**Assignment No. 3**

Submission Date: 27/1/2025

1. Read chapter 11: [“Implementing a Multi-layer Artificial Neural Network from Scratch” of the book “Machine Learning with PyTorch and Scikit-Learn](https://drive.google.com/file/d/1rzCDAkmLlOdqGciO7NnARlnahCeaqzFS/view?usp=sharing)” by Raschka et al. (2022)
2. Given the code of chapter 11 that can be found in:

<https://github.com/rasbt/machine-learning-book/blob/main/ch11/ch11.ipynb>

your main goal is to extend the code to address two hidden layers (instead of a single hidden layer). Extend the code by creating a local copy of the ch11.ipynb, perform the revisions, and submit the GitHub link to your revised code.

1. Apply the code of section 2 with the two layers for classifying handwritten digits MNIST dataset using the same full ANN architecture presented in the class (see “Solution 1: A plain deep NN”) and evaluate its prediction performance (macro AUC) using Train(70%)/Test(30%) validation procedure.
2. Compare the predictive performance of section 3 with the original (single hidden layer) code and with the fully connected ANN implemented in Keras/TensorFlow/PyTorch (choose one).

Submission should include:

One file (RAR or ZIP) should be submitted in Moodle (תרגיל 3). The file should contain:

1. Readme file with the links to the GitHub source codes
2. A PDF file for explaining your solution and results.