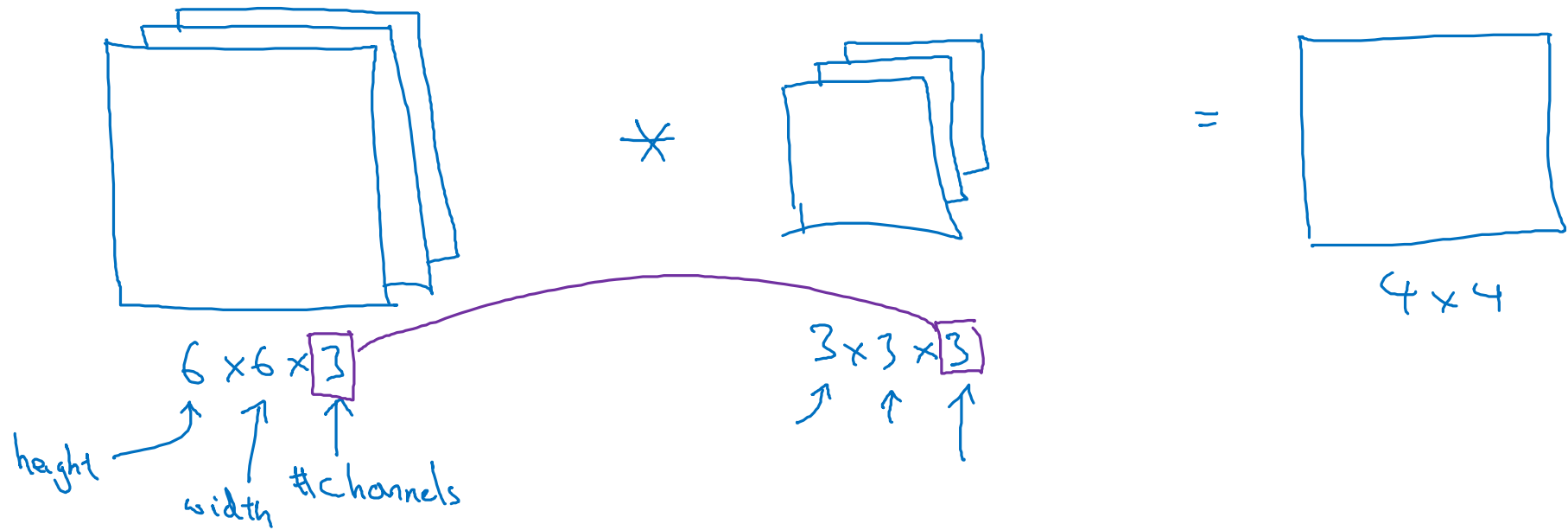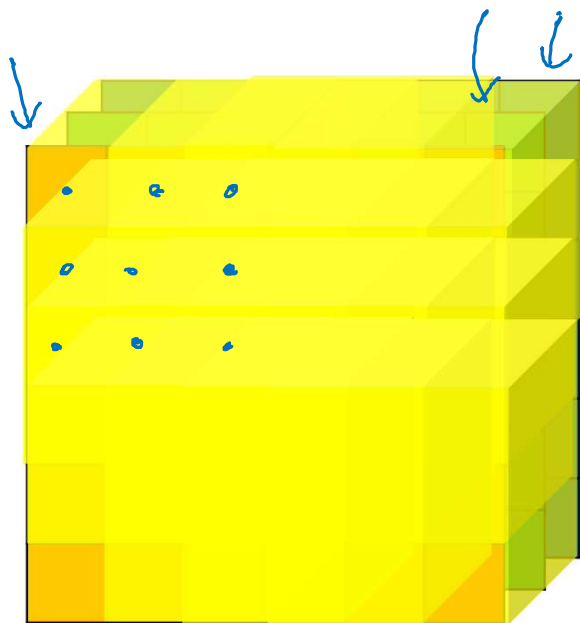Convolutional
Neural Networks

Convolutions over
volumes

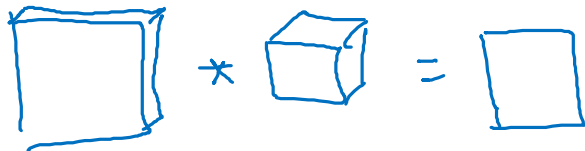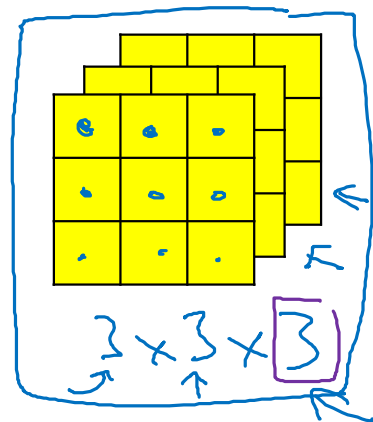# Convolutions on RGB images

