1. Linear Regression

- **Linearity**: The relationship between independent and dependent variables should be linear.
- **Independence**: Observations should be independent of each other.
- **Homoscedasticity**: Constant variance of residuals across levels of the independent variable.
- **Normality of Residuals**: Residuals should be approximately normally distributed.
- **No Perfect Multicollinearity**: Independent variables should not be perfectly correlated.

2. Logistic Regression

- **Linearity of Logits**: A linear relationship exists between the log-odds of the outcome and each predictor.
- **Independence of Observations**: No correlation between observations, especially in time-series data.
- **No Perfect Multicollinearity**: Predictor variables should not be perfectly correlated.
- **Large Sample Size**: More data helps improve the reliability of logistic regression estimates.

3. Decision Trees

- **No Assumptions on Feature Distribution**: Decision trees do not require any particular distribution for predictors.
- **Independence of Observations**: Assumes observations are independent.
- **Pruning to Prevent Overfitting**: Without pruning, decision trees can overfit, especially on small datasets.

4. Random Forest

- **Independence Between Trees**: Trees in the forest should be independent (ensured by bootstrapping).
- **No Assumptions on Data Distribution**: Random forests work well with non-linear data.

- **Sufficient Number of Trees**: Performance improves with the number of trees but also requires computational resources.

5. Support Vector Machines (SVM)

- **Linearity in Kernel Space**: For linear SVM, data should be linearly separable; otherwise, non-linear kernels are used.
- **Independent and Identically Distributed (i.i.d.)**: Assumes observations are independent.
- **Choice of Kernel**: For non-linear data, an appropriate kernel function (like RBF or polynomial) must be selected.

6. K-Nearest Neighbors (KNN)

- **No Assumptions on Data Distribution**: Works on non-linear and non-parametric data.
- **Feature Scaling**: Requires scaling for distance calculations (Euclidean distance).
- **Sufficient Data Points**: More data points improve KNN's ability to generalize.

7. Naive Bayes

- **Conditional Independence**: Assumes independence between features, which can simplify calculations.
- **Suitable for Categorical Data**: Naive Bayes often performs well with categorical features.
- **Class-Conditional Independence**: Probability of features is assumed to be independent within each class.