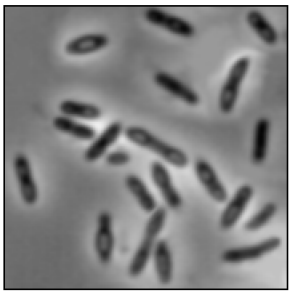
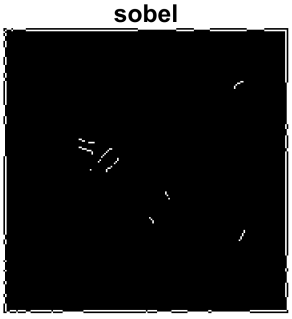
8)

a)Utiliza un operador basado en un filtro de paso alta para la detección de los contornos de los granos de arroz de la imagen de la figura 26.

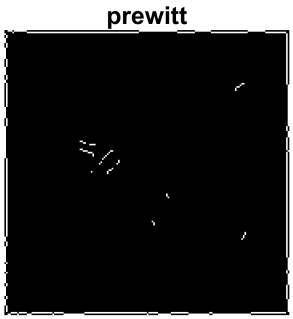
```
I=imread('bacteria.tif');
imshow(I)
```



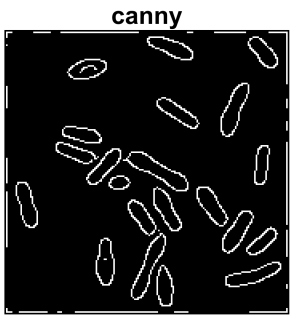
```
B1=edge(I,'sobel');
B2=edge(I,'prewitt');
B3=edge(I,'canny');
imshow(B1),title('sobel')
```




```
figure,imshow(B2),title('prewitt')
```

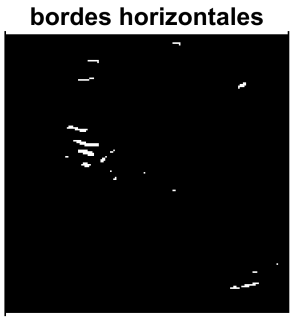



```
figure, imshow(B3),title('canny')
```



