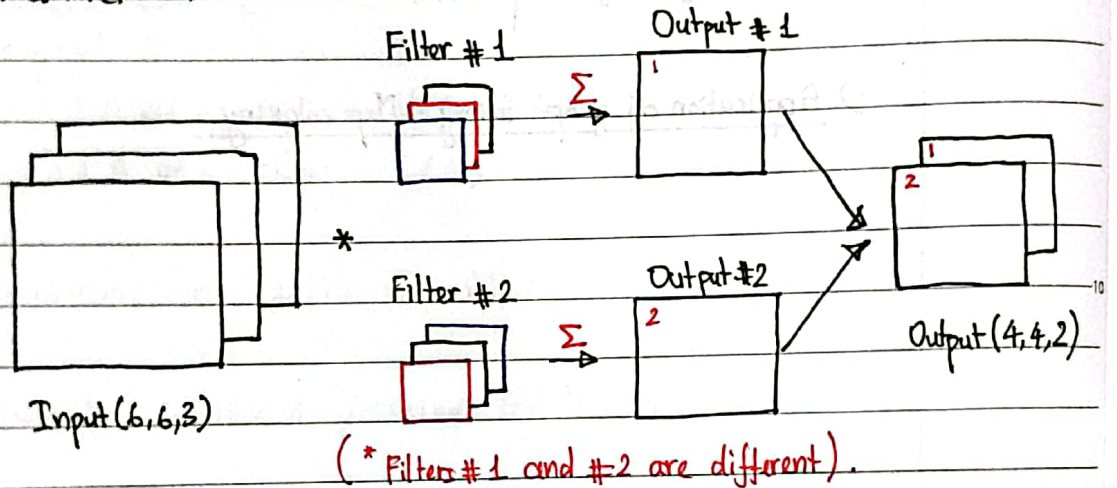




## Difference between Depth-wise & Regular Convolution.

### ① Regular Convolution:

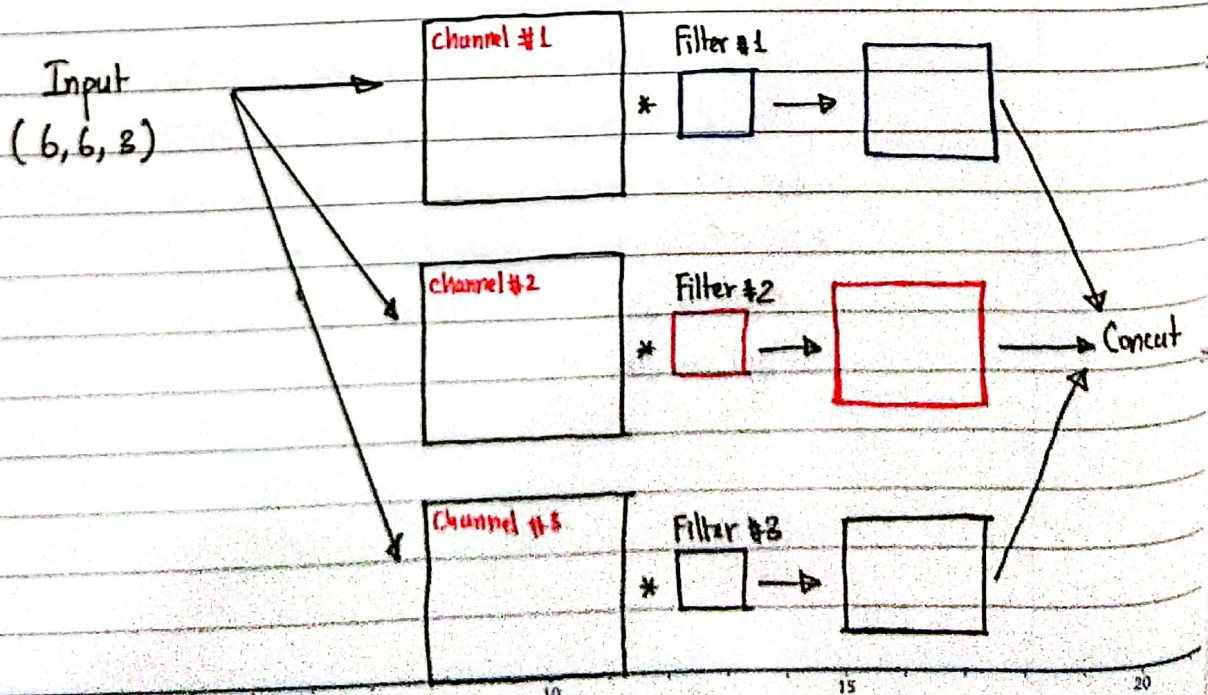
↳ Suppose we have  $(6, 6, 3)$  input with  $3 \times 3$  kernel size and output channel = 2:



### ② Depth-wise Convolution.

↳ Depth-wise convolution separates the input channels out and performs convolution separately on each channel then stacks the output back.

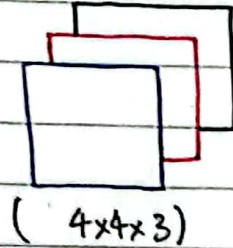
↳ Depth-wise cannot output a specific number of channels so it's usually followed by a point-wise convolution ( $1 \times 1$  regular conv).



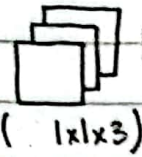


↳ Point-wise convolution:

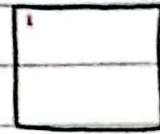
(Depth-wise conv  
output)



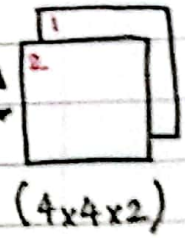
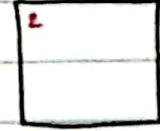
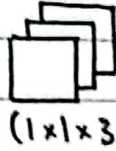
\*



Filter #1



Filter #2



↳ The main advantage of Depth-wise convolution is that it uses considerably less parameters than regular convolution → Efficiency!