Deep Learning
Assignment 4

Instructions:

1. Provide commented, indented code. Variables should have meaningful names.
2. Use Google Colab as the code editing/ execution environment.
3. Write questions in separate text blocks before the code blocks containing answers.
4. Read the questions carefully before answering. If a question asks to follow a particular approach or to use a specific data structure, then it must be followed.
5. MNIST Dataset: http://yann.lecun.com/exdb/mnist
6. CIFAR-10 Dataset: https://www.cs.toronto.edu/~kriz/cifar.html

Tasks:

1. Build classifiers for MNIST and CIFAR-10 datasets using FNNs. Task 2 (Classifier construction and evaluation) below needs to be repeated for each dataset.
2. Classifier construction and evaluation:
    1. Split the training dataset into train and validation sets.
    2. Create a base FNN model by choosing hyperparameters like number of layers, number of neurons in each layer, batch size, learning rate etc. Proper justification should be provided for hyperparameter selection.
    3. Train the base model on the train-validation data.
    4. Plot the train and validation accuracy and loss curves.
    5. Modify the base model created in step 2 by adding batch normalization layers after each layer. See if the accuracy improves. Draw plots as in step 4. Note down your observations including the changes in the plots, if any. Continue with the modified model if the accuracy improves, otherwise revert back to the base model.
    6. Add dropout regularization (add a drop-out layer) to the model obtained in step 5. Train it and observe the changes in performance by plotting the accuracy and loss curves. Note down your observations.
    7. Run the best model (from among the ones created in steps 2, 5 and 6), on the test dataset and report the results.

Files to be submitted:

1. .ipynb file containing code named as '*YourName*_*YourRollNo*_Assignment4.ipynb'