Summary

Requirement 1: This row indicates that when the number of GRU units was increased, the lowest validation MAE obtained was 4.5897, which occurred at the very first epoch. This could suggest that the model with more GRU units performed well quickly, but it's important to note that this might not necessarily indicate overall best performance as sometimes a lower MAE can be achieved at a later epoch after more training.

Requirement 2: The second row shows that when a model with a combination of LSTM and GRU units was built and used, the lowest validation MAE was 4.5833 at Epoch 2. This change to the model build did result in a slight improvement in MAE when compared to the first requirement. This suggests that the inclusion of LSTM layers offered a benefit in this case.

Requirement 3: The final row shows the model that combined 1D convolutional layers with an LSTM layer. This model achieved the lowest validation MAE of 4.0596 at Epoch 8. This is the lowest MAE reported in the table, suggesting that the combination of convolutional layers (which can capture local patterns in sequence data) with LSTM layers (which can capture long-term dependencies) was the most effective model structure among those tested.

After running many different models, including the three for the requirements, it appears that the model leveraging the strengths of both convolutional layers and recurrent networks (Requirement 3) is the most promising in terms of validation MAE. This indicates potentially better generalization on unseen data. I have found that combining the 1D convolutional and LSTM layers worked very well. I wonder what would happen if I made another model with 1D convolutional, LSTM, and GRU layers all combined. I think it would perform even better.

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| **Requirement** | **Description** | **Lowest Validation MAE** | **Epoch** |
| 1 | Adjusting the number of units in each recurrent layer in the stacked setup | 4.5897 at Epoch 1 (Adjusted model with increased GRU units) | 1 |
| 2 | Using layer\_lstm() instead of layer\_gru(). | 4.5833 at Epoch 2 (Adjusted model with LSTM and GRU units) | 2 |
| 3 | Using a combination of 1D convnets and RNN. | 4.0596 at Epoch 8 (Conv1D + LSTM model) | 8 |