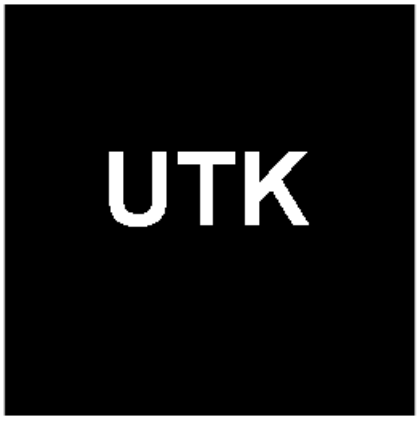
```
imshow(merge)
```



Morphological Image Processing

Exercise-1

```
clf('reset')
A = imread('./images/morphology/utk.tif');
B = imread('./images/morphology/gt.tif');

figure, imshow(A)
```




```
figure, imshow(B)
```

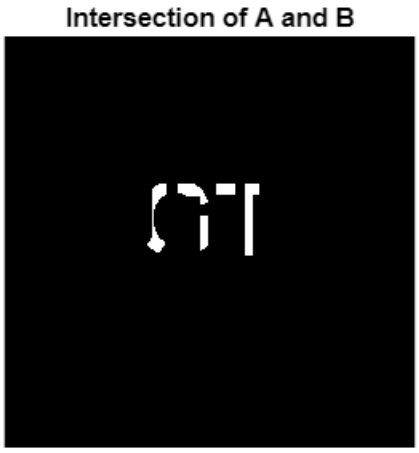

```
complement_A = ~A;
union_A_B = A | B;
intersection_A_B = A & B;
set_difference_A_B = (~B) & A;

figure, imshow(complement_A), title('Complement of A')
```

Complement of A

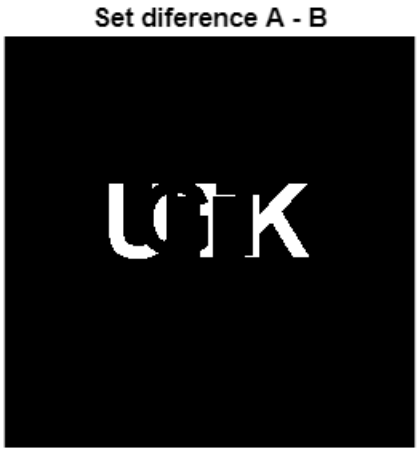

```
figure, imshow(union_A_B), title('Union of A and B')
```

Union of A and B


```
figure, imshow(intersection_A_B), title('Intersection of A and B')
```

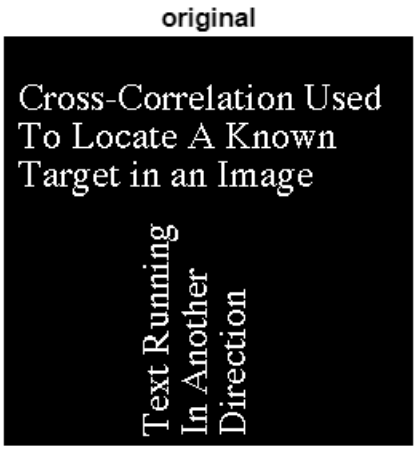



```
figure, imshow(set_difference_A_B), title('Set diference A - B')
```

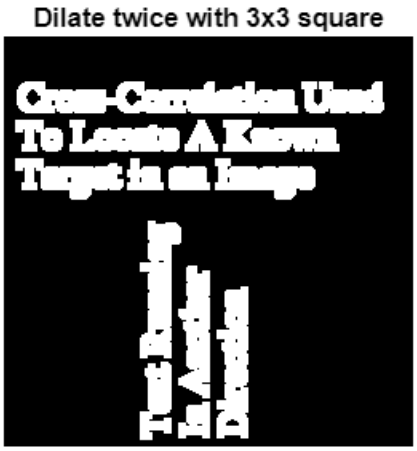


Exercise-2

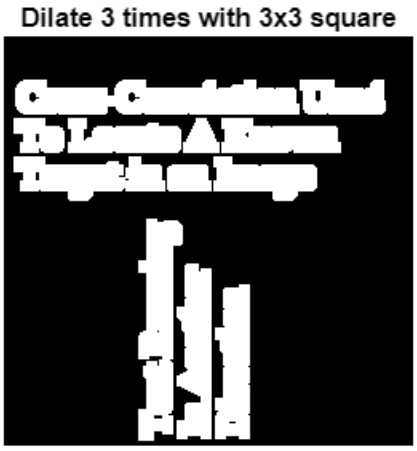
```
clf('reset')
t = imread('./images/morphology/text.tif');
sq3 = ones(3, 3);
sq5 = ones(5, 5);
diamond = [0 1 0; 1 1 1; 0 1 0];

dilate_2 = imdilate(imdilate(t, sq3), sq3);
dilate_3 = imdilate(dilate_2, sq3);
dilate_diamond = imdilate(t, diamond);
dilate_1 = imdilate(t, sq5);

figure, imshow(t), title('original')
```



