

1. What are the inputs and outputs for this neuron?

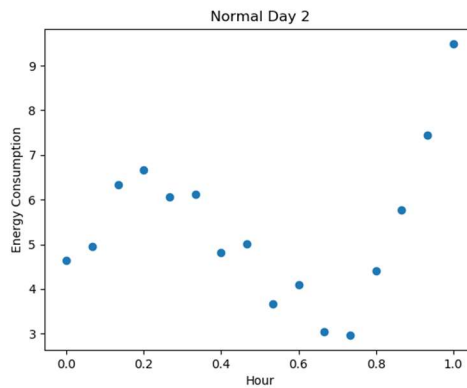
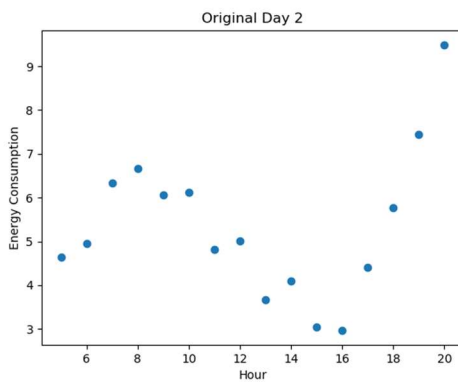
- Inputs
 - Our Inputs was the graph provided for each day of training. The Energy Consumption per day by the time of the day in hours
- Outputs
 - The outputs for our neuron were dataframes that contained the predicted energy consumption per hour for each iterative day

2. Which activation function is used in the three architectures above and why?

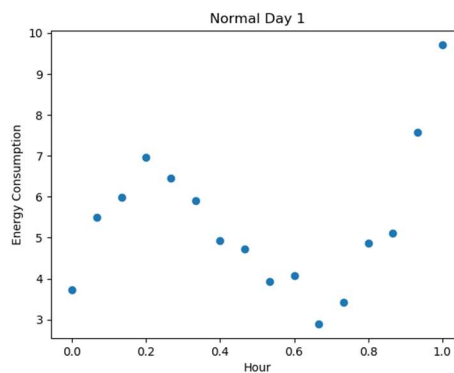
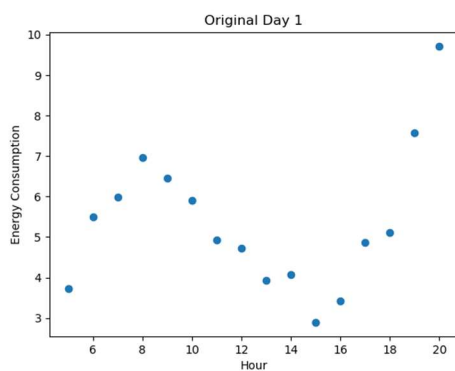
- Linear Activation function for polynomial regression because our function is not attempting to classify the dataset, but instead predicting a value for a given datapoint by looking at previous training days.

3. Compare training and testing total errors with each architecture

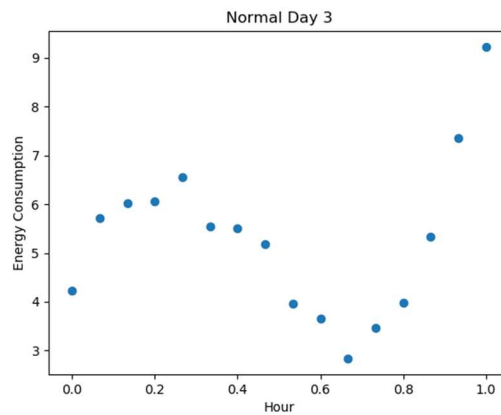
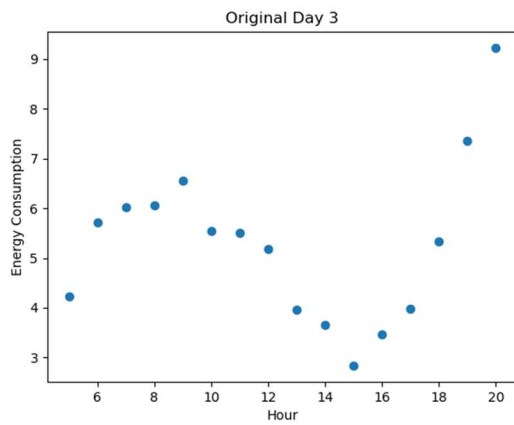
- Train the decision unit on the 3 training days. Report Total Error for each day as well as graphs for each iteration plus the original model
- Original and Normal Graphs for each Day
 - Day 1



