

P.246 (5-1)

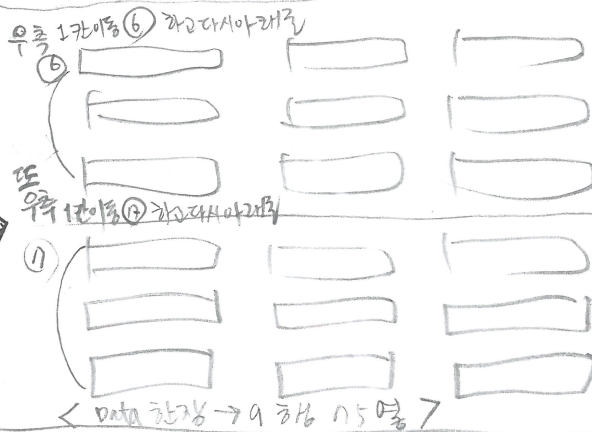
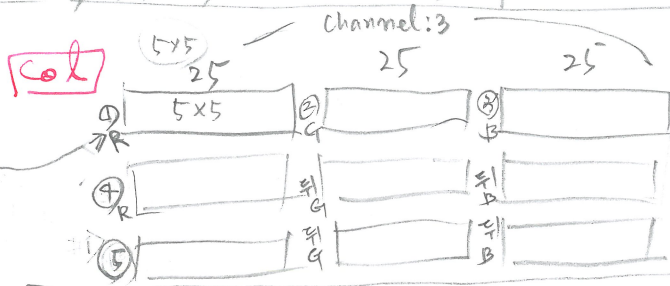
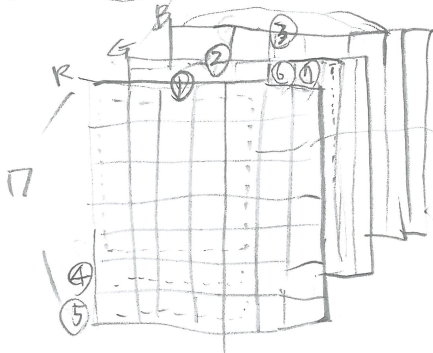
channel 3

< SKK_Simple_Convolution - p.246 >

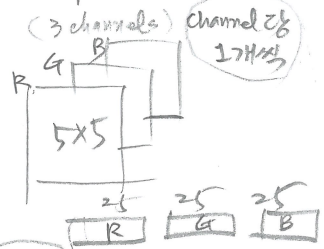
참고

$X = \text{np.random.rand}(10, 3, 1, 1)$ # data 10개

$\text{Col} = \text{im2col}(X, 5, 5, \text{stride}=1, \text{pad}=0)$



Filters



< Input Data 28x28 >

< SKK_Simple_Convolution - P.246_1_data.py >

< Input Data 10개 > $\text{col} = 90$ 개 175열. [Data p.245 하단]

$W = \text{np.random.rand}(5, 3, 5, 5)$ # Filters.

$\text{col}_w = \text{self.W.reshape}(\text{FN}, -1).T$
 $= W.reshape(5, -1).T$ $(175, 5)$
 $(5, 3, 5, 5) \rightarrow 375 \rightarrow (5, -1) = 375$ $(5, 175) \rightarrow (5, 175)$

Filter 1개당 $(90, 175) \times (175, 1)$

Filter 개수 5개당 $(5, 175)T$

$(90, 175) \times (175, 5)$

$\text{out} = \text{np.dot}(\text{col}, \text{col}_w) + \text{self.b}$
 $(90, 175) \times (175, 5) = (90, 5)$

$\text{out} = \text{out.reshape}(N, \text{out_h}, \text{out_w}, -1).transpose(0, 3, 1, 2)$

