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Question-3

① The Dimensions of the Input (x) = 6 × 6 and the kernel or filter (f) = 3 × 3. The number of parameters are 9

$$X = \begin{bmatrix} 7 & 5 & 0 & 0 & 3 & 2 \\ 6 & 4 & 5 & 1 & 4 & 8 \\ 9 & 0 & 2 & 2 & 5 & 4 \\ 6 & 3 & 4 & 7 & 9 & 8 \\ 5 & 7 & 5 & 6 & 9 & 0 \\ 7 & 9 & 0 & 8 & 2 & 3 \end{bmatrix}$$

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

② $C = ((n - f + 2p)/S) + 1$

Where,

c = the size of the Convoluted Matrix
n = size of the Input Matrix
f = size of the filter Matrix
p = padding amount
S = Stride applied

Here, $n = 6, f = 3, p = 0, S = 1$

$$C = ((6 - 3 + 2 \times 0)/1) + 1 = 4$$

$$\begin{bmatrix} 18 & 9 & -4 & -18 \\ 17 & -3 & -10 & -12 \\ 11 & -9 & -17 & 2 \\ 9 & -1 & -15 & 16 \end{bmatrix} \Rightarrow \text{Output Matrix}$$

Therefore, the Size of Convoluted matrix is 4×4

③ Max pooling means selecting the maximum Value

filter 3×3 and stride is 1 and so, the size of resultant matrix is

max (18, 9, -4, 17, -3, -10, 11, -9, -17)

= 18

$$\Rightarrow \begin{bmatrix} 18 & 9 \\ 17 & 16 \end{bmatrix}$$