Homework 1

The exercises below are from Ch. 2, Marsland.
Your homework will be due on may 16, 2013 by 5 pm, Romel time. Email your solution as a Word or a pdf file to the instructor.

In some of the problems below, you can use the programs from Chapter 2 which are given in 2linear.

Problem 2.1 Consider a neuron with 2 inputs, 1 output, and a threshold activation function. If the two weights are $w_1 = 1$ and $w_2 = 1$, and the bias is $b = -1.5$, then what is the output for input $(0, 0)$? What about for inputs $(1, 0)$, $(0, 1)$, and $(1, 1)$?

Draw the discriminant function for this function, and write down its equation. Does it correspond to any particular logic gate?

Problem 2.2 Work out the Perceptrons that construct logical NOT, NAND, and NOR of their inputs.

Problem 2.3 The parity problem returns 1 if the number of inputs that are 1 is even, and 0 otherwise. Can a Perceptron learn this problem for 3 inputs? Design the network and try it.

Problem 2.4 Test out both the Perceptron and linear regressor code from the website on the parity problem.