Input Image ⇒

$$\begin{bmatrix} 1 & 2 & 3 & 2 & 2 & 1 & 0 \\ 3 & 2 & 1 & 4 & 1 & 1 & 1 \\ 2 & 1 & 3 & 2 & 1 & 0 & 1 \\ 5 & 3 & 1 & 1 & 0 & 1 & 1 \\ 2 & 1 & 0 & 0 & 1 & 2 & 3 \\ 1 & 2 & 3 & 4 & 5 & 0 & 0 \\ 2 & 1 & 0 & 0 & 0 & 1 & 1 \end{bmatrix}_{7\times 7}$$

Kernal / filter = $\begin{bmatrix} 3 & 4 & 2 \\ 1 & 0 & 1 \\ -1 & 1 & 2 \end{bmatrix}$

Input size = 7×7. Stride = 1.

Kernal size = 3×3.

Output size :

$$\text{o/p height} = \frac{\text{input height} - \text{kernal height}}{\text{Stride}}$$

$$= \frac{7-3}{1} = 5.$$

$$\text{o/p width} = \frac{\text{input width} - \text{kernal width}}{\text{Stride}}$$

$$= \frac{7-3}{1} = 5.$$

total no. of receptive fields.

= output height × output width

= 5×5

= 25.

Output feature map:

First depth:

$$\begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \\ 2 & 1 & 3 \end{bmatrix} \begin{bmatrix} 3 & 4 & 2 \\ 1 & 0 & 1 \\ -1 & 1 & 2 \end{bmatrix}$$

$= (1\times3) + (2\times4) + (3\times2)$ .... weight $\Rightarrow$

$$\begin{bmatrix} 3 & 8 & 6 \\ 3 & 0 & 1 \\ -2 & 1 & 6 \end{bmatrix} \Rightarrow 3+8+6+3+0+1-2+1+6$$

$= 26.$

Second depth:

$$\begin{bmatrix} 2 & 3 & 2 \\ 2 & 1 & 4 \\ 1 & 3 & 2 \end{bmatrix} \begin{bmatrix} 3 & 4 & 2 \\ 1 & 0 & 1 \\ -1 & 1 & 2 \end{bmatrix} = \begin{bmatrix} 6 & 12 & 4 \\ 2 & 0 & 4 \\ -1 & 3 & 4 \end{bmatrix}$$

$= 34$

Similarly $\Rightarrow$

$$\begin{bmatrix} 26 & 34 & 24 & 20 & 13 \\ 24 & 21 & 25 & 21 & 14 \\ 21 & 22 & 22 & 17 & 13 \\ 38 & 25 & 21 & 9 & 4 \\ 13 & 8 & 11 & 14 & 26 \end{bmatrix}_{5\times5}$$

Max pooling:

$$\begin{bmatrix} 34 & 34 & 25 & 21 \\ 24 & 25 & 25 & 21 \\ 38 & 25 & 22 & 17 \\ 38 & 25 & 21 & 26 \end{bmatrix}_{4\times4}$$

(OR)

First max pooling operation:

$$\begin{bmatrix} 26 & 34 \\ 24 & 21 \end{bmatrix}$$ max. value = 34

Second Max. pooling:

$$\begin{bmatrix} 24 & 20 \\ 25 & 21 \end{bmatrix} \Rightarrow$$ max value = 25.

third max pooling:

$$\begin{bmatrix} 21 & 22 \\ 38 & 25 \end{bmatrix}$$ max value = 38

fourth Max pooling:-

$$\begin{bmatrix} 22 & 17 \\ 21 & 9 \end{bmatrix}$$ max value = 22.

final max. pooled feature map ⇒

$$\begin{bmatrix} 34 & 25 \\ 38 & 22 \end{bmatrix}_{2\times2}$$