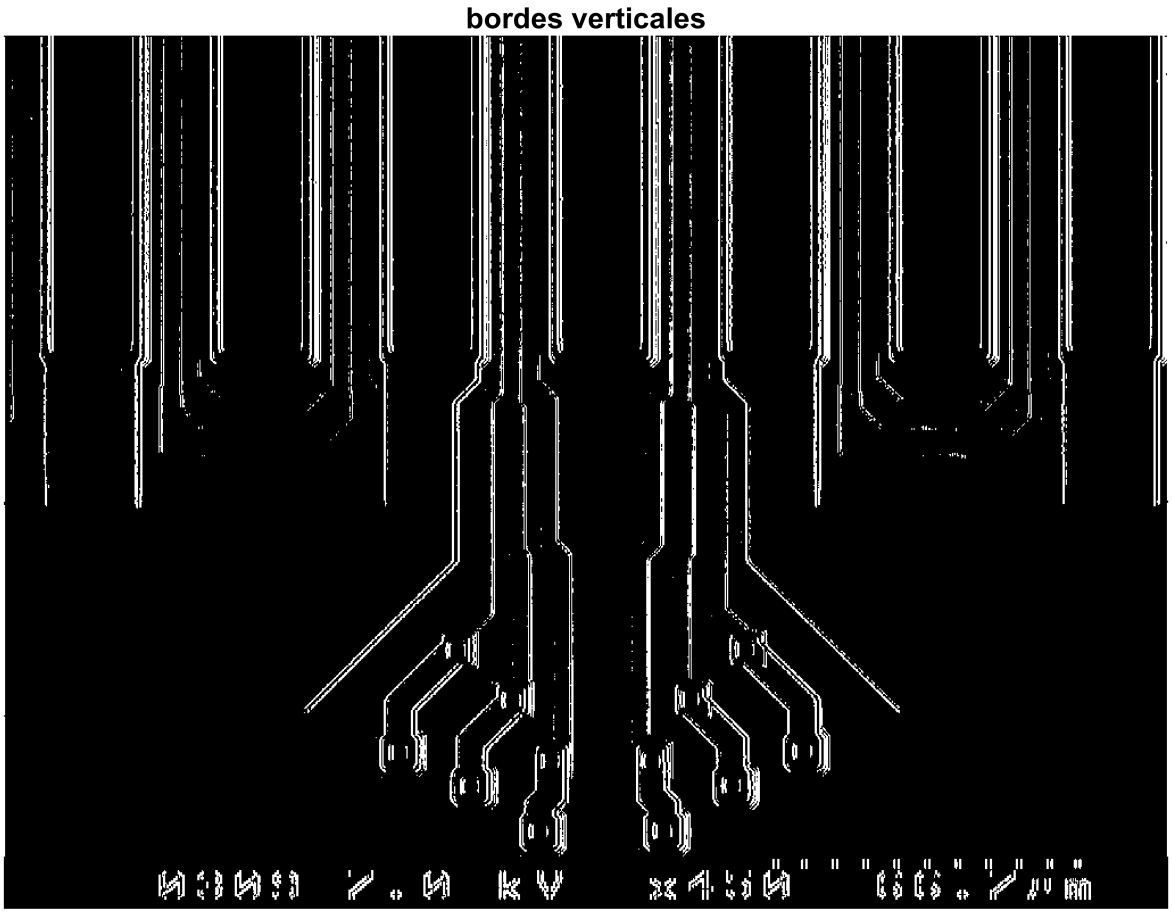
b) Detecta los bordes horizontales de la imagen de la figura 26 aplicando un filtro de paso alta.

```
I=imread('bacteria.tif');
g=[1 1 1;0 0 0; -1 -1 -1];
J=filter2(g,I);
J=abs(J);
B=J>0.27*(max(J(:))-min(J(:)));
imshow(B),title('bordes horizontales')
```



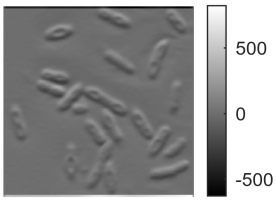
c) Detecta los bordes verticales de la imagen de la figura 29 (wafer1.tif).

```
I=imread('WAFER1.TIF');
g = [1 0 -1; 1 0 -1; 1 0 -1];
J=filter2(g,I);
J=abs(J);
B=J>0.27*(max(J(:))-min(J(:)));
imshow(B),title('bordes verticales')
```



d) Aplica un filtro de pasa alta a la imagen de la figura 31 y muestra la imagen resultante.

```
I=imread('bacteria.tif');
h=[1 2 1; 0 0 0; -1 -2 -1];
I1=filter2(h,I);
imshow(I1,[]), colorbar
```



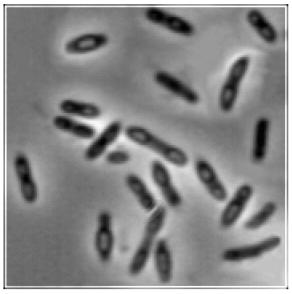
9)

a) Acentúa (perfila) los contornos a la imagen de la figura 31.

```
I=imread('bacteria.tif');
h=fspecial('unsharp')
```

```
h = 3×3
   -0.1667   -0.6667   -0.1667
   -0.6667    4.3333   -0.6667
   -0.1667   -0.6667   -0.1667
```

```
J=abs(filter2(h,I));
J1=J/255; % /max(J(:));
imshow(J1)
```



b) Añade ruido gaussiano a la imagen de la figura 31 y a continuación restaura y realza la imagen resultante.

```
I=imread ('bacteria.tif');
J=imnoise(I, 'gaussian' ,0,0.01);
imshow(J),title('ruido gaussiano')
```

