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The perceptron’s learning rule in practice

I attach a nice script I made that plots:

- Three runs for each dataset
- The maximum accuracy of the neuron
- Values of the weights and bias.

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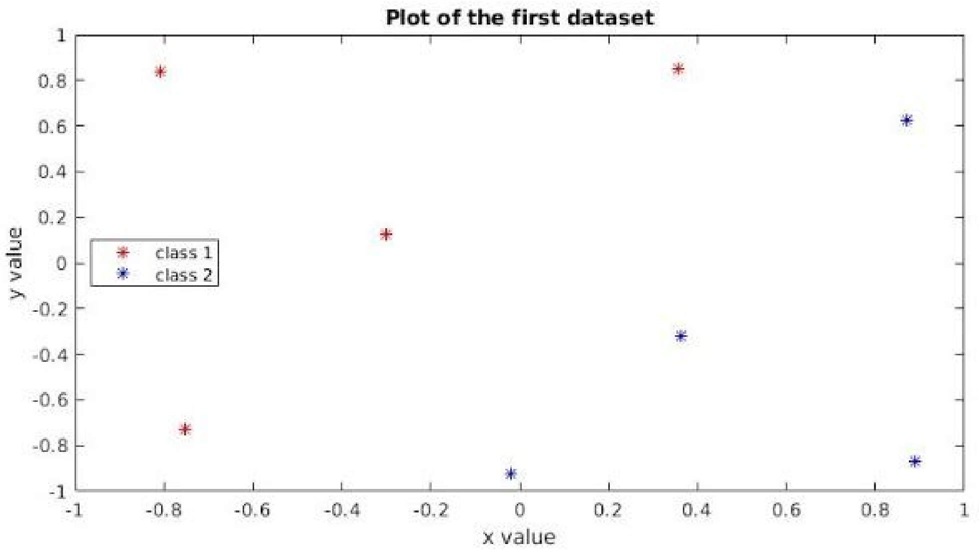
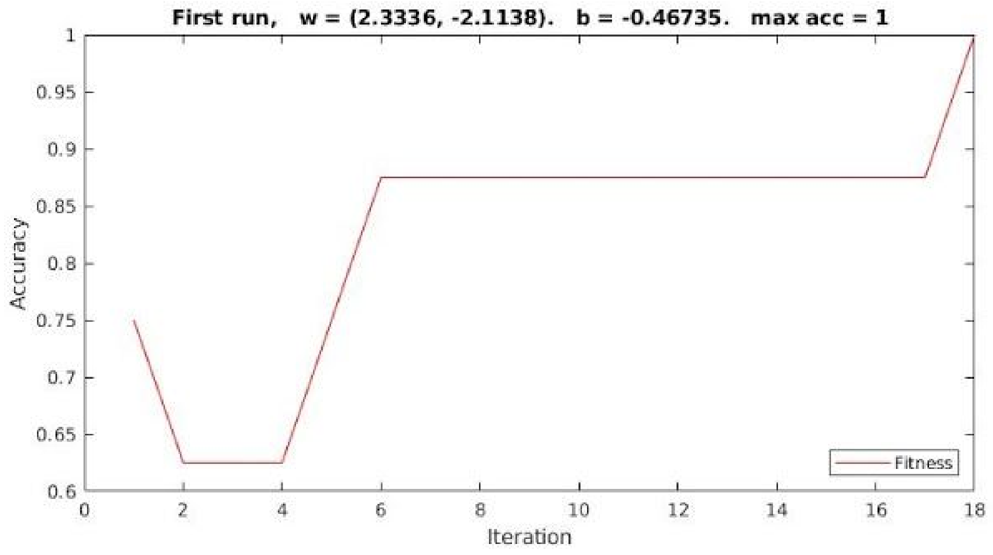
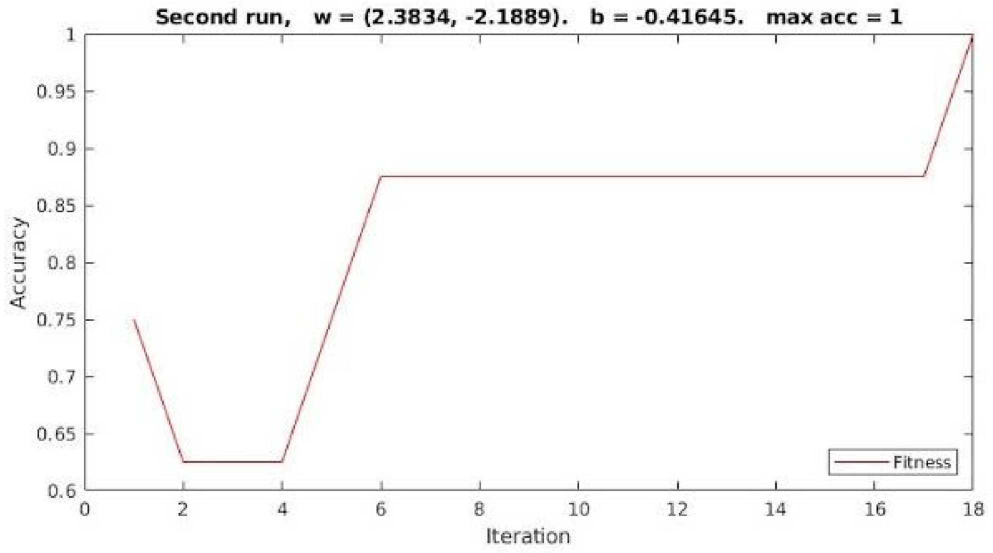
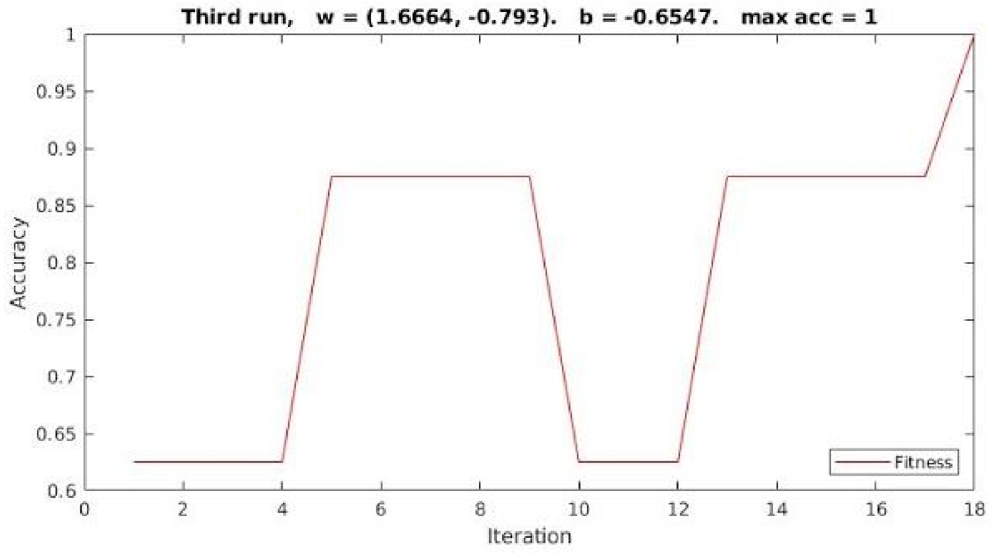
The first dataset is linearly separable, so we can use a neuron to classify this data.