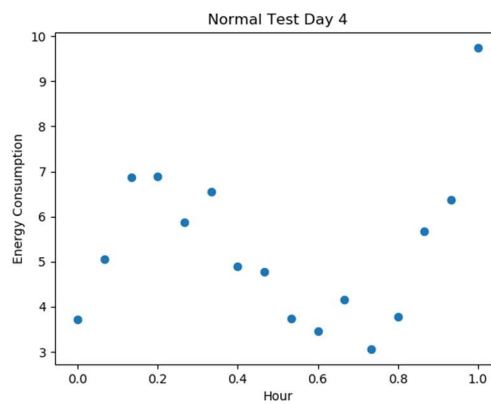
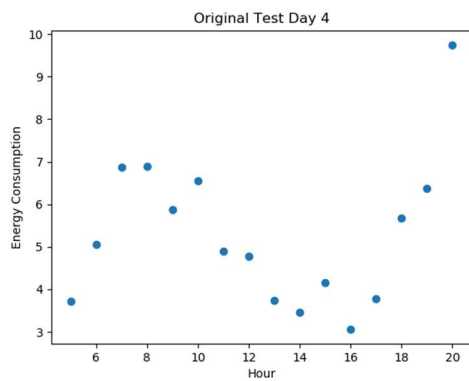
• Day 2



