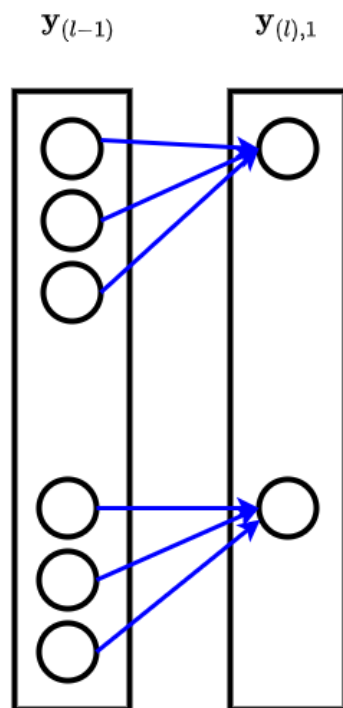


Conv 1D: One spatial dimension

Conv 1D: single feature

Conv1D layer, single feature

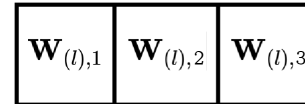


Conv 1D, single feature: sliding the filter

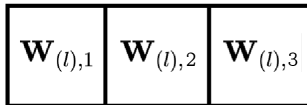
$\mathbf{y}^{(l-1)}$



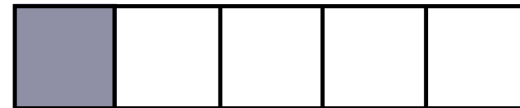
Kernel/Filter



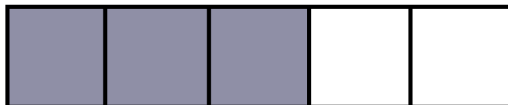
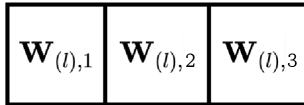
Kernel/Filter



