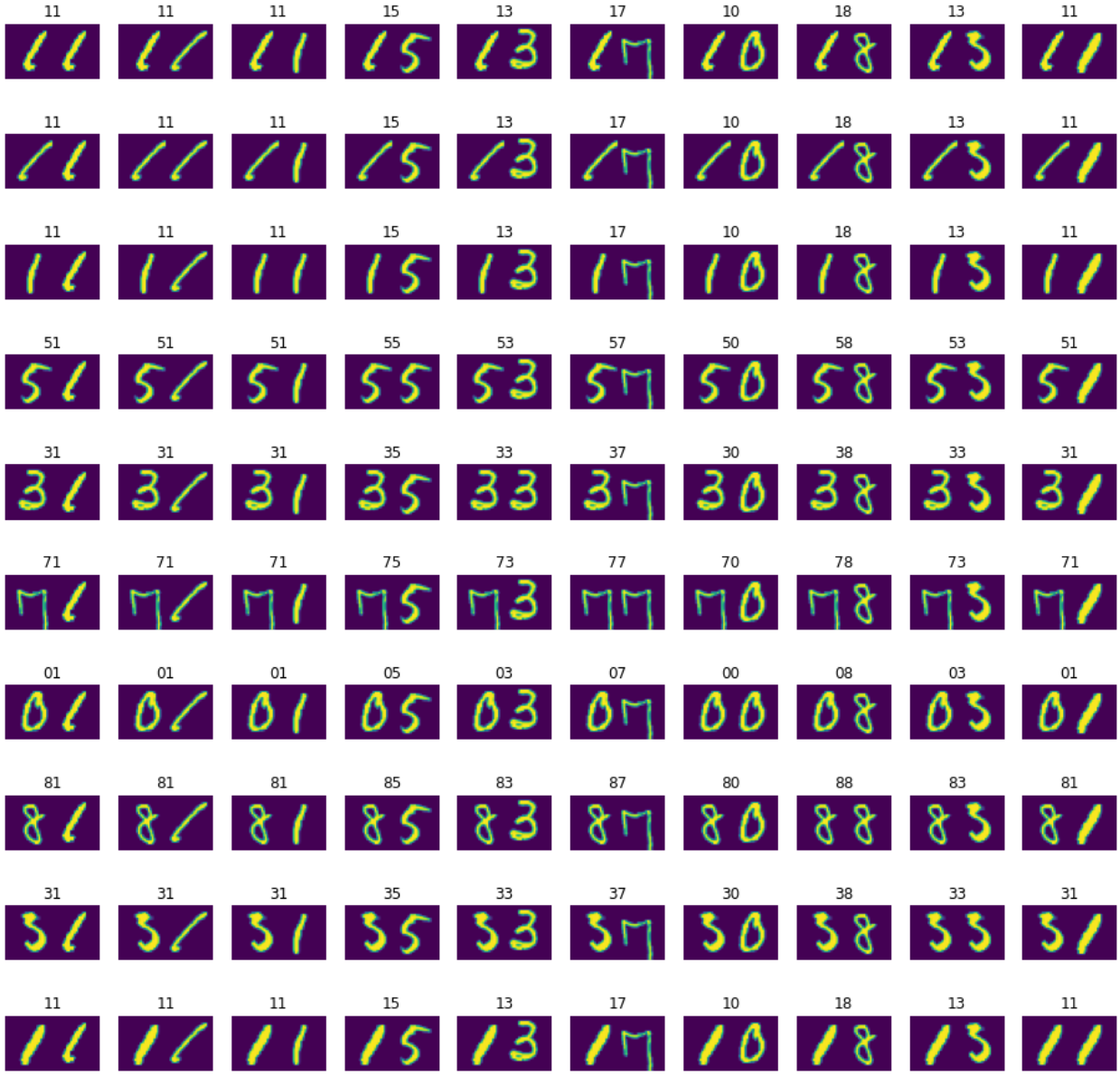
Assignment 1

Advanced Machine Learning - 2022

Due Date: Tuesday, 13 September 2022

Task: Design a fully connected neural network that classifies pairs of handwritten digits, as shown in the figure below.



(1) Note that the task is to classify a given image of a two-digit number, and hence we have a hundred classes.

(2) To create the training set, start from the MNIST training set, pick a batch of 10 images using the dataloader, and then create 100 images+labels from the pairs as shown above. These 100 images+labels pair will be one training batch.

(3) Create test-set in the same manner from the MNIST test set, and evaluate your network on it.
(4) Design a network with suitable input_size, output_size and number of neurons. You may choose the number of neurons and layers in your neural network, along with the optimizer and all other hyper-parameters.
(5) Train your network and show the loss function value, training and test error rates as was done in class.
(6) You may use the code example shown in class as your starting point.
(7) To submit your solutions: You have to upload, on moodle a jupiter(ipynb) notebook with your code and the outputs of the code. Any other submission format is invalid and won't be accepted. If the outputs of your code is not present in the uploaded ipynb notebook then you will get only partial credit.
(8) You may work in groups of two or three. Please write down your names and roll-numbers at the top of notebook of everyone in the group
(9) Only one of the group members should submit the jupyter notebook for the group.