

## Practical 10

**Aim:** Write a program to implement morphological operations (Dilation, Erosion, Opening, Closing).

**Code:**

```

Editor - D:\Marwadi\SEM-5\IP-lab\Prg\morphological_1.m
morphological_1.m  reconstruction_facial.m  reconst

1 - fprintf('92000103073-Raj Chhadia');
2 - % Importing the image
3 - I = imread('cameraman.tif');
4 - subplot(2, 3, 1);
5 - imshow(I);
6 - title('Original image');
7 - % Dilated Image
8 - subplot(2, 3, 2);
9 - se = strel('square', 7);
10 - dilate = imdilate(I, se);
11 - imshow(dilate);
12 - title('Dilated image');
13 - % Eroded image
14 - subplot(2, 3, 3);
15 - erode = imerode(I, se);
16 - imshow(erode);
17 - title('Eroded image');
18 - % Opened image
19 - subplot(2, 3, 4);
20 - open = imopen(I, se);
21 - imshow(open);
22 - title('Opened image');
23 - % Closed image
24 - subplot(2, 3, 5);
25 - close = imclose(I, se);
26 - imshow(close);
27 - title('Closed image');

```

**Output:**



**Extra:**

## 1. Display Boundary Extraction, Skeletonization, Thickening, Thinning.

**Code:**

```

morphological_1.m  reconstruction_facial.m  reconstruction_texture.m  morphological_2.m  +
- fprintf('92000103073-Raj Chhadia');
- %Read binary image and display it.
- subplot(2, 3, 1);
- BW = imread('circles.png');
- imshow(BW);
- title('Original Image')

- %Boundary Extraction
- subplot(2, 3, 2);
- BW2 = bwmorph(BW, 'remove');
- imshow(BW2);
- title('Boundary Extraction');

- %Skeletonization
- subplot(2, 3, 3);
- % BW3= bwskel(BW);
- BW3= bwmorph(BW, 'skel', Inf);
- imshow(BW3);
- title('Skeleton of Image');

20
21 %Thickening
22 subplot(2, 3, 4);
23 BW4 = bwmorph(BW, 'thicken');
24 imshow(BW4);
25 title('Thickening');
26
27 %Thinning
28 subplot(2, 3, 5);
29 BW4 = bwmorph(BW, 'thin');
30 imshow(BW4);
31 title('Thinning');
32
33 %Convex Hull of Image
34 subplot(2, 3, 6);
35 BW5 = bwconvhull(BW);
36 imshow(BW5);
37 title('Convex Hull');
38 disp(CC.Connectivity);
39 disp(CC.NumObjects);

```

**Output:**

