Neural Networks & Deep Learning

Exercise 4

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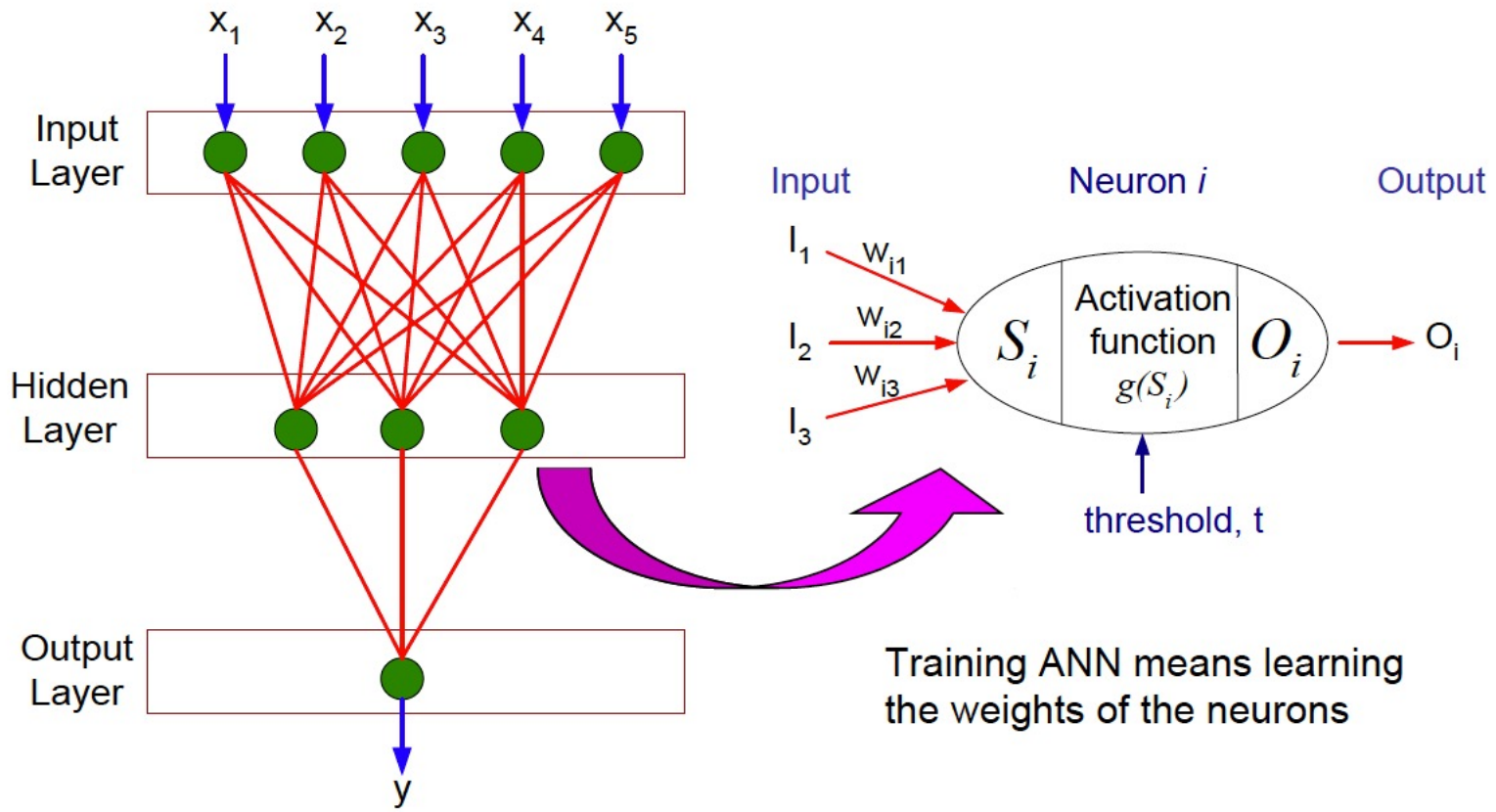
School of Business Informatics and Mathematics

