**Assignment 1 Executive Summary**

The goal of this analysis was to understand how RNN’s work with time-series data, then to use various methods to improve the performance of the network, and use different deep-learning layers on the time-series data. Each change to the layers, or different modeling methods, all resulted in a difference in the MAE of the models.

**Findings for Select Changes in the Model**

1. **Training and evaluating a dropout-regularized LSTM with 1 LSTM Layer**
   1. Using an LSTM with one Layer resulted in an MAE worse than our baseline of 2.62. The LSTM model achieved an MAE of 5.93.
2. **Increased LSTM to 2 Layers**
   1. Again using a dropout-regularized LSTM, now with 2 layers, the MAE slightly improved to 5.67. Not as large of a drop as I was hoping, but an improvement.
3. **Using a GRU model instead – 2 Layers**
   1. Much better MAE at 4.32, but still above the MAE of the baseline. I’m sure I could add steps to my epochs to help train, but each model run is taking almost 7 minutes, and I’m not sure how to improve that while adding steps to my epochs.

**Recommendations:**

After running models with both LSTM and GRU networks, the GRU did perform better, but only slightly, and both performed worse than the initial baseline model. I’m sure I could add steps to each epoch and run the models for a longer time period, and at this point that might be the best way to move forward, as well as adding layers to a GRU model. If I were to run this experiment again, I would have 64 or 128 nodes per layer, and a 2 or 3 layer GRU RNN to see what MAE it would come back with.