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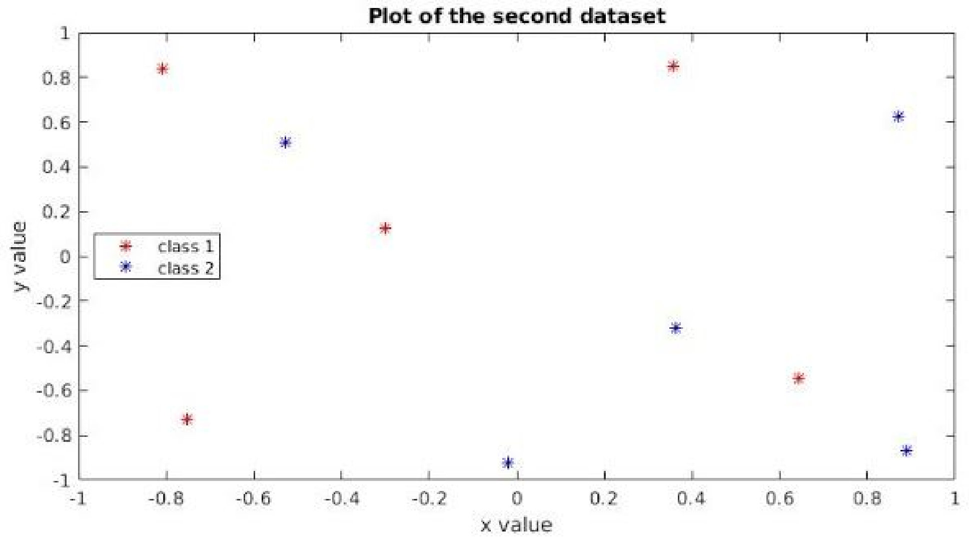
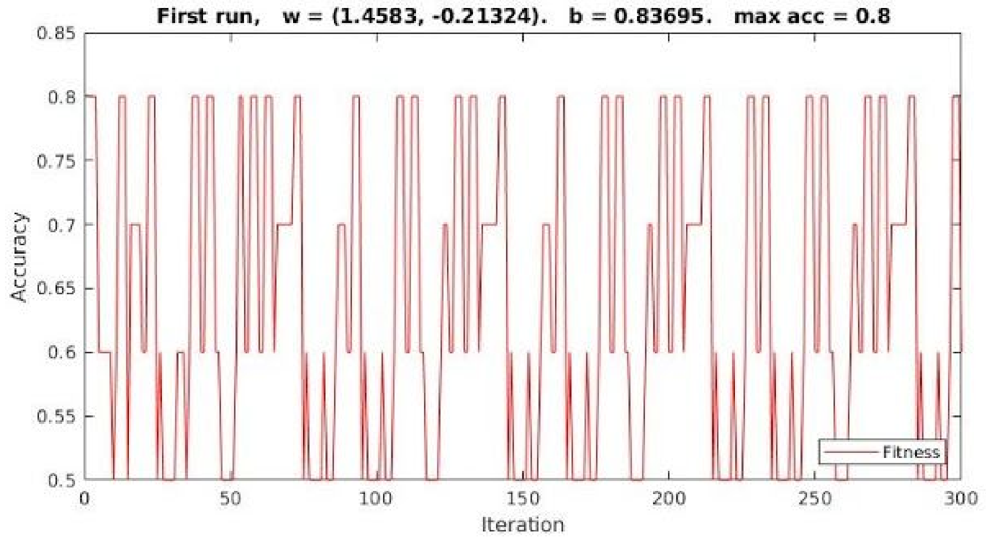
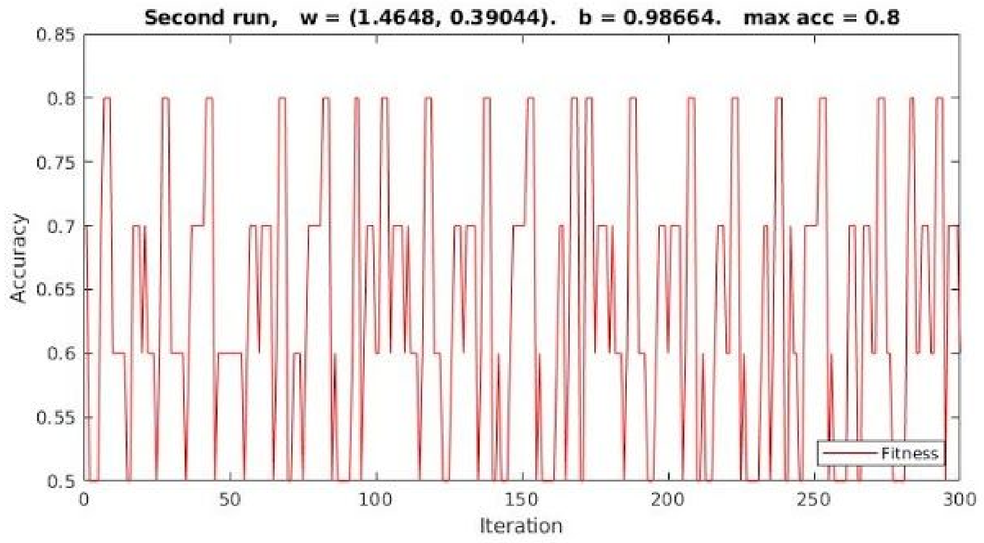
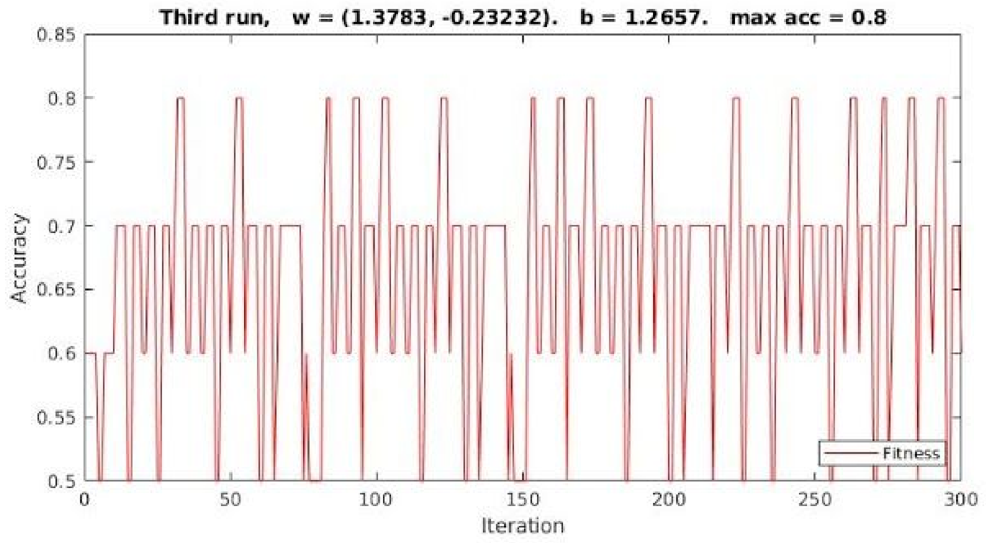
The second dataset is not linearly separable, so we can not use a single neuron to classify this data.