• Day 3



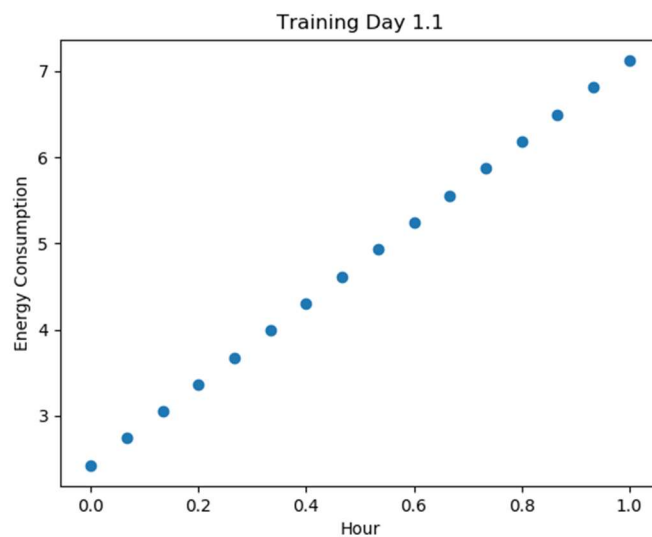
• Day 4



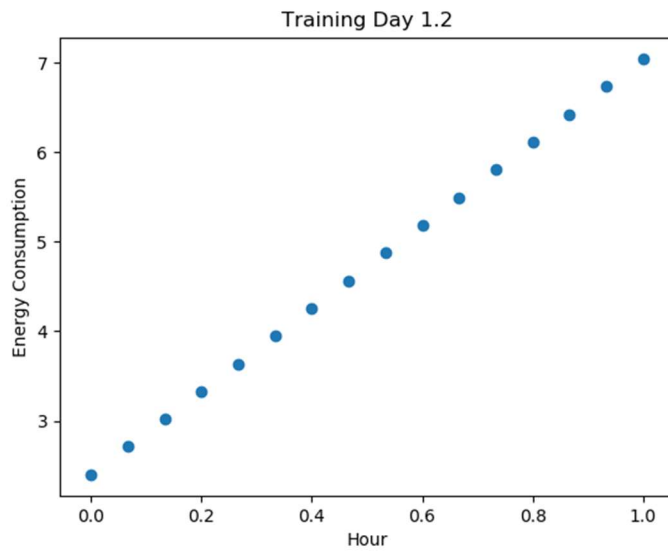
• Model 1

○ Day 1

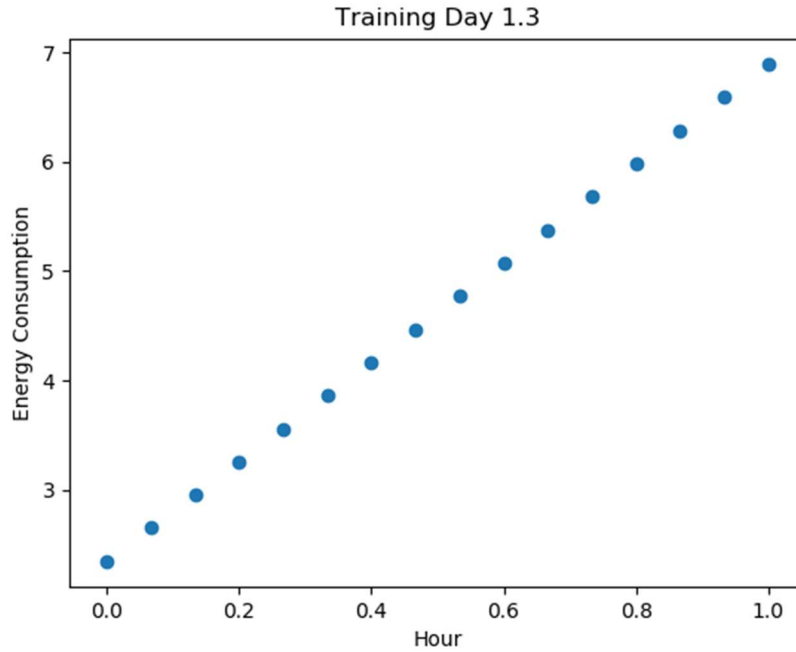
▪ Total Error – 27.322



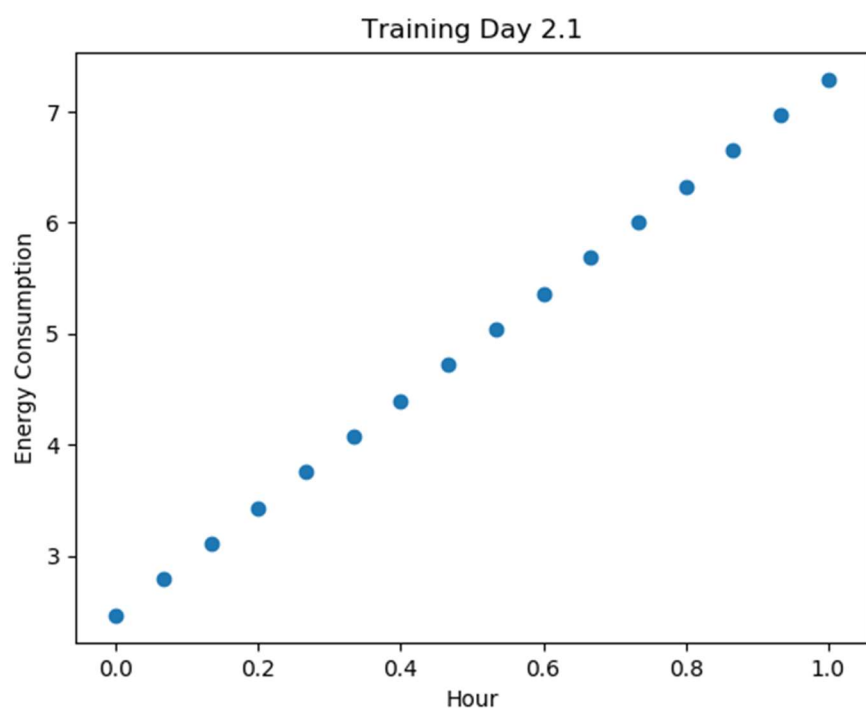