Neural Networks
General Structure



Neural Networks
Representing Logics

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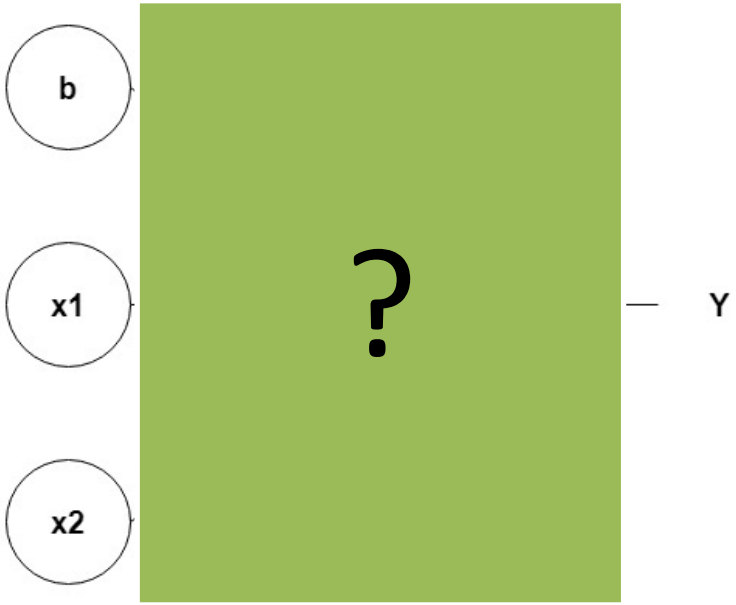
TODO

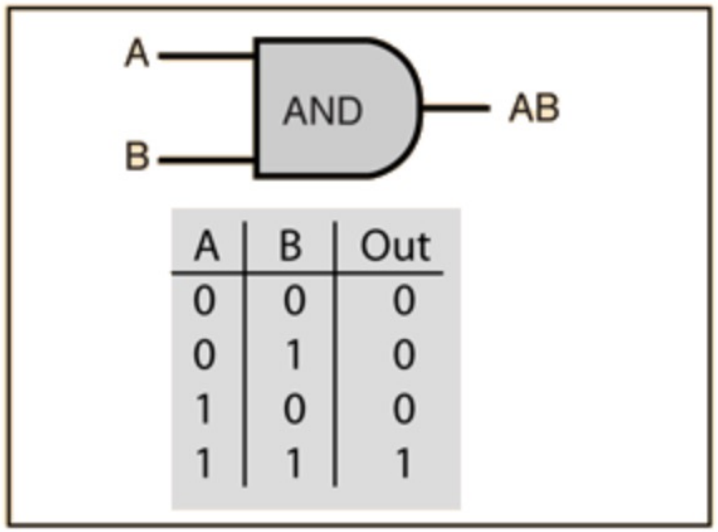
Try to represent the following logic gates with Neural Networks

