

Result:

In network 1:

$$\begin{cases} \vec{a}^{(1)} = W^{(1)} \vec{a}^{(0)} + \vec{b}^{(1)} \\ \vec{a}^{(2)} = W^{(2)} \vec{a}^{(1)} + \vec{b}^{(2)} \\ \vec{a}^{(3)} = W^{(3)} \vec{a}^{(2)} + \vec{b}^{(3)} \end{cases}$$

$$\text{Then: } \vec{a}^{(2)} = W^{(2)} (W^{(1)} \vec{a}^{(0)} + \vec{b}^{(1)}) + \vec{b}^{(2)}$$

$$= W^{(2)} W^{(1)} \vec{a}^{(0)} + \vec{b}^{(1)} W^{(2)} + \vec{b}^{(2)}$$

$$\vec{a}^{(3)} = W^{(3)} W^{(2)} W^{(1)} \vec{a}^{(0)} + \vec{b}^{(1)} W^{(2)} W^{(3)} + \vec{b}^{(2)} W^{(3)} + \vec{b}^{(3)}$$

In network 2:

$$\vec{a}^{(1)} = \tilde{W} \vec{a}^{(0)} + \tilde{b}$$

$$\text{So: } \tilde{W} = W^{(1)} W^{(2)} W^{(3)}$$

$$\tilde{b} = \vec{b}^{(1)} W^{(2)} W^{(3)} + \vec{b}^{(2)} W^{(3)} + \vec{b}^{(3)}$$