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?

The optimal value of Alpha for Ridge is 5 and for Lasso is 0.0001. When the value of alpha doubled, the significance of the model (R2 score in Train and Test) is reducing in both Ridge and Lasso. This is due to the compromise in bias and more regularization introduced due to increased alpha. After the change is implemented, for Ridge "**1stFlrSF (First Floor square feet)** " variable is the important predictor and for Lasso, "**GrLivArea (Above grade (ground) living area square feet)** " is the important predictor.

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?

From the model results, I will choose Lasso regression. Because, Lasso model gives better regularization than ridge for the optimal value of lambda for the given dataset. This is due to some of the variable might not be significant in predicting the target variable and Lasso handling that by zeroing out the coefficient of those variables which result in the feature selection.

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?

After creating the new model, the following are the 5 important predictor variables of Lasso.

1. 1stFlrSF (First Floor square feet)
2. 2ndFlrSF (Second floor square feet)
3. BsmtFinSF1 (basement Type 1 finished area in square feet)
4. Neighborhood_StoneBr (Physical locations within Ames city limits with value of 'Stone Broo k')
5. OverallQual_3 (overall material and finish of the house with value 'Fair' (It is negatively affecting the target variable with negative coefficeient value))

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?

When the model is robust and generalizable, the dependent variable will be accurate even if there is a change in the independent variable. This can be achieved through bias variance trade-off. By using the regularization, we can achieve the low variance with slight compromise in bias. When we evaluate R-squared value in train and test, there shouldn't be much change. When we introduce the regularization, the model predictive accuracy will be increased. This is due to, we are making sure that the model isn't too complex and enough to learn all the important things from the dataset and also making the model not to over fit.