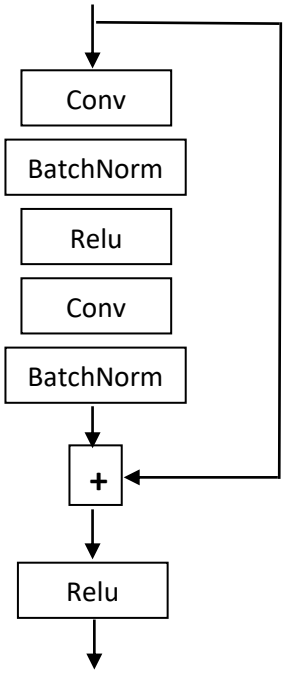
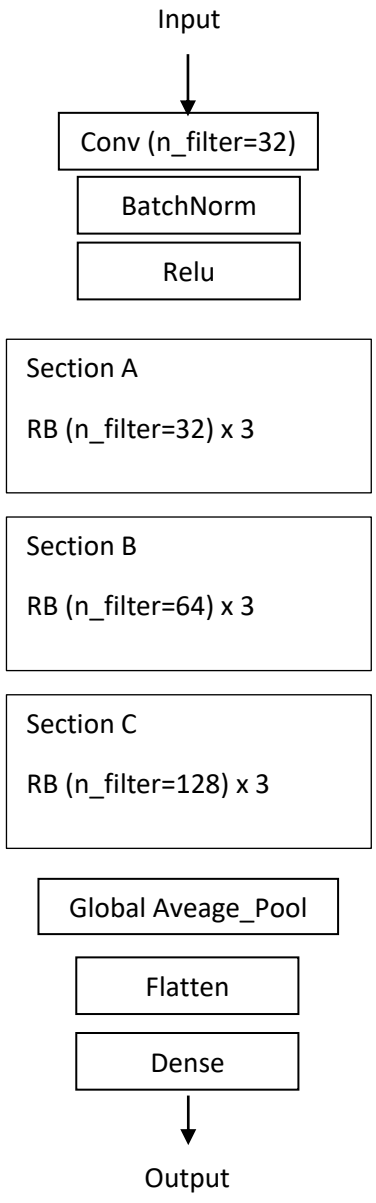
CSC 4700 Homework 1 (due March. 14th by end of day)

Implement the residual network specified in the "ResNet Structure" diagram. Sections A, B, and C consist of multiple residual blocks (RBs) as shown in the "residual block" diagram. All convolutional layers use kernel size = 3, stride = 1 and padding = 'same', except the following: Section B, RB0, conv0, and Section C, RB0, conv 0. These two conv layers use stride = 2.

Residual Block (RB):



ResNet Structure



Note that RB0 of sections B and C changes the feature map size and the number of channels. You cannot simply add the result tensor with the skip tensor as they have different shapes. You can use a (1x1) conv layer (no BN or activation) to change the shape of the skip tensor to match the shape of the result tensor.

Train your model on the cifar10 dataset. Save the trained model after training.

Homework Submission:

Upload a Python file (not .ipynb file) named **ResModel.py** in moodle. You need have the following in the file:

1. A function **create_model()** which returns a keras model (untrained) that implements the above resnet.
2. A function **get_trained_model()** which returns a keras model for the above resnet with trained weights. This model should be compiled with accuracy in metrics.

We will test your model by running some code similar to the following:

```
from ResModel import create_model, get_trained_model

um = create_model()
um.summary()    ## print out summary of the model
um.fit(some_train_images, label_of_images, epochs=5, batch_size=128)

m = get_trained_model()
_, accuracy = m.evaluate(some_test_images, label_of_images)
```

In get_trained_model, your code should not train the model from scratch and return the model. Rather, the code should load a trained model from a model file and return it. Example code for save and load trained model:

```
from keras.models import load_model
model.save('my_model.h5')

model = load_model('my_model.h5')
```

You should not upload the .h5 file of the trained model to moodle. Instead, you should share it in your google drive and put the share link in a comment line at the beginning of the ResModel.py. **Before submission, make sure people other than yourself can download the model file using the link. Your code should work when ResModel.py and the model file are in the same directory.**