Project Title: Market Basket Analysis

Problem Statement

Problem Definition: The problem is to perform market basket analysis on a provided dataset to unveil hidden patterns and associations between products. The goal is to understand customer purchasing behavior and identify potential cross-selling opportunities for a retail business. This project involves using association analysis techniques, such as Apriori algorithm, to find frequently co-occurring products and generate insights for business optimization

1. **Data Collection and Preprocessing:**
   - Obtain the dataset containing transaction records.
   - Clean and preprocess the data, ensuring it is in a suitable format for analysis.

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2. **Exploratory Data Analysis (EDA):**
   - Conduct initial data exploration to understand the basic statistics and characteristics of the dataset.

3. **Market Basket Analysis:**
   - Implement the Apriori algorithm or similar association analysis techniques to find frequent itemsets and association rules.
   - Determine key metrics such as support, confidence, and lift to evaluate the strength of associations.

4. **Visualization and Interpretation:**
   - Visualize the discovered associations using appropriate charts and graphs.
   - Interpret the results to extract meaningful insights, such as which products are frequently bought together or which combinations have the highest lift.

Sample Dataset

▶ Sample Taiwanese data set from anonymous retailer
▶ Data from November 2000 – December 2000
▶ Transaction #: ID Variable in Enterprise Miner
▶ Prodid: Target in Enterprise Miner

Sample Taiwanese Data Set

Obs	Transaction #	Date	Customer_ID	Age	Area	subclass	ProdId	AMT	Cost	SalePrice
1	1	01NOV2000	00038317	J	E	130315	4714981010038	2	56	48
2	1	01NOV2000	00038317	J	E	120105	4719090105002	1	28	28
3	2	01NOV2000	00045902	H	E	100304	4710147100018	1	24	28
4	2	01NOV2000	00045902	H	E	130204	4710088434692	1	114	119
5	2	01NOV2000	00045902	H	E	100511	4710594912028	6	210	313
6	2	01NOV2000	00045902	H	E	100113	4710285000126	1	112	95
7	3	01NOV2000	00045957	G	E	110217	4710265849066	1	180	133
8	4	01NOV2000	00046855	D	E	110411	4710085120468	3	51	57
9	4	01NOV2000	00046855	D	E	110401	4710088410139	1	43	39
10	4	01NOV2000	00046855	D	E	110117	4710063031878	1	77	89

5. **Business Recommendations:**
   - Provide actionable recommendations based on the analysis, such as product bundling or marketing strategies.
   - Identify cross-selling opportunities to increase sales and customer satisfaction.

6. **Documentation and Reporting:**

- Document the entire analysis process, including data preprocessing, modeling, and interpretation.
- Create a comprehensive report summarizing the findings and recommendations for stakeholders.