1. Which of the following methods do we use to find the best fit line for data in Linear Regression?

1. Least Square Error

2. Which of the following statement is true about outliers in linear regression?

A) Linear regression is sensitive to outliers

3. A line falls from left to right if a slope is \_\_\_\_\_\_?

B) Negative

4. Which of the following will have symmetric relation between dependent variable and independent variable?

B) Correlation

5. Which of the following is the reason for over fitting condition?

C) Low bias and high variance

6. If output involves label then that model is called as:

1. Predictive modal

7. Lasso and Ridge regression techniques belong to \_\_\_\_\_\_\_\_\_?

1. Regularization

8. To overcome with imbalance dataset which technique can be used?

1. SMOTE

9. The AUC Receiver Operator Characteristic (AUCROC) curve is an evaluation metric for binary

classification problems. It uses \_\_\_\_\_ to make graph?

1. TPR and FPR

10. In AUC Receiver Operator Characteristic (AUCROC) curve for the better model area under the curve should be less.

1. False

11. Pick the feature extraction from below:

B) Apply PCA to project high dimensional data

12. Which of the following is true about Normal Equation used to compute the coefficient of the Linear Regression?

A) We don’t have to choose the learning rate.

B) It becomes slow when number of features is very large.

13. Explain the term regularization?

Regularization refers to techniques that are used to calibrate machine learning models in order to minimize the adjusted loss function and prevent overfitting or underfitting. Using Regularization, we can fit our machine learning model appropriately on a given test set and hence reduce the errors in it.

Regularization is an application of Occam’s Razor. It is one of the key concepts in Machine learning as it helps choose a simple model rather than a complex one.

Regularization refers to the modifications that can be made to a learning algorithm that helps to reduce this generalization error and not the training error. It reduces by ignoring the less important features. It also helps prevent overfitting, making the model more robust and decreasing the complexity of a model.

14. Which particular algorithms are used for regularization?

The particular algorithms or techniques in machine learning are:

* Lasso regression: having the L1 norm
* Ridge regression: with the L2 norm
* Elastic net regression: It is a combination of Ridge and Lasso regression.

1. Ridge Regression

The Ridge regression technique is used to analyze the model where the variables may be having multicollinearity. It reduces the insignificant independent variables though it does not remove them completely. This type of regularization uses the L2 norm for regularization.

* It uses the L2-norm as the penalty.
* L2 penalty is the square of the magnitudes of beta coefficients.
* It is also known as L2-regularization.
* L2 shrinks the coefficients, however never make them to zero.
* The output of L2 regularization is non-sparse.

2. Lasso Regression

Least Absolute Shrinkage and Selection Operator (or LASSO) Regression penalizes the coefficients to the extent that it becomes zero. It eliminates the insignificant independent variables. This regularization technique uses the L1 norm for regularization.

* It adds L1-norm as the penalty.
* L1 is the absolute value of the beta coefficients.
* It is also known as the L-1 regularization.
* The output of L1 regularization is sparse.

### 3. Elastic Net Regression

The Elastic Net Regression technique is a combination of the Ridge and Lasso regression technique. It is the linear combination of penalties for both the L1-norm and L2-norm regularization.

The model using elastic net regression allows the learning of the sparse model where some of the points are zero, similar to Lasso regularization, and yet maintains the Ridge regression properties. Therefore, the model is trained on both the L1 and L2 norms.

## When to Use Which Regularization Technique?

The regularization in machine learning is used in following scenarios:

* Ridge regression is used when it is important to consider all the independent variables in the model or when many interactions are present. That is where collinearity or codependency is present amongst the variables.
* Lasso regression is applied when there are many predictors available and would want the model to make feature selection as well for us.
* When many variables are present, and we can’t determine whether to use Ridge or Lasso regression, then the Elastic-Net regression is your safe bet.

15. Explain the term error present in linear regression equation?

Within a linear regression model tracking a stock's price over time, the error term is the difference between the expected price at a particular time and the price that was actually observed.

[Linear regression](https://www.scribbr.com/statistics/simple-linear-regression/) most often uses mean-square error (MSE) to calculate the error of the model. MSE is calculated by:

1. measuring the distance of the observed y-values from the predicted y-values at each value of x;
2. squaring each of these distances;
3. calculating the[mean](https://www.scribbr.com/statistics/mean/) of each of the squared distances.

Linear regression fits a line to the data by finding the regression coefficient that results in the smallest MSE.