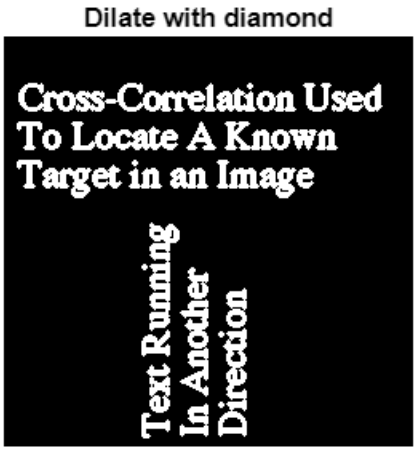

```
figure, imshow(dilate_2), title('Dilate twice with 3x3 square')
```



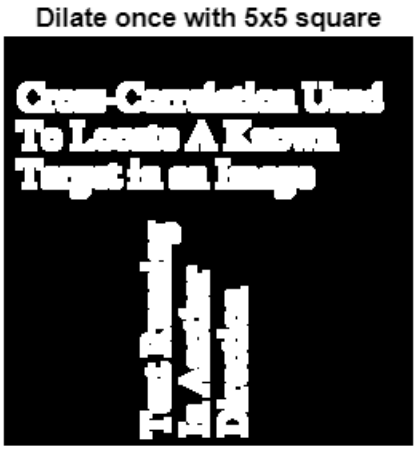

```
figure, imshow(dilate_3), title('Dilate 3 times with 3x3 square')
```




```
figure, imshow(dilate_diamond), title('Dilate with diamond')
```

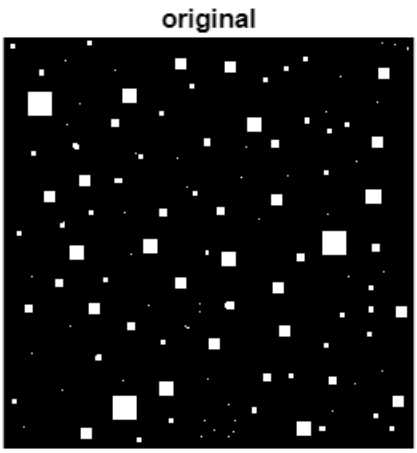



```
figure, imshow(dilate_1), title('Dilate once with 5x5 square')
```

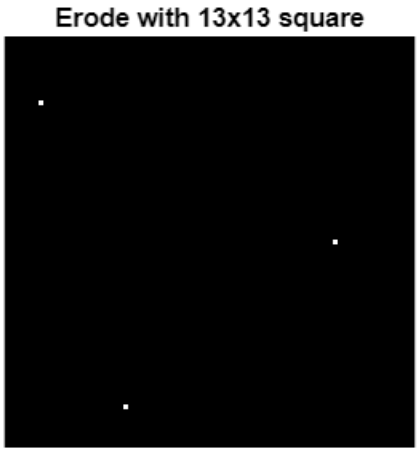


Exercise-3

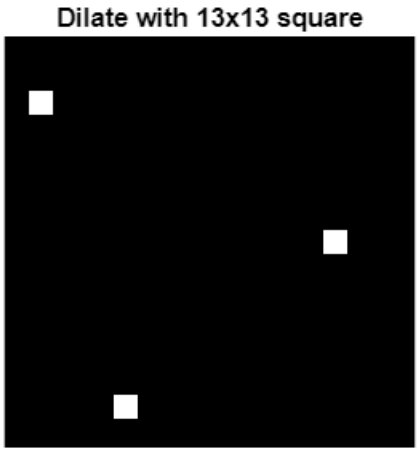
```
clf('reset')
I = imread('./images/morphology/small-squares.tif');
sq13 = ones(13, 13);
erode = imerode(I, sq13);
dilate = imdilate(erode, sq13);

figure, imshow(I), title('original')
```




```
figure, imshow(erode), title('Erode with 13x13 square')
```

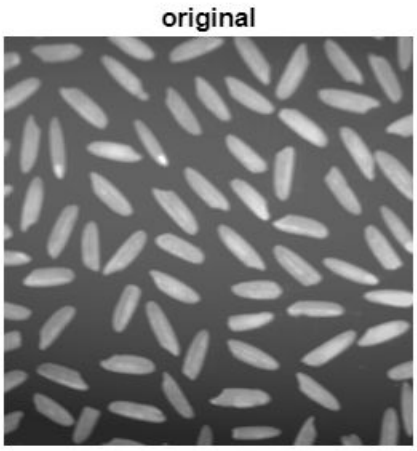



```
figure, imshow(dilate), title('Dilate with 13x13 square')
```