$\mathbf{y}^{(l),1}$



Kernel/Filter



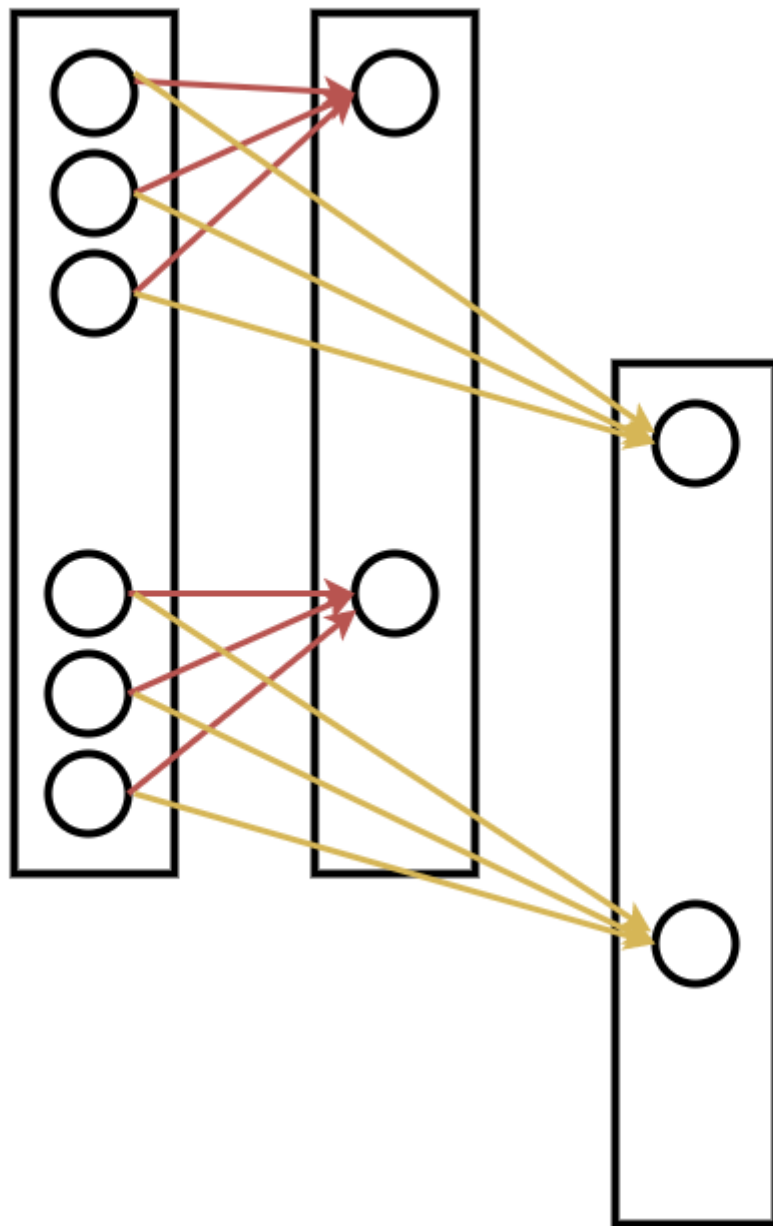
$\mathbf{y}^{(l),1}$



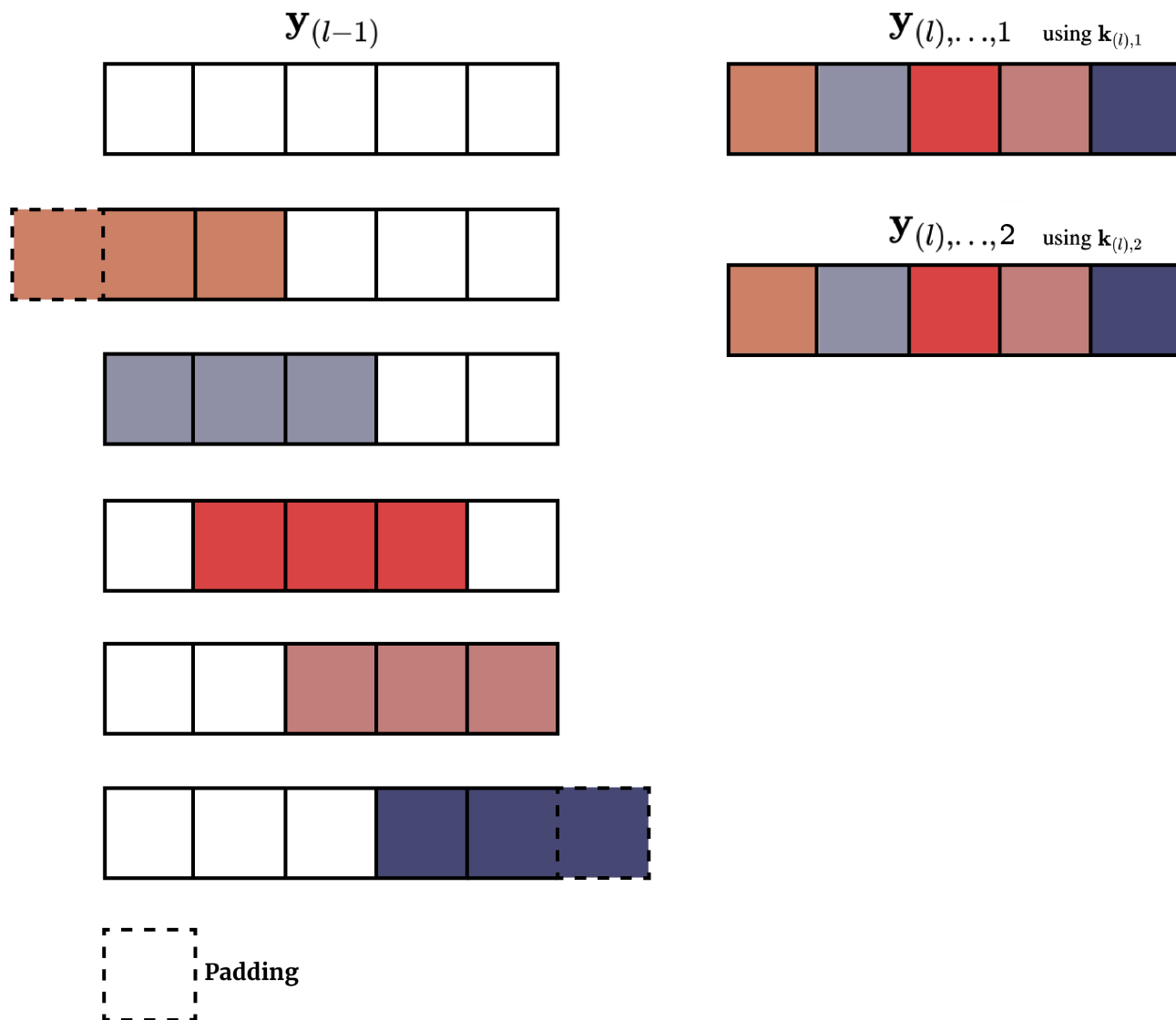


Conv 1D: single feature to multiple features

Conv 1D: single feature to multiple features

