

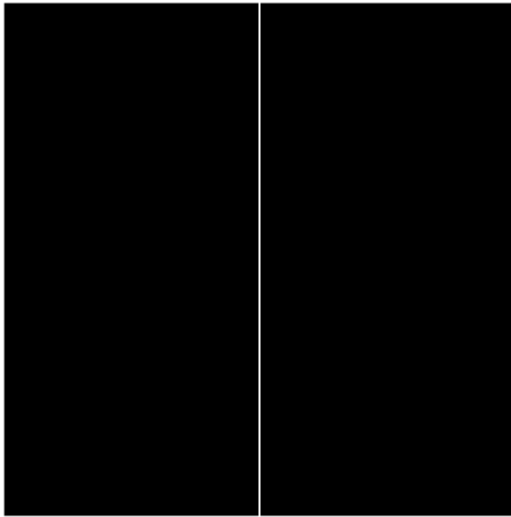
# Visión por Computador - Sesión 3

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## Coding Dilatación

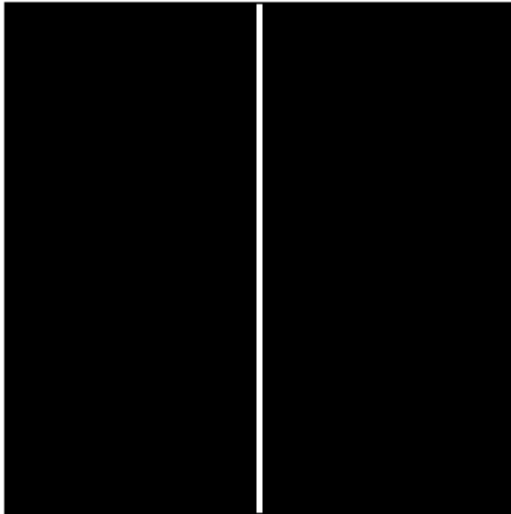
```
im = false(256);  
im(:, 128) = 1;  
  
imshow(im)
```



```
ee = [1 1 1]
```

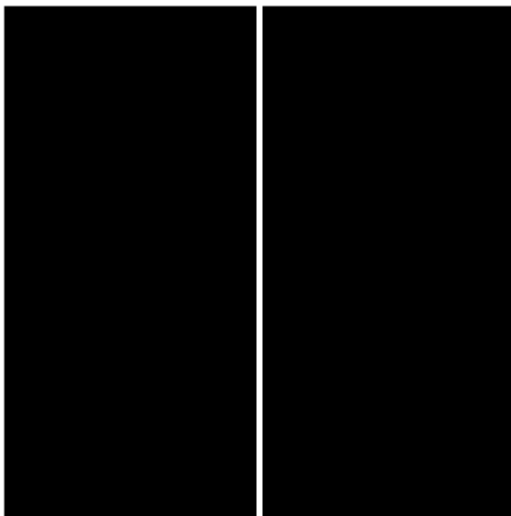
```
ee = 1x3  
    1    1    1
```

```
imDil1 = false(256);  
for i = 2:255  
    for j = 2:255  
        if (im(i, j) == 1)  
            imDil1(i, j-1:j+1) = imDil1(i, j-1:j+1) | ee;  
        end  
    end  
end  
  
imshow(imDil1)
```



Función de dilatación:

```
imDil2 = imdilate(im, ee);  
figure, imshow(imDil2)
```



## Dilatación, Erosión, Open y Close

```
im2 = imread('blob.tif');
```

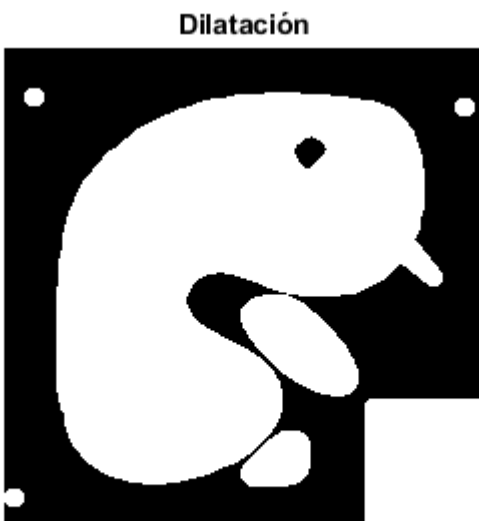
```
figure, imshow(im2)
```



```
ee2 = strel('disk', 5);
```

