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

The optimal value of alpha for ridge is 2 and for lasso is 0.0001, the r2_score for these models is approximately to 0.82

Since there isn't much change after modifying or doubling the alpha value for Ridge and Lasso remains pretty same and r2_score predict approximately 0.82 but if we look the co efficient we see there are few changes

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?

Lambda optimal value for both ridge and lasso:

Ridge -- 2

Lasso – 0.0001

MSE for ridge and lasso:

MSE for ridge:0.0018396090787924267

MSE for lasso: 0.0018634223418673179

Since if we look at these MSE value for both model are pretty same

The co-efficient of features tends to become zero with Lasso model helps in feature reduction, which has little advantage over ridge we go ahead with lasso as suggestion model for our problem.

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 five most important predictor variables now?

These are five most important predictor variables in lasso model.

Total_sqr_area

GarageArea

TotRmsAbvGrd

OverallCond

LotArea

Now we have removed these important predictor variables in the lasso model and rebuild the lasso model again.

We found that

R2_score for the new model: 0.7330077964268464 which reduce when removed the important features.

However there is increase in the MSE ,MSE score: 0.002857567090648254

And the new best predictor variables:

	Lasso Co-Efficient
LotFrontage	0.146535
Total_porch_area	0.072445
HouseStyle_2.5Unf	0.062900
HouseStyle_2.5Fin	0.050487
Neighborhood_Veenker	0.042532

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?

To make model more robust and generalisable following features are required.

As per, Occam's Razor view -two models that show similar performance in the finite training or test data

Simpler models are more generic and widely applicable, it uses few training samples for effective training compared to complex models.

Simple models are more robust; however, the complex models tend to change widely with changes in training dataset.

Simpler models tend for errors while training the dataset, whereas complex models lead to overfitting, work well with training samples but fail when applied to test samples.

Model accuracy should be > 70-75 % on both test and train set.

P-value should be < 0.05 % for all the features

VIF for all the features should be < 5.

Regularization, helps to make model simpler, balance between keeping model simple not making too naive.