**# Exercise 1 - practical part - Fashion MNIST Classification with LeNet5**

This code provides an implementation of LeNet5 architecture for classifying images from the Fashion MNIST dataset.

**## Dataset**

The Fashion MNIST dataset is a collection of 28x28 grayscale images of 10 different categories of clothing items such as T-shirts, trousers, sneakers, etc. The dataset consists of 60,000 training and 10,000 testing images.

**## Model**

The LeNet5 architecture is used for image classification. It consists of three convolutional layers, followed by a fully connected layer. The input to the network is a 28x28 image and the output is one of 10 possible classes.

**## Run**

First set your relevant paths:

* models dir.
* plots dir (optional if you would like to see convergence graphs we saved).

The choose to train/load model :

* Load Trained Model and Test it (flag = 1).
* Train new model (flag = 0).

Finally pick the regularization method from:

* 'Batch\_Normalization'
* 'Dropout'
* 'Weight\_Decay'
* 'Without\_Regularization'

All changes are made in the 'For the Instructor' cell.   
Then click on 'Run all' or ctrl F9.

(The default parameters are: batch size = 100, epochs =60, learning rate = 1e-4. To change them go to the 'Globals' cell).

**## Results**

The model final accuracy on the train and test dataset is printed below each graph.

* without regularization - model accuracy train: 92.44% | test: 89.27%
* weights decay - model accuracy train: 91.35% | test: 89.30%
* dropout - model accuracy train: 90.07% | test: 88.55%
* batch normalization - model accuracy train: 95.16% | test: 90.16%