$\mathbf{y}_{(l-1)}$ $\mathbf{y}_{(l), \dots, 1}$ $\mathbf{y}_{(l), \dots, 2}$ 

Conv 1D, single feature to multiple features



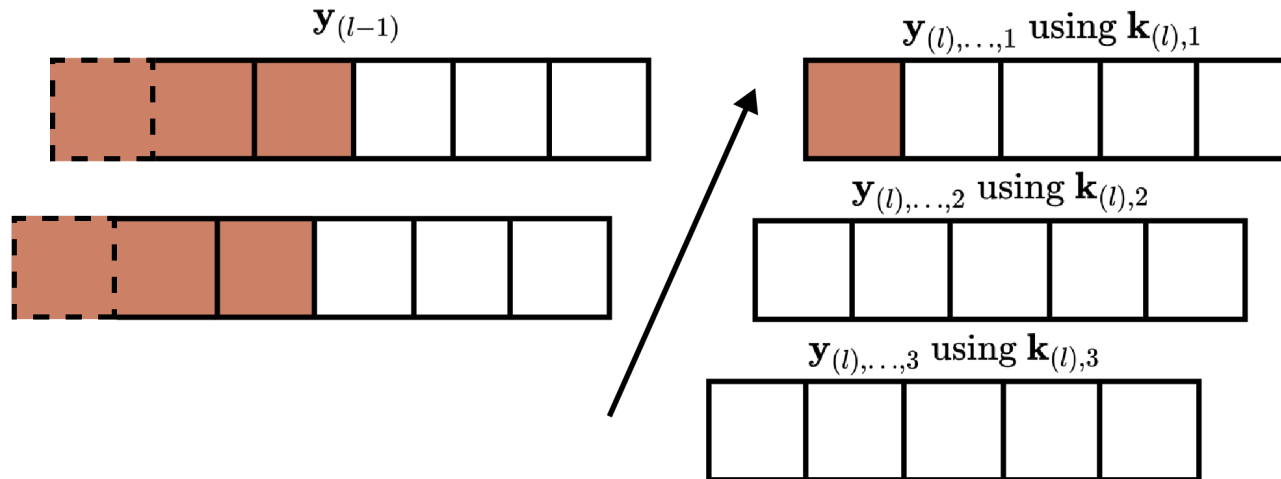


Conv 1D: Multiple features to multiple features

Let's illustrate how this works.

