```matlab
% Morphological Operations
% 19BAI10150 - AAYUSH MISHRA
% Computer Vision - Practical 3
```

```matlab
I = imread('circbw.tif')
```

I = 280×272 logical array

```
    1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1···
    1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
    1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
    1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
    1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
    1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
    1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
    1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
    1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
    1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
      :
      :
```

```matlab
figure()
imshow(I)
```



```matlab
SE = strel('rectangle',[40,30])
```

SE =
strel is a rectangle shaped structuring element with properties:

```
     Neighborhood: [40×30 logical]
   Dimensionality: 2
```
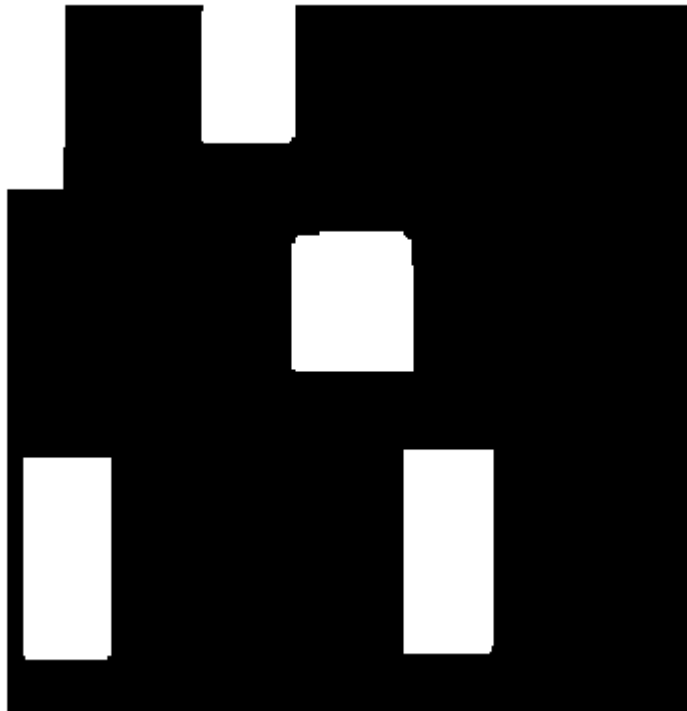
```
J = imopen(I,SE)
```

J = 280×272 logical array

```
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1···
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
      :
      :
```

```
imshow(J)
```



```
%Using erotion and dilation
A = imerode(I,SE)
```

