Supervised learning problems can be further grouped into **Classification**and **Regression** problems. As opposed to classification problems, regression has the task of predicting a continuous quantity (i.e. weight, income).

Ridge Regression:

As the name implies, ridge regression falls under the latter category. According to the sklearn cheat-sheet, ridge regression is useful in solving problems where you have less than one hundred thousand samples or when you have more parameters than samples.

From the discussion so far, we have concluded that we would like to decrease the model complexity, that is the number of predictors. We could use the forward or backward selection for this, but that way we would not be able to tell anything about the removed variables' effect on the response. Removing predictors from the model can be seen as settings their coefficients to zero. Instead of forcing them to be exactly zero, let's penalize them if they are too far from zero, thus enforcing them to be small in a continuous way. This way, we decrease model complexity while keeping all variables in the model. This, basically, is what Ridge Regression does.

In Ridge Regression, the OLS loss function is augmented in such a way that we not only minimize the sum of squared residuals but also penalize the size of parameter estimates, in order to shrink them towards zero.

Lasso Regression:

Lasso Regression is almost identical to Ridge Regression, the only difference being that we take the absolute value as opposed to the squaring the weights when computing the ridge regression penalty.

Business Problem:

Perform lasso and ridge regularization techniques on the given datasets to obtain the required

Solutions.

EDA:

Perform EDA for the given dataset

=>remove the index columns

=>check whether there are na values and remove them.

=>check correlation between the variables.

=>visualize different types of plots for easy understanding.

=>Create model for Linear Regression

=>Split the data into train and test datasets.

Prepare Ridge regression model:

=> Running a Ridge Regressor of set of alpha values and observing how the R-Squared, train\_rmse and test\_rmse are changing with change in alpha values.

=> Plotting train\_rmse, test\_rmse, R-Squared values with respect to alpha values.

Prepare Lasso Regression on data set:

=>Running a LASSO Regressor of set of alpha values and observing how the R-Squared, train\_rmse and test\_rmse are changing with change in alpha values.

=> Plotting train\_rmse, test\_rmse, R-Squared values with respect to alpha values.

From the above models, check which model is best.