Deep Learning Assignment Two

Due October 31, 2025. This assignment must be completed in **groups of 2 or 3**.

Try to achieve more than 99% test accuracy on MNIST using a convolutional network. Experiment with different architectures, augmentation methods, and regularization methods to get a sense of a) what is helpful, and b) reasonable ranges of hyperparameters. After this preliminary exploration, use Optuna to search for good hyperparameters. Describe your network, the hyperparameter space you explored (and why), and observations from exploring this space. Report hyperparameter values and test accuracy of your final model after automatic hyperparameter optimization. Comment on the limitations of not using separate validation and test sets.

Submission Checklist

Submit the following:

- A PDF file with the requested results and discussion (up to two pages).
- Your Python source code.

Grading

Marks will be assigned as follows:

- Informed discussion of your approach to hyperparameter exploration (3 marks)
- Your observations from exploring hyperparameter space (1 mark)
- Correct and effective use of Optuna in your code (1 mark)
- Final performance of your model (1 mark)
- Comment on limitations of not using a separate validation set (1 mark)