• Build the Residual Network specified in Figure 1 and achieve at least 60% test accuracy. In the homework, you should define your "Basic Block" as shown in Figure 2. For each weight layer, it should contain 3 × 3 filters for a specific number of input channels and output channels. The output of a sequence of ResNet basic blocks goes through a max pooling layer with your own choice of filter size, and then goes to a fully-connected layer. The hyperparameter specification for each component is given in Figure 1. Note that the notation follows the notation in He et al. (2015).

• Fine-tune a pre-trained ResNet-18 model and achieve at least 70% test accuracy.

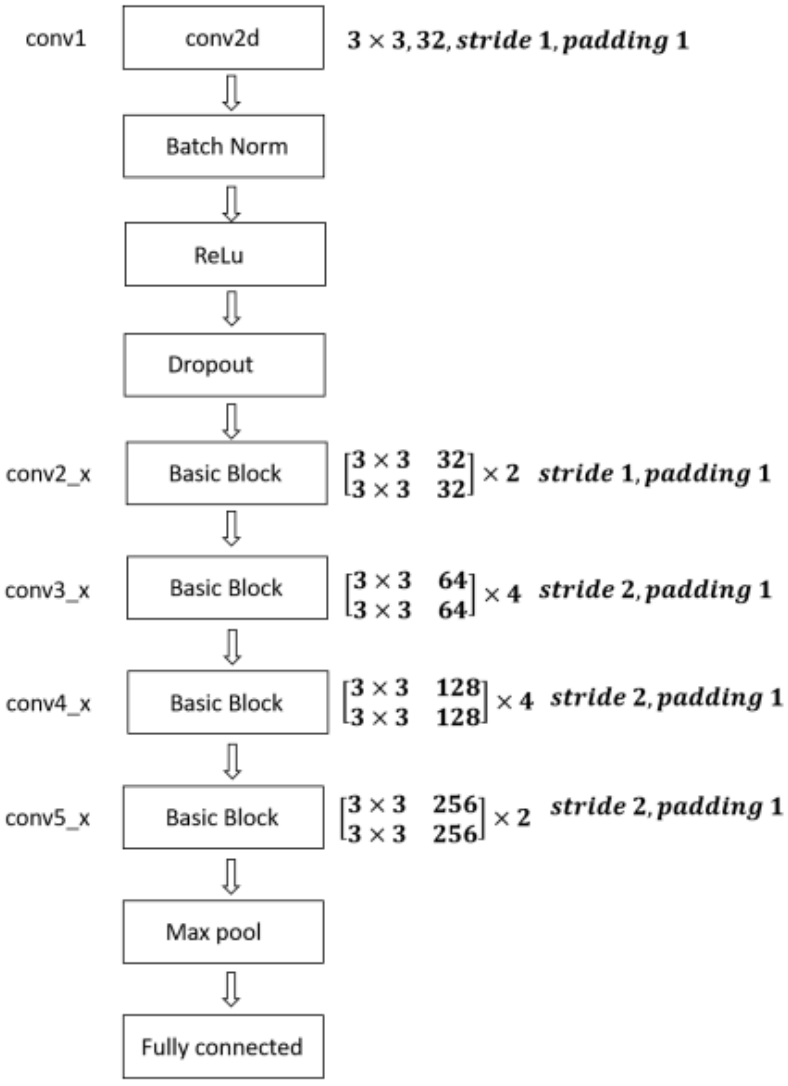

Figure 1: ResNet Structure

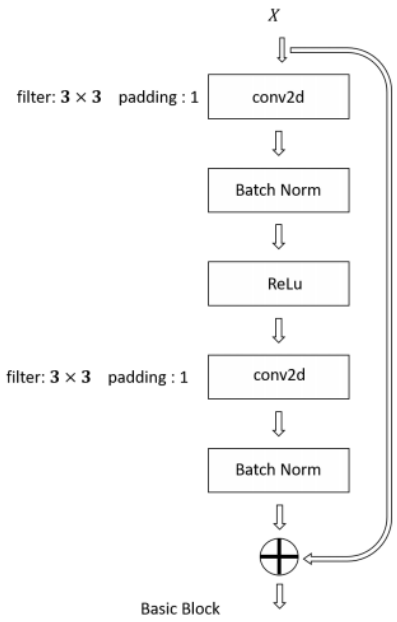

Figure 2: Basic Block

Part 1
Test Accuracy = 61%
Train Accuracy = 73.1%
Number of epochs = 65

Hyper-Parameters:
Learning Rate = 0.0001
Optimizer Used: SGD
Momentum: 0.9
Dropout Probability = 0.3
MaxPool : Kernel Size 2
Training Data Augmentation Techniques: Random Crop and Random Horizontal Flip

Part 2 (Transfer Learning)
Test Accuracy = 72%
Train Accuracy = 77.8%
Number of epochs = 25

Hyper-Parameters:
Learning Rate = 0.0001
Optimizer Used: SGD
Momentum: 0.9
Training Data Augmentation Techniques: Random Crop and Random Horizontal Flip