

Assignment 8

MORPHOLOGICAL OPERATION USING MATLAB

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MT-006

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AIM 1

- 1) Write a program Which performs following morphological operations on images.
- Erosion
- Dilation
- Opening
- Closing
- Hit or Miss Transformation

Code :- (EROISION-DIALATION)

- clear all;
- close all;
- clc;
-
- chs=input('PRESS 1. FOR EROSION:-2. FOR DILATION:-');
- if chs==1
-
- I=imread('erdl.tif');
- SE1 = strel('diamond', 1);
- SE2 = strel('square',33);
- SE3 = strel('line',10,45);
- SE4 = strel('disk',15);
- SE5 = strel('rectangle',[10 10]);

Code:-(Cont'd)

- `eroded1 = imerode(I,SE1);`
- `eroded2 = imerode(I,SE2);`
- `eroded3 = imerode(I,SE3);`
- `eroded4 = imerode(I,SE4);`
- `eroded5 = imerode(I,SE5);`
- `subplot(2,3,1);`
- `imshow(I);title('ORIGINAL')`
- `subplot(2,3,2);`
- `imshow(eroded1);title('Diamond')`
- `subplot(2,3,3);`
- `imshow(eroded2);title('Square')`
- `subplot(2,3,4);`
- `imshow(eroded3);title('Line')`

Code:-(Cont'd)

- subplot(2,3,5);
- imshow(eroded4);title('Disk')
- subplot(2,3,6);
- imshow(eroded5);title('Rectangle')
-
- elseif chs==2
- I=imread('erdl.tif');
- SE1 = strel('diamond', 1);
- SE2 = strel('square',33);
- SE3 = strel('line',10,45);
- SE4 = strel('disk',15);

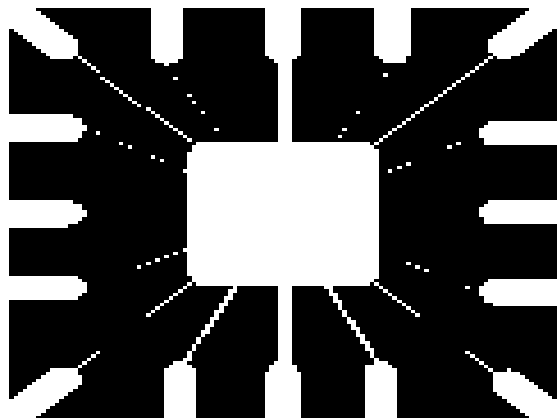
Code:-(Cont'd)

- `SE5 = strel('rectangle',[10 10]);`
- `dil1 = imdilate(I,SE1);`
- `dil2 = imdilate(I,SE2);`
- `dil3 = imdilate(I,SE3);`
- `dil4 = imdilate(I,SE4);`
- `dil5 = imdilate(I,SE5);`
- `subplot(2,3,1);`
- `imshow(I);title('ORIGINAL')`
- `subplot(2,3,2);`

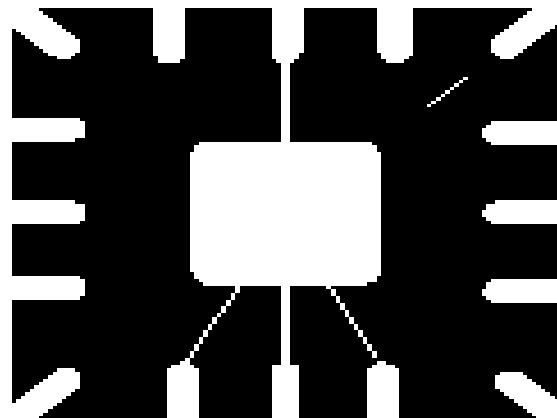
Code:-(Cont'd)

- `imshow(dil1);title('Diamond')`
- `subplot(2,3,3);`
- `imshow(dil2);title('Square')`
- `subplot(2,3,4);`
- `imshow(dil3);title('Line')`
- `subplot(2,3,5);`
- `imshow(dil4);title('Disk')`
- `subplot(2,3,6);`
- `imshow(dil5);title('Rectangle')`
- `end`

