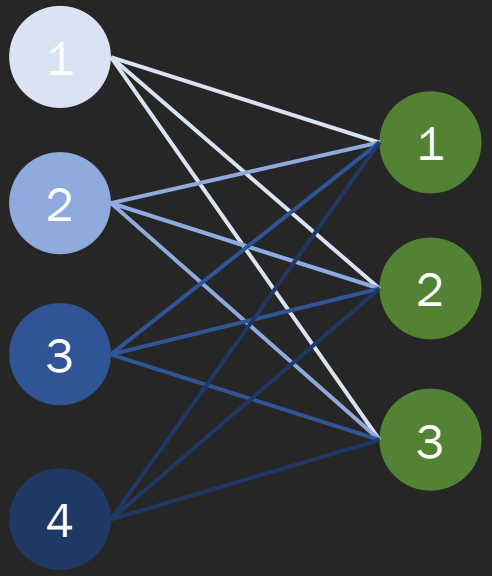
Deep Learning

Or why you should just ask a computer to figure it out.

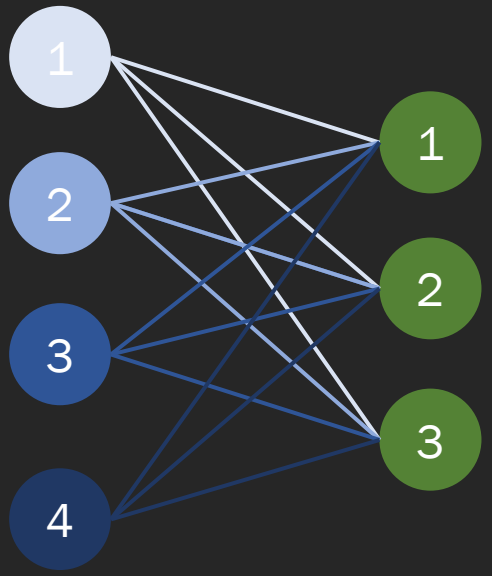
Convolutions

Linear Layers

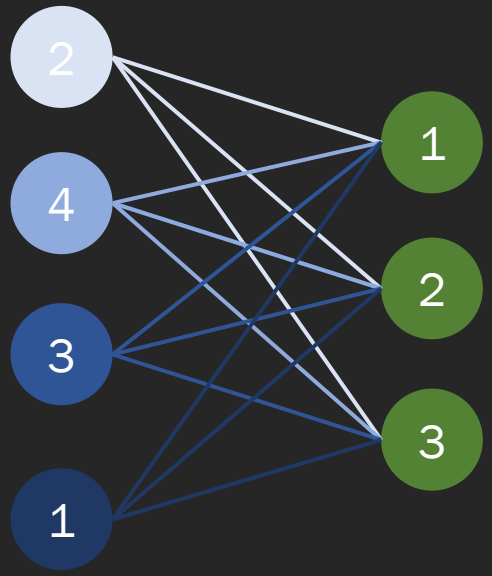


Convolutions

Linear Layers



Does changing
the order matter?