- AND
- OR
- NOT
- NAND
- XOR

Neural Networks

Representing Logics: AND

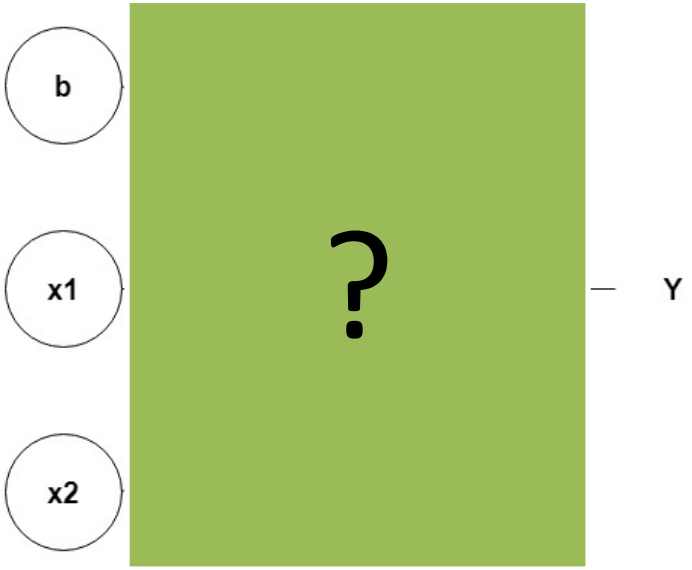


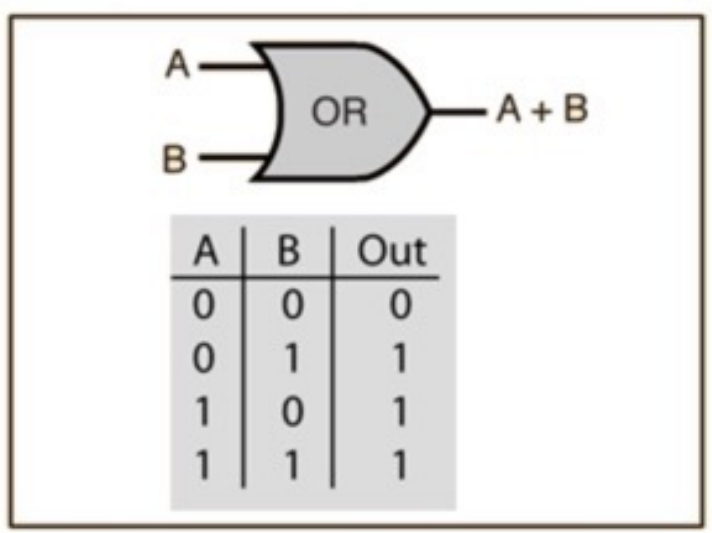


Images taken from https://medium.com/@stanleydukor/neural-representation-of-and-or-not-xor-and-xnor-logic-gates-perceptron-algorithm-b0275375fea1

Neural Networks

Representing Logics: OR





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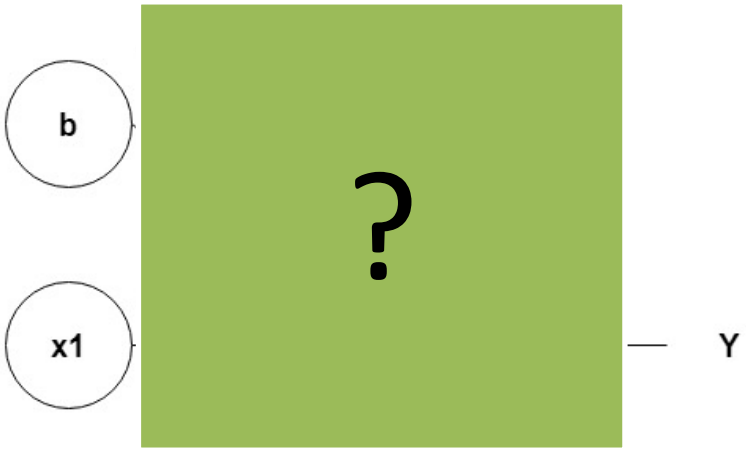
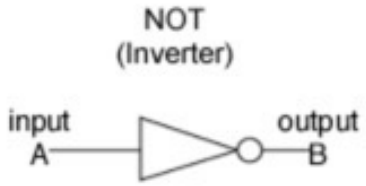
Neural Networks

Representing Logics: NOT



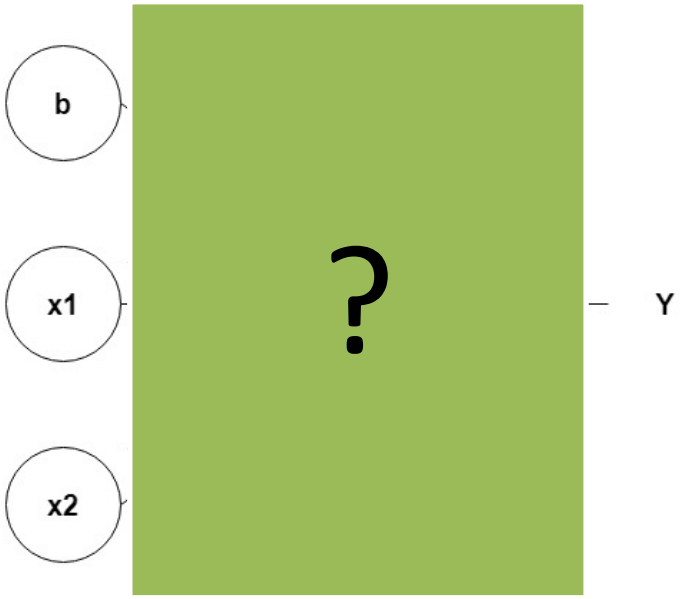


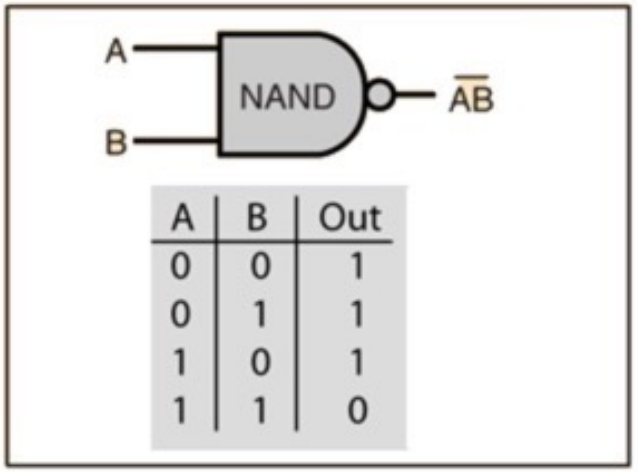
A	B
0	1
1	0

Images taken from https://medium.com/@stanleydukor/neural-representation-of-and-or-not-xor-and-xnor-logic-gates-perceptron-algorithm-b0275375fea1