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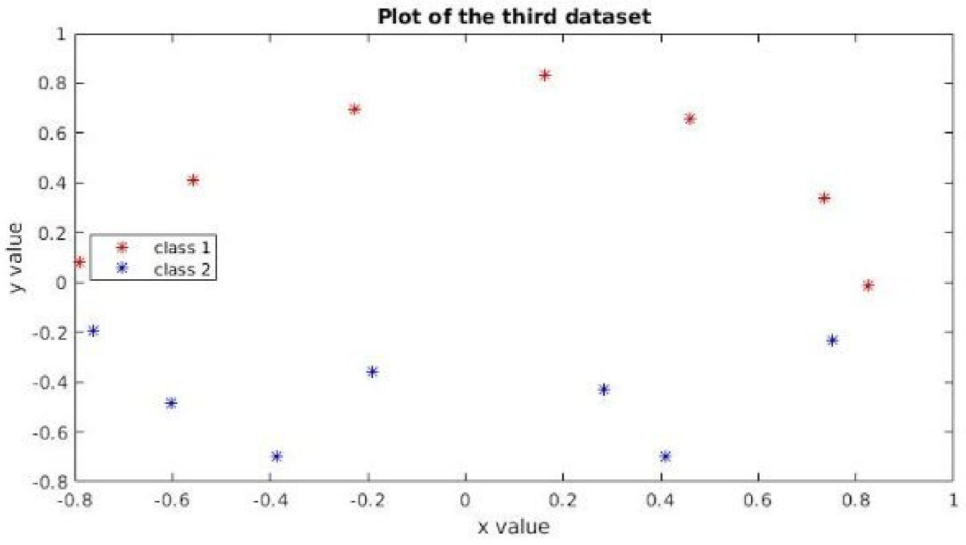
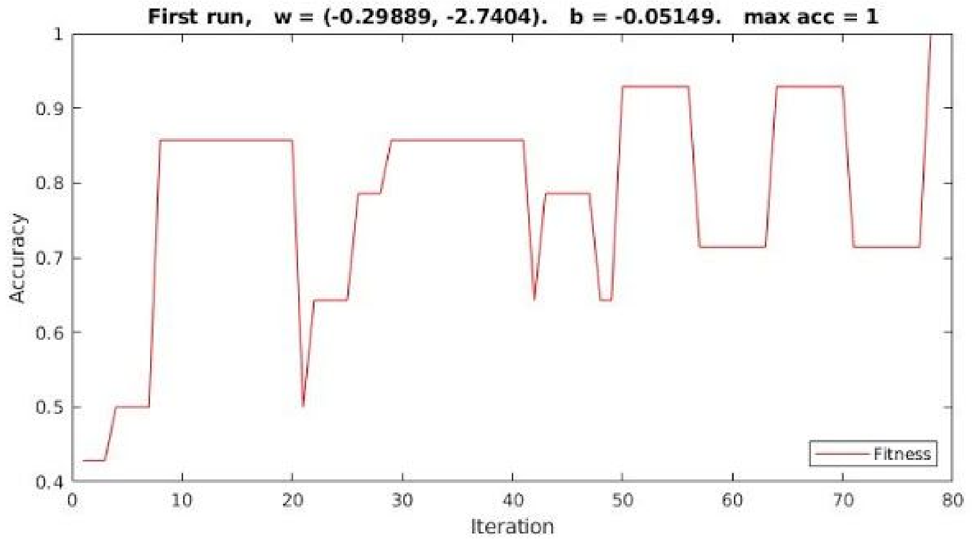
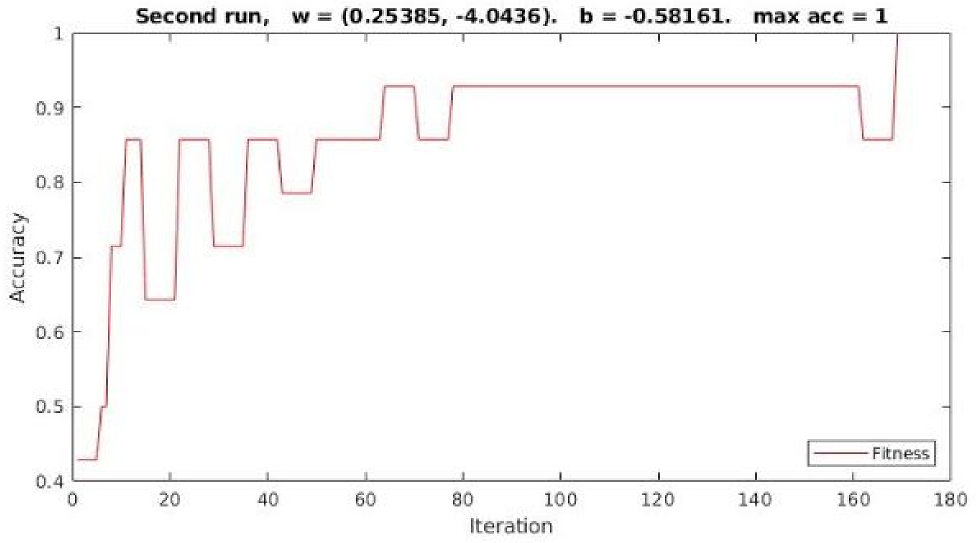
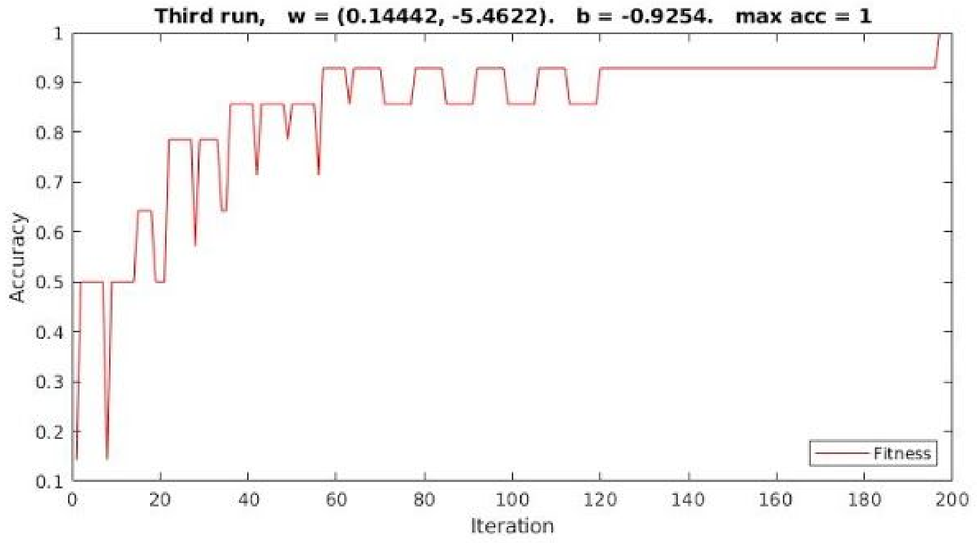
The third dataset is linearly separable, and we could find the neuron that classifies the dataset correctly, but it took more time than Datset 1.