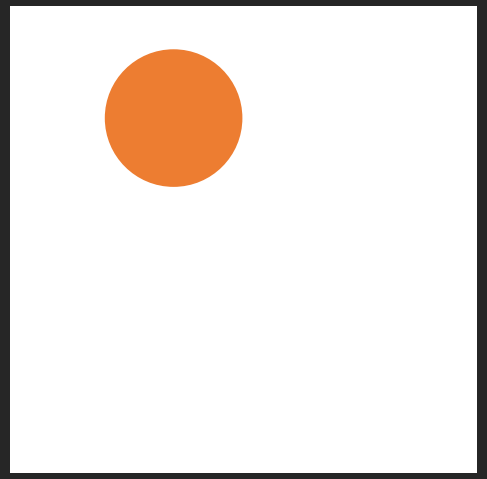


Convolutions

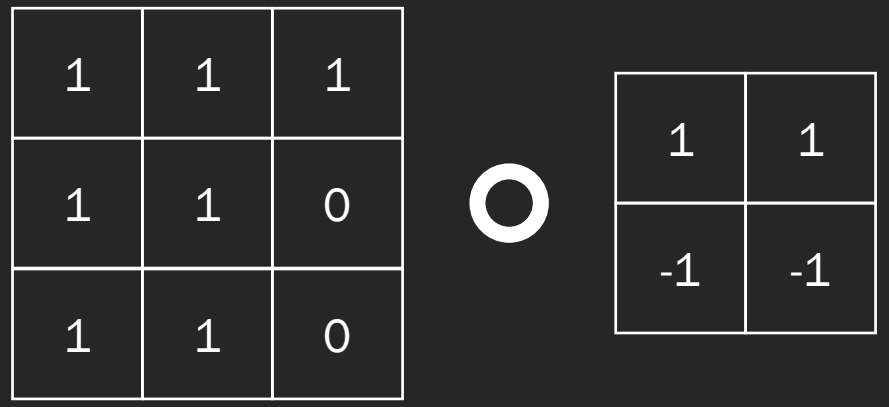
Translation
invariance

Convolutions

Locality

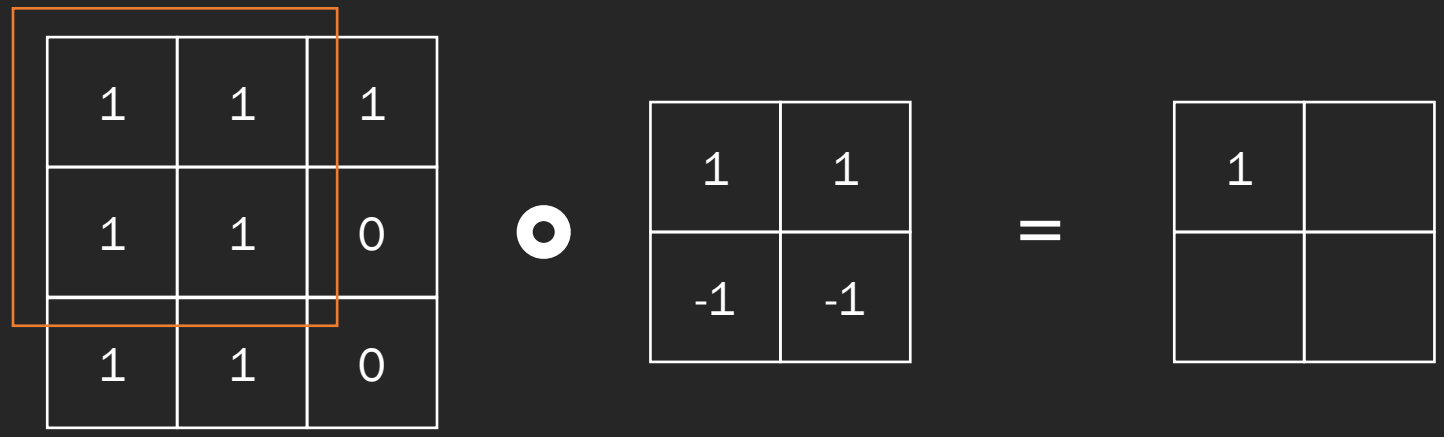


Convolutions



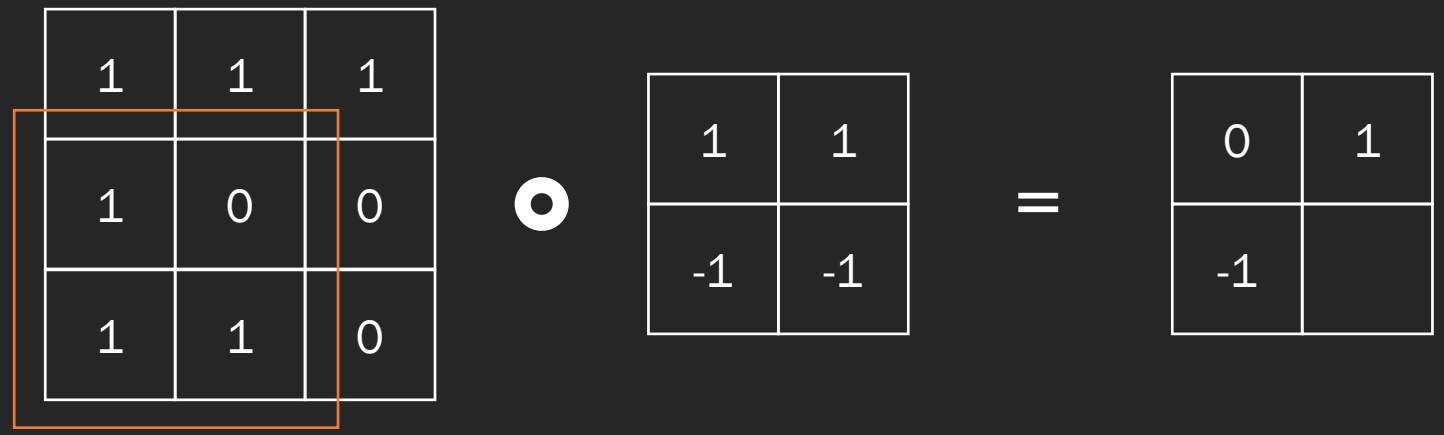
Elementwise multiplication and then summation

