## 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?**

**Answer**: *As observed after the code implementation the optimal value of alpha was 0.03. However, it was also observed R-square increased after initializing alpha to 0 which is equivalent to linear regression. This indicates regularisation was not required in the dataset as there was less noise.*

*If the value of alpha increases regularisation is increased which affects the overall error term causing the coefficient to shrink. Lasso might cause some more variable coefficients to 0, while ridge will reduce the coefficients close to 0.*

*The most important variable will be the one having the highest standardized coefficient indicating its correlation with the target variable.*

## 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:** *Lambda is simply a hyperparameter which can be tuned. Both ridge and lasso regression will be applied to see which performs the best. Added advantage of Lasso is that it can do feature selection where the selected features can be passed to any model.*

**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**: *We can apply lasso regression for performing feature selection. After fitting the model, we can check for the coefficients of the features. Important thing to note while checking the feature importance, we need to make sure that the features are on the same scale so that we obtain standardized coefficients.*

*Once we have the standardized coefficients, we can order them in the descending order and select top 5 as the most important predictor variables.*

**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 having low bias and low variance is robust and generalisable. In terms of accuracy the model should have high accuracy on both train and test. Below are the possible combinations for accuracy in terms of bias and variance:*

*99% train + 88% test = High variance*

*85% train + 84% test = Low bias*

*85% train + 70% test = High variance High bias*

*99% train + 98% test = Low variance Low bias*