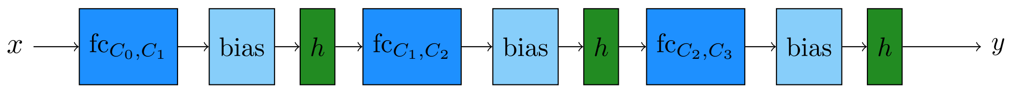


Figure 1: Illustration of a multi-layer perceptron with $L = 3$ fully-connected layers followed by bias layers and non-linearities. The sizes $C_1$ and $C_2$ are hyper-parameters while $C_0$ and $C_3$ are determined by the problem at hand. Overall, the multi-layer perceptron represents a function $y(x; w)$ parameterized by the weights $w$ in the fully-connected and bias layers.

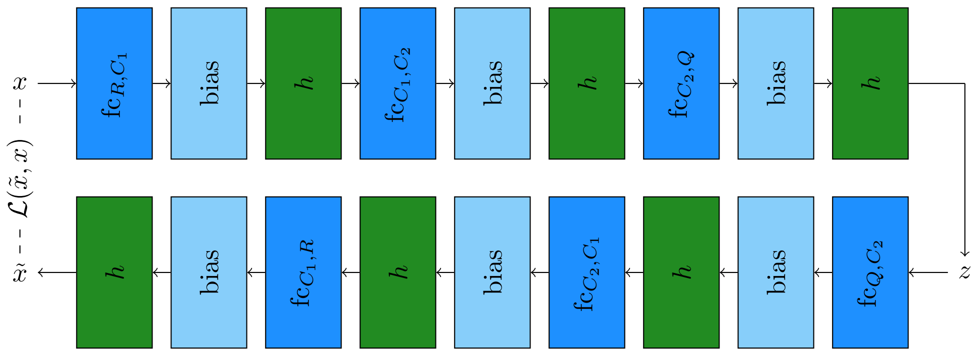
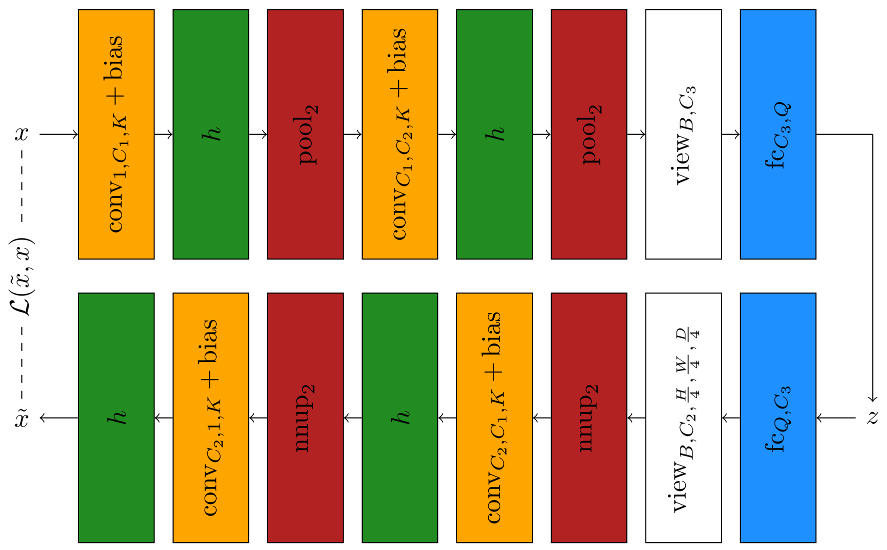


Figure 2: A simple variant of a multi-layer perceptron based auto-encoder. Both encoder (top) and decoder (bottom) consist of 3-layer perceptrons taking an $R$-dimensional input $x$. The parameters $C_1, C_2$, and $Q$ can be chosen; $Q$ also determines the size of the latent code $z$ and is usually chosen significantly lower than $R$ such that the auto-encoder learns a dimensionality reduction. The non-linearity $h$ is also not fixed and might be determined experimentally. The reconstruction loss $\mathcal{L}(\tilde{x}, x)$ quantifies the quality of the reconstruction $\tilde{x}$ and is minimized during training.



$x$
$\text{conv}_{1,C_1,K} + \text{bias}$
$h$
$\text{pool}_2$
$\text{conv}_{C_1,C_2,K} + \text{bias}$
$h$
$\text{pool}_2$
$\text{view}_{B,C_3}$
$\text{fc}_{C_3,Q}$
$z$
$\text{fc}_{Q,C_3}$
$\text{view}_{B,C_2,\frac{H}{4},\frac{W}{4},\frac{D}{4}}$
$\text{nnup}_2$
$\text{conv}_{C_2,C_1,K} + \text{bias}$
$h$
$\text{nnup}_2$
$\text{conv}_{C_2,1,K} + \text{bias}$
$h$
$\tilde{x}$
$\mathcal{L}(\tilde{x}, x)$

Figure 3: Illustration of a convolutional auto-encoder consisting of encoder (top) and decoder (bottom). Both are modeled using two stages of convolutional layers each followed by a bias layer and a non-linearity layer. The encoder uses max pooling to decrease the spatial size of the input; the decoder uses upsampling to increase it again. The number of channels $C_1$, $C_2$ and $C_3$ as well as the size $Q$ are hyper parameters. We assume the input to comprise one channel. Again, the reconstruction loss $\mathcal{L}(\tilde{x}, x)$ quantifies the quality of the reconstruction and is minimized during training.