LAB 8

Aim: Introduction to Morphological Image Processing.

(a) Create input image of size 9x9 as shown below. Perform 'Erosion', 'Dilation', 'Opening' and 'Closing' operations using 'Disk' structuring element of size '1'.

```
matrix = [
    0 0 0 0 0 0 0 0 0
    0 0 0 0 0 0 0 0 0
    0 0 1 1 1 0 0 0 0
    0 0 1 1 1 0 0 0 0
    0 0 1 1 1 1 1 0 0
    0 0 1 1 1 1 1 0 0
    0 0 1 1 1 1 1 0 0
    0 0 0 0 0 0 0 0 0
    0 0 0 0 0 0 0 0 0

];

se = [
    [0,1,0]
    [1,1,1]
    [0,1,0]
   ];

imerode(matrix,se);
imdilate(matrix,se);
imopen(matrix,se);
imclose(matrix,se)
```

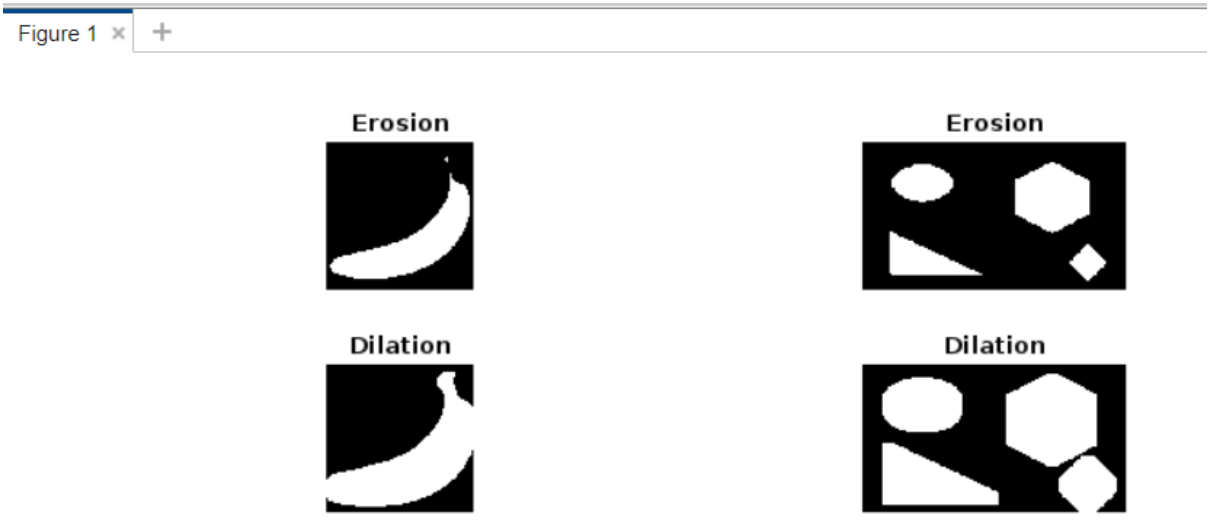
```
ans =

     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
     0     0     1     1     1     0     0     0     0
     0     0     1     1     1     1     0     0     0
     0     0     1     1     1     1     1     0     0
     0     0     1     1     1     1     1     0     0
     0     0     1     1     1     1     1     0     0
     0     0     0     0     0     0     0     0     0
     0     0     0     0     0     0     0     0     0
```

(b)Download 'banana' image. Convert it into black and white image as shown below. Perform 'Erosion' and 'Dilation' operation with 'Disk' and 'Square' structuring elements.

lab61.m | Smoothning.m | lab62.m | lab63.m | lab81.m

```
banana=imread('banana.bmp');
shapes=imread('Geometrical.bmp');

%complement img
banana_c=1-banana;
shapes_c=1-shapes;

%creating structure element
SE=strel('square',9);

%Erosion
e_banana=imerode(banana_c,SE);
e_shapes=imerode(shapes_c,SE);

subplot(4,2,1);
imshow(e_banana,[]);
title('Erosion');
subplot(4,2,2);
imshow(e_shapes,[]);
title('Erosion');

%Dilation
d_banana=imdilate(banana_c,SE);
d_shapes=imdilate(shapes_c,SE);

subplot(4,2,3);
imshow(d_banana,[]);
title('Dilation');
subplot(4,2,4);
imshow(d_shapes,[]);
title('Dilation');
```

Figure 1



(c) Read in the image ‘blobs.png’ . This image should already be available with MATLAB as it comes with the Image Processing Toolbox.

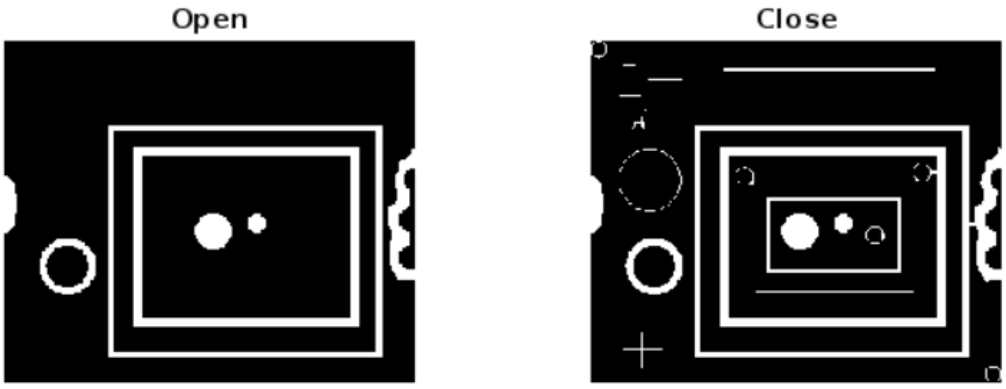
Perform ‘Opening’ and ‘Closing’ operations on the given image with ‘Disk’

structuring element of size ‘5’.

lab61.m | Smoothning.m | lab62.m | lab63.m | lab8

```
clear all;

img=imread('blobs.png');

%creating structure element
SE=strel('square',5);

open_img=imopen(img,SE);
subplot(2,2,1);
imshow(open_img,[]);
title('Open');

close_img=imclose(img,SE);
subplot(2,2,2);
imshow(close_img,[]);
title('Close');

```

Figure 1



(d) Perform ‘Boundary Extraction’ Operation on ‘Banana’ and ‘Shapes’ images.

lab61.m | Smoothning.m | lab62.m | lab63.m | lab81.m | lab82.m | lab83.m

```
1
2   clear all;
3
4   banana=imread('banana.bmp');
5   shapes=imread('Geometrical.bmp');
6
7   %complement img
8   banana_c=1-banana;
9   shapes_c=1-shapes;
10
11  %creating structure element
12  SE=strel('square',9);
13
14  %Erosion
15  e_banana=imerode(banana_c,SE);
16  e_shapes=imerode(shapes_c,SE);
17
18  %Boundry Extraction
19  b_banana=banana_c-e_banana;
20  subplot(2,2,1);
21  imshow(b_banana);
22  title('Boundary Extraction');
23  b_shapes=shapes_c-e_shapes;
24  subplot(2,2,2);
25  imshow(b_shapes);
26  title('Boundary Extraction');
```

Figure 1