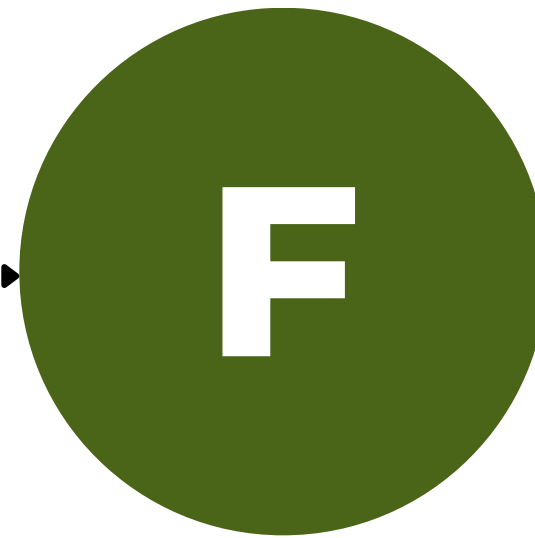**Sales Report**

Part A: RFM Analysis and Segmentation

What is RFM?

RFM stands for Recency, Frequency, and Monetary Value. It is a customer segmentation technique used in marketing and analytics.
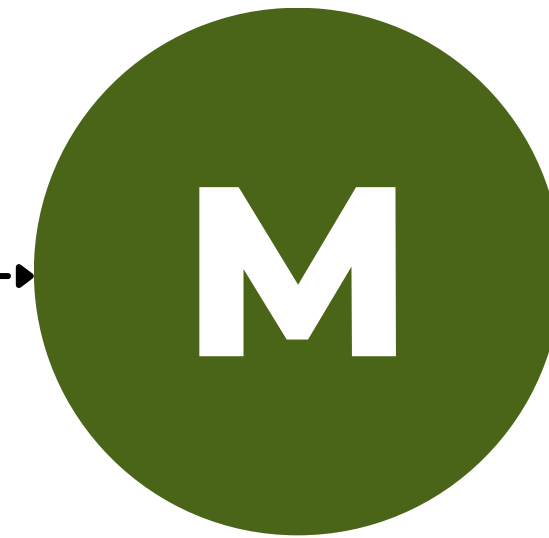
R
Recency

To calculate the recency score we have used the 'Days since last order' field. from the given data. We have considered the minimum value of each customer.

F
Frequency

To calculate the frequency score we grouped by the 'Customer Name' column and took a unique count of the field 'Order Number'

M
Monetary Value

To calculate the monetary value score, we have taken the summation of all the purchases made by each customer.

We have binned all three fields using The 'Auto-Binner' Node of KNIME into 5 bins. Each bin number is taken as a score. However, the Score is taken inversely in the case of Recency.

