**Naan Mudhalvan Phase – 4**

**Formatting the transaction data in a suitable format for analysis:**

Developing the preprocessed data into analysis. Split the 'Itemname' column in transaction\_data into individual items using str.split(', ', expand=True).Concatenate the original DataFrame (transaction\_data) with the items DataFrame (items\_df) using pd.concat.Drop the original 'Itemname' column since individual items are now in separate columns.Display the resulting DataFrame.

**Association Rules - Data Mining**

**Converting Items to Boolean Columns:**

To prepare the data for association rule mining, we convert the items in the transaction\_data DataFrame into boolean columns using one-hot encoding. This is achieved through the pd.get\_dummies function, which creates a new DataFrame (df\_encoded) with boolean columns representing the presence or absence of each item.

**Association Rule Mining:**

We apply the Apriori algorithm to perform association rule mining on the encoded transaction data. The min\_support parameter is set to 0.007 to filter out infrequent itemsets. The resulting frequent itemsets are then used to generate association rules based on a minimum confidence threshold of 0.5.Finally, we print the generated association rules.

**Visualization**

**Visualizing Market Basket Analysis Results:**

We use matplotlib and seaborn libraries to create a scatterplot visualizing the results of the market basket analysis. The plot depicts the relationship between support, confidence, and lift for the generated association rules.

**Interactive Market Basket Analysis Visualization:**

We leverage the Plotly Express library to create an interactive scatter plot visualizing the results of the market basket analysis. This plot provides an interactive exploration of the relationship between support, confidence, and lift for the generated association rules.

**Interactive Network Visualization for Association Rules:**

We utilize the NetworkX and Plotly libraries to create an interactive network graph visualizing the association rules. This graph represents relationships between antecedent and consequent items, showcasing support as edge weights.

**Interactive Sunburst Chart for Association Rules**

We use Plotly Express to create an interactive sunburst chart visualizing association rules. This chart represents the relationships between antecedent and consequent items, showcasing lift as well as support through color intensity.