

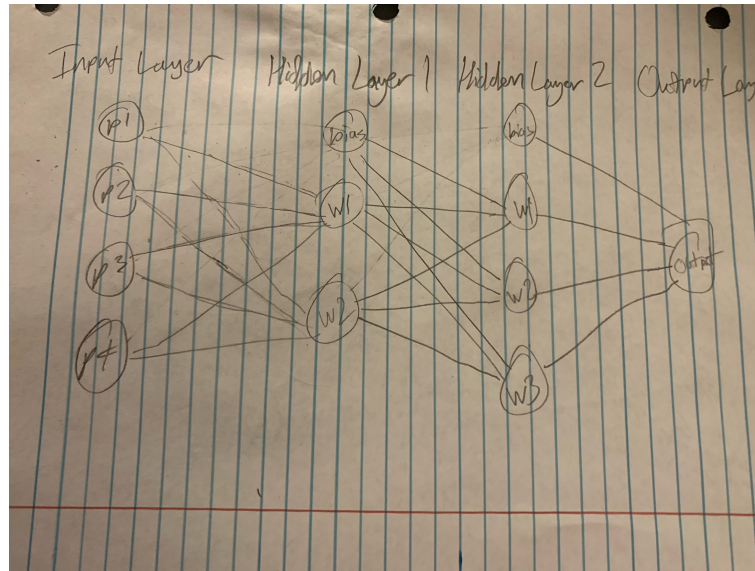
STAT4610 Homework 8

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1 Problem 1

a.



b.

To calculate the number of parameters in the model, you multiply the number of outputs by the number of inputs and add the number of outputs to account for the biases of each layer and add the layers together.

$$\text{Hidden Layer 1: } 4 * 2 + 2 = 10$$

$$\text{Hidden Layer 2: } 2 * 3 + 3 = 9$$

$$\text{Output Layer: } 1 * 3 + 1 = 4$$

$$10 + 9 + 4 = 23$$

c.

The expression for the full neural network using the ReLU activation function is as follows:

$$A_k^{(1)} = \mathbf{ReLU}(w_{k0}^{(1)} + \sum_{j=1}^4 (w_{kj}^{(1)} * x_j))$$

$$A_k^{(2)} = \mathbf{ReLU}(w_{k0}^{(2)} + \sum_{j=1}^2 (w_{kj}^{(2)} * A_j^{(1)}))$$

$$f(x) = \beta_0 + \sum_{k=1}^3 (\beta_k * A_k^{(2)})$$