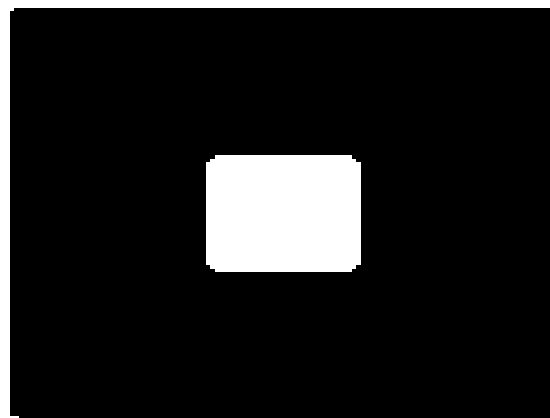
ORIGINAL



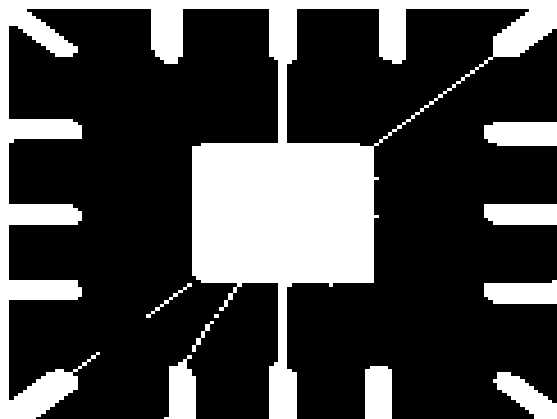
Diamond



Square



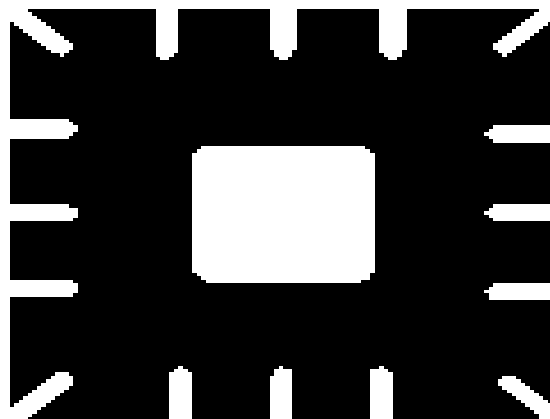
Line



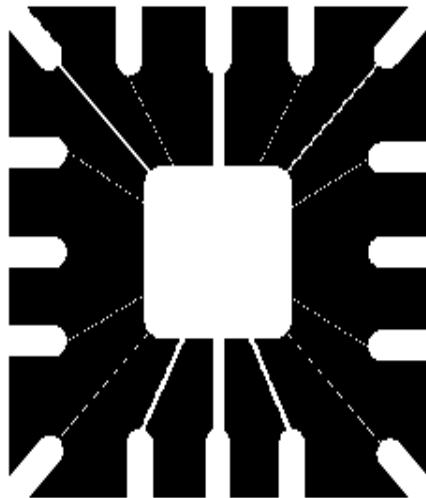
Disk



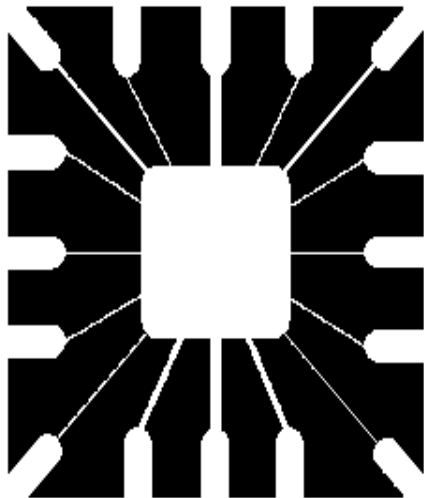
Rectangle



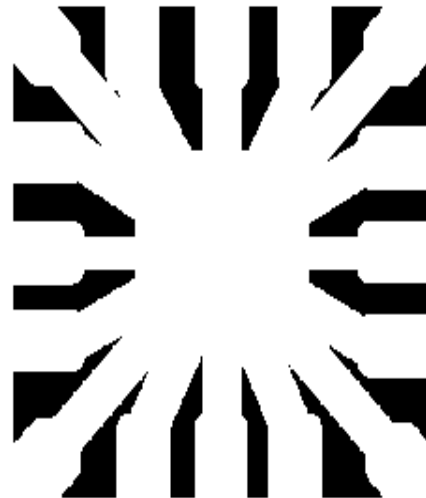
ORIGINAL



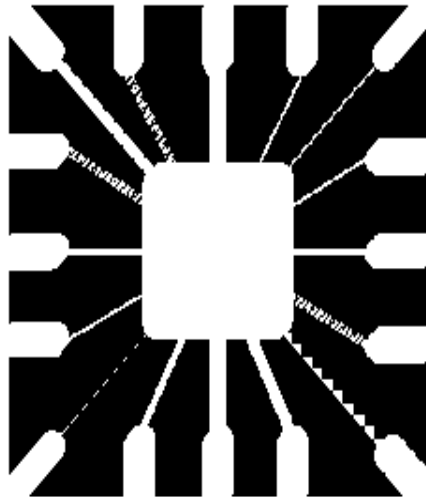
Diamond



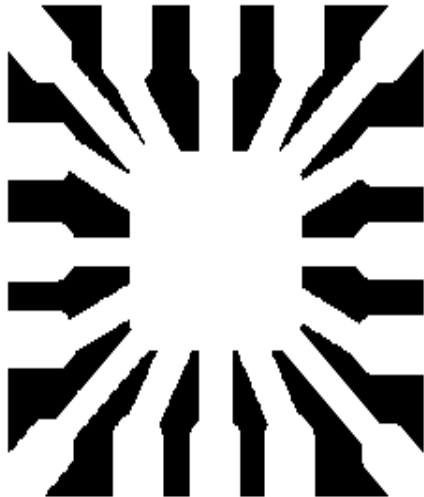
Square



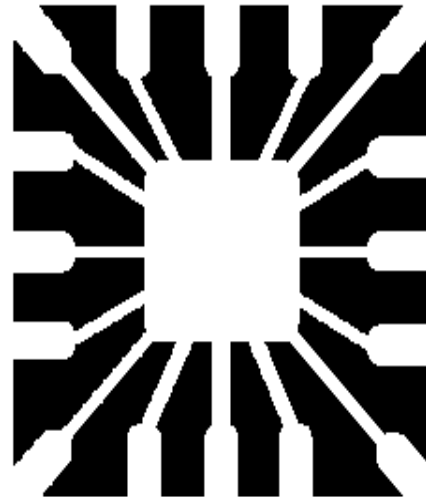
Line



Disk



Rectangle



Code:-(OPENING-CLOSING)

- clear all;
- close all;
- clc;
-
- chs=input('PRESS 1. FOR OPENING:-2. FOR CLOSING:-');
- if chs==1
-
- I=imread('erdl.tif');
- s1=input('Enter StructuringElement for Erosion:1.diamond 2.square 3.line 4.disk 5.rectangle:--');
- if s1==1
- SE = strel('diamond', 1);
- elseif s1==2
- SE = strel('square',33);
- elseif s1==3
- SE = strel('line',10,45);

Code:-(Cont'd)

- elseif s1==4
- SE = strel('disk',15);
- elseif s1==5
- SE = strel('rectangle',[10 10]);
- end
- eroded = imerode(I,SE);
- s2=input('Enter StructuringElement for Dilation:1.diamond 2.square 3.lone 4.disk 5.rectangle:--');
- if s2==1
- SE = strel('diamond', 1);
- elseif s2==2
- SE = strel('square',33);
- elseif s2==3
- SE = strel('line',10,45);
- elseif s2==4
- SE = strel('disk',15);
- elseif s2==5

Code:-(Cont'd)

