Question 1

What is the optimal value of alpha for ridge and lasso regression? What will be the changes in the model if you choose double the value of alpha for both ridge and lasso? What will be the most important predictor variables after the change is implemented?

- Optimal Value
    - Ridge 0.8
    - Lasso .001

When we double the value of alpha in case of Ridge regression the model try to make most coefficients value to zero. And in case of Lasso regression r2 decreases and coefficients value is reduced to zero

Important predictor variable :

- Zoning classification
- Size of garage in car capacity
- the overall condition of the house
- Total square feet of basement area
- Years after the property has been remodelled
- the general zoning classification of the sale
- the overall material and finish of the house
- First and Second Floor square feet

Question 2

You have determined the optimal value of lambda for ridge and lasso regression during the assignment. Now, which one will you choose to apply and why?
`mean_squared_error for lasso is` 0.0132 and Ridge is 0.01362

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Mean squared error for lasso is slightly lesser and some coefficients are more towards zero hence lasso is better
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Question 3

After building the model, you realised that the five most important predictor variables in the lasso model are not available in the incoming data. You will now have to create another model excluding the five most important predictor variables. Which are the five most important predictor variables now?

- GrLivArea
- OverallQual
- OverallCond
- totalBsmtSF
- GarageArea

Question 4

How can you make sure that a model is robust and generalisable? What are the implications of the same for the accuracy of the model and why?

Answer:

As per Occam's Razor if two model show same performance
- Occam's razor is a heuristic that suggests choosing simpler machine learning models as they are expected to generalize better.
- The heuristic can be divided into two razors, one of which is true and remains a useful tool and the other that is false and should be abandoned.
- Ensemble learning algorithms like boosting provide a specific case of how the second razor fails and added complexity can result in lower generalization error.

Regularisation can be use to make model more simpler

- it is one of the most important concepts of machine learning. This technique prevents the model from overfitting by adding extra information to it.

- It is a form of regression that shrinks the coefficient estimates towards zero. In other words, this technique forces us not to learn a more complex or flexible model, to avoid the problem of overfitting.
- For regression problems, the increase in flexibility of a model is represented by an increase in its coefficients, which are calculated from the regression line.

- Regularization technique, we reduce the magnitude of the independent variables by keeping the same   number of variables". It maintains accuracy as well as a generalization of the model.

To build a good model, we need to find a good balance between bias and variance such that it minimizes the total error