Neural Networks

Representing Logics: NAND



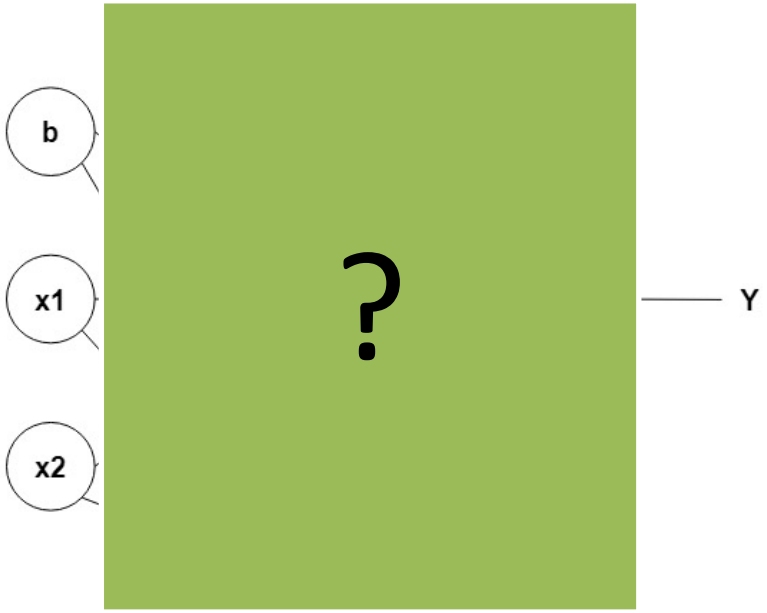


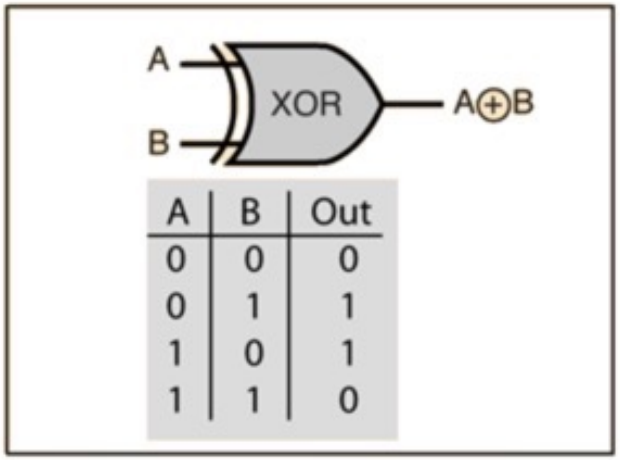
A	B	Out
0	0	1
0	1	1
1	0	1
1	1	0

Images taken from https://medium.com/@stanleydukor/neural-representation-of-and-or-not-xor-and-xnor-logic-gates-perceptron-algorithm-b0275375fea1

Neural Networks

Representing Logics: XOR





A	B	Out
0	0	0
0	1	1
1	0	1
1	1	0

Images taken from https://medium.com/@stanleydukor/neural-representation-of-and-or-not-xor-and-xnor-logic-gates-perceptron-algorithm-b0275375fea1

Neural Networks
TRUE or FALSE?

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„When the optimization of a Neural Network converges, we always end up with the optimal solution.“

Neural Networks
TRUE or FALSE?

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„A higher learning rate typically leads to faster convergence, but increases the risk of getting stuck in local optima.“

Neural Networks
TRUE or FALSE?

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„Auto-Encoders can be used to remove noise from a given input.“

Neural Networks
TRUE or FALSE?

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„*Dropout* is a mechanism used during the training of Neural Networks to drastically reduce training time.“

Neural Networks
TRUE or FALSE?

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„Word2Vec converts every word to a vector in a latent vector space to make computations possible.“

Word2Vec
Task

You have a corpus of 1,000 product reviews that you shall use to train a sentiment predictor. As the number of unique words in these product reviews is 150 and hence rather small, you are unsure whether to use One-Hot-Encoding or Word2Vec to encode the words in your product reviews.

TODO

1) Name some advantages for both of the approaches.

2) Which one would you prefer?

3) Would it change your opinion if you knew that your sentiment predictor will never encounter words that are not in the training corpus?