1. A
2. A
3. B
4. C
5. C
6. B
7. B
8. B
9. Gini Index: 1-((0.40)^2 + (0.60)^2) = 0.48

Entrophy: -[(0.40)log2(0.40)+(0.60)log2(0.60)] = 0.290

1. Decision trees have a low bias / are non-parametric, they suffer from a high variance which makes them less useful for most practical applications.

By aggregating multiple decision trees, one can reduce the variance of the model output significantly, thus improving performance. While this could be archived by simple tree bagging, the fact that each tree is build on a bootstrap sample of the same data gives a lower bound on the variance reduction, due to correlation between the individual trees. Random Forest addresses this problem by sub-sampling features, thus de-correlating the trees to a certain extend and therefore allowing for a greater variance reduction / increase in performance.

1. Feature Scaling is a technique to standardize the independent features present in the data in a fixed range. It is performed during the data pre-processing to handle highly varying magnitudes or values or units.

Two techniques used for scaling are Normalization and Standardization.

1. We can use fixed learning rate during training without worrying about learning rate decay.

It has straight trajectory towards the minimum and it is guaranteed to converge in theory to the global minimum if the loss function is convex and to a local minimum if the loss function is not convex.

It has unbiased estimate of gradients. The more the examples, the lower the standard error.

1. A pair of evaluations metrics that are commonly used when there is a class imbalance are precision and recall. Precision is defined as the number of true positives divided by the sum of true positives and false positives,
2. The F measure (F1 score or F score) is a measure of a test's accuracy and is defined as the weighted harmonic mean of the precision and recall of the test.

F-Measure = (2 \* Precision \* Recall) / (Precision + Recall)

1. fit() : used for generating learning model parameters from training data

transform() : parameters generated from fit() method,applied upon model to generate transformed data set.

fit\_transform() : combination of fit() and transform() api on same data set