Convolutions



Convolutions

Convolutions

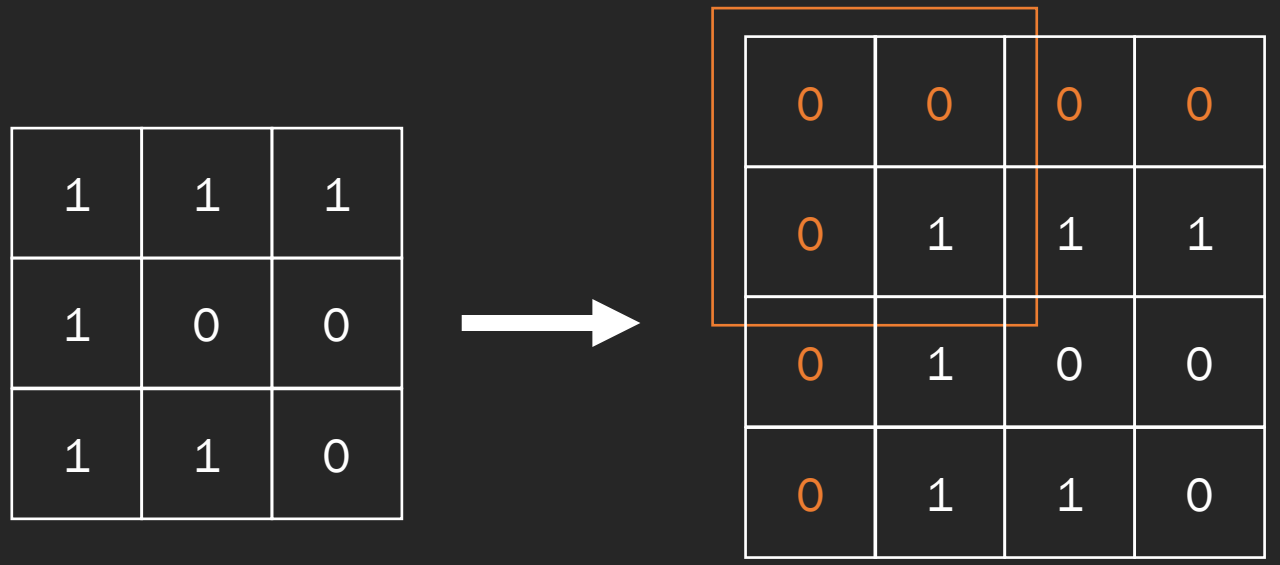


Convolutions

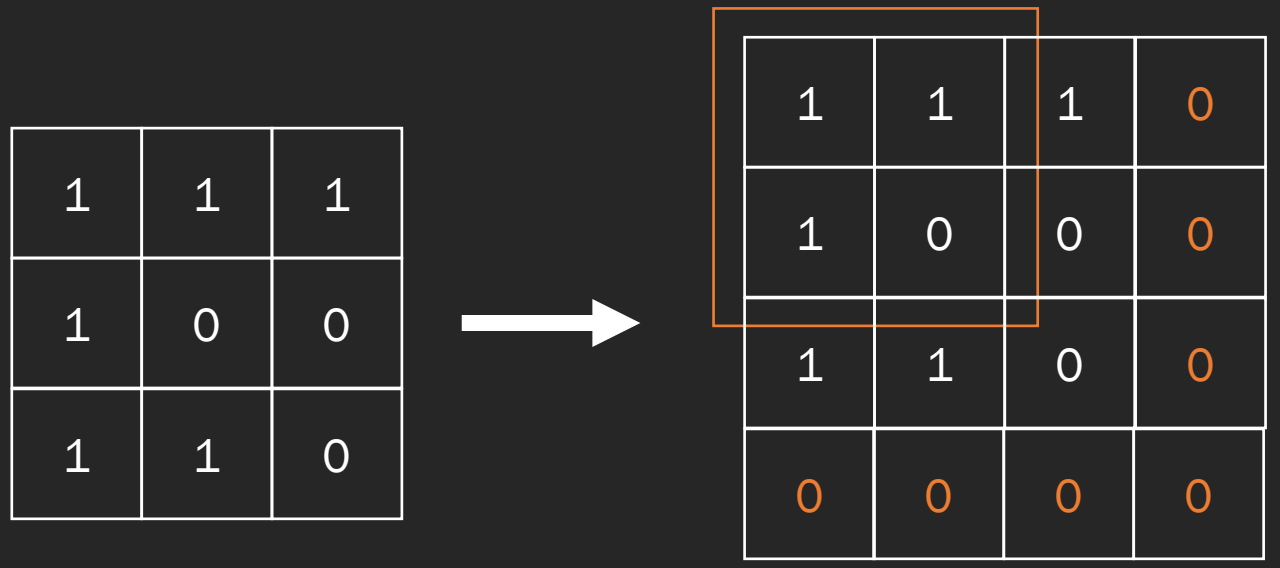
