Problem:

1. **(Neural Network) Task-0:** Download the MNIST dataset using torchvision. Split data into train, test, and validation. Apply the following augmentations to images: RandomRotation, RandomCrop, ToTensor, and Normalize. **[2 pts]**

   Task-1: Plot a few images from each class. Create a data loader for the training dataset as well as the testing dataset. **[2 pts]**

   Task-2: Write a 3-Layer MLP using PyTorch all using Linear layers. Print the number of trainable parameters of the model. **[4 pts]**

   Task-3: Train the model for 5 epochs using Adam as the optimizer and CrossEntropyLoss as the Loss Function. Make sure to evaluate the model on the validation set after each epoch and save the best model as well as log the accuracy and loss of the model on training and validation data at the end of each epoch. **[4 pts]**

   Task-4: Visualize correct and Incorrect predictions along with Loss-Epoch and Accuracy-Epoch graphs for both training and validation. **[3 pts]**

References:

- Build the Neural Network using Pytorch: https://pytorch.org/tutorials/beginner/basics/buildmodel_tutorial.html

- Google Playground: https://developers.google.com/machine-learning/crash-course/introduction-to-neural-networks/playground-exercises (Here, you can change your architecture and visually see the decision boundary that your NN learns at various epochs.)

End of Paper