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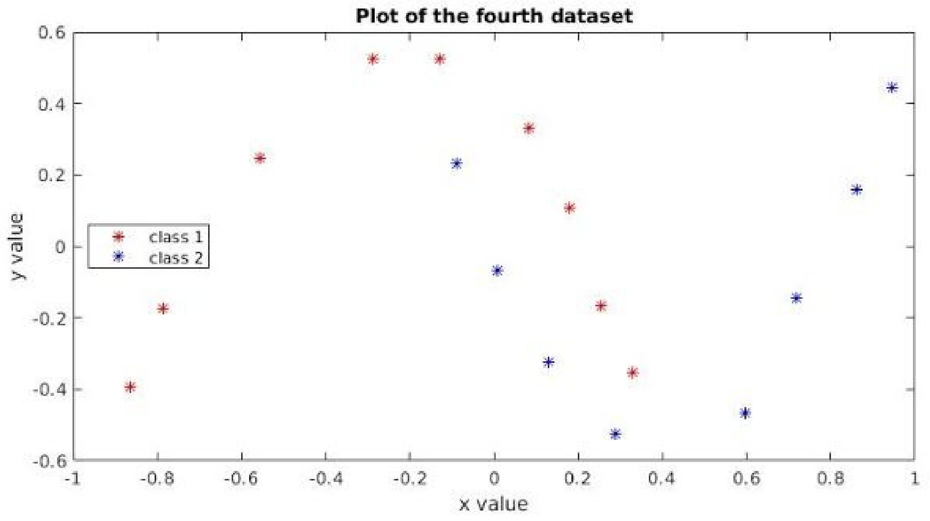
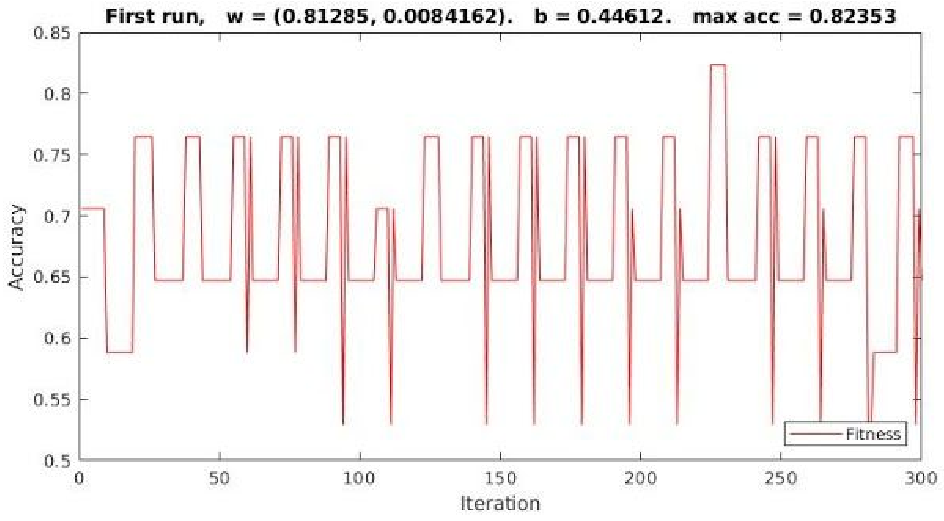
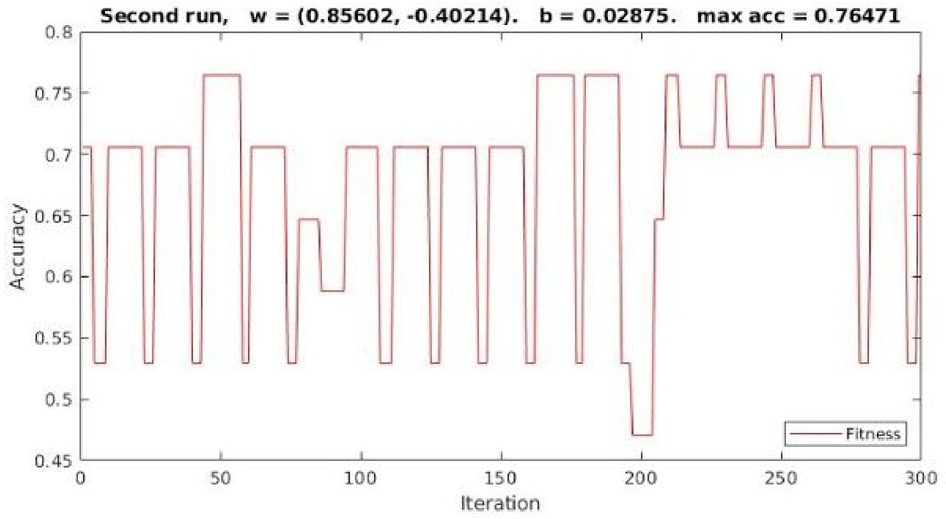
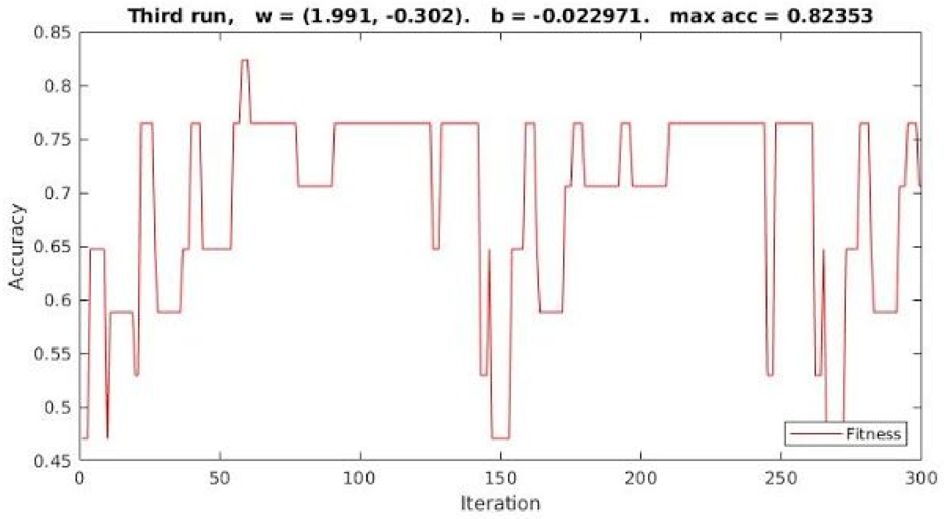
The fourth dataset is not linearly separable, so we can not use a single neuron to classify this data.