An excellent visualization

https://setosa.io/ev/image-kernels/

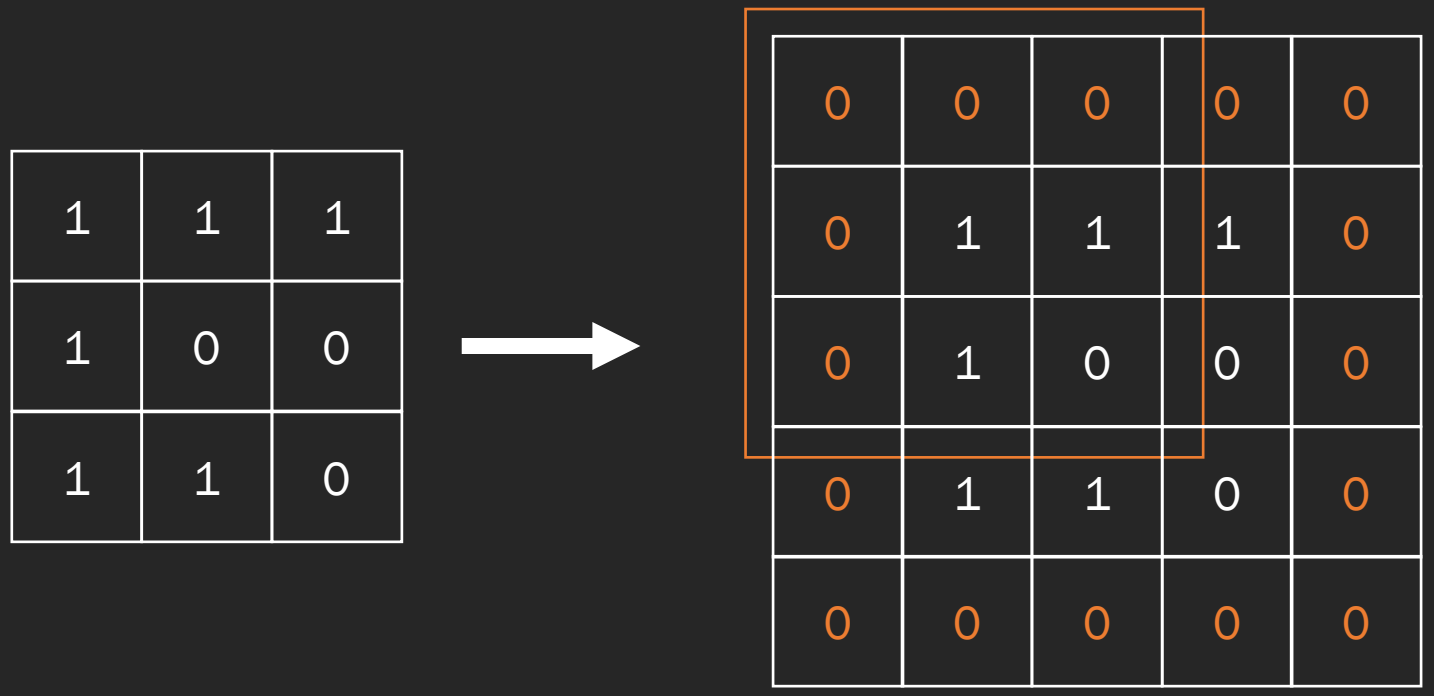
Padding



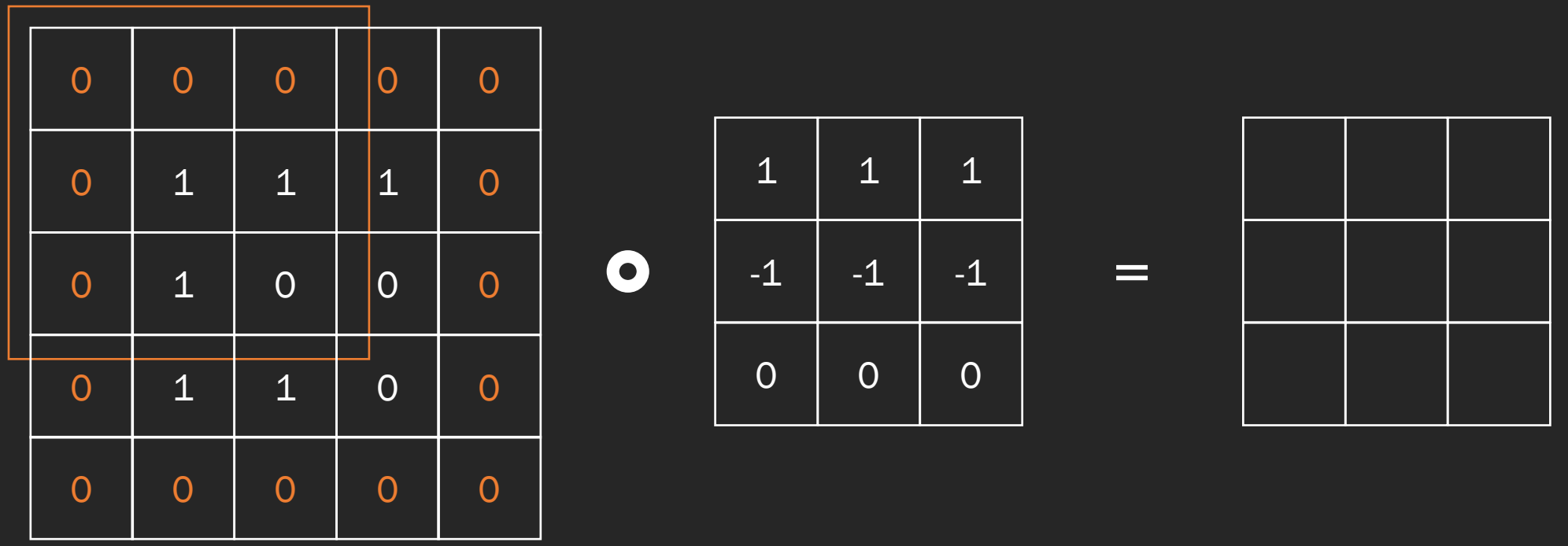
