# HW9

## Simple Image Classification using Convolutional Neural Network

This homework demonstrates creating and training a simple Convolutional Neural Network (CNN) for image classification using PyTorch.

### Tasks

1. Experiment with different numbers of filters (e.g. 16 and 32) in the convolutional layers. Compare the performance of the model with different numbers of filters.

2. Experiment with different kernel sizes (e.g. 3x3 and 5x5) in the convolutional layers. Compare the performance of the model with different filter sizes.

3. Experiment with padding and without padding in the convolutional layers. Compare the performance of the model with and without padding.

4. Pick the best model from the above experiments. Use the settings and train your network with 0.30 dropout. Compare the results.

Use the following hint:

```
super(SimpleCNN, self).__init__()
        self.layer1 = nn.Sequential(
            nn.Conv2d(……..),
            nn.ReLU(),
            nn.MaxPool2d(kernel_size=2, stride=2))
        self.layer2 = nn.Sequential(
            nn.Conv2d(……..),
            nn.ReLU(),
            nn.MaxPool2d(kernel_size=2, stride=2))
        self.fc = nn.Linear(……..)
        self.dropout = nn.Dropout(dropout_rate)
```

You only need to submit one PDF report that includes the final accuracies for different configurations, your observations, and your implementation code of Simple CNN. You need to implement task 4 in your solution since it is not provided.

The visualization function is already implemented for you, you can use it.