3개 3개씩 묶어서 10개씩 22개씩 제곱하기만은 5개씩

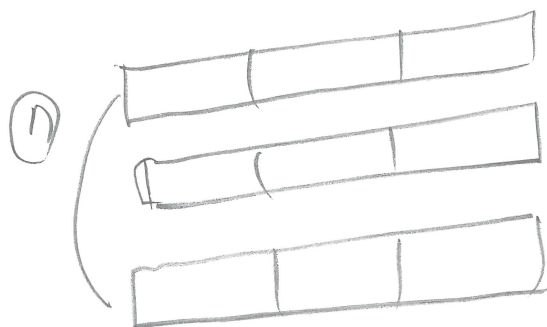
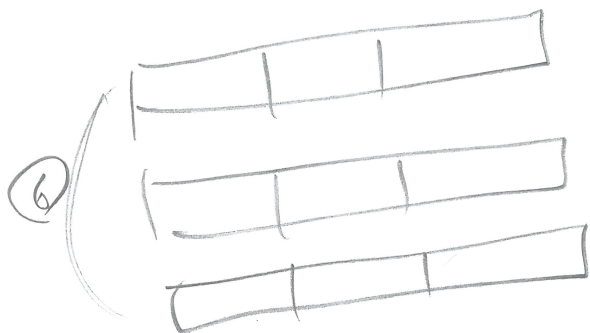
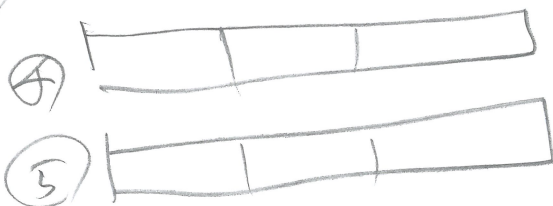
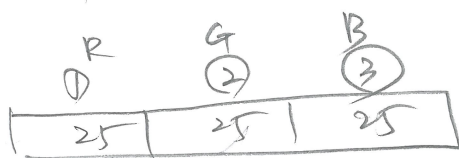
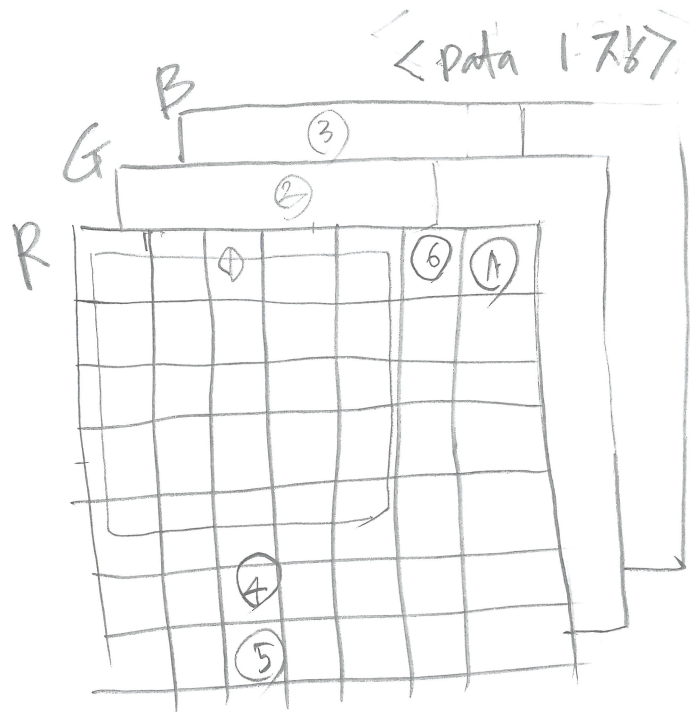
$(10, 5, 3, 3) \rightarrow 3 \times 3$ 자리를 5개씩 10개씩



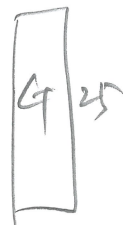
아래로 5개씩 Total 10개

아래로 5개씩 10개

< Convolution Forward - 1 >

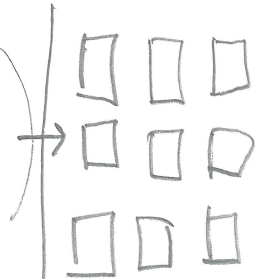


<Filter 1st>



⊗

(138 158)T



4

938 158 ⊗ 158 138

= 938 138

<Convolution Forward -2>