$6 \times 6 \times 3$

height
width
#channels

$*$

$3 \times 3 \times 3$

$=$

4×4

Convolutions on RGB image

$6 \times 6 \times \boxed{3}$

$3 \times 3 \times \boxed{3}$

27 numbers

4 x 4

$\rightarrow 3 \times 3 \times 3$

$\rightarrow 3 + 3 + 3$

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Multiple filters

$6 \times 6 \times 3$

channels

Vertical edge

$3 \times 3 \times 3$

horizontal edge

$3 \times 3 \times 3$

$*$

$=$

4×4

$4 \times 4 \times 2$

$4 \times 4 \times 2$

4×4
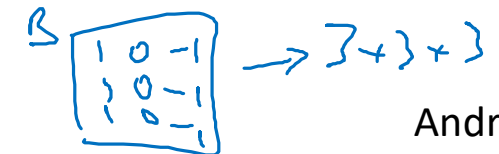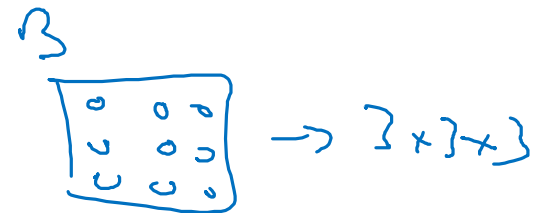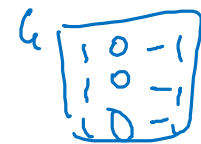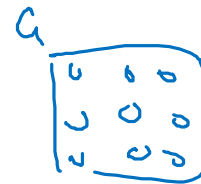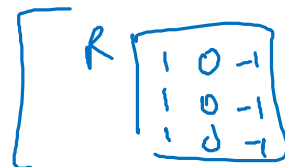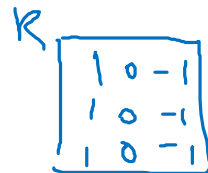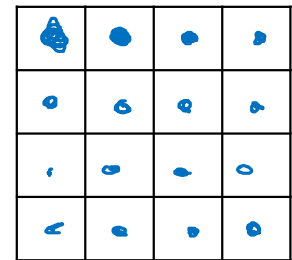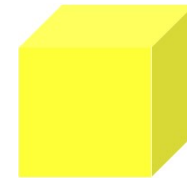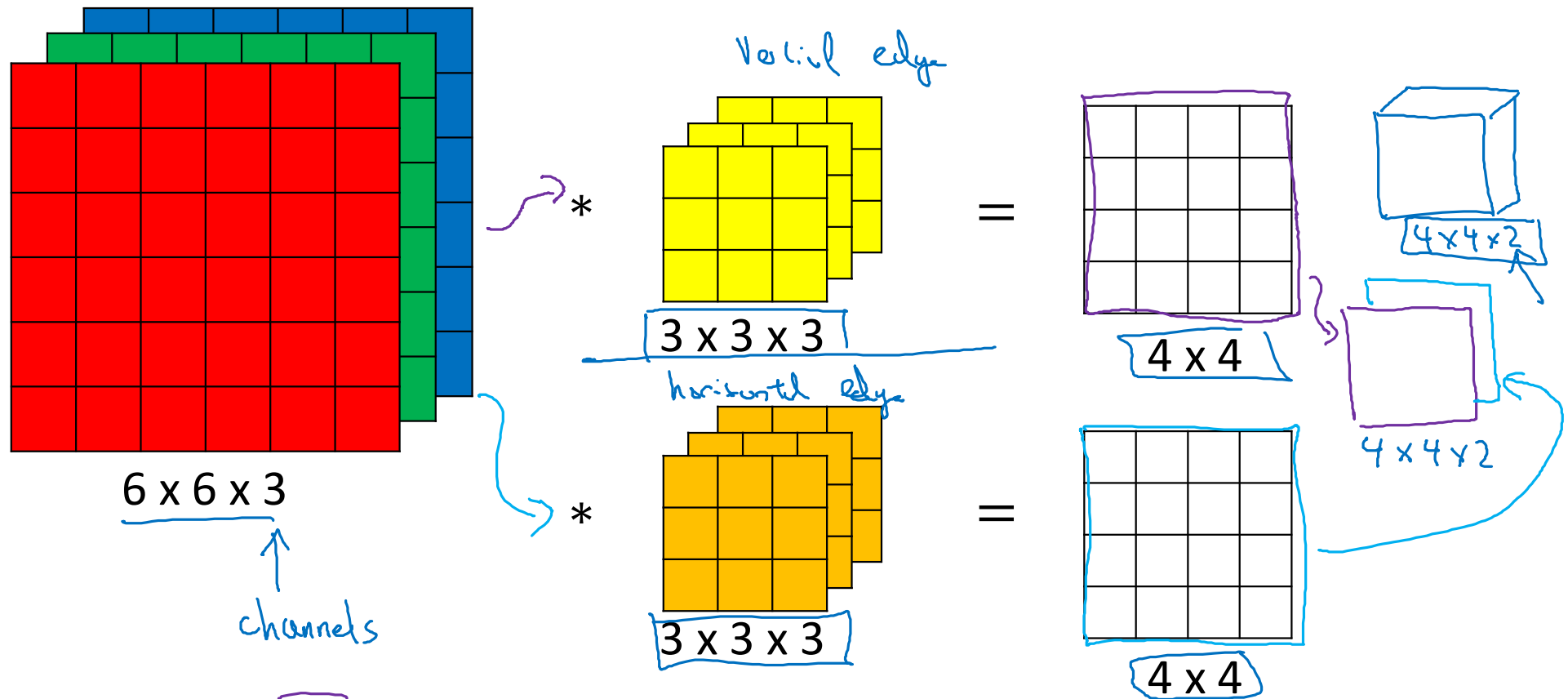
Summary: $n \times n \times \boxed{n_c}$ $*$ $f \times f \times \boxed{n_c}$ $\rightarrow$ $\frac{n-f+1}{4} \times \frac{n-f+1}{4} \times n_c'$

$6 \times 6 \times 3$ $3 \times 3 \times 3$ $4 \times 4 \times 2$ #filters

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