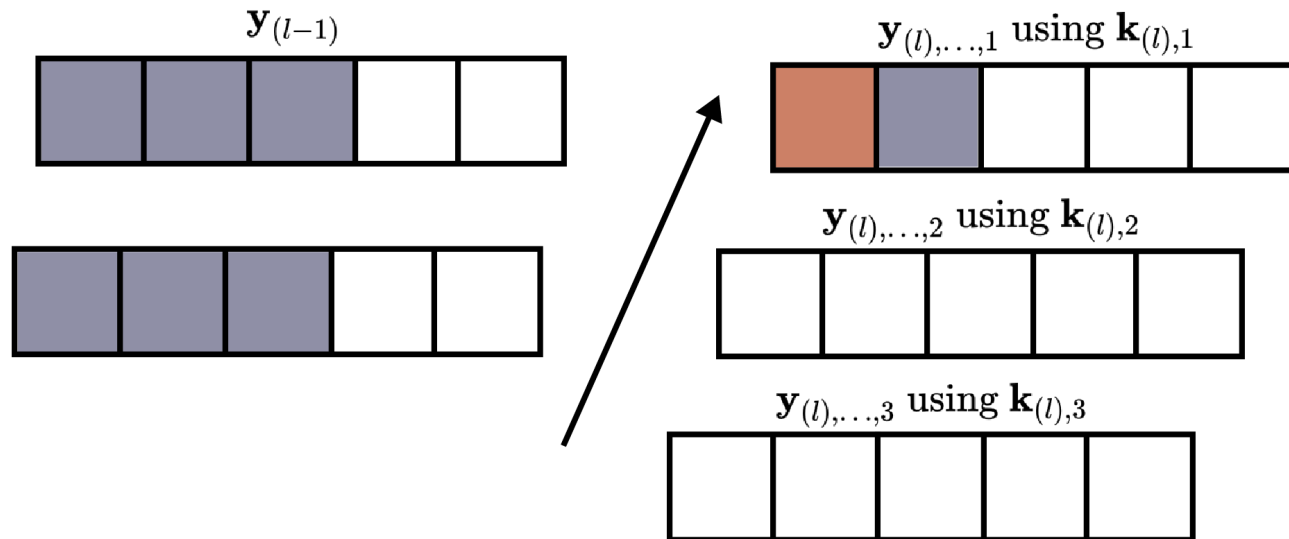
- Output feature 1
- Spatial location 1

Conv 1D: 2 features to 3 features: kernel 1



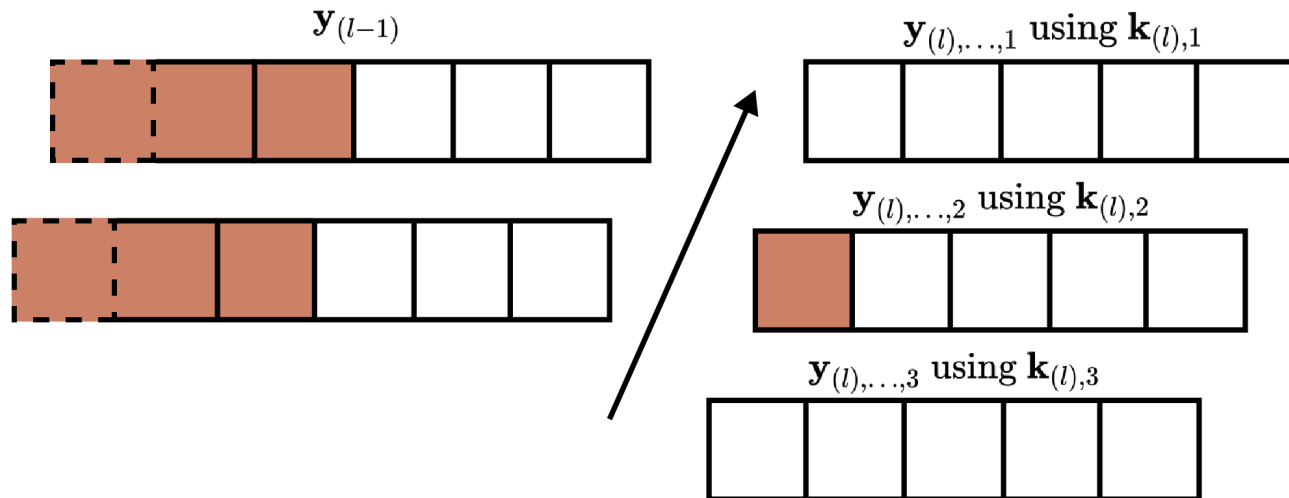
- Output feature 1
- Spatial location 2

Conv 1D: 2 features to 3 features: kernel 1



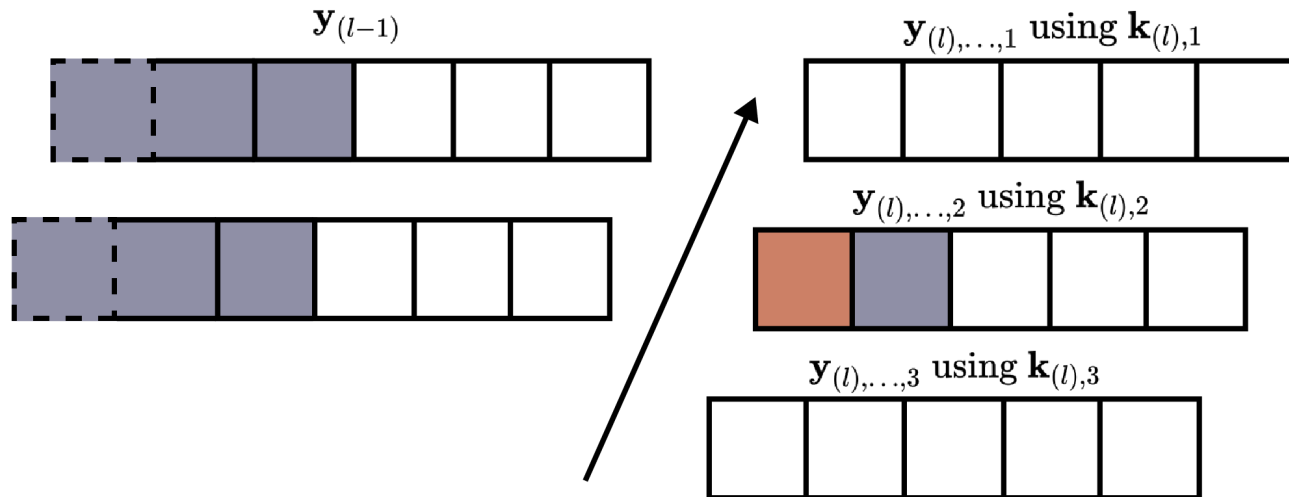
- Output feature 2