ruido gaussiano

```
g=fspecial('average',[5 5])
```

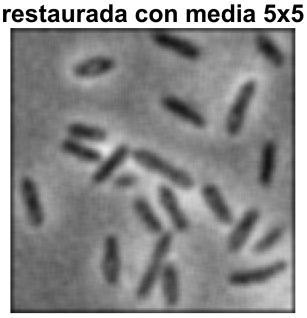
```
g = 5×5
    0.0400    0.0400    0.0400    0.0400    0.0400
    0.0400    0.0400    0.0400    0.0400    0.0400
    0.0400    0.0400    0.0400    0.0400    0.0400
    0.0400    0.0400    0.0400    0.0400    0.0400
    0.0400    0.0400    0.0400    0.0400    0.0400
```

```
M1=filter2(g,J)/255;
h=fspecial('unsharp')
```

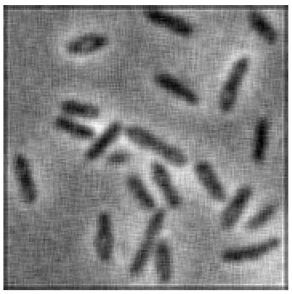
```
h = 3×3
   -0.1667   -0.6667   -0.1667
   -0.6667    4.3333   -0.6667
   -0.1667   -0.6667   -0.1667
```

```
M2=abs(filter2(h,M1));
imshow(M1),title('restaurada con media 5x5'); figure, imshow(M2),title('realzada')
```

restaurada con media 5x5



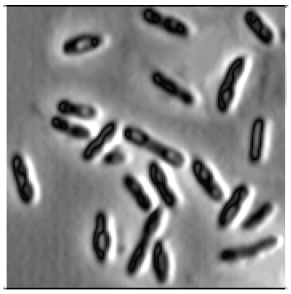
realzada



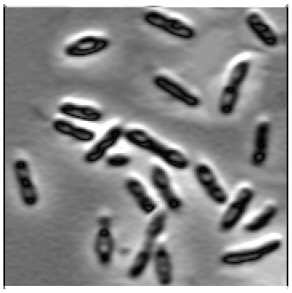
c) Realza la imagen de la figura 26 utilizando un filtro lineal.

```
I=imread('bacteria.tif');
gv=[-1 0 1;-1 1 1; -1 0 1];
gh=[1 1 1;0 1 0; -1 -1 -1];
Jv=abs(filter2(gv,I))/255;
Jh=abs(filter2(gh,I))/255;
imshow(Jv),title('vertical'); figure, imshow(Jh),title('horizontal')
```

vertical

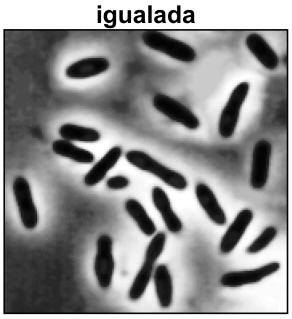


horizontal

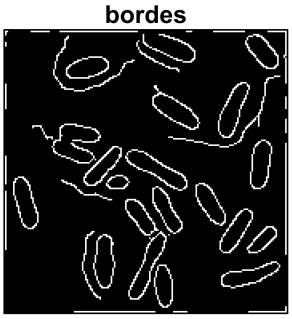


d) Realza la imagen ecualizada de la espina dorsal (figura 22(a)) utilizando la imagen de bordes.

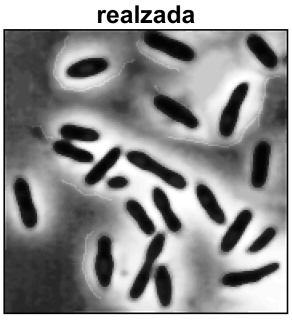
```
I=imread('bacteria.tif');
I=histeq(I);
imshow(I),title('igualada')
```




```
B=edge(I,'canny');
figure, imshow(B),title('bordes')
```




```
R=double(I)/255+0.1*double(B);
figure, imshow(R),title('realzada')
```



e) Mejora la imagen de un insecto (figura 40) realzando sus bordes horizontales.

```
I = imread('BUG.TIF');
gh = [1 1 1; 0 1 0; -1 -1 -1];
Jh = abs(filter2(gh, I)) / 255;
imshow(Jh);
```