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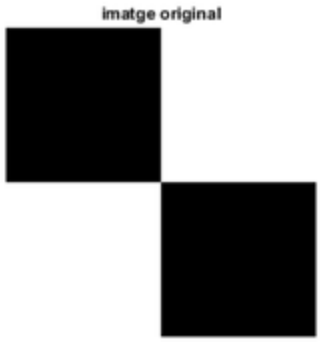
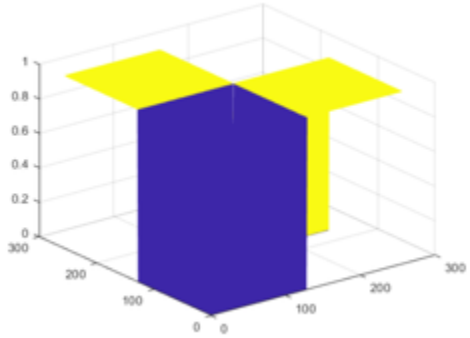
E4

```
im1 = imread('toycars1.png');
im2 = imread('toycars2.png');
im3 = imread('toycars3.png');
subplot(1,3,1), imshow(im1)
subplot(1,3,2), imshow(im2)
subplot(1,3,3), imshow(im3)

res1 = imabsdiff(im1, im2);
res2 = imabsdiff(im1, im3);
figure;
subplot(1,2,1), imshow(res1)
subplot(1,2,2), imshow(res2)

im = ones(256);
im(1:128, 1:128)= 0;
im(129:256, 129:256) = 0;
figure, imshow(im), title('imatge original')
figure, mesh(im)
```

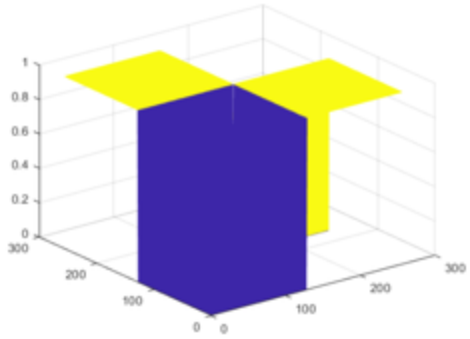


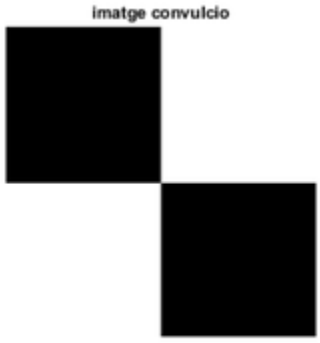


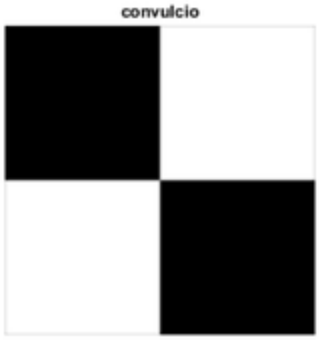
Imatge convulcio

```
im2 = im;
im3 =ones(256);
sum_i = [-1,0, 1;
        -1, 0, 1;
        -1,0, 1];
sum_j = [-1,-1,-1;
        0, 0,  0;
        1, 1, 1];
h=[0,1,0; 1,2,1;0,1,0]/6;
for i = 1:size(im, 1)
 for j = 1:size(im, 2)
     sum_par = 0;
     for k_i =1:3
         for k_j = 1:3
            h_i = i+ sum_i(k_i,K_j);
            h_j = j + sum_j(k_i,k_j);
            if (h_i < 1 || h_i > 256) && h_j >= 1 &&  h_j <= 256 % i fuera de
 rango pero j esta en rango
                sum_par = sum_par + im(i,h_j)* h(k_i,k_j);
            elseif (h_j < 1 || h_j > 256) && h_i >= 1 &&  h_i <= 256 % j fuera
 de rango pero i esta en rango
                sum_par = sum_par + im(h_i,j)*h(k_i,k_j);
            elseif (h_j < 1 || h_j > 256) && (h_i < 1 || h_i > 256) % los 2
 fuera de rango
```

```
                sum_par = sum_par + im(i,j)*h(k_i,k_j);
            else
                sum_par = sum_par + im(h_i,h_j)*h(k_i,k_j);
            end

        end
    end
    im3(i,j) = sum_par;
 end
end

figure, imshow(im3), title('imatge convulcio')

res = imfilter(im2,h);
figure, imshow(res), title('convulcio')
```

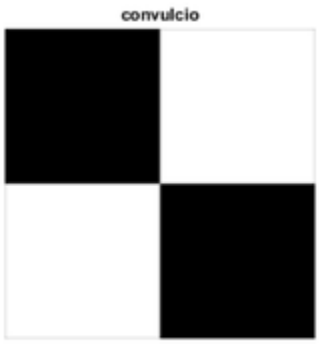






Filter

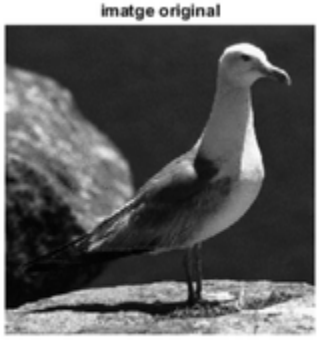
```
h2 = ones(31)/31/31;
res2=imfilter(im,h2);
figure, imshow(res2), title('convolució 31x31')

res3 = imfilter(im,h2, 'replicate');
figure,imshow(res3), title('padding replicat')

im =imread('gull.tif');
figure, imshow(im), title('imatge original')
img = imnoise(im,'gaussian');
figure, imshow(img), title('soroll gaussia')

h=fspecial('gaussian',7,2);
res =imfilter(double(img), h);

imsp=imnoise(im,'salt & pepper');
figure, imshow(imsp), title('soroll s&p')
res2 = imfilter(double(imsp),h);
figure, imshow(res2,[]), title('filtrat gaussià')
```



convolució 31x31

padding replicat

imatge original



soroll gaussia

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