- Day 2
 - Total Error – 27.174



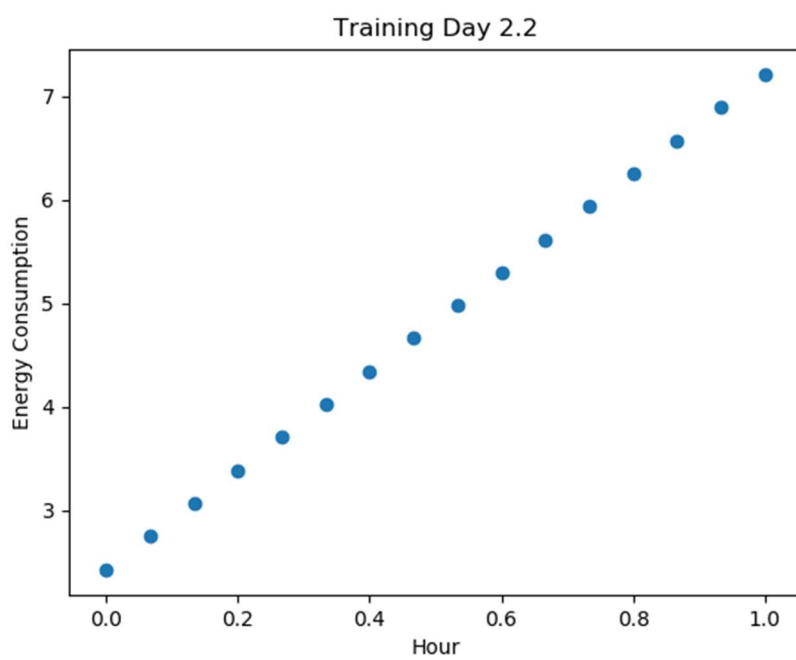
- Day 3
 - Total Error – 26.892



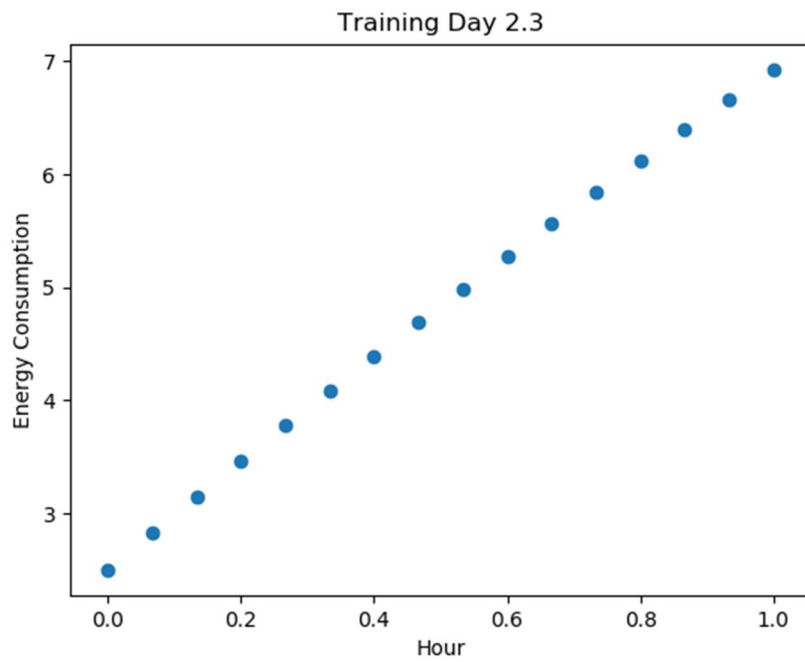
- Model 2
 - Day 1
 - Total Error – 27.711