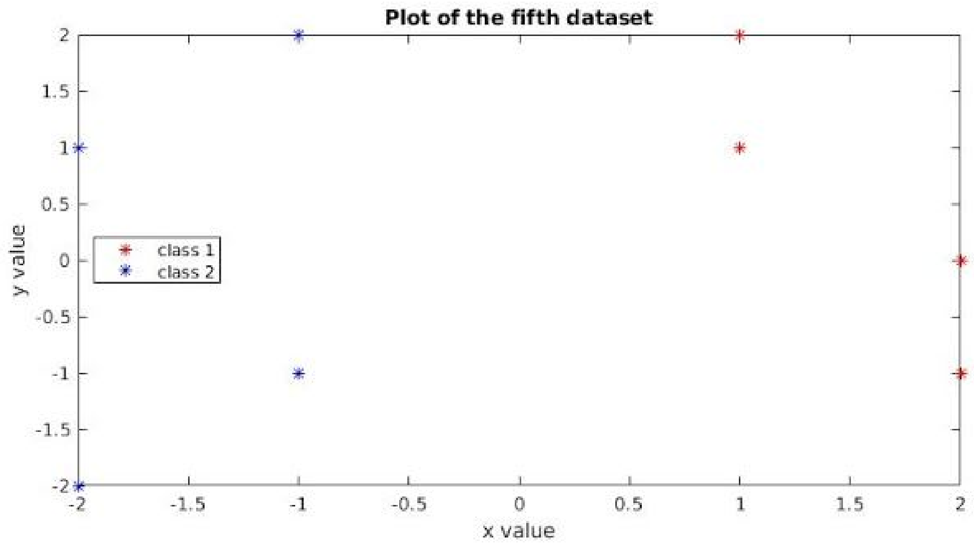


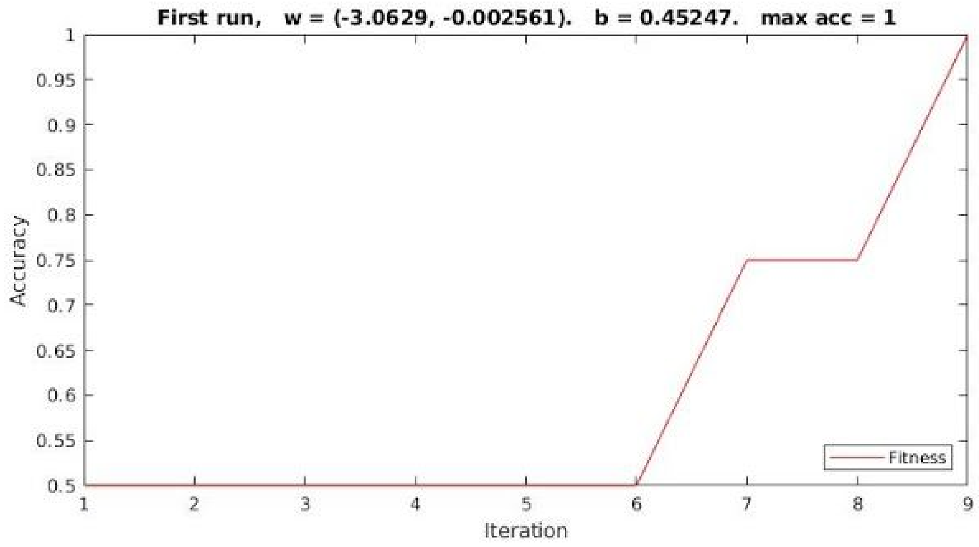


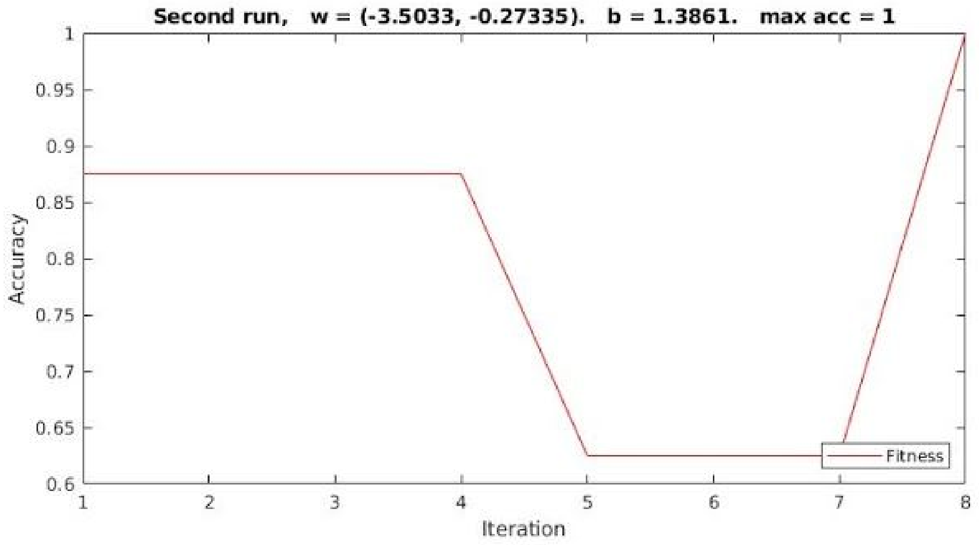


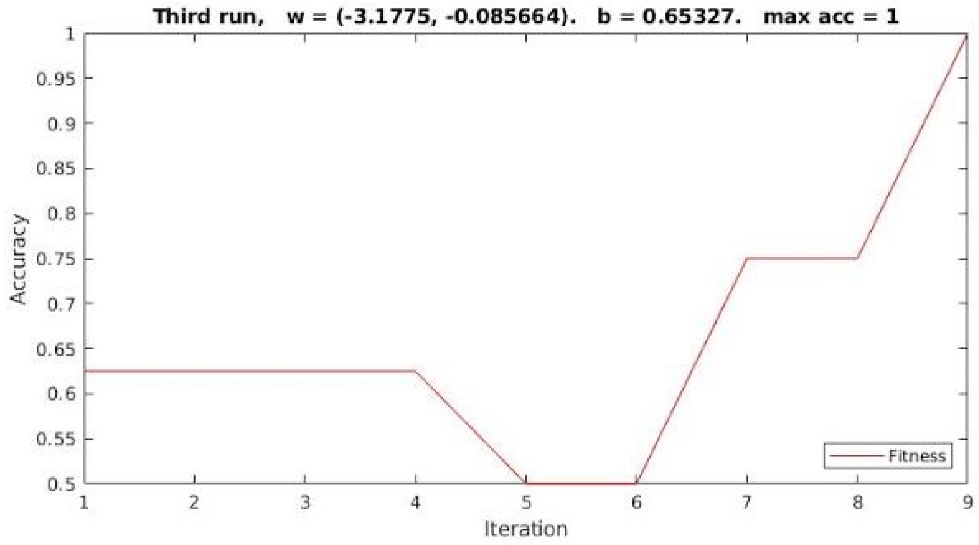


The fifth dataset is easily separable









