

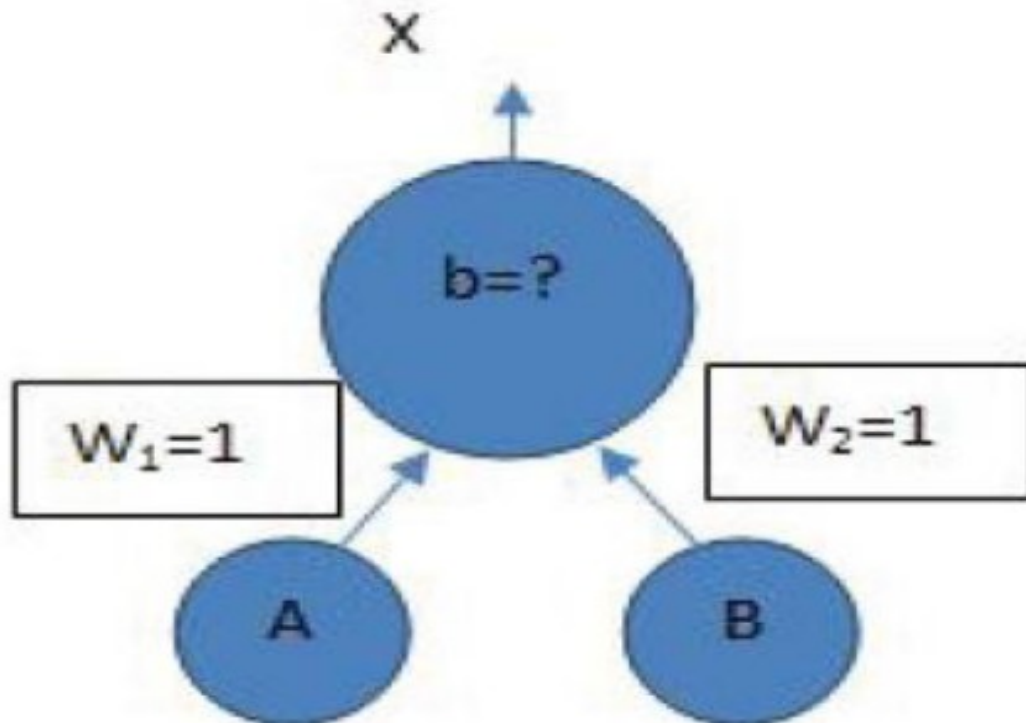
SCOA Assignment A5

Roll No. 41163

Title: Single Layer Perceptron

Problem Statement:

Write a program to find the Boolean function to implement following single layer perceptron. Assume all activation functions to be the threshold function which is 1 for all input values greater than zero and 0, otherwise.



Objectives:

1. Understand concept and basics of single layer perceptron.
2. Understand Boolean logic implementation using perceptron.

Outcomes:

1. Understand and implement concept and basics of single layer perceptron.
2. Understand and implement Boolean logic implementation using perceptron.

Software Requirements :

- Jupyter Notebook
- Python 3.8.5
- 64 bit OS

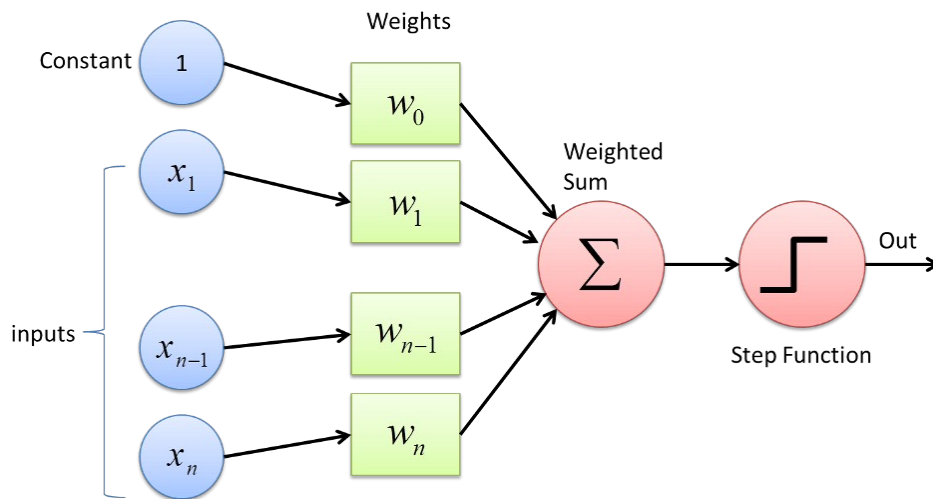
Hardware Requirements :

- Machine with 64 bit processor

Theory:

Perceptron:

A Perceptron is an algorithm used for supervised learning of binary classifiers. Binary classifiers decide whether an input, usually represented by a series of vectors, belongs to a specific class. In short, a perceptron is a single-layer neural network. They consist of four main parts including input values, weights and bias, net sum, and an activation function.



Perceptron is as a model that implements the following function:

$$\hat{y} = \Theta(w_1x_1 + w_2x_2 + \dots + w_nx_n + b)$$

$$= \Theta(\mathbf{w} \cdot \mathbf{x} + b)$$

$$\text{where } \Theta(v) = \begin{cases} 1 & \text{if } v \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

Test Cases:

Operation	Input	Expected O/P	Actual O/P	Result
And	0 0	0	0	Success
	0 1	0	0	
	1 0	0	0	
	1 1	1	1	
OR	0 0	0	0	Success
	0 1	1	1	
	1 0	1	1	
	1 1	1	1	
NOT	0	1	0	Success
	1	0	1	
XOR	0 0	0	0	Success
	0 1	1	1	
	1 0	1	1	
	1 1	0	0	

Conclusion:

Thus, we implemented single layer perceptron for Boolean functions.