**Instructions:** Find weight and bias values to make logic gate perceptrons. The sign function returns 1 if the value is greater than 0, and returns 0 otherwise.

# 1. OR

Out = Sign(Input1 \* Weight1 + Input2 \* Weight2 + Bias)

The output of the network should be 1 if either of the inputs is 1. Otherwise, the network should output 0.

Here is the truth table for an OR gate.

|  |  |  |
| --- | --- | --- |
| Input 1 | Input 2 | Output |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 1 |

What values should w1, w2 and b have to satisfy the truth table?

|  |  |
| --- | --- |
| Weight1 |  |
| Weight2 |  |
| Bias |  |

# 2. AND

Using the same perceptron layout as OR, the output of the network should be 1 if the inputs are 1. Otherwise, the network should output 0.

Here is the truth table for an AND gate.

|  |  |  |
| --- | --- | --- |
| Input 1 | Input 2 | Output |
| 0 | 0 | 0 |
| 0 | 1 | 0 |
| 1 | 0 | 0 |
| 1 | 1 | 1 |

What values should w1, w2 and b have to satisfy the truth table?

|  |  |
| --- | --- |
| Weight1 |  |
| Weight2 |  |
| Bias |  |

# 3. NOT

Out = Sign(Input \* Weight + Bias)

The not operation only takes in a single input and gives a single output, so uses the formula above.

Here is the truth table for a NOT gate.

|  |  |
| --- | --- |
| Input | Output |
| 0 | 1 |
| 1 | 0 |

What values should w and b have to satisfy the truth table?

|  |  |
| --- | --- |
| Weight |  |
| Bias |  |

# 4. XOR

Using the same perceptron layout as OR, the output of the network should be 1 if exactly one of the inputs is a 1. Otherwise, the network should output 0.

Here is the truth table for an XOR gate.

|  |  |  |
| --- | --- | --- |
| Input 1 | Input 2 | Output |
| 0 | 0 | 0 |
| 0 | 1 | 1 |
| 1 | 0 | 1 |
| 1 | 1 | 0 |

What values should w1, w2 and b have to satisfy the truth table?

|  |  |
| --- | --- |
| Weight1 |  |
| Weight2 |  |
| Bias |  |