Quiz #1 : Optimization in Neural Networks
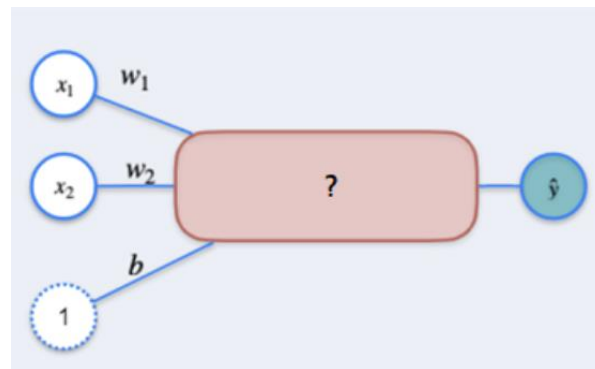
Question 1

Given the Single Layer Perceptron described in the lectures:

What should be replaced in the question mark?

a):- $w_1 w_2 + a_1 a_2 + b$

b):- $w_1 x_2 + w_1 x_2 + b_1 + b_2$

c):- $w_1 x_1 + w_2 x_2 + b$

d):- $w_1 x_2 + w_2 x_1 + b$

Answer:- c

Question 2

For a Regression using a Single Layer Perceptron, select all that apply:

a):-

The Loss Function used is $L(y, \hat{y}) = -y \ln(\hat{y}) - (1 - y) \ln(1 - \hat{y})$.

b):-

The Loss Function used is $L(y, \hat{y}) = \frac{1}{2}(y - \hat{y})^2$.

c):-

To minimize the Loss Function, we consider $L(y, \hat{y})$ as a function of w_1, w_2 and b.
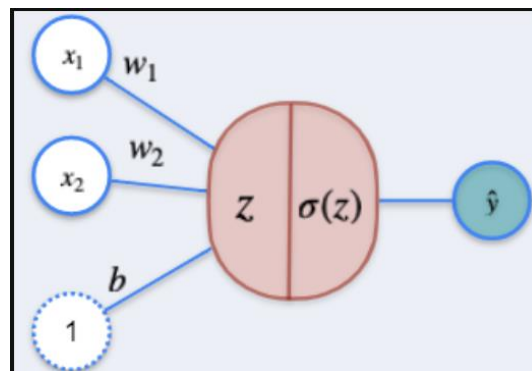
d):-

To minimize the Loss Function, we consider $L(y, \hat{y})$ as a function of x_1 and x_2.

Answer:- b and c

Question 3

Consider the problem of Classification using a Single Layer Perceptron as discussed in the lectures.

In the figure above, z and σ(z) are, respectively:

a):-

$z = w_1 x_1 + w_2 x_2 + b$ and $\sigma(z) = \frac{1}{2}(z - \hat{z})^2$

b):-

$z = \frac{1}{1+e^{-z}}$ and $\sigma(z) = w_1 x_1 + w_2 x_2 + b$

c):-

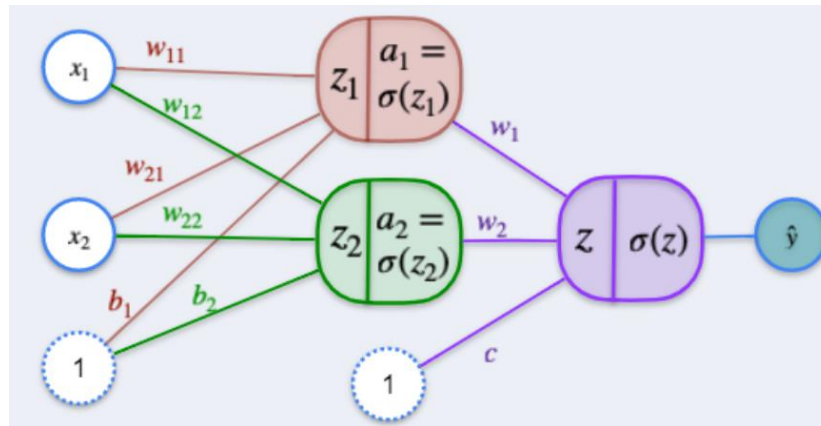$z = x_1 + x_2 + b$ and $\sigma(z) = \frac{1}{2}(z - \hat{z})^2$

d):-

$z = w_1 x_1 + w_2 x_2 + b$ and $\sigma(z) = \frac{1}{1+e^{-z}}$

Answer:- d

Question 4

In the 2,2,1 Neural Network described below

How many parameters must be tuned to minimize the Loss Function?

a):- 2

b):- 3

c):- 6

d):- 9

Answer:- d

Question 5

About Backpropagation, check all that apply:

a):- It is a way to obtain the input values for a given output of a neural network.

b):- It is a method to update the parameters of a neural network.

c):- It is the same as gradient descent.

d):- It is a method that starts in the output layer and finishes in the input layer.

Answer:- b,d