1. Is SVM (Support Vector Machine) a supervised or unsupervised learning algorithm?  
   Why is SVM such a powerful classification method?  
   What are 3 disadvantages of SVMs?
2. SVM is a supervised learning. All training data must be labeled to proceed the next step.
3. SVM can find the best line in two dimensions or best plane for multiple dimensions, it works well with even unstructured and semi structured data, e.g., text, images and trees; it can solve linear and non-linear problems with different kernel; it is suitable when feature size is greater than training samples.
4. SVM is not robust for outliers, it tends to have overfitting problem; it is not easy to select a good kernel; long training time for large dataset due to the training time complexity of O(n2); it is not easy to fine tune gamma or Cost -C due to difficulty of visualize the impact.
5. What is the time complexity of SVM?   
   What is it for Logistic Regression?
6. Training time complexity for SVM is O(n2); run time complexity is O(k\*d).
7. Training time complexity for Logistic Regression is O(n\*d). Space complexity is O(d).

\*Where n is sample size, k is number of support vector, and d is the dimensionality of the data.

1. Explain feature importance for the Random Forest algorithm?  
   When examining feature importance, what is Gini impurity or information gain?
2. Feature importance describes which features are relevant to the problem. It can help improve the model with feature selection. Random forest is composed of a set of decision trees. Each tree has its own internal node and leaves. The features for internal nodes are selected with some criterion. In classification problems, Gini impurity or information gain is used. While in regression problems, variance reduction is the target. For each feature, the average of impurity decrease for all trees can be calculated, which is applied to determine the feature importance.
3. Gini impurity is used to predict the likelihood that a randomly selected example would be incorrectly classified by a specific node. The Gini impurity of value 1 indicates that all items are randomly distributed over various classes, whereas a value of 0.5 indicates that elements are uniformly distributed across some classes.
4. SHAP (SHapley Additive exPlanations) is a game theoretic approach to explain the output of any machine learning model, what is it and how does it work?
5. SHAP is a method to explain individual predictions. The goal is to explain the prediction of an instance x by computing the contribution of each feature to the prediction.
6. The SHAP explanation method computes Shapley values from coalitional game theory. The idea behind SHAP feature importance is simple: Features with large absolute Shapley values are important. Since we want the global importance, we average the absolute Shapley values per feature across the data.