Date: 21-03-2023 **Assignment # 02**

Subject: Artificial Intelligence (AI)

Total Marks: 100

Weightage: 2

Non-Extendable Deadline for submission is **16:00 PKT, Monday 27th March, 2023**.

Only Handwritten assignment will be accepted.

Topic: Neural Networks

Question 01)

Let us consider a perceptron that you want to train for the Boolean functions given below. For each function given, initialize the weights of the perceptron with values (0.1, 0.1, 0.1). You have to train one perceptron to learn the given functions. Report values of $\triangle$Wi's and Wi's after the first two training iterations of the perceptron learning algorithm. Assume learning rate η=0.1, and incremental weight updates.

(a) $x_1 \wedge \neg x_2$

(b) $x_1 \vee \neg x_2$

(c) $\neg x_1 \wedge \neg x_2$

Question 02)

Consider a two-layer feedforward ANN with two inputs a and b, one hidden unit c, and one output unit d. This network has five weights (w_{ac}, w_{bc}, w_{0c}, w_{cd}, w_{0d}), where w_{ox} represents the threshold (bias) weight for unit x. Initialize these weights to the values (0.1, 0.l, 0.l, 0.l, 0.1), then give their values after each of the first two training iterations of the BACKPROPAGATION algorithm. Assume learning rate μ= 0.3, momentum α = 0.9, incremental weight updates, and the following training examples:

a	**b**	**target**
1	0	1
0	1	0

P.S: Read in chapter 4 in Machine Learning by Thomas Mitchel's how to add momentum in an artificial neural network.