Padding



Padding

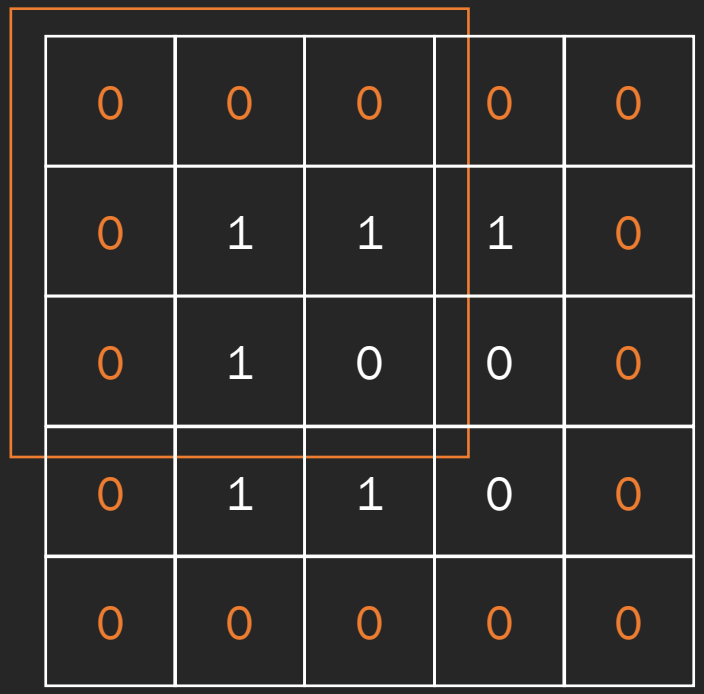


Padding

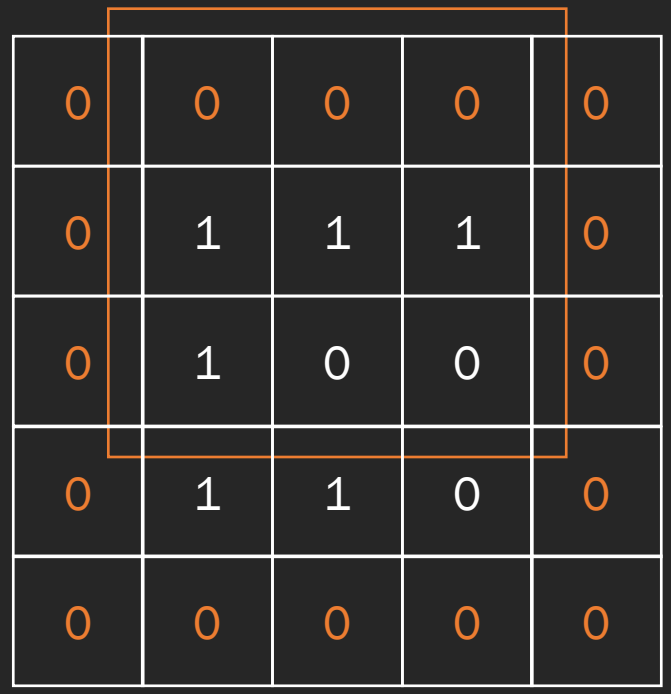


Stride

How much to move the kernel?