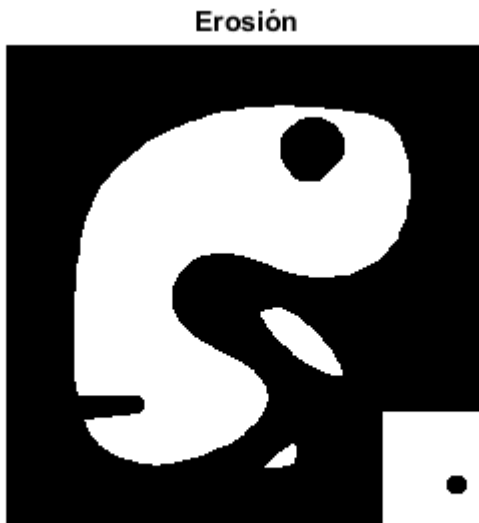
Dilatación:

```
imDil3 = imdilate(im2, ee2);  
figure, imshow(imDil3), title('Dilatación')
```



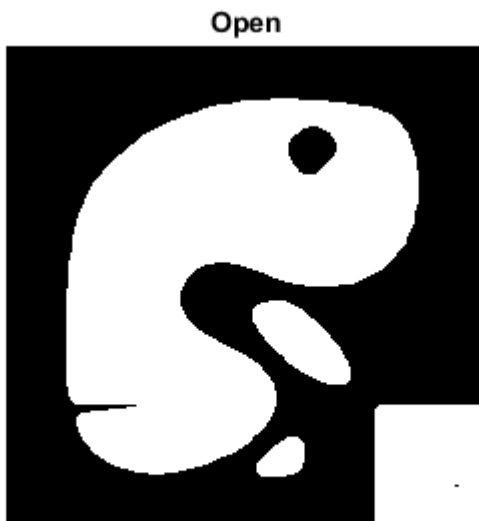
Erosión:

```
imEro1 = imerode(im2, ee2);  
figure, imshow(ero), title('Erosión')
```

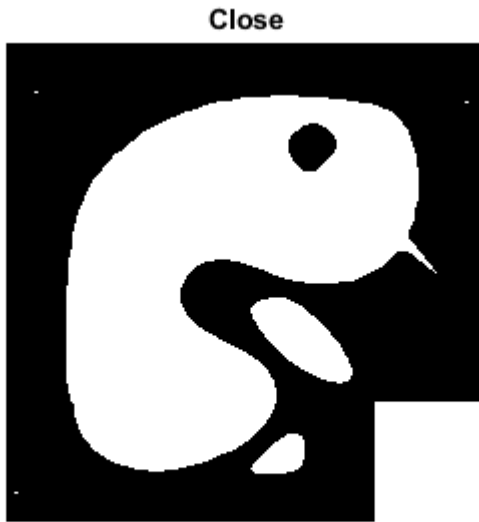


Open y close:

```
op = imopen(im2, ee2);  
cl = imclose(im2, ee2);  
figure, imshow(op), title('Open')
```



```
figure, imshow(cl), title('Close')
```



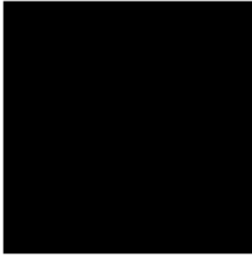
## Dilatación condicional

```
im3 = imread('blob3.tif');  
imshow(im3)
```



```
mark = true(128);  
mark(2:end-1, 2:end-1) = 0;  
figure, imshow(mark), title('Marker')
```

