**Question 01: Neural Network**

Consider the following single layer neural network:

1. The network consists of 2 input neurons, 2 hidden neurons, and 1 output neuron.
2. The inputs and are
3. The weight matrix ​ () between the input layer and the hidden layer is:
4. The activation function for the hidden layer is the ReLU function.
5. The weight matrix ​ () between the hidden layer and the output neuron is:
6. The final output is computed as a weighted sum of the hidden layer activations (output of the hidden layer). No activation function is applied at the output layer.
7. Draw the network architecture with 2 input neurons, 2 hidden neurons, and 1 output neuron. Label the layers and connections, including weights ​ and ​.
8. Given the inputs to the neural network, perform a forward pass to compute the final output .

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**Question 02: Next word prediction**

A neural language model was given the following context to predict the next word:

“Habib University is”

The tokens in the sequence are represented as vectors:

Assume these embeddings are column vectors in :

1. Compose these embeddings into a single vector by computing the sum to represent the sequence “Habib University is”.
2. Given a vocabulary of three words: "brilliant," "amazing," and "incredible," and the weight matrix , determine which word the model predicts next. The weight matrix is as follows: