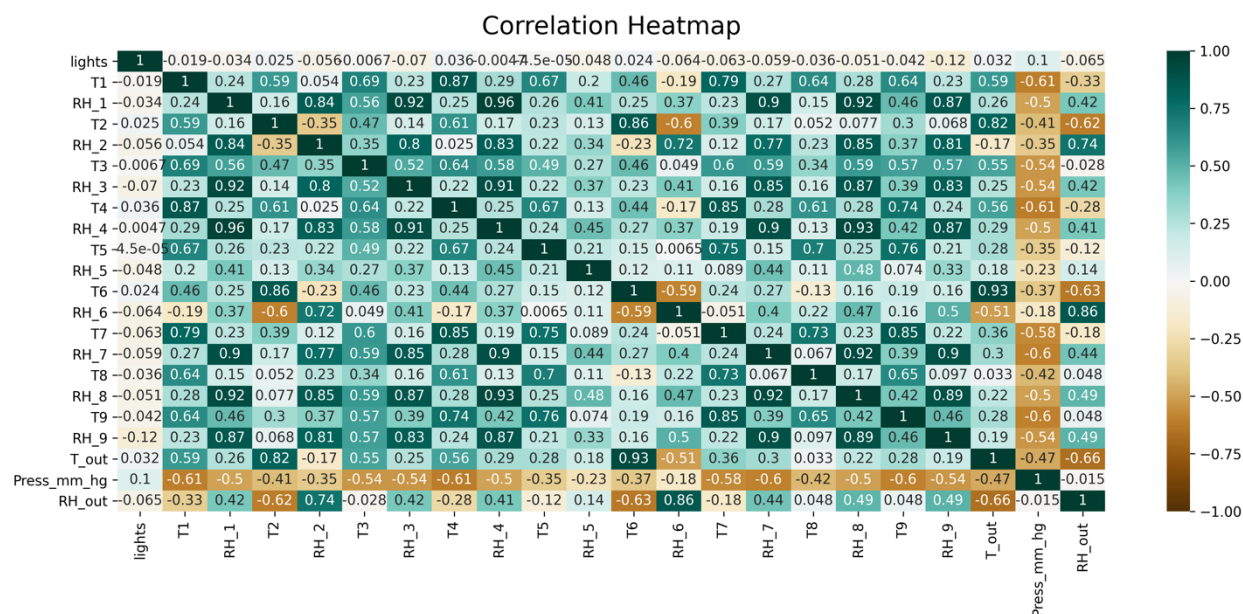


1.

a)

I believe the humidity and temperature in all the rooms, the humidity and temperature from outside, and the pressure could be relevant in predicting energy usage.

b)



c)

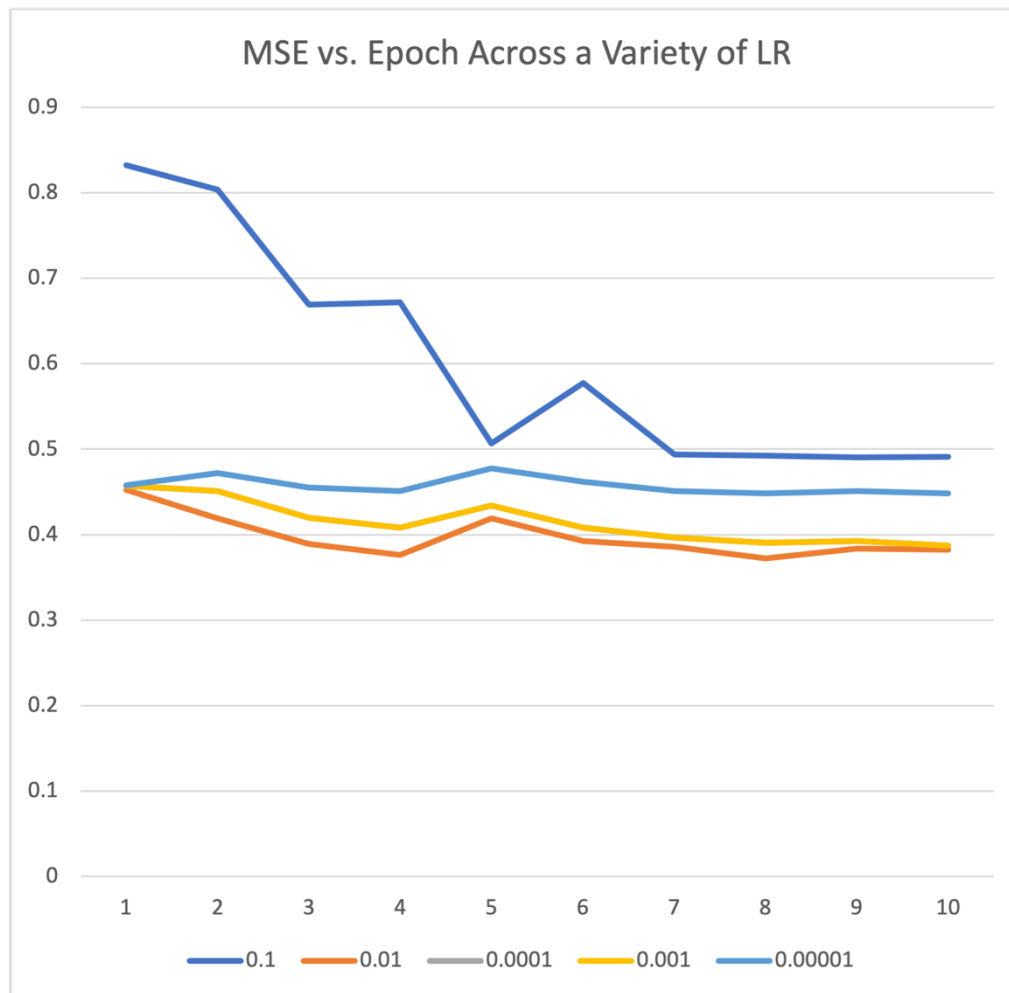
For the regression, I kept everything except for the indoor temperatures. I decided to omit all the indoor temperatures because there was very little correlation between indoor temperature and energy usage, so including them will not significantly impact the results. Additionally, they were correlated with the corresponding indoor humidity from the same room, so omitting them reduces multicollinearity.

d)

I decided to scale my data using sklearn's standard scaler

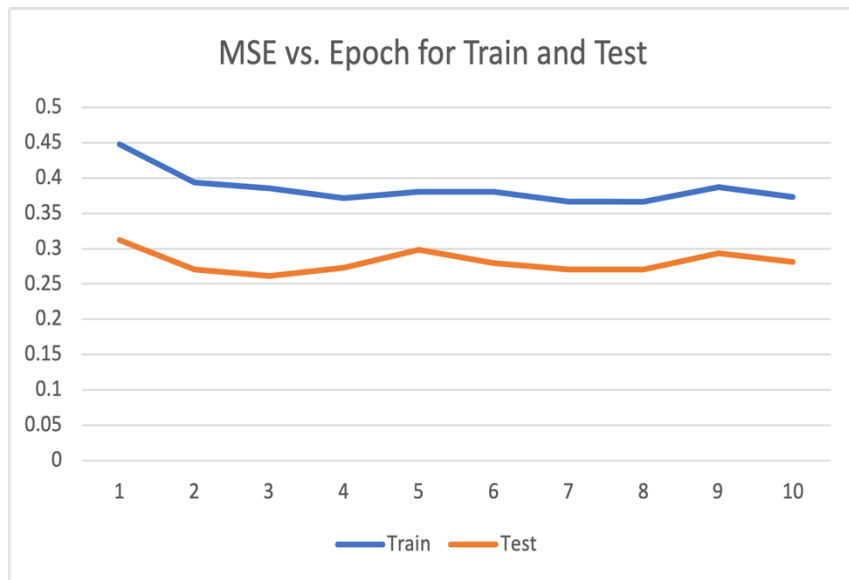
3.

b)

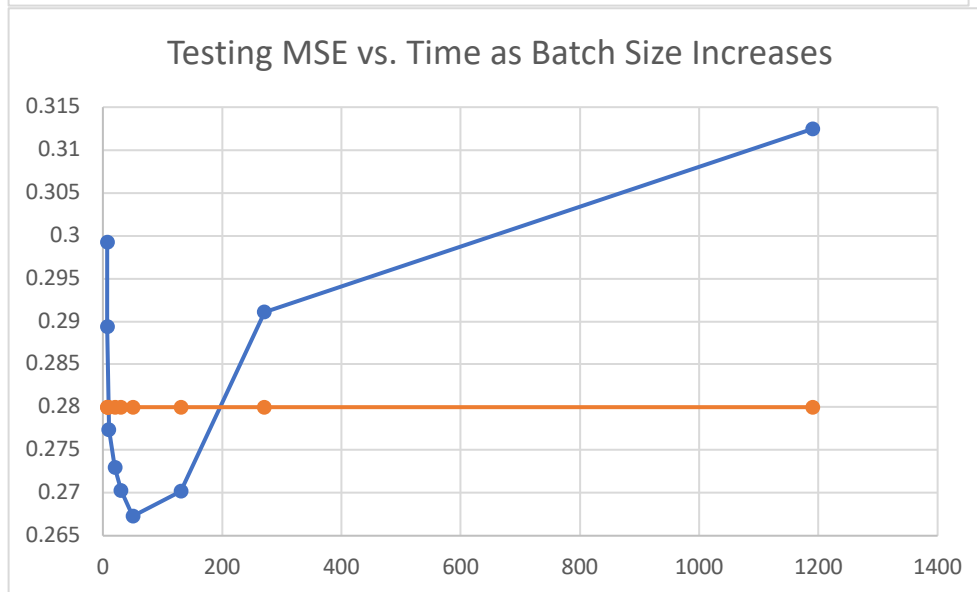
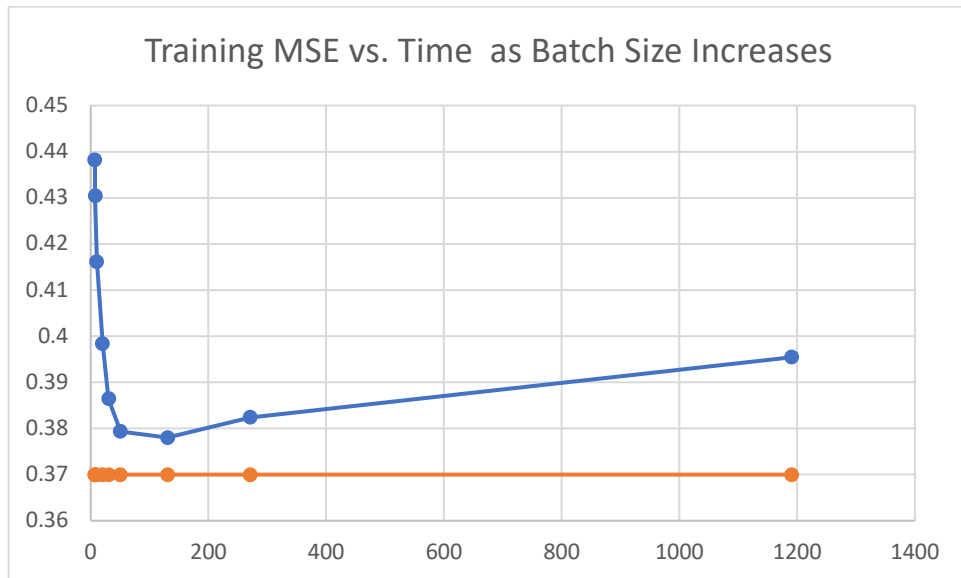


The optimal learning rate appears to be 0.01 since it has the lowest MSE across all Epochs

c)



4
a)



b)

Lower batch sizes significantly increase runtime. Lower size also improves training and testing MSE up to a certain point, then it has a negative effect. For this dataset, that point occurs when the runtime of 136 seconds, or a batch size of 130. The lowest Training MSE achieved was 0.3785 which was higher than the closed form solution of 0.37. The lowest Testing MSE achieved was 0.2675 which was lower than the closed form solution of 0.28.