ECE/CS/ME 539 – Fall 2024 — Activity 17

Implement a two-layer neural network to perform binary addition. The network should take two 2-bit binary sequences as inputs, a_1a_0 and b_1b_0, and output a 3-bit binary sequence, $c_2c_1c_0$, where the output represents the sum of the two input sequences.

- The first layer should use a ReLU activation function.
- The second (output) layer should use a step function (binary threshold) as its activation function.

Specifications

- Inputs: Two 2-bit binary sequences, a_1a_0 and b_1b_0, where $a_1, a_0, b_1, b_0 \in \{0, 1\}$.
- Output: A 3-bit binary sequence, $c_2c_1c_0$, where the output represents the binary sum of the input sequences, i.e.,
$$c_2c_1c_0 = a_1a_0 + b_1b_0.$$
- Layer 1: Implements a ReLU activation function on the inputs.
- Layer 2: Implements a step function (binary threshold) to produce the final output.