Example

f(x)	10	15	10	20	25	10	20	20	20
f'(x)	0	5	-5	10	5	-15	10	0	0
f''(x)	0	5	-10	15	-5	-20	25	-10	0

- Derivative Mask
  - Backward difference [-1 1]
  - Forward difference[1 -1]
  - Centre Difference[-1 0 1]

By Backward difference
$= 1 * 15 + (-1) * 10$

Derivative of Images (2D)

- Derivative filters

$$h_x = \frac{1}{3}\begin{bmatrix} -1 & 0 & 1 \\ -1 & 0 & 1 \\ -1 & 0 & 1 \end{bmatrix} \qquad h_y = \frac{1}{3}\begin{bmatrix} 1 & 1 & 1 \\ 0 & 0 & 0 \\ -1 & -1 & -1 \end{bmatrix}$$

$$F = \begin{bmatrix} 10 & 10 & 20 & 20 & 20 \\ 10 & 10 & 20 & 20 & 20 \\ 10 & 10 & 20 & 20 & 20 \\ 10 & 10 & 20 & 20 & 20 \\ 10 & 10 & 20 & 20 & 20 \end{bmatrix} \qquad F_x = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 10 & 10 & 0 & 0 \\ 0 & 10 & 10 & 0 & 0 \\ 0 & 10 & 10 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$