- SE = strel('rectangle',[10 10]);
- end
- dil = imdilate(eroded,SE);
- subplot(1,3,1);
- imshow(I);title('ORIGINAL')
- subplot(1,3,2);
- imshow(eroded);title('EROSION')
- subplot(1,3,3);
- imshow(dil);title('EROSION+DILATION=OPENING')
-
- elseif chs==2
- I=imread('erdl.tif');
- s1=input('Enter StructuringElement for Dilation:1.diamond 2.square 3.lone 4.disk 5.rectangle:--');
- if s1==1
- SE = strel('diamond', 1);

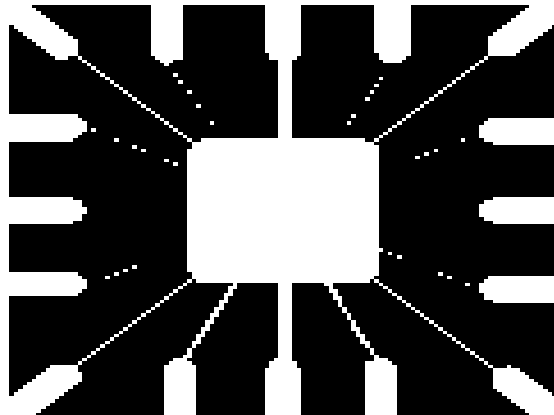
Code:-(Cont'd)

- elseif s1==2
- SE = strel('square',33);
- elseif s1==3
- SE = strel('line',10,45);
- elseif s1==4
- SE = strel('disk',15);
- elseif s1==5
- SE = strel('rectangle',[10 10]);
- end
- dil = imdilate(I,SE);
-
- s2=input('Enter StructuringElement for Erosion:1.diamond 2.square 3.lone 4.disk 5.rectangle:--');
- if s2==1
- SE = strel('diamond', 1);
- elseif s2==2

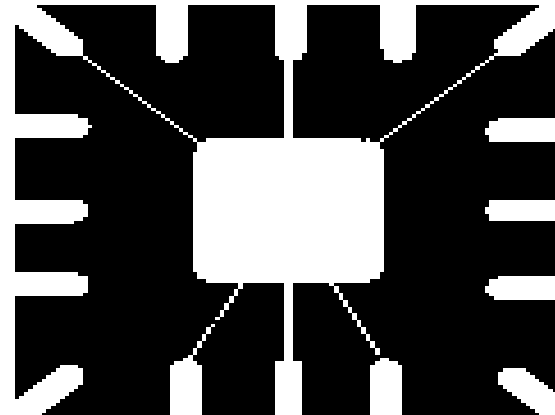
Code:-(Cont'd)

- SE = strel('square',33);
- elseif s2==3
- SE = strel('line',10,45);
- elseif s2==4
- SE = strel('disk',15);
- elseif s2==5
- SE = strel('rectangle',[10 10]);
- end
- eroded = imerode(dil,SE);
- subplot(1,3,1);
- imshow(I);title('ORIGINAL')
- subplot(1,3,2);
- imshow(dil);title('DILATION')
- subplot(1,3,3);
- imshow(eroded);title('DILATION+EROSION=OPENING')
- end

