

## Experiment no- 11

**Objective:-** To implement the Apriori algorithm for discovering frequent itemsets and generating association rules from transactional data using R.

## Apriori Algorithm

The Apriori algorithm is a classic algorithm in data mining used for association rule learning over transactional databases. It identifies frequent itemsets (groups of items frequently bought together) and derives association rules that highlight relationships between items.

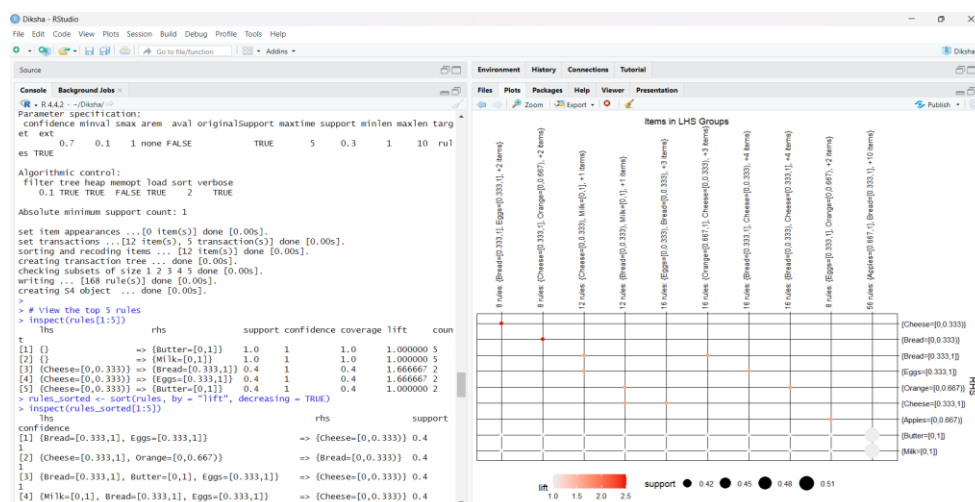
### Key Concepts:

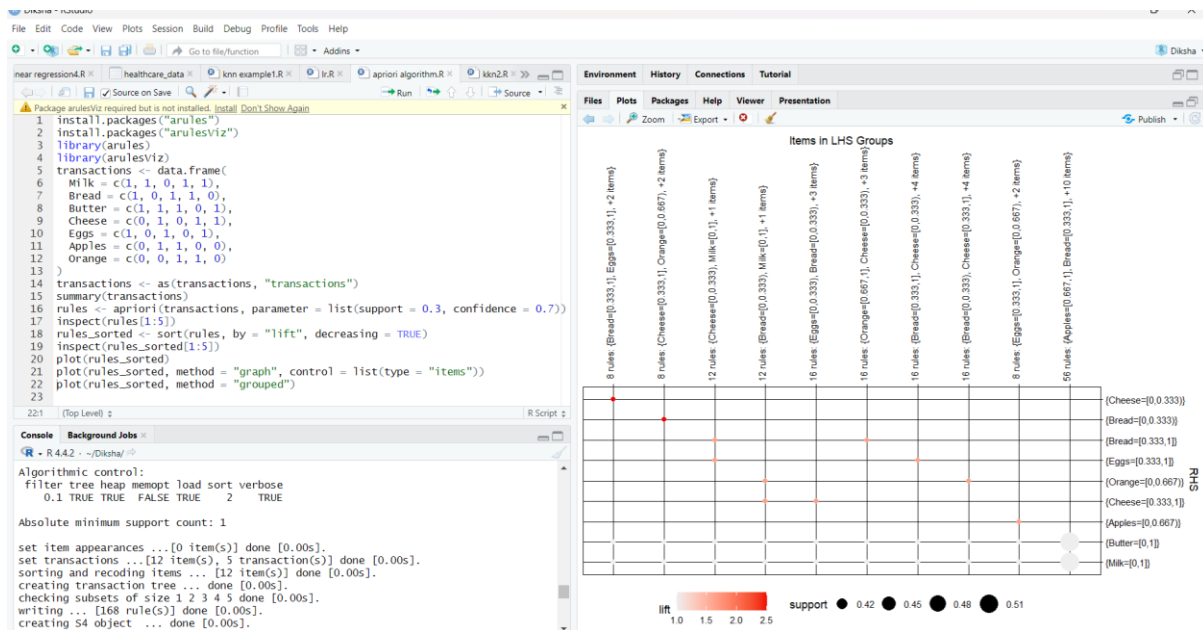
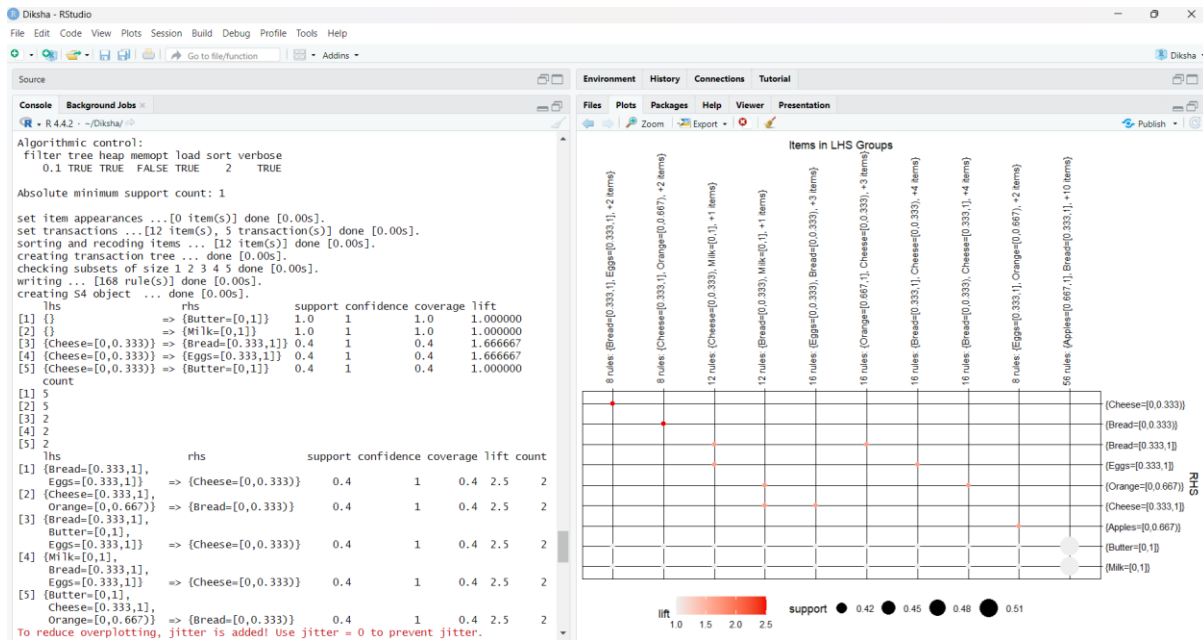
- **Itemset:** A group of one or more items.
- **Support:** The proportion of transactions containing the itemset.
- **Confidence:** The likelihood that the RHS item(s) are purchased when the LHS item(s) are purchased.
- **Lift:** A measure of how much more likely RHS is given LHS, compared to random chance.

### Steps of the Apriori Algorithm:

1. Set minimum support and confidence thresholds.
2. Generate all candidate itemsets of size 1.
3. Iteratively expand the itemsets:
  - Generate size  $k$  itemsets from size  $k-1$  frequent itemsets.
  - Prune itemsets with support less than the threshold.
4. Generate rules from the frequent itemsets that meet the confidence threshold.
5. Evaluate rules using support, confidence, and lift.

### Example-1





## Example-2