Step 1

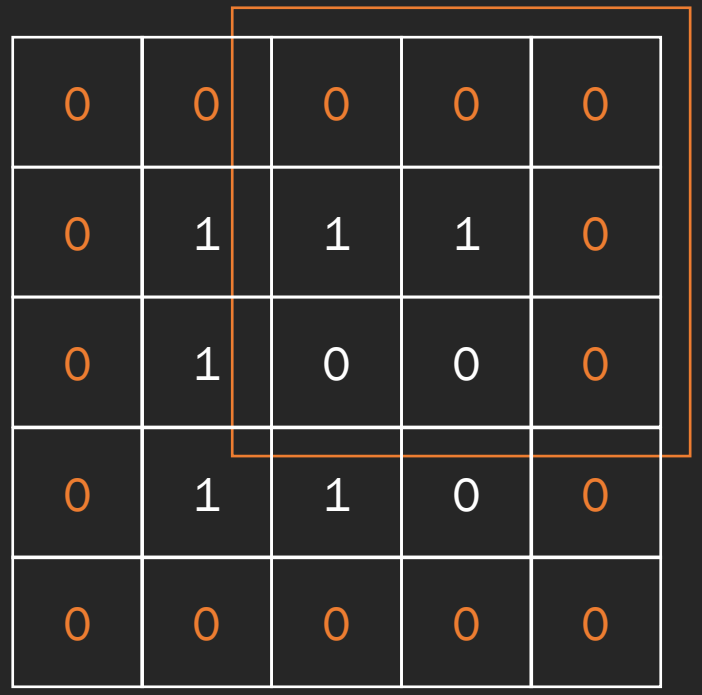


Step 2

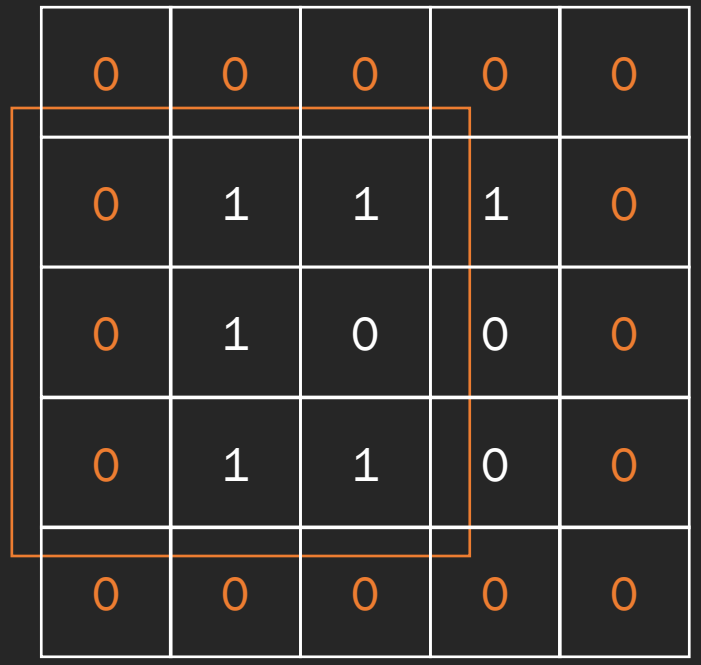
Stride 1

Stride

How much to move the kernel?



Step 3

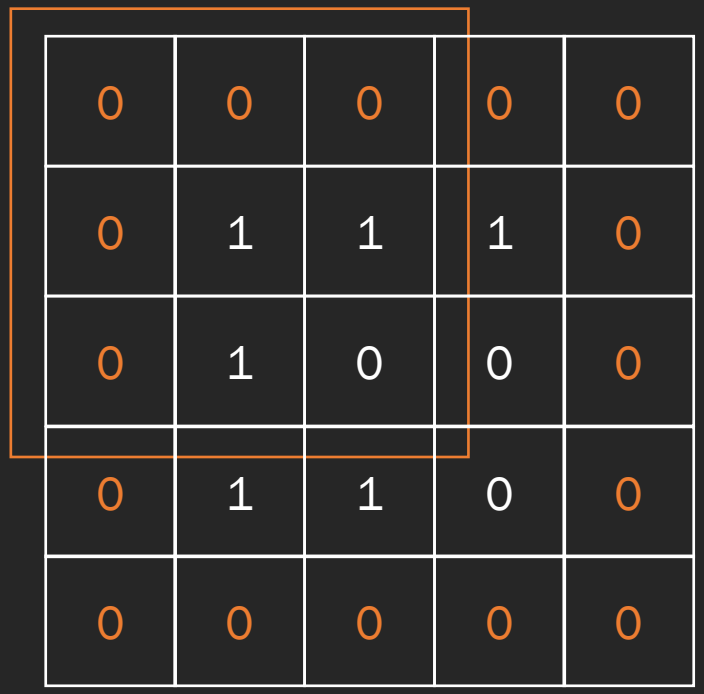


Step 4

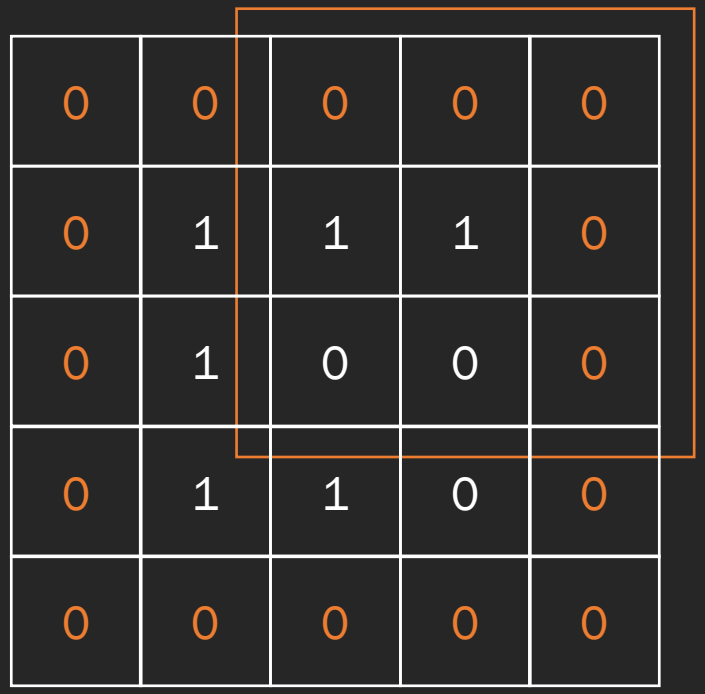
Stride 1

Stride

How much to move the kernel?