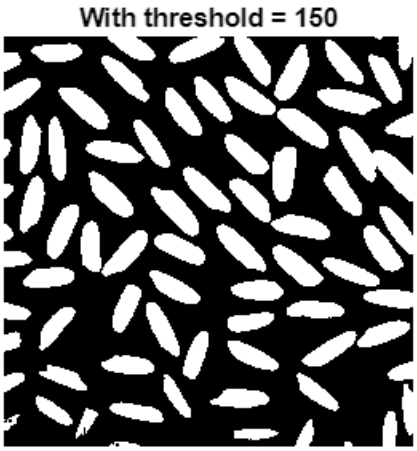


Exercise-4

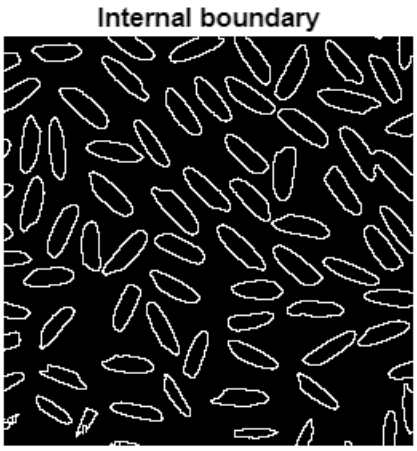
```
clf('reset')
rice = imread('./images/morphology/rice.tif');
r = rice > 110;
kernal = ones(3, 3);

internal = ~(imerode(r, kernal)) & r;
external = ~r & (imdilate(r, kernal));
morphological_gradient = ~(imerode(r, kernal)) & (imdilate(r, kernal));

figure, imshow(rice), title('original')
```



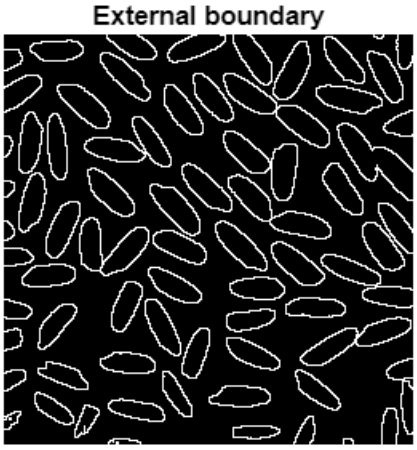

```
figure, imshow(r), title('With threshold = 150')
```



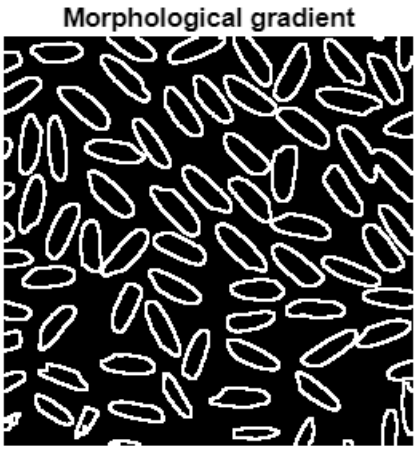

```
figure, imshow(internal), title('Internal boundary')
```




```
figure, imshow(external), title('External boundary')
```

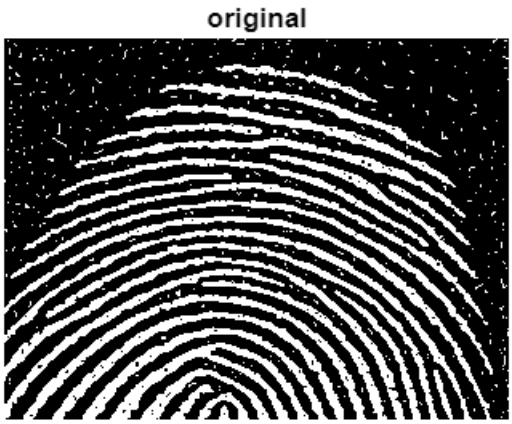



```
figure, imshow(morphological_gradient), title('Morphological gradient')
```



Exercise-5

```
clf('reset')
I = imread('./images/morphology/noisy-fingerprint.tif');
figure, imshow(I), title('original')
```




```
kernal = ones(3, 3);

open1 = imopen(I, kernal);
close1 = imclose(open1, kernal);
figure, imshow(open1), title('original -> open')
```


```
figure, imshow(close1), title('original -> open -> close')
```


```
close2 = imclose(I, kernal);
open2 = imopen(close2, kernal);
figure, imshow(close2), title('original -> close')
```


```
figure, imshow(open2), title('original -> close -> open')
```


```
diff = ~close1 & open2;
figure, imshow(diff), title('Show if open -> close or close -> open are the same')
```

Show if open -> close or close -> open is the same