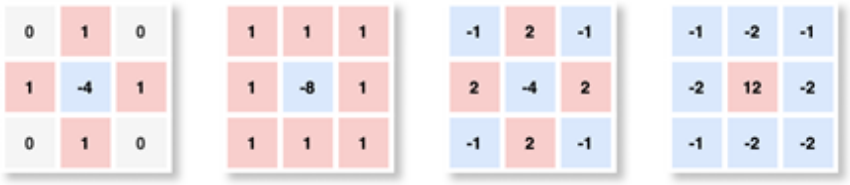
LAB SHEET 3

Digital Filters

1. Download some images from google and convert them to grayscale.
2. Implement the following filters and convolve the images with each of these filters. [Hint: You may use cv2.filter2D].
    a. Mean filter
    b. Median filter
    c. Max filter
    d. Min filter
    e. Gaussian filter
    f. Laplacian filter
3. Perform following experiments and note down the results.
    a. Apply an edge detector to the image and observe the intensity of the resulting output. Subsequently, employ a 3×3 mean filter on the initial image and reapply the edge detector. Comment on the difference. Investigate the effects of using a 5×5 or a 7×7 filter in this context.
    b. Assess the comparative speed of mean and median filters when employing identical-sized neighbourhoods and images. Analyse how the efficiency of each filter is influenced by variations in the image size and the size of the neighbourhood.
    c. Experiment with the Gaussian filter using various sigma values and evaluate each one on the basis of noise removal and preservation of image details.
    d. Apply following Laplacian filters over the image and compare the results.



What will happen if the kernel weights are negated?