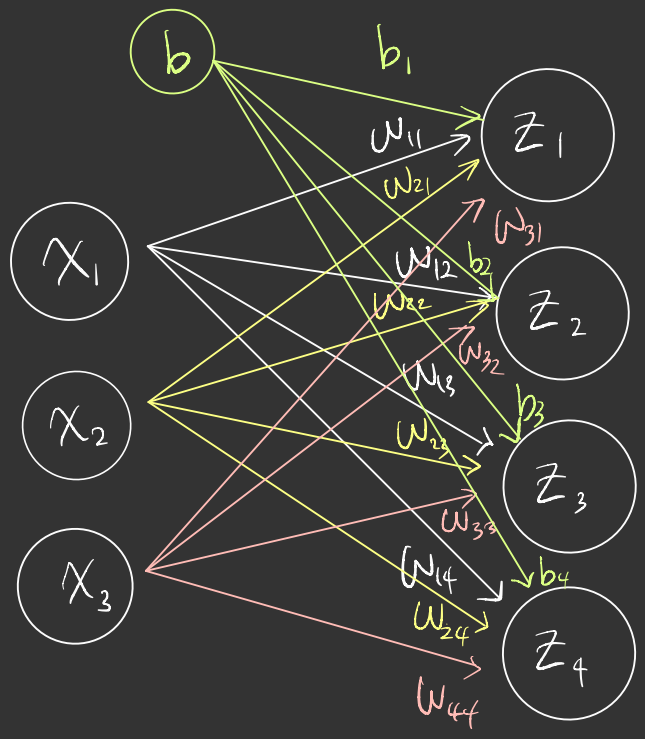
Vizualization of Vectorizing the Output Computation

$$\underbrace{\begin{bmatrix} z_1^{[1]} \\ \vdots \\ \vdots \\ z_4^{[1]} \end{bmatrix}}_{z^{[1]} \in \mathbb{R}^{4\times 1}} = \underbrace{\begin{bmatrix} — \; W_1^{[1]T} \; — \\ — \; W_2^{[1]T} \; — \\ \vdots \\ — \; W_4^{[1]T} \; — \end{bmatrix}}_{W^{[1]} \in \mathbb{R}^{4\times 3}} \underbrace{\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}}_{x \in \mathbb{R}^{3\times 1}} + \underbrace{\begin{bmatrix} b_1^{[1]} \\ b_2^{[1]} \\ \vdots \\ b_4^{[1]} \end{bmatrix}}_{b^{[1]} \in \mathbb{R}^{4\times 1}}$$



$$w_1^{[1]} = \begin{bmatrix} w_{11}^{[1]} \\ w_{21}^{[1]} \\ w_{31}^{[1]} \end{bmatrix} \in \mathbb{R}^3$$

$$w_2^{[1]} = \begin{bmatrix} w_{12}^{[1]} \\ w_{22}^{[1]} \\ w_{32}^{[1]} \end{bmatrix} \in \mathbb{R}^3$$

$$w_3^{[1]} = \begin{bmatrix} w_{13}^{[1]} \\ w_{23}^{[1]} \\ w_{33}^{[1]} \end{bmatrix} \in \mathbb{R}^3$$

$$w_4^{[1]} = \begin{bmatrix} w_{14}^{[1]} \\ w_{24}^{[1]} \\ w_{34}^{[1]} \end{bmatrix} \in \mathbb{R}^3$$