**Deep Learning** **(Due: 13/05/20)**

# Assignment 1

*Instructor:* Siamak Mehrkanoon

**Assignment Policy**: Read all the instructions below carefully before you start working on the assignment, and before you make a submission.

- Please include your names and student IDs with your submission.
- You can do this assignment in groups of 2 or alone. Please submit no more than one submission per group.
- You have one week to work on the assignment.
- Please submit a short description of what you have done. including used methods, results, discussion, conclusion and references. The report should not exceed 4 pages. Please also submit your code along with your Short description. Put both of them in a zip file named "*yournames_assignment*1.*zip*", e.g. "Alex Smith and Julia Lopez_Assignment1.zip".

- In order to give everyone the same amount of time, late submissions are not allowed unfortunately. Unless it is discussed in advance.

## 1 Tasks:

**(a)** Download the Iris data and explore it, (visualize it, how many classes, instances, features, etc).

**(b)** Select feature number 0 and 2 and the first 100 samples and do the following analysis:

**(c)** Implement the logistic regression model that discussed in the class (with and without regularization). Use Gradient descent algorithm for updating the parameters. Visualize the results.

**(d)** Explore the influence of learning rate on the convergence of the model. (Tune the learning rate).

**(e)** Repeat steps 1-4 for different randomly selected features (e.g. 1 and 3 or 2 and 3) and compare the results.

**(f)** Give the option to the users to select whatever combination of features they want and your code will do the rest.

**(g)** Try your model on Monk2 dataset and report the results, (test accuracy, training accuracy, optimal learning rate, loss value). Use the last 20% of the data as test.