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 ?

- **Ridge regression:**

  Ridge regression is a technique of analyzing multiple regression data that suffer from multicollinearity . when multicollinearity occurs, least squares estimates are unbiased, but their variance are large so they may be far from the true value

  Formula

  COST(W)=RSS(W)+LAMBDA*(SUMOF SQUARE OF WEIGHTS)

$$\sum\{Yi-\sum WjXij\}2+LAMBDA\sum Wj2$$

FOR RIDGE REGRESSION OPTIMAL VALUE IS 8

- **LASSO REGRESSION:**

  Lasso regression is a type of linear regression that uses shrinkage. Shrinkage is where data values are shrunk towards a central point, like that mean the lasso procedure encourages simple, sparse models(i,e. model with fewer parameters

  FORMULA

  COST(W)=RSS(W)+LAMBDA*(SUM OF ABSOLUTE VALUE OF WEGHTS)

$$= \sum\{Yi-\sum Wj\ Xij\}2+LAMBDA\sum|Wj|$$

In this case of lasso regression, the optimal value for alphais 1 if we choose double the value of alpha for both ridge and lasso regression, model complexity will have a greater contribution to the code. This means that higher λ will bias the selection towards model with lower complexity. In the second model is build we compare r square value of model with old one. But odel have

higher r square of the train and test dataset will select the feature / variable from the model.

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 ?

- **Answer**:

Lasso regression would be better option it would help in feature elimination and the model will be more robust. Because in the ridge coefficient of the linear distribution are normally distributed and lasso are also laplace distributed. In the lasso, this makes is coefficient to be zero and therefore easier to eliminate some of your input variable as not contributing the output and ridge regression can't be zero out coefficient thus uo either including all model coefficient is none of them. But in contrast of lasso does both parameter shrinkage and variable selection be automatically. Lasso regression can produce many solution to the same problem. Ridge regression can only produce one solution to one problem…..

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?

- **Answer**:

Statistical measures can show the relative importance of the different predictor variables. However, these measures can't determine whether the variables are important in a practical sense. To determine practical importance, you'll need to use your subject area knowledge. How you collect and measure your sample can bias the apparent

- importance of the variables in your sample compared to their true importance in the population. If you randomly sample your observations, the variability of the predictor values in your sample

likely reflects the variability in the population. In this case, the standardized coefficients and the change in R-squared values are likely to reflect their population values.

- And one more think this 5 values to predict are those below:
- MiscVal :value of miscillenous feature
- BsmtHalfBath: Basement Half Bathroom
- LowQualFinSf : Low Quality finished Square Feet
- BsmtFullBath : Basement Full Bathroom
- HalfBath : HalfBathGrade

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:**

A model needs to be made robust and generalizable so that they are not impacted by outliers in the training data. The model should also be generalisable so that the test accuracy is not lesser than the training score.

- We should ensure that the model is robust and generlisable by regularsiation and model using a regularsation term with RSS because the parameter will ensure to take the straight balance the model being too simple or too complex.
- Making a model generalisable may take a tool on accuracy but too extent we can also have a look and precision recall the model is sensitivity or specificity also play important model using the evaluation criteria. Together if all the above are average to way the model accepted…