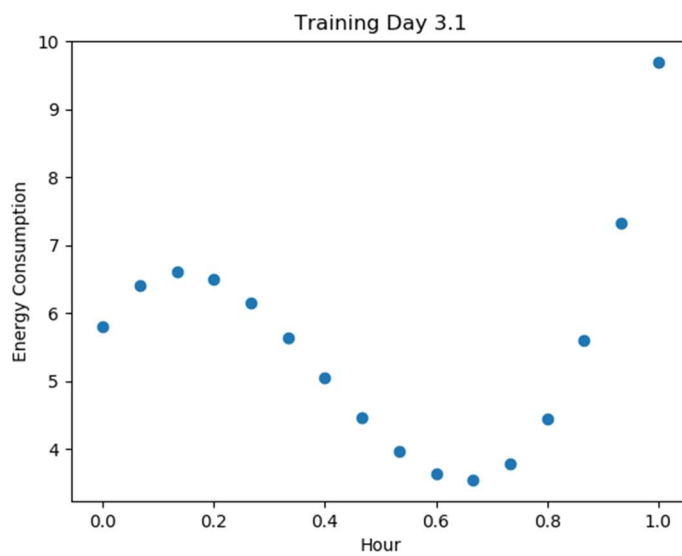
- Day 2
- Total Error – 27.583



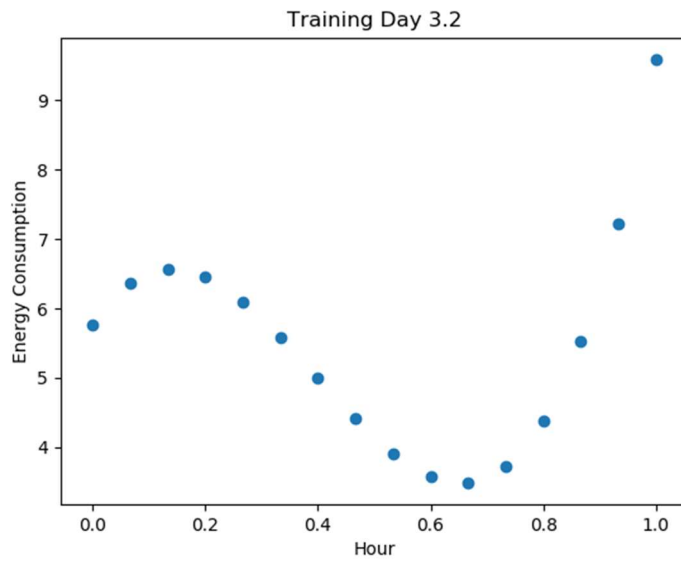
- Day 3
- Total Error – 26.353



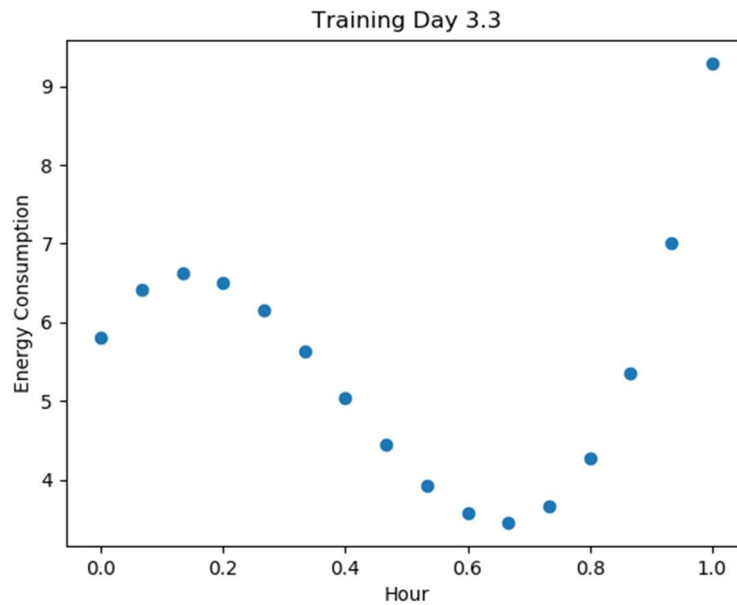
- Model 3
 - Day 1
 - Total Error – 9.163



