Association Rule Mining with Apriori and FP-Growth

Objective:
Discover frequent itemsets and association rules from a dataset of store transactions using the **Apriori** and **FP-Growth** algorithms.

Instructions:

1. Import the required libraries:

   o pandas for data manipulation

   o TransactionEncoder from mlxtend.preprocessing for encoding transactions (to convert lists of items from each transaction into a table of True/False values, where each column represents an item.)

   o apriori, fpgrowth, and association_rules from mlxtend.frequent_patterns for frequent pattern mining

2. Load the dataset store_data_association_rules.csv into a pandas DataFrame.

   o Each row represents one transaction, and each column contains an item purchased.

3. Save the dataset as new_transactions.csv (use ; as the separator and exclude the index).

4. Rename the columns as item1, item2, item3, ... to ensure consistency.

5. Print the first row of the DataFrame to inspect the data before encoding.

6. Convert each transaction (row) into a list of items, removing any missing values.

   o Display the first transaction in the list to verify.

7. Use TransactionEncoder to transform the transaction list into a one-hot encoded DataFrame.

   o Save this encoded dataset as df_encoded.csv.

8. Apply both algorithms to find frequent itemsets with a minimum support of 0.05:

   o Apriori algorithm

   o FP-Growth algorithm

9. Generate association rules from both algorithms using:

   o Metric: "lift"

   o Minimum threshold: 1

10. Sort the resulting rules by lift (in descending order) for better interpretation.

11. Display the top rules generated by Apriori and FP-Growth.