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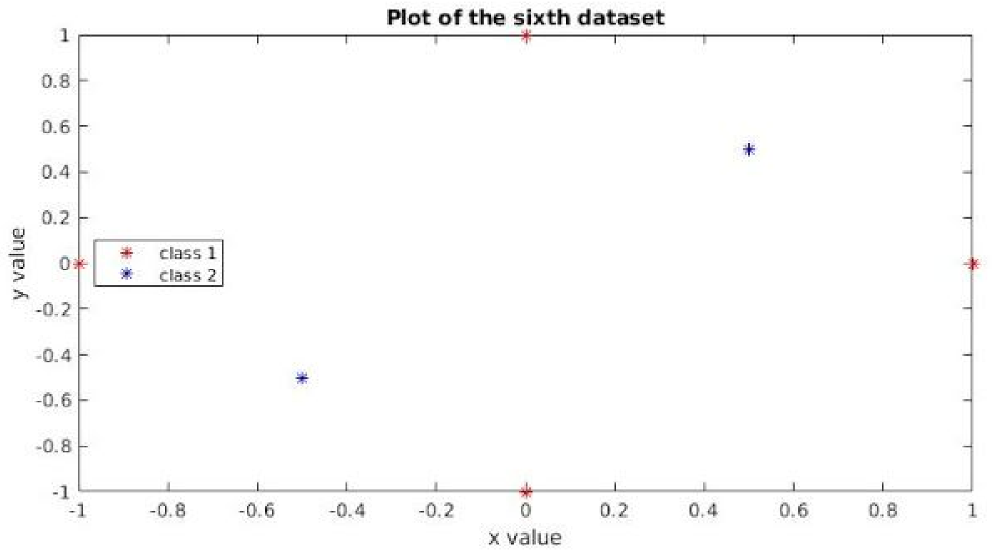
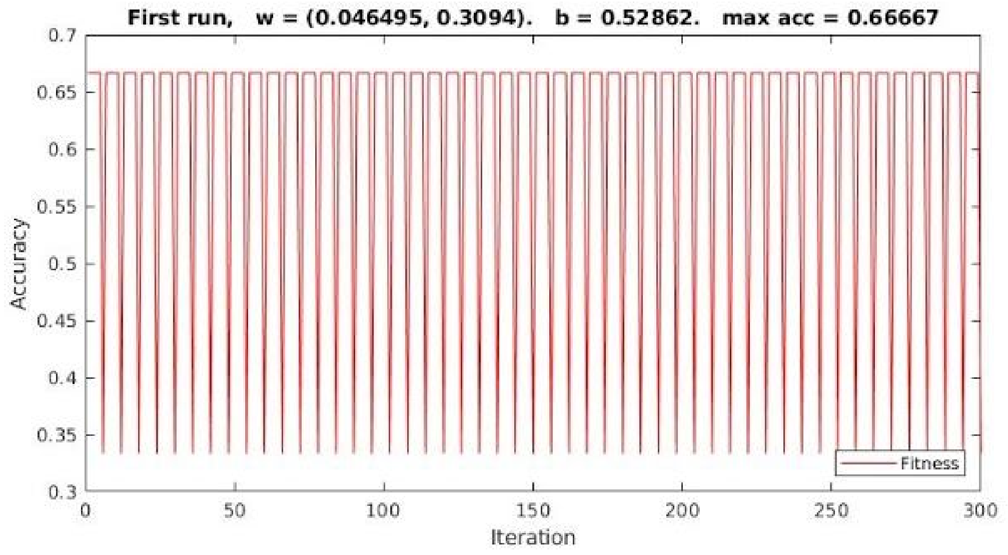
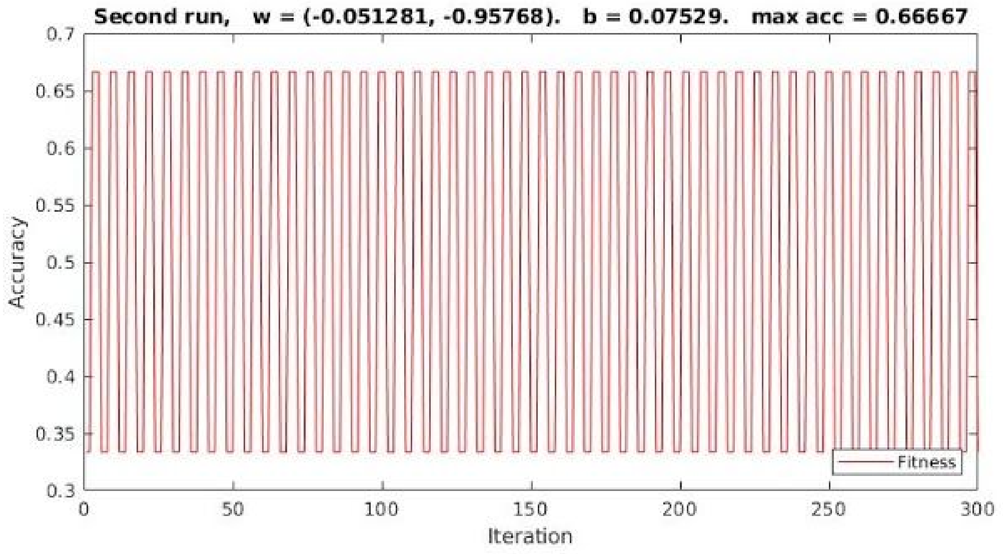
