1. Data Exploration
   1. Basic concepts: types of attributes, objects, etc.
   2. Proximity measures
   3. Basic Statistical Descriptions of Data: mean, mode, median, quartile, IQR, etc.
   4. Data Visualization: box plot, scatter plot
2. Data Preprocessing
   1. Basic concepts: basic tasks in data mining
   2. Data Cleaning methods
   3. Data Integration: redundancy and correlation analysis
   4. Data Reduction: main ideas of Principle Component Analysis (PCA), attribute subset selection
3. Finding frequent itemsets
   1. Basic concepts: support, confidence, frequent items
   2. Apriori algorithm
   3. FP-tree algorithm
4. Classification
   1. Naïve Bayes
   2. Decision Trees: GINI index, entropy, information gain, how to build decision trees
   3. Support Vector Machines:
   4. KNN
   5. Artificial Neural Networks and Backpropagation
   6. Evaluation measures: Accuracy, Precision, Recall, F1-measure, Sensitivity, etc.
5. Clustering
   1. Basic concepts: centroids, dendrogram,
   2. K-means
   3. K-medoids
   4. Hierarchical clustering: agglomerative clustering
   5. Gaussian Mixture Model
   6. DBSCAN
   7. Clustering with constraints
   8. Biclustering
   9. Evaluation: B-cubed precision, B-cubed recall, Silhouette coefficients, etc.
6. Outlier Detection
   1. Basic concepts: outliers, types of outliers
   2. Univariate outlier detection
   3. Multivariate outlier detection
   4. Distance-based outlier detection
7. Advanced Topics
   1. Map-Reduce programming model
   2. Streaming Model
   3. Bloom Filter