

# Homework 5

Q1

(A)

Apply smoothing using Mask

	1	1	1
$x_9$	1	1	1
	1	1	1

We get result image as.

	$x=1$	$x=2$	$x=3$	$x=4$	$x=5$
$y=2$	0	3	6	9	9
$y=3$	0	3	6	9	9
$y=4$	0	3	6	9	9

(B)

Applying median filtering

Given Mask  $\rightarrow$

		X	
X	X	X	
		X	

	$x=1$	$x=2$	$x=3$	$x=4$	$x=5$
$y=2$	0	0	9	9	9
$y=3$	0	0	9	9	9
$y=4$	0	0	9	9	9

③ - for given picture we have.

$$\Delta_1 = \begin{bmatrix} -1 & 0 & 1 \\ -2 & 0 & 2 \\ -1 & 0 & 1 \end{bmatrix}$$

In original image.

	$x=1$	$x=2$	$x=3$	$x=4$	$x=5$
$y=2$	0	0	9	9	9
$y=3$	0	0	9	9	9
$y=4$	0	0	9	9	9

After applying sobel operator for vertical gradient we get.

	$x=1$	$x=2$	$x=3$	$x=4$	$x=5$
$y=2$	0	0	36	0	0
$y=3$	0	36	36	0	0
$y=4$	0	36	36	0	0

Thus we get a vertical edge between  $x=2$  &  $x=3$

If we apply.

$$\Delta_2 = \begin{bmatrix} -1 & -2 & -1 \\ 0 & 0 & 0 \\ 1 & 2 & 1 \end{bmatrix}$$



we get

	$x=1$	$x=2$	$x=3$	$x=4$	$x=5$
$y=2$	0	0	0	0	0
$y=3$	0	0	0	0	0
$y=4$	0	0	0	0	0

Thus no horizontal edge is detected.