1. **What are the key hyperparameters in KNN?**

**K-Nearest Neighbors (KNN):**

1. **Key Hyperparameters in KNN**:
   * **Number of Neighbors (k)**: Defines how many nearest neighbors to include when making the prediction. A small k can lead to overfitting, while a large k can lead to underfitting.
   * **Distance Metric**: Determines how the distance between points is calculated (e.g., Euclidean, Manhattan, etc.).
   * **Weights**: Determines how much influence each neighbor has. Options include uniform weights (all neighbors contribute equally) or distance-based weights (closer neighbors have more influence).
   * **Algorithm**: Determines the algorithm used for finding neighbors (e.g., brute force, k-d tree, or ball tree).
   * **Leaf Size**: In tree-based algorithms (like k-d tree), the leaf size impacts the speed and accuracy of the model.

**2. What distance metrics can be used in KNN?**

1. **Distance Metrics for KNN**:
   * **Euclidean Distance**: Straight-line distance between two points.
   * **Manhattan Distance**: The sum of the absolute differences between the coordinates of two points.
   * **Minkowski Distance**: Generalization of both Euclidean and Manhattan, controlled by a parameter.
   * **Cosine Similarity**: Measures the cosine of the angle between two vectors.
   * **Hamming Distance**: Used for categorical variables, measures the number of positions at which the corresponding symbols are different.