

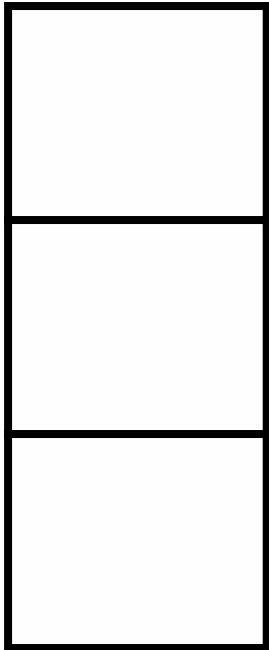
# **Exercises 08**

**Morphological Ops, Convolution and Denoising (1600)**

1- Apply the kernel to the image with erosion method. Use Zero-Padding method for padding. (200 points)



Original Image (4 x 5 )

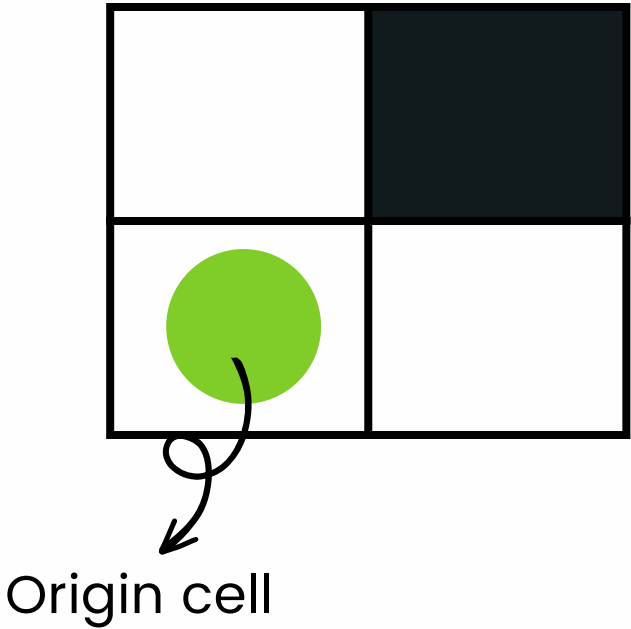


Kernel (3x1)

2- Apply the kernel to the image with dilation method. Use Zero-Padding method for padding. (200 points)



Original Image (3 x 4 )



Kernel (2x2)

**3-Convolve the following image with Gaussian kernel (3x3), use Zero-Padding. (200 points)**

50	60	90	0	0
18	95	20	36	0
8	10	1	0	0
6	20	40	20	80
3	0	0	15	0

Original Image

4-Apply the Median kernel (3x3) on the following image, using Zero-Padding. (400 points)

50	60	90	0	0
18	95	20	36	0
8	10	1	0	0
6	20	40	20	80
3	0	0	15	0

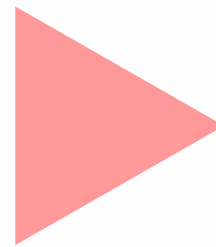
Original Image



Use contrast enhancement ways and Denoising methods to enhance the following noisy image to the output image. Use both input images for denoising, and compare 'jpg' and 'png' formats! (The pictures are available in the questions folder) (600)



**noisy image**



**output image**