Step 1

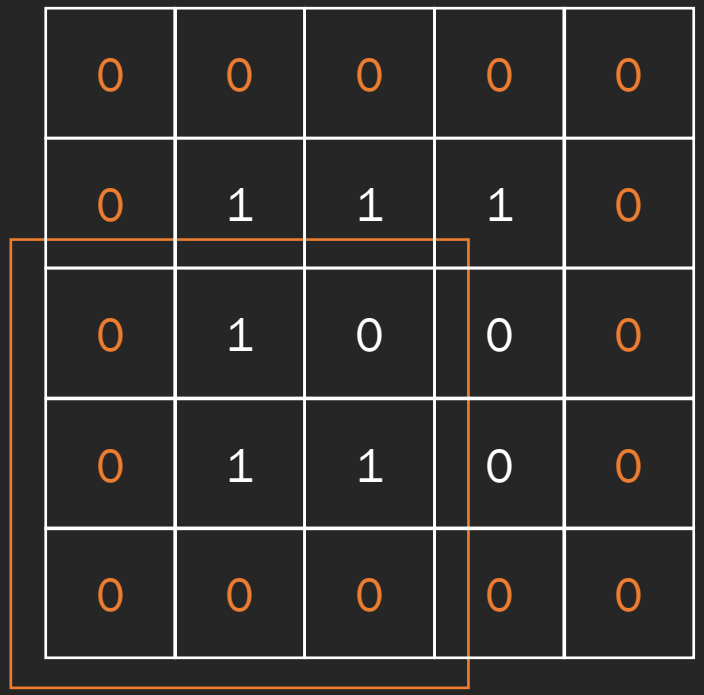


Step 2

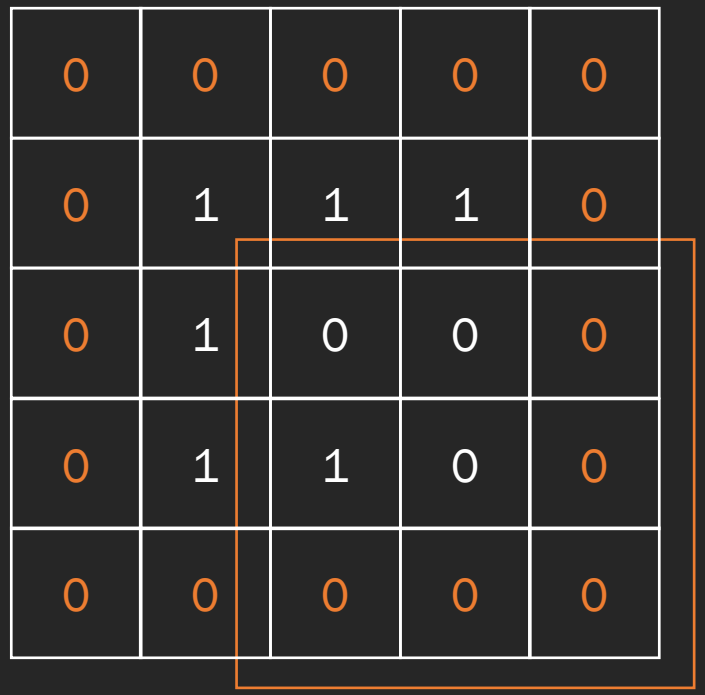
Stride 2

Stride

How much to move the kernel?