A = 280×272 logical array

```
   1   1   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0···
   1   1   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0
   1   1   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0
   1   1   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0
   1   1   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0
```
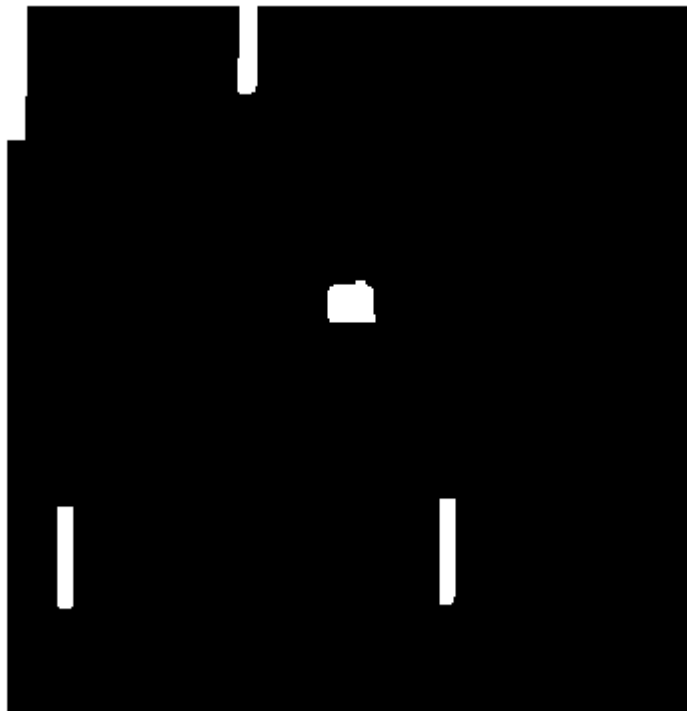
```
   1   1   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0
   1   1   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0
   1   1   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0
   1   1   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0
   1   1   1   1   1   1   1   1   0   0   0   0   0   0   0   0   0   0   0   0
     :
     :
```
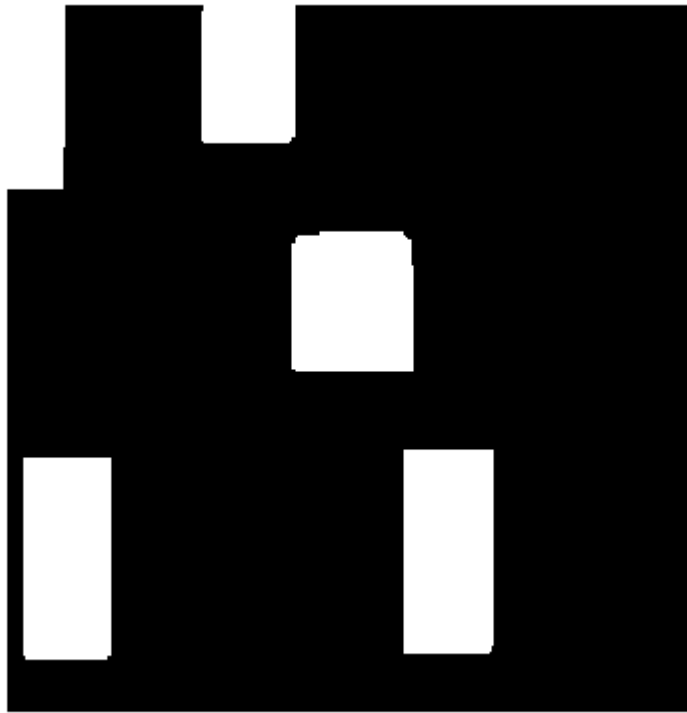
```
imshow(A)
```



```
B = imdilate(A,SE)
```

B = 280×272 logical array
```
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1 ···
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1   1
     :
     :
```

```
imshow(B)
```

```matlab
SE1 = strel('diamond',15)
```

```
SE1 =
strel is a diamond shaped structuring element with properties:

      Neighborhood: [31×31 logical]
    Dimensionality: 2
```
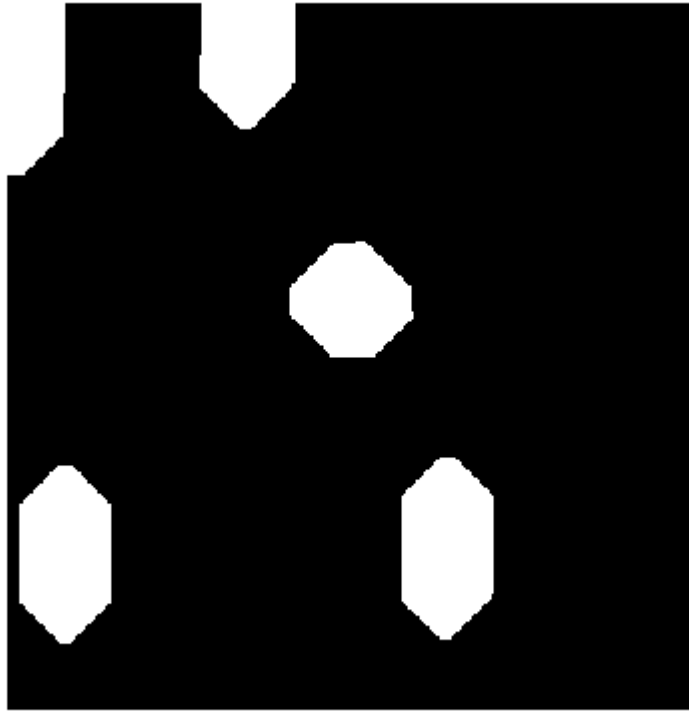
```matlab
z = imdilate(A,SE1)
```

```
z = 280×272 logical array
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1···
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1    1
        .
        .
        .
```

```matlab
imshow(z)
```