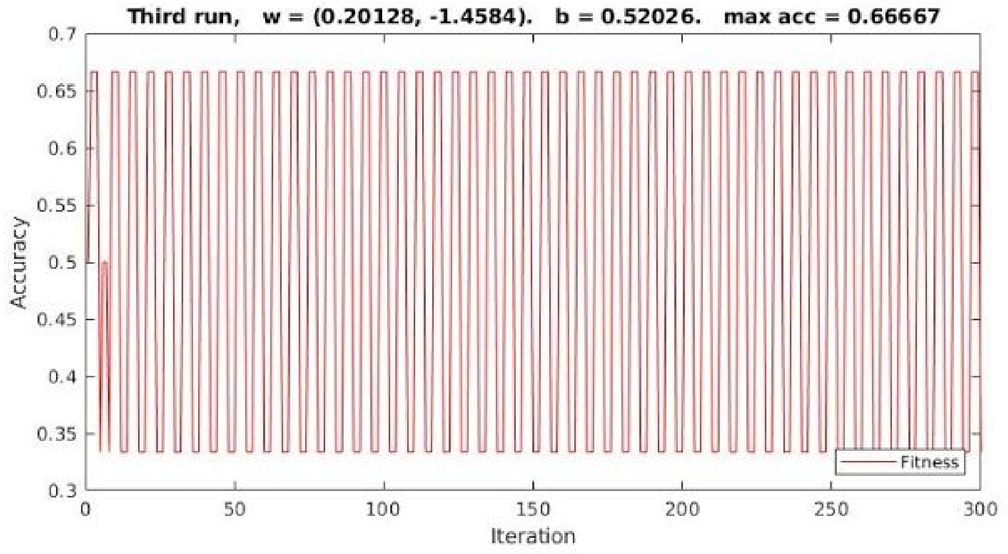
The sixth dataset is not linearly separable.









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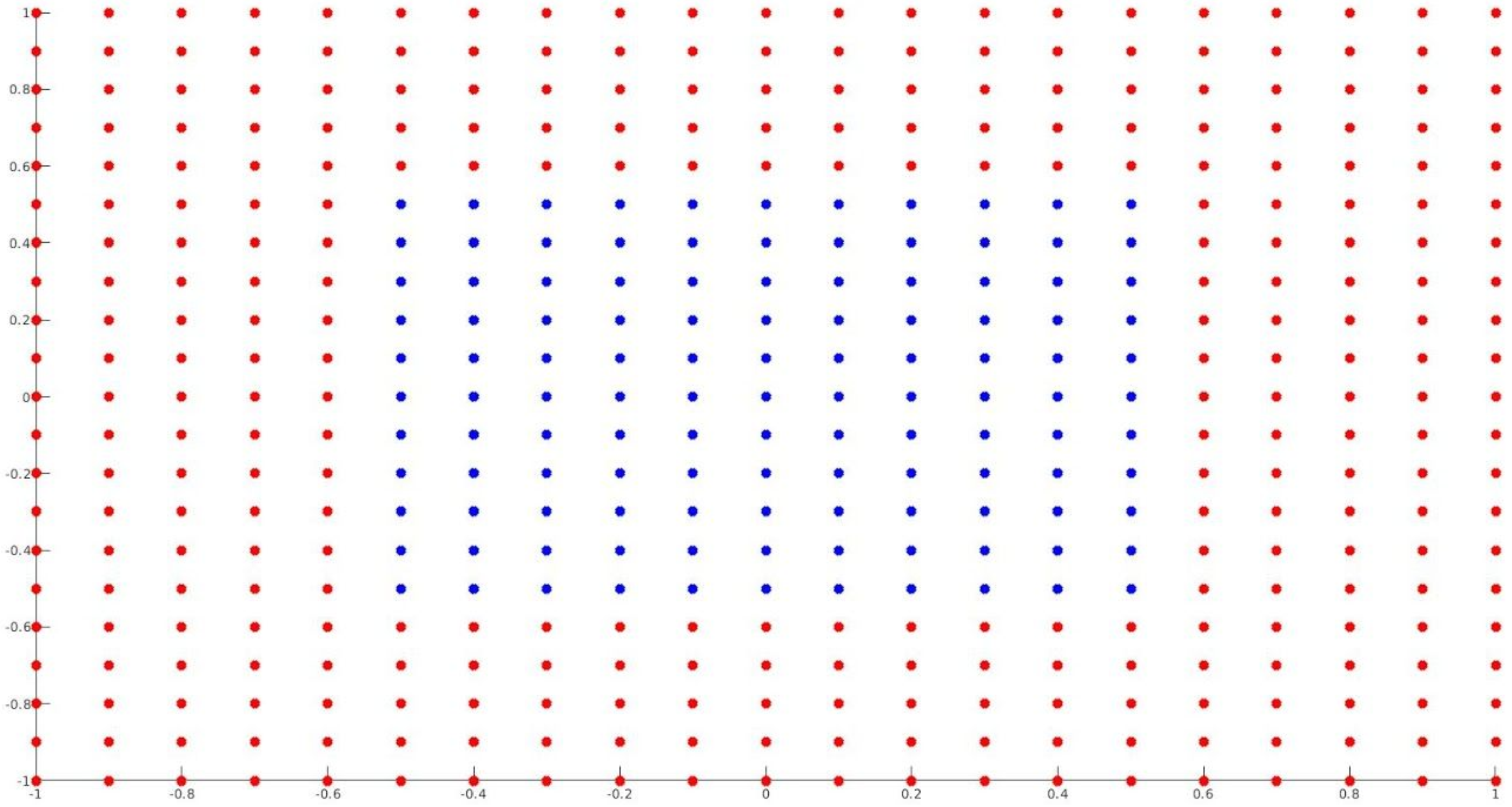
Multi Layered Neural networks

