Indian Institute of Technology Indore
Discipline of Computer Science & Engineering
CS 403/603 Machine Learning
Lab 1 - Perceptron and Linear Regression

Some general instructions:

- Plagiarism in any form will not be tolerated.
- You are allowed to do only one submission before the deadline. However, in case of multiple submissions, only the last submitted file will be used for evaluation.
- Submission of the assignment should be made using Google Classroom platform only.
- Last date for submission of the assignment : **19th Aug 2021**

Question 1: Write down the perceptron learning rule to learn "NAND" Function using four patterns, as shown in Table 1.: and Implement the same using a perceptron.

Input	Output
0 0	1
0 1	1
1 0	1
1 1	0

Question 2: Download datasets of your choices from the UCI Machine Learning Repository

And perform the following two tasks(Linear Regression, Classification):

Task 1: Can a Perceptron be used as a Linear Regression? If yes, Perform Linear Regression using a Perceptron and mention the activation function (if used). Plot the data on a two-dimensional graph and report the accuracy. (Perform pre-processing of data if required).

Task 2: Use Perceptron as a binary classifier for the data set of your choice. Plot the data on a two-dimensional graph. Compare the results based on the precision, recall, and accuracy or plot confusion matrix. (Perform preprocessing if required).

Note- For task 2 you are allowed to modify the dataset to select the classes which are linearly separable. For example, If you are using iris dataset for the binary

classification you can remove the third class from the dataset based on its linear separability with the others. Hint- use only (Setosa, Versicolour) or (Setosa, Virginica).

Results:
Attach your code file and include a single write-up (pdf) file which includes a brief description for each question explaining what you did. Include any observations and/or plots required by the question in this single write-up file.
