Practical No:- 4.

Title:- Implementation of Market Basket Analysis.

Objective:-
To understand the concept of Market Basket
Analysis and its applications in the retail
industry.

Theory:-
- Market Basket Analysis is a data mining
technique used to identify associations or
relationships between items bought together.
- It helps businesses understand customer
purchasing behavior and improve product
placement, cross-selling and inventory management.

for eg:- If customers who buy bread also frequently
buy butter, their relationship can be captured
using an association rule:-
Bread → Butter.

Milk	Bread
Transaction 1	

Milk	Butter
Transaction 2	

Bread	Butter.
Transaction 3	

Important terms in MBA

- **Support** - Indicates how frequently an itemset appears in the dataset.
  Formula:- $Support(x) = \dfrac{(Transactions\ contain...)}{(Total\ transactions)}$

- **Confidence** - Measures the how often items in y appears in transactions that contain x.
  Formula:- $Confidence(X \rightarrow Y) = \dfrac{Support(X \cup Y)}{Support(X)}$

- **lift** - Measures the strength of a rule over random co-occurance.
  Formula:- $lift(X \rightarrow Y) = \dfrac{Confidence(X \rightarrow Y)}{Support(Y)}$

Types of MBA:

1. **Transactional MBA** - Based on purchase data from POS system.

2. **Temporal MBA** - considers the time-based sequence of purchase.

3. **Multi-level MBA** - Works on grouped categories like Dairy → Milk → Skimmed Milk.

4. **Cross-category MBA** → Analyzes relationships between different product categories.