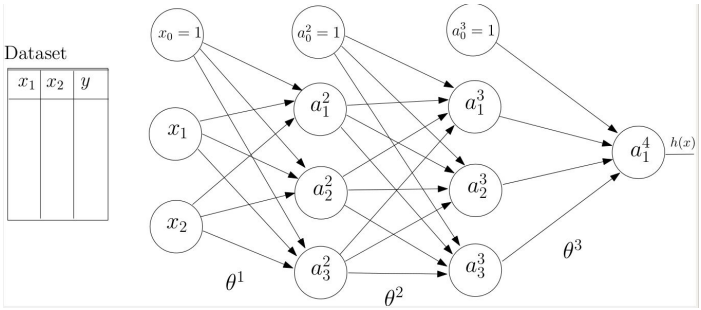
CSAL4243
Introduction to Machine Learning

Quiz 3

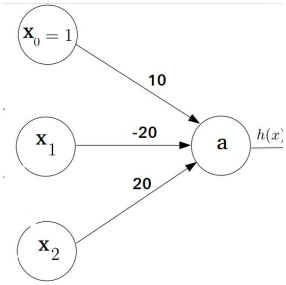
1. A neural network that has two hidden layers each with 3 neurons is trained on a dataset with two input features x1 and x2 and a binary output y has how many parameters? Justify your answer by drawing the network and showing parameters between consecutive layers. (3 marks)

θ^1 *is a* 3×3 *marix* = 9 parameters
θ^2 *is a* 4×3 *marix* = 12 parameters
θ^3 *is a* 4×1 *marix* = 4 parameters



2. For input x1=1 and x2=0, find the activation of the following neuron both a = g(z) and final output Y = 1 or 0 using logistic function. (3 marks)

Z = $\theta_0 x_0 + \theta_1 x_1 + \theta_2 x_2$ = 10*1 + (-20)*1 + 20*0 = -10
h(x) = a = g(z) = g(-10) ~ 0
Since h(x) <= 0.5 output y = 0



3. Neural network can only be used for classification? Yes/No, why? (2 marks)

Ans: No, neural network can be used for both classification and regression. The final cost function will change to regression problem as we did in linear regression.

4. Neural network gives a non-linear hypothesis function h(x). Yes/No, why? (2 marks)

Ans: Yes it gives a non-linear function h(x) by stacking multiple layers of neurons. Also logistic function is a non-linear function which is used for activation of each neuron and h(x) is combination of these neurons.