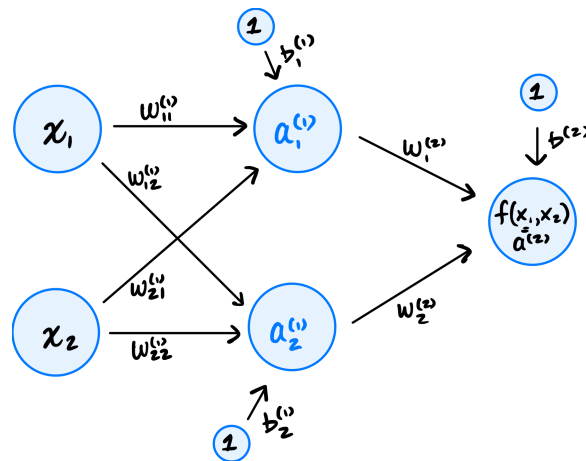# DSC 190 - Homework 08
Due: Wednesday, May 25

Write your solutions to the following problems by either typing them up or handwriting them on another piece of paper. Unless otherwise noted by the problem's instructions, show your work or provide some justification for your answer. Homeworks are due via Gradescope at 11:59 PM.

Problem 1.

Consider the network below:

Suppose

$$W^{(1)} = \begin{pmatrix} 1 & 3 \\ -2 & 2 \end{pmatrix}$$

$$\vec{b}^{(1)} = (0,0)^T$$

and assume that the hidden layer uses the ReLU as its activation function.

As discussed in lecture, this neural network can be viewed as mapping an input point in $\mathbb{R}^2$ to a new representation, also in $\mathbb{R}^2$.

Suppose $\vec{x} = (2,1)^T$. What is the new representation of $\vec{x}$ produced by this network?

> **Solution:** The new representation is $(0,8)^T$.