ORIGINAL



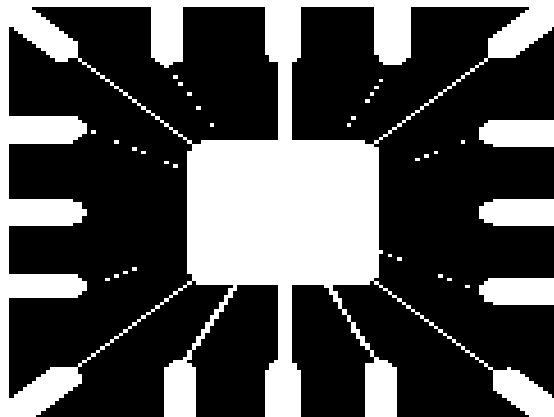
EROSION



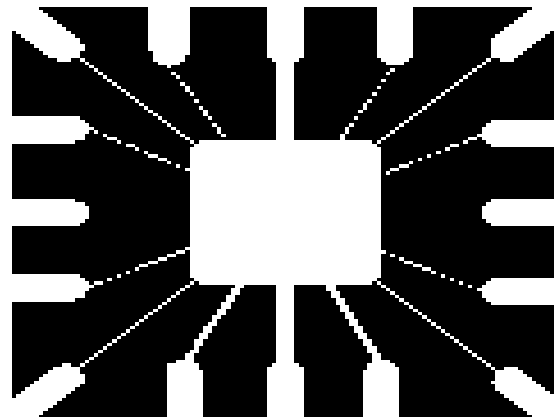
EROSION+DILATION=OPENING



ORIGINAL



DILATION



DIALATION+EROSION=CLOSING



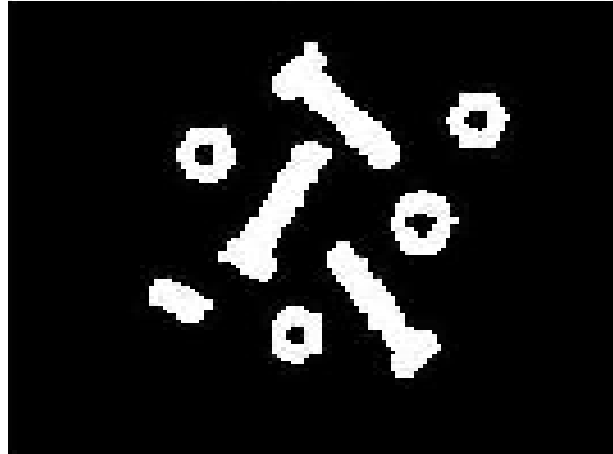
AIM 2

- Write a program for following applications of morphological operations for images.
- Boundary extraction
- Hole filling
- Extraction of connected components
- Convex hull (optional)
- Skeletons (optional)
- Thinning (optional)
- Thickening (optional)

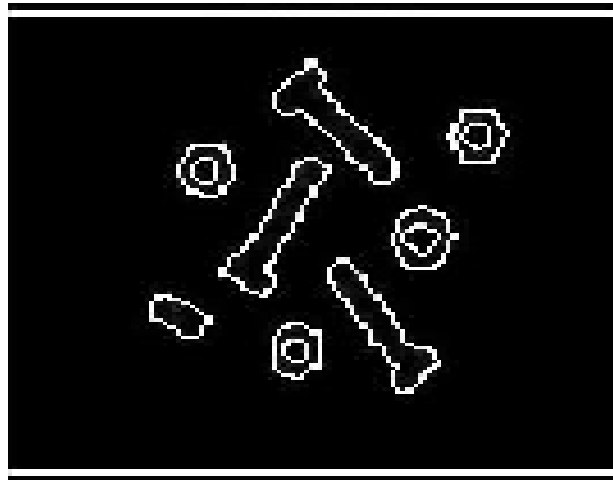
Code:- (BOUNDARY EXTRACTION)

- `A=imread('binaryimg.png');`
- `s=strel('disk',2,0);`
- `F=imerode(A,s);`
- `figure,`
- `subplot(2,1,1);`
- `imshow(A);title('Binary Image');`
- `subplot(2,1,2);`
- `imshow(A-F);title('Boundary extracted Image');`

Binary Image



Boundary extracted Image



Code:- (HOLE FILLING)

- `clc;`
- `close all;`
- `clear all;`
- `I=imread('hole.tif');`
- `figure,imshow(I);`
- `I = imcomplement(I);`
- `sz=size(I);`
- `I=I>128;`
- `[a, b] = bwlabel(I,8);`
- `ni=ones(sz(1),sz(2));`

Code:- (Cont'd)