Step 3

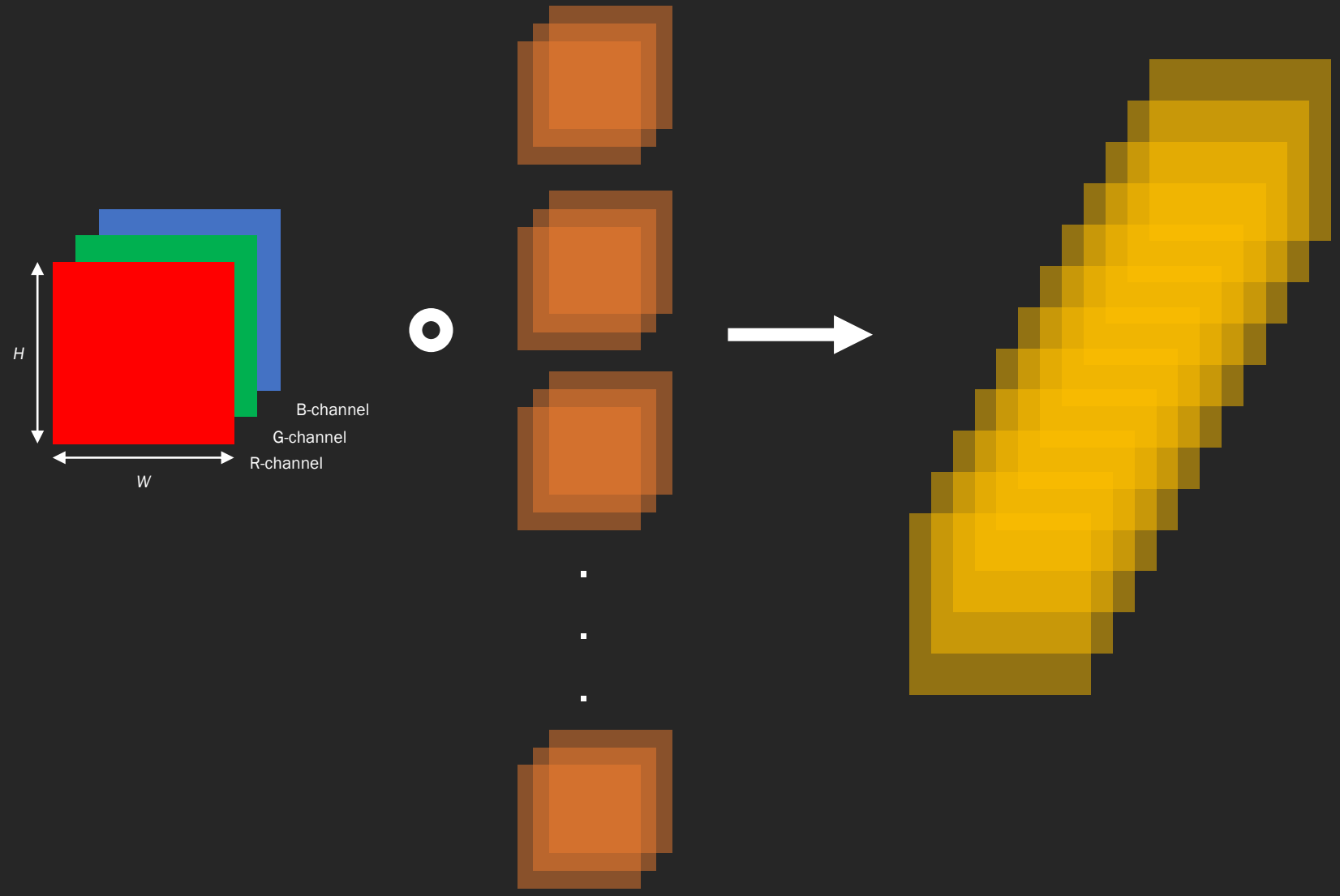


Step 4

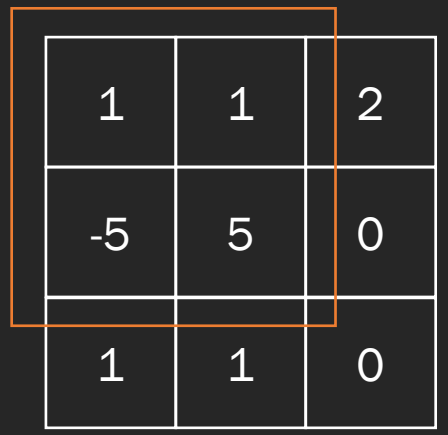
Stride 2

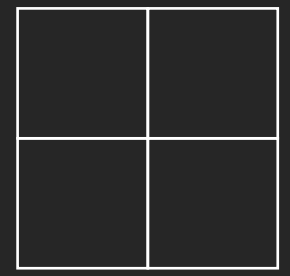
Channels are the new nodes

Channels are the new nodes

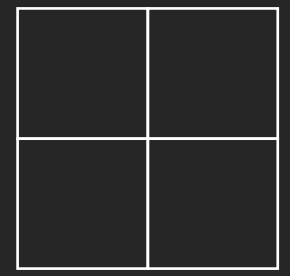


Pooling



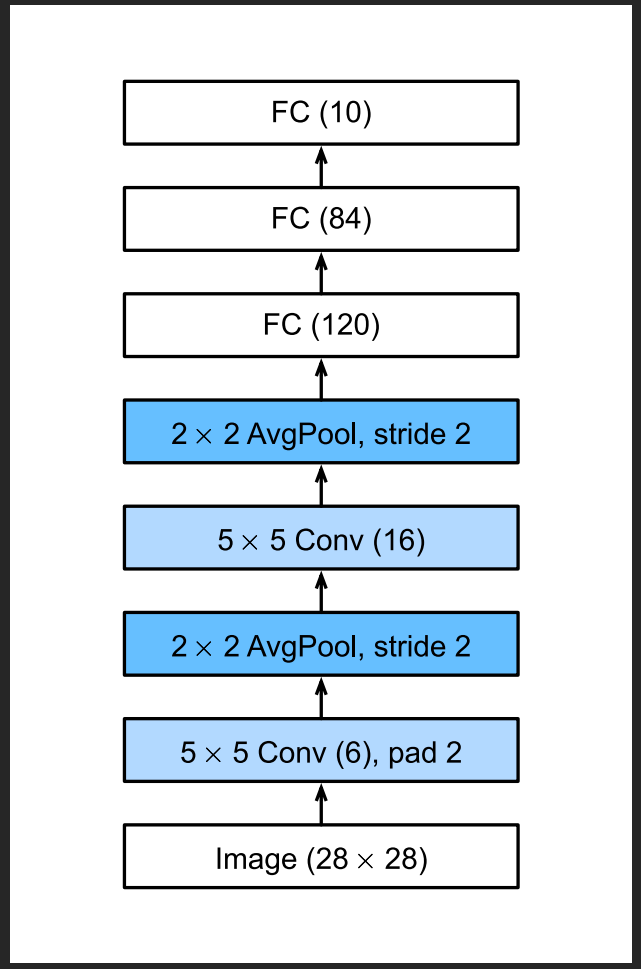


Average



Max

LeNet



Source: d2l.ai