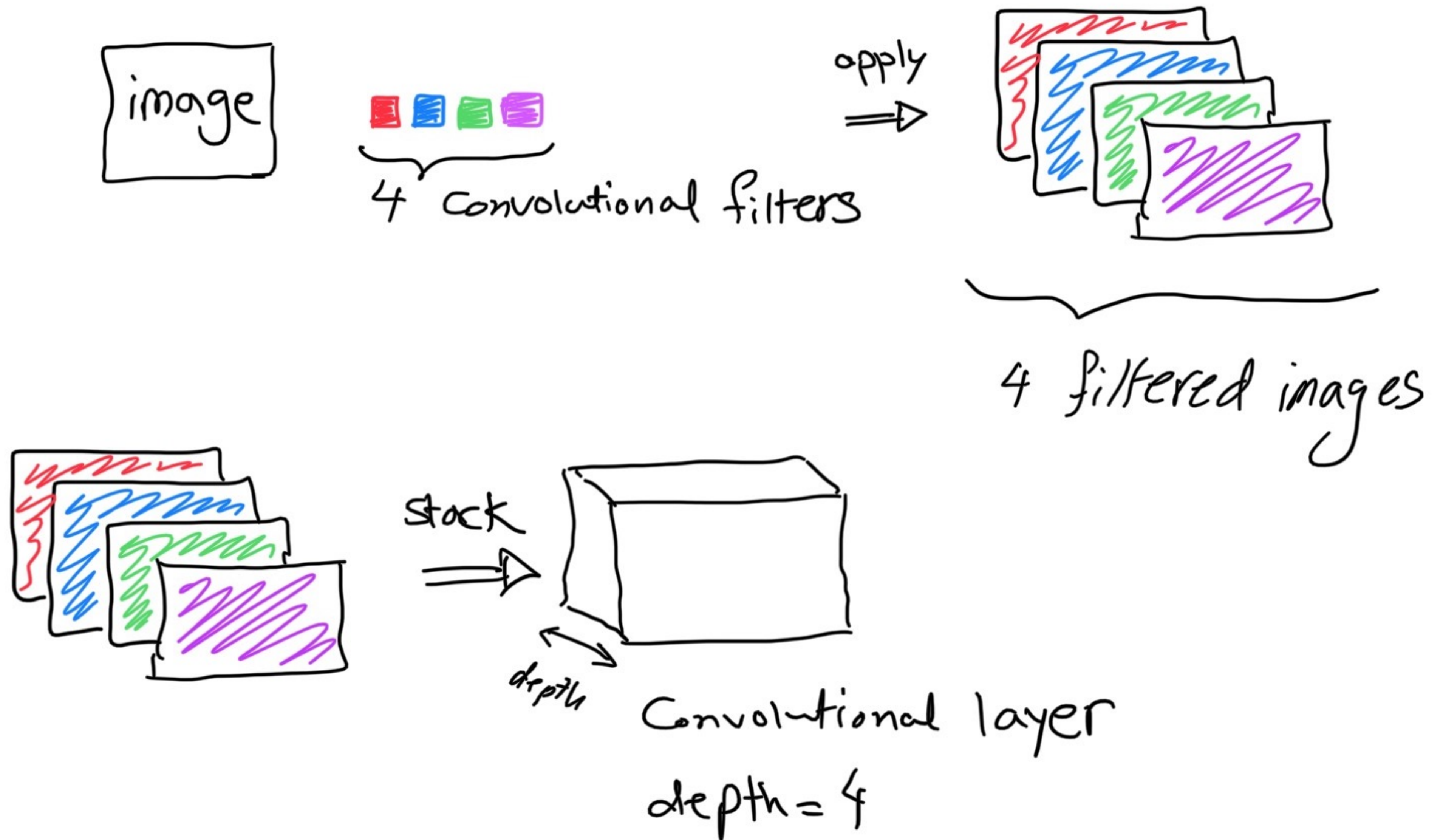


Overview of a Convolutional Layer



As we learn, our goal is to find good weights for filters.

Number of Parameters in a Conv layer

- $\text{out_channels} = K$
- $\text{kernel_size} = F$
- last value in input_shape tuple = D_{in}
 - ↓
 - 1 for B/W
 - 3 for RGB

$$\underbrace{K}_{\substack{\downarrow \\ \text{\# filters}}} \times \underbrace{F \times F \times D_{\text{in}}}_{\substack{\text{weights per filter}}} + \underbrace{K}_{\substack{\downarrow \\ \text{one bias term} \\ \text{per filter}}} \quad \text{parameters}$$

Shape of a Conv Layer

- other than K and F above:
- $S = \text{stride}$
- $P = \text{padding}$
- $W_{\text{in}} = \text{height or width of previous layer}$

$$(W_{\text{in}} - F + 2P) / S + 1 \rightarrow \text{spatial dimensions of a layer}$$

we compute this for the final level.