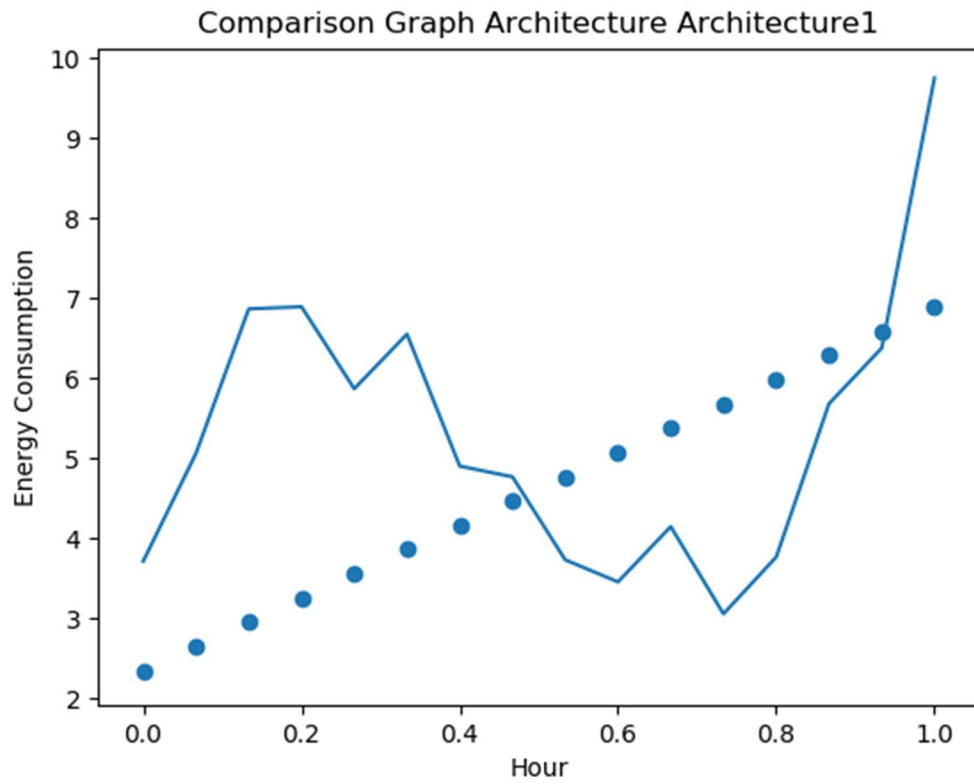
- Day 2
 - Total Error – 8.986



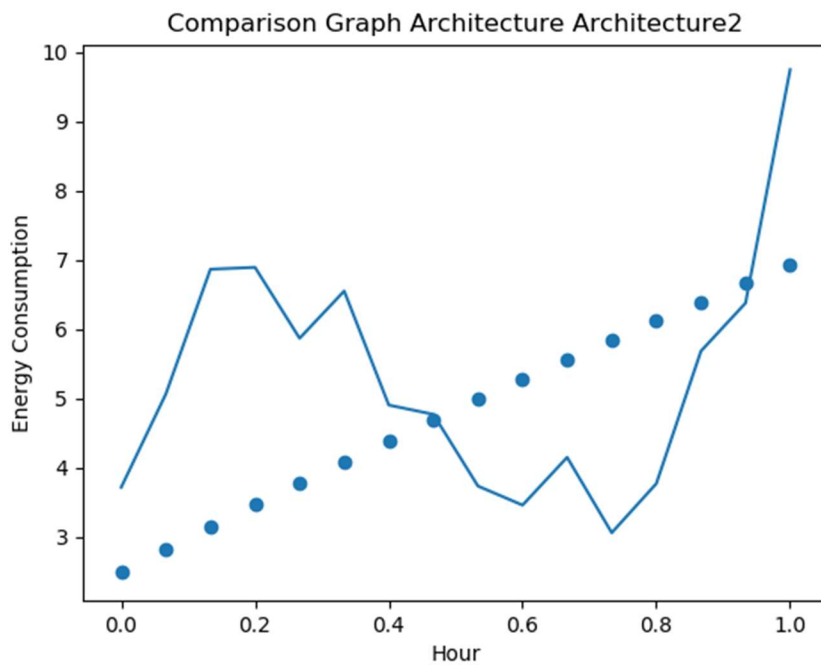
- Day 3
 - Total Error – 8.778



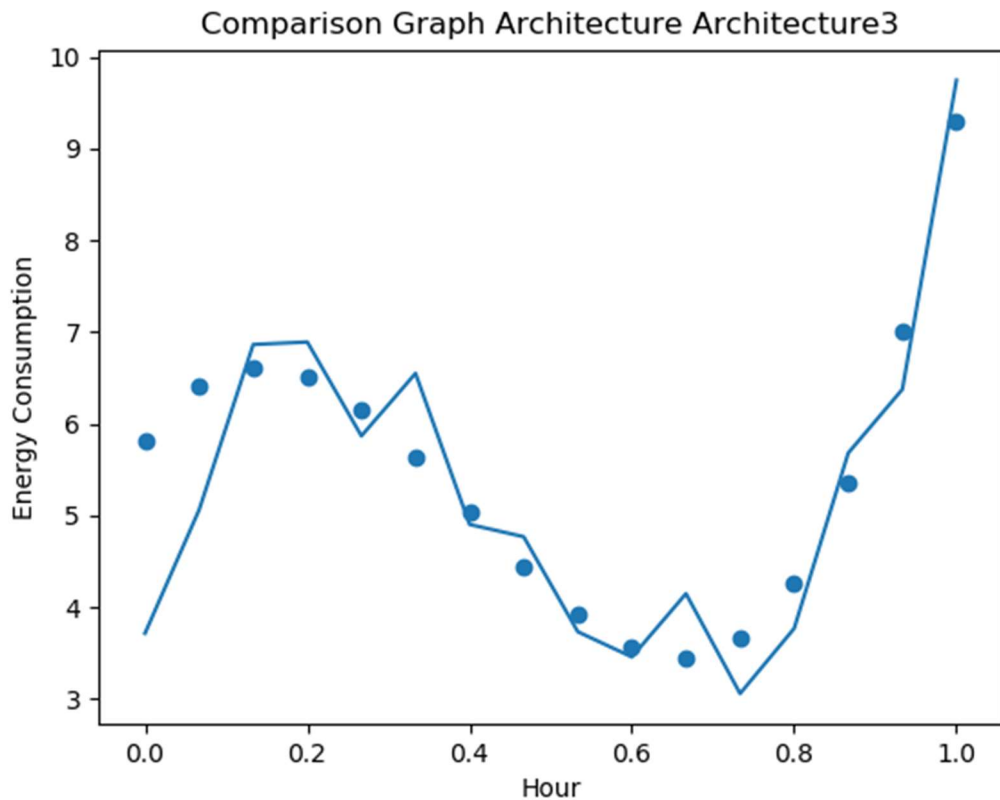
- Predict the energy consumption of the 4th day. Report total Error and graphs comparing the model final model versus the testing data
 - NOTE: For our comparison graphs, the dotted line is our prediction for the 4th day for each architecture, while the solid line is the normalized test graph
 - Day 1 Model
 1. Total Error – 26.892



- Day 2 Model
 1. Total Error – 26.353



- Day 3 Model
 1. Total Error – 8.778



4. Report the number of iterations, learning rate, and data pre-processing steps as well as the explanations for each
 - Iterations
 - The final number of iterations we went with was 10000, but we frequently altered this number from 3000 – 20000 along with the alpha to attempt to minimize the total error for the models we produced
 - Learning Rate
 - As with the number of iterations, we frequently changed this value to minimize the total error of the models we produced. The range was between .01- .5, with our final alpha value for this model being .04
 - Pre-processing
 - We originally normalized both the Energy Consumption and Hour data inputs, however we changed this to only normalizing the Hour input data on the recommendation of Javier, so we do not lose important data regarding the actual power consumption predictions and so we can easily compare our models to the testing data