Using Keras API to write ANNs

Installing Keras
Open “Anaconda Navigator”. Go to “Environments” and create environment in Anaconda and name it, e.g. “algo”.

Select the newly created environment by clicking the tab. Install numpy, tensorflow, keras, scikit-learn, and matplotlib by searching the “uninstalled” packages. Also install Jupyter Notebook within the environment.

Click ‘play’-button and select ‘Open with Jupyter Notebook’

Exercise
Getting started with an ANN
You may find answers to many of your questions at https://keras.io

Open a Jupyter Notebook and take a look at the code. Try executing cells by pressing shift+enter.

Your task
Try to improve the performance of the neural network. You can make teams of 2-4 persons. Keep track of your best performance (lowest validation error of the best epoch) in this spreadsheet:

https://docs.google.com/spreadsheets/d/1VOdX09fuCyj8H1jiiAp5a4fruwdDT2m-tUxkKPnLQTAQ/edit?usp=sharing

Remember to store your training parameters. The winning team should present its solution.

The rules

- you may not train for more than 500 epochs
- only train one network, no ensembles

Some ideas for modifications

- learning rate
- number of hidden neurons
- number of hidden layers
- batch size
- activation function (nonlinearity)
- update method (gradient descent optimizers)
- weight initialization
- dropout
- regularization