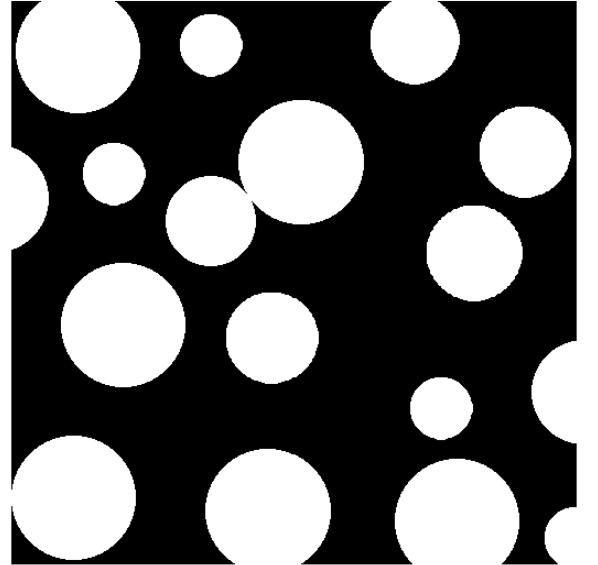
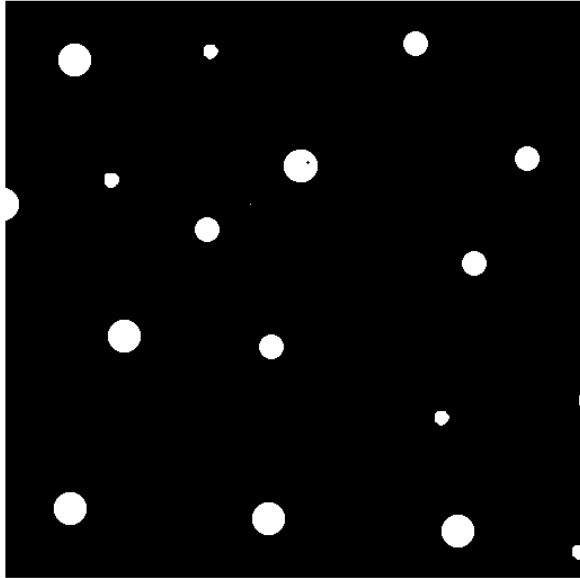
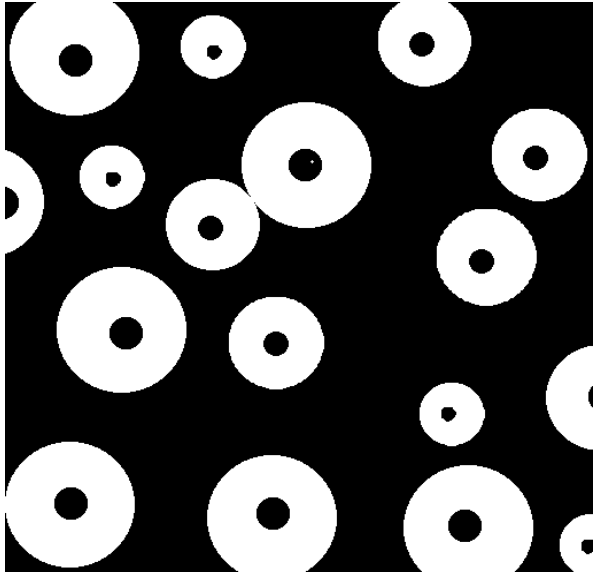
- for i=1:sz(1)
- for j=1:sz(2)
- if a(i,j)>0
- ni(i,j)=1;
- else
- ni(i,j)=0;
- end
- end
- end

Code:- (Cont'd)

- for i=1:sz(1)
- for j=1:sz(2)
- if a(i,j)>1
- ni(i,j)=1;
- else
- ni(i,j)=0;
- end
- end
- end

Code:- (Cont'd)

- `l=imcomplement(l);`
- `for i=1:sz(1)`
- `for j=1:sz(2)`
- `if ni(i,j)>0`
- `l(i,j)=l(i,j)+ni(i,j);`
- `end`
- `end`
- `end`
- `figure,imshow(ni);`
- `figure,imshow(l);`



Code:- (Extraction of connected components)

- `clc;`
- `close all;`
- `clear all;`
- `I=imread('mob2.jpg');`
- `I = rgb2gray(I);`
- `figure,imshow(I);`
- `I = imcomplement(I);`
- `sz=size(I);`
- `I=I>128;`
- `[a, b] = bwlabel(I,8);`

Code:- (Cont'd)

- for i=1:sz(1)
- for j=1:sz(2)
- if a(i,j)>0
- ni(i,j)=1;
- else
- ni(i,j)=0;
- end
- end
- end
- figure,imshow(ni);



Input Image

Output Image



THANK YOU