I built a deep neural network that behaves as follows:



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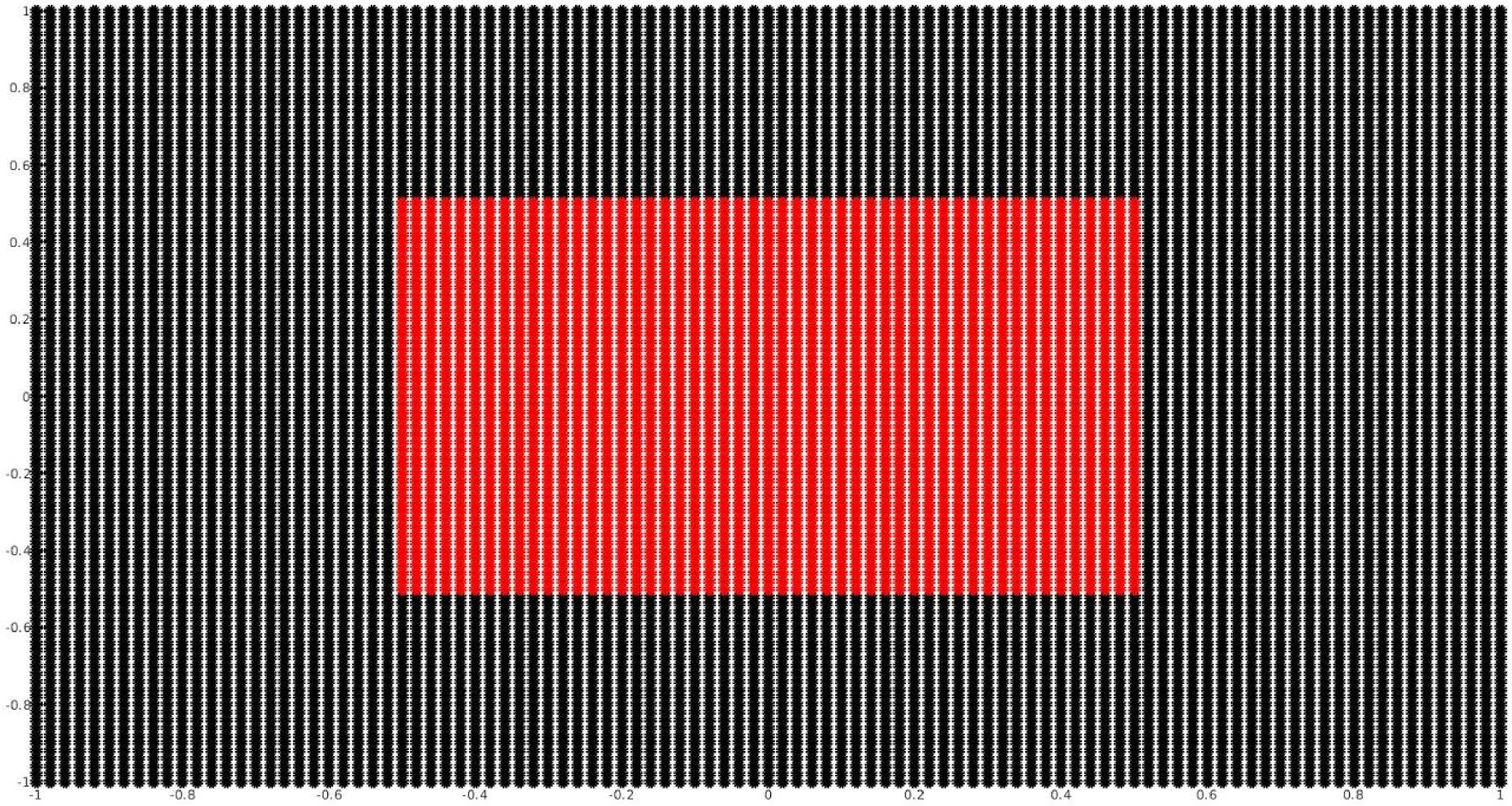
There is also a higher resolution image of this deep neural network.



The first layer contains neurons that determine the following

- Neuron 1: If the element of the x axis is greater than 0.5 (W = [0, 1] b = -0.51)
- Neuron 2: If the element of the y axis is greater than 0.5 (W = [1, 0] b = -0.51)
- Neuron 3: If the element of the x axis is less than -0.5 (W = [0, -1] b = -0.51)
- Neuron 4: If the element of the x axis is less than -0.5 (W = [-1, 0] b = -0.51)

The second layer contains a single neuron that has as entries the outputs of the first layer, and if a single one of the entries is 1, then the output will be one as well:
Neuron 1: (W = [1, 1, 1, 1], b = -0.1)

All of these code usted here is available in https://github.com/iamerroralpha/Hw07ComputationalIntelligence.

To run the code that corresponds to *the perceptron's learning rule in practice,* just clone the repo, and then run ***cod1.m***.
To run the code that corresponds to *multi layered neural networks*, clone the repo and run ***deepscript.m***.