5. How do we measure the success of the algorithm?

Hint: what is stored in the variable TOTAL\_ERROR and how are these values converted into

the number that is stored in SaveOutput vector?

Total error and the absolute error.

The error is adjusted by multiplying with the eta (adjusting weight) to minimize the error.

The saved output is the total error divided by the number of examples.

TOTAL\_ERROR <- TOTAL\_ERROR + abs(Error)

if(Error > 0) { # check if weights should be decreased

W[1] <- W[1] - abs(Error\*INPUT[Example,1]\*eta) # adjust weight 1

W[2] <- W[2] - abs(Error\*INPUT[Example,2]\*eta) # adjust weight 2

W[3] <- W[3] - abs(Error\*eta) # adjust weight 3 (=bias)

}

if(Error < 0 ) { # check if weights should be increased

for (i in 1:NUM\_INPUTS) {

W[i] <- W[i] + abs(Error\*INPUT[Example,i]\*eta) # adjust weight i

}

W[NUM\_INPUTS+1] <- W[NUM\_INPUTS+1] + abs(Error\*eta) # adjust the bias

}

}

Count <- Count + 1

SaveOutput[Count] <- TOTAL\_ERROR/NUM\_EXAMPLES

6. Run the script. How many generations did the perceptron need to find the solution (=to

reach zero error)?

When the difference between expected and actual output are equal.

7. Run the script again. Did you get the same answer as in question 6? If so, run it again. Why may the number of iterations differ for the same problem?

Hint: what is stored in the W vector when it is initiated?

0.7666049 0.2589865 -0.1314191 first run with W values

2.7487520 0.6253581 -0.4108031 second run with W values

8. Run the code 10 times, what is the average generation time for solving this task?

Hint: now might be a good time write a for loop... see code OR

9. Change the code so that the perceptron is trained on the AND operator.

Hint: change the numbers in the CORRECT\_OUTPUT variable. [0,0,0,1]

10. Run the code 10 times, what is the average generation time? See code AND

11. Which task takes longest to solve ”OR” or ”AND”? Why? The task is the same, to draw a

line somewhere in the coordinate system for x and y between 0 and 1.

Hint: in what range are the weights first set?

See redline in code OR