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?

Ans: If the value of alpha is too small the model may overfit, if the value is too high it will lead to underfit. we have to choose optimum value of lambda by hyperparameter tuning. We can get optimum value of lambda by compromising in the bias with low total error. The higher the value of alpha, the lower the value of the model coefficients, and more is the regularization. We can select the important predictor variables by the Regression model(Ridge and Lasso) which give best r2 score for the appropriate alpha value.

For the model which I created, below are the alpha values

Ridge: alpha: 500

Lasso: alpha: 500

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?

Ans: We can select the Regression model (Ridge and Lasso) which give best r2 score for the appropriate alpha value even though Lasso performs variable selection. If the r2 score value on the training and test data is good for Ridge compared to Lasso then we will have to select Ridge and vice versa. There shouldn't be big difference between the R2 score for train and test data. Also we

have to compare the RSS, MSE, RMSE values for both Ridge and Lasso. Select the model which is simple with less no. of variables.

3. After building the model, you realized 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?

Ans: Below are the most important predictor variables picked from Lasso regression.

```
[49] para = para.sort_values((['Coeff']), axis = 0, ascending = False)
     para.head()
```

	Variable	Coeff
131	RoofMatl_CompShg	33602.305566
12	GrLivArea	27509.500925
136	RoofMatl_WdShngl	24061.979284
134	RoofMatl_Tar&Grv	17762.363059
118	OverallQual_9	13367.900244

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

Ans: The model should be as simple as possible. There should be trade-off

between bias and variance. A simple model tends to less variance and more bias. We can select the Regression model (Ridge and Lasso) which give best r2 score for the appropriate alpha value even though Lasso performs variable selection, but

it's better to select the model which is simpler with less no. of variables. If the r2 score value on the training and test data is good for Ridge compared to Lasso then we will have to select Ridge and vice versa. There shouldn't be big difference between the R2 score for train and test data. Also, we have to compare the RSS, MSE, RMSE values for both Ridge and Lasso.