Marker



```
ee3 = strel('disk',1);  
  
imDil4 = imdilate(mark, ee3) & im3;  
figure, imshow(imDil4), title('Dilatación condicional')
```

Dilatación condicional



```
imDil4 = imdilate(imDil4, ee3) & im3;  
imDil4 = imdilate(imDil4, ee3) & im3;  
imDil4 = imdilate(imDil4, ee3) & im3;  
  
figure, imshow(imDil4), title('Dilatación condicional')
```

**Dilatación condicional**



```
imDil4 = imdilate(imDil4, ee3) & im3;  
imDil4 = imdilate(imDil4, ee3) & im3;  
imDil4 = imdilate(imDil4, ee3) & im3;  
  
figure, imshow(imDil4), title('Dilatación condicional')
```

**Dilatación condicional**



```
imDil4 = imdilate(imDil4, ee3) & im3;  
imDil4 = imdilate(imDil4, ee3) & im3;  
imDil4 = imdilate(imDil4, ee3) & im3;  
  
figure, imshow(imDil4), title('Dilatación condicional')
```



```
imDil4 = imdilate(imDil4, ee3) & im3;  
imDil4 = imdilate(imDil4, ee3) & im3;  
imDil4 = imdilate(imDil4, ee3) & im3;  
  
figure, imshow(imDil4), title('Dilatación condicional')
```



Eliminación de células en bordes:

```
imRes = im3 - imDil4;  
imshow(imRes)
```





Reconstrucción:

```
imRec = imreconstruct(mark, im3);  
figure, imshow(imRec), title('Reconstrucción')
```



## Tapando agujeros

```
im4 = imread('pcbholes.tif');  
imshow(im4)
```

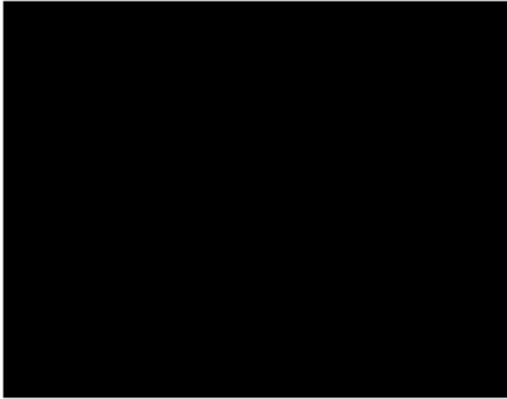


```
notIm4 = logical(true(size(im4)) - im4);  
imshow(notIm4)
```



```
mark2 = true(size(notIm4));  
mark2(2:end-1, 2:end-1) = 0;  
figure, imshow(mark2), title('Marker')
```

Marker



```
imRec2 = imreconstruct(mark2, notIm4);  
figure, imshow(imRec2), title('Reconstrucción')
```

Reconstrucción



```
imRes2 = logical(true(size(imRec2)) - imRec2);  
figure, imshow(imRes2), title('Agujeros tapados')
```



## Figuras

```
im5 = imread('tools.tif');  
figure, imshow(im5);
```



```
ee4 = strel('disk', 7);  
ero2 = imerode(im5, ee4);  
figure, imshow(ero2);
```



```
imRec3 = imreconstruct(ero2, im5);
figure, imshow(imRec3);
```



## Letters

```
im6 = imread('letters.tif');
figure, imshow(im6)
```

wed by erosion  
 cal filter:  
 $(f) = \Psi(\Psi(f))$   
 $< g \Rightarrow \Psi(f) <$

```

mark3 = true(size(im6));
mark3(2:end-1, 2:end-1) = 0;
im6 = im6 - imreconstruct(mark3, im6);
figure, imshow(im6)

```

e y erosion  
 al filter:  
 $(f) = \Psi(\Psi(f))$   
 $< g \Rightarrow \Psi(f) <$

```

ee5 = strel('line', 15, 90);
ero3 = imerode(im6, ee5);

imRec4 = imreconstruct(ero3, im6);
figure, imshow(imRec4);

```

$\Psi \Psi$   
 $\Psi$