

Tutorial for

Introduction to Computational Intelligence in Winter 2015/16

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<https://ls11-www.cs.uni-dortmund.de/people/rudolph/teaching/lectures/CI/WS2015-16/lecture.jsp>

Sheet 1, Block I

22 October 2015

Due date: 11 November 2015

Discussion: 12/13 November 2015

Exercise 1.1: McCulloch-Pitts Neural Network (3 Points)

Consider the McCulloch-Pitts ANN depicted in figure 1. Complete the truth table by specifying the output of each neuron(A-F) and the output of the network f for all possible input combinations of x_1, x_2 and x_3 .

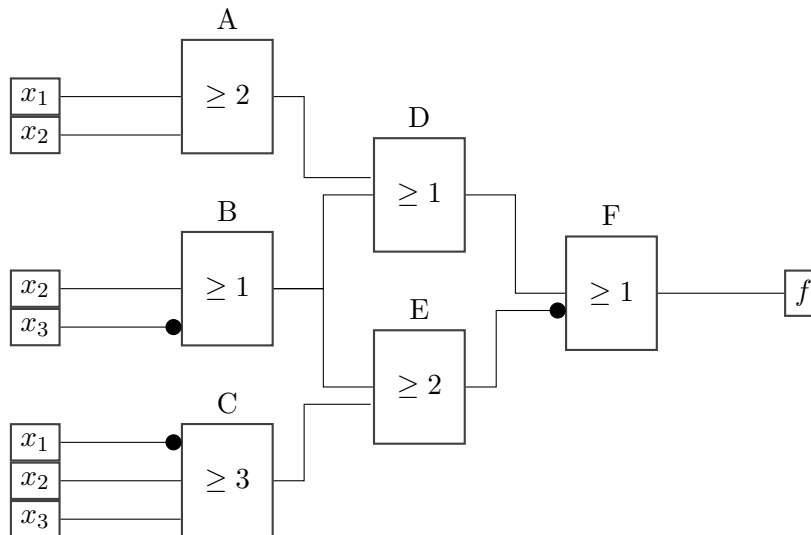


Figure 1: McCulloch-Pitts ANN

x_1	x_2	x_3	A	B	C	D	E	F	f
0	0	0							
1	0	0							
0	1	0							
0	0	1							
1	1	0							
0	1	1							
1	0	1							
0	0	0							

Table 1: truth table

Exercise 1.2: Perceptron Classification (3 Points)

A class $C \subset \mathbb{R}^2$ contains all points marked yellow in figure 2. Please note that the area is only bounded at the black lines.

Manually construct an ANN of perceptrons that decides whether an input vector $(x, y)^T \in \mathbb{R}^2$ belongs to C (i.e. is within the marked area) or not. State the reasons for your choice of weights and network structure.

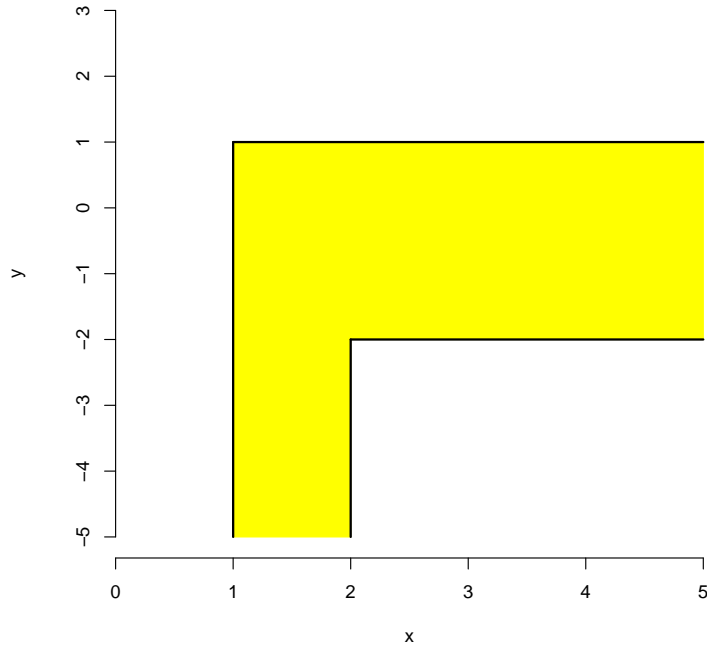


Figure 2: Plot this figure!

Exercise 1.3: Single-Layer Perceptron: Gradient method (8 Points)

To be announced after corresponding lecture on 28/10/2015.

Exercise 1.4: Multi-Layer Perceptron: Backpropagation (6 Points)

To be announced after corresponding lecture on 28/10/2015.