- Spatial location 1

Conv 1D: 2 features to 3 features: kernel 2



- Output feature 2
- Spatial location 2

Conv 1D: 2 features to 3 features: kernel 2

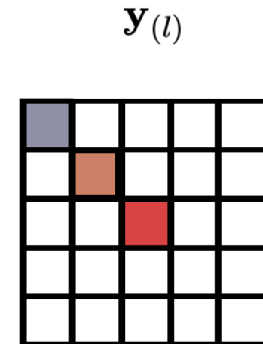
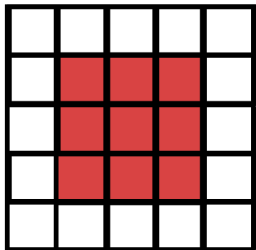
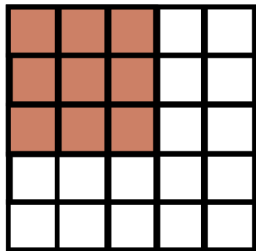
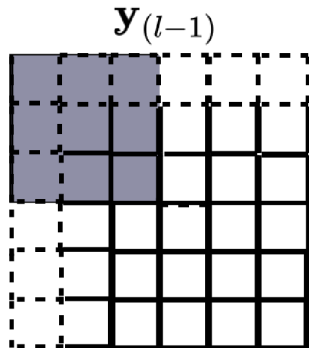