KNIME Workflow

Customer Segments

Lost Customers
19.1%

Loyal Customers
32.6%

On Verge of Churning
21.3%
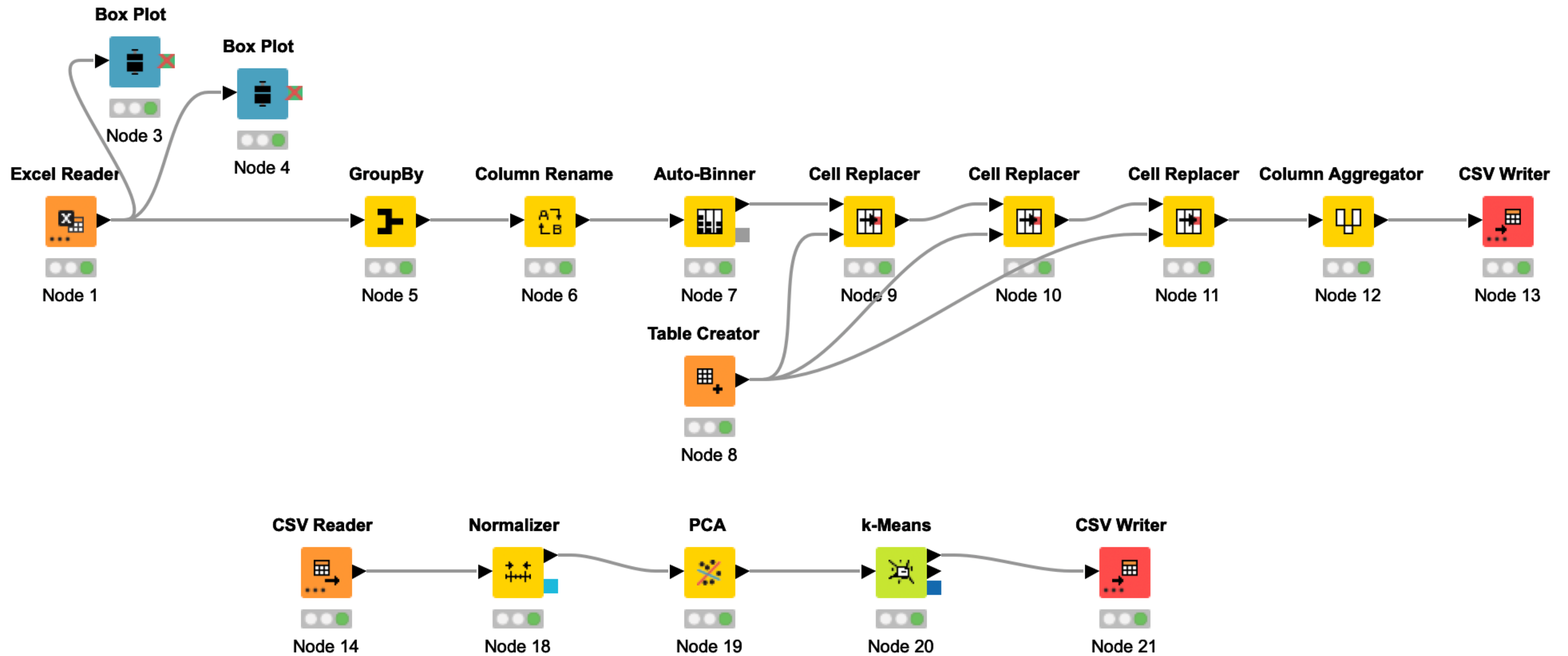
Best Customers
27%
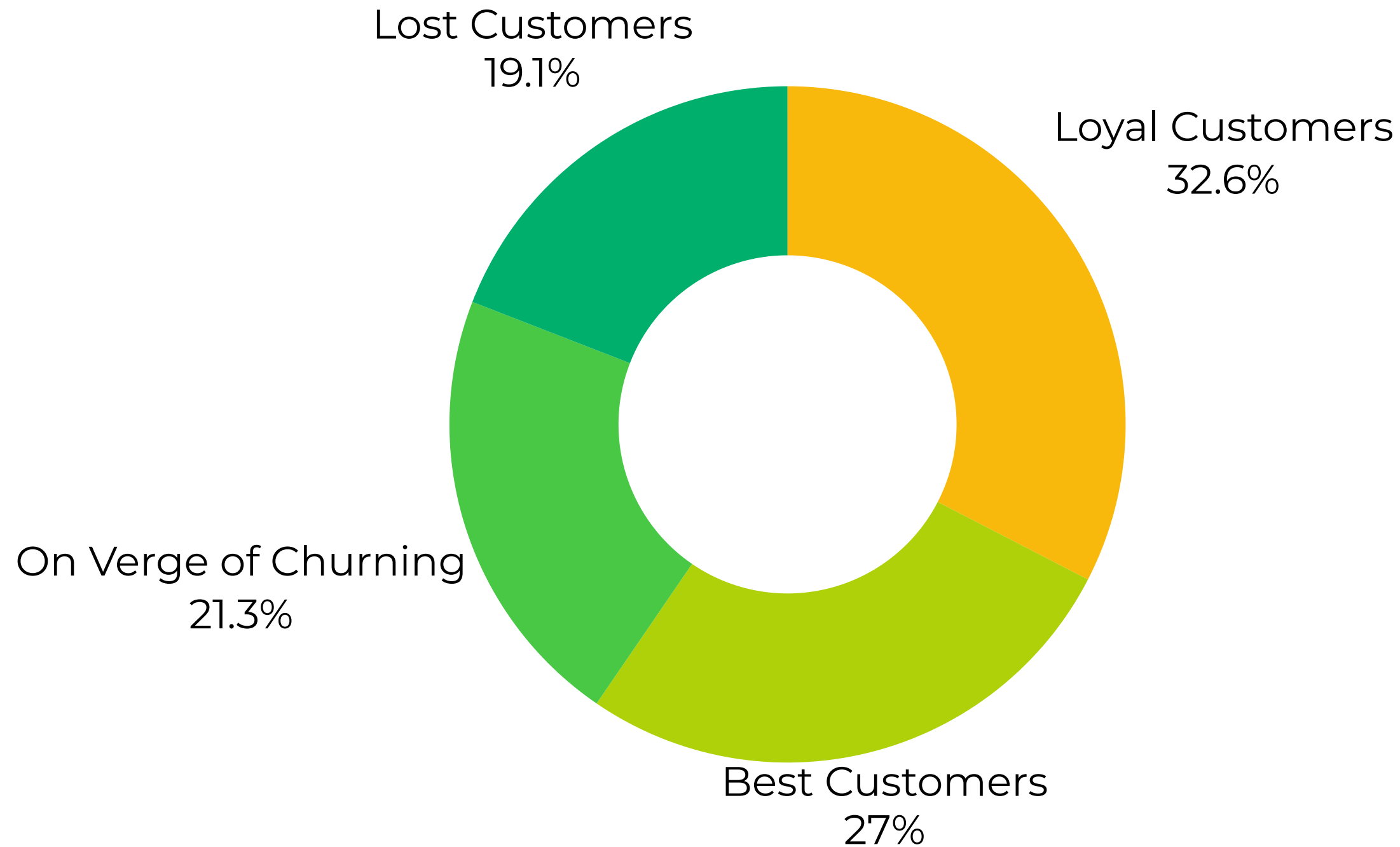
1. We scaled the RFM scores using the