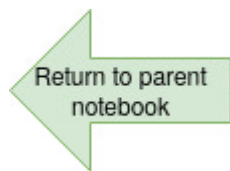
Conv 2D: Two spatial dimensions

Conv 2D: single feature to single feature

Conv 2D, single feature to single feature: padding at border

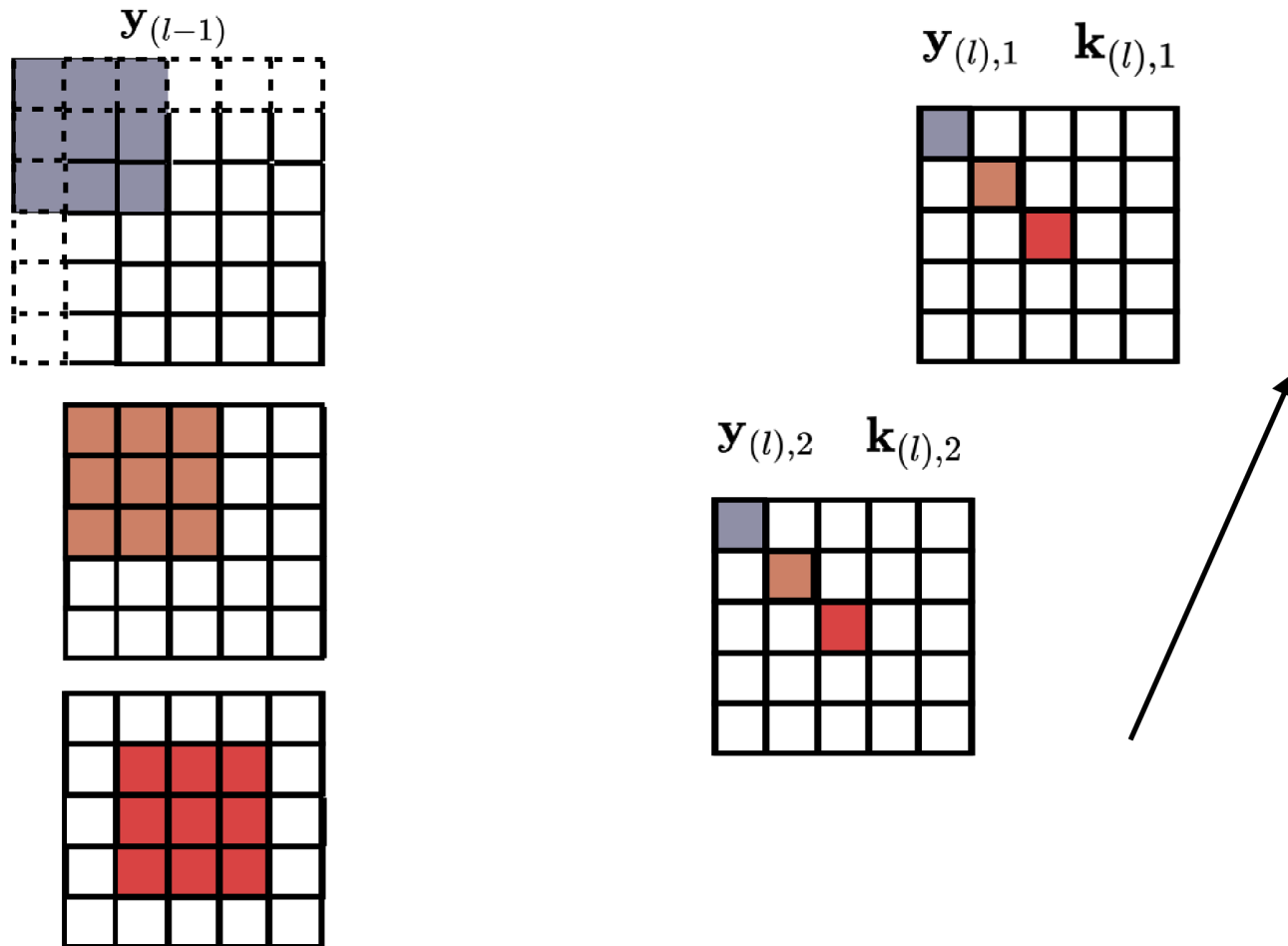


1



Conv 2D: single feature to multiple features

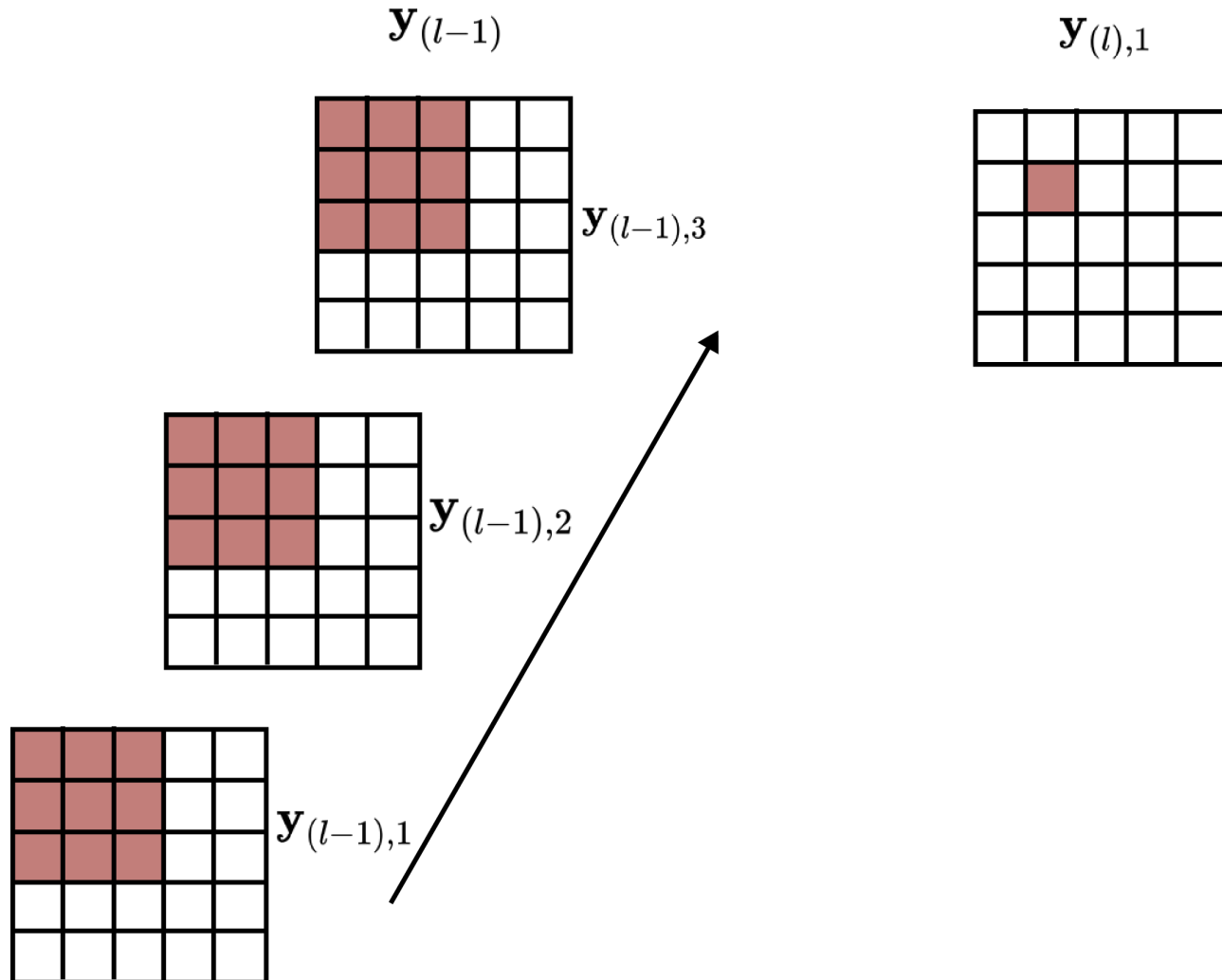
Conv 2D, single feature to multiple features: padding at border





Conv 2D: multiple features to single feature

Conv 2D, multiple input, single output feature: padding at border





Conv 2D: multiple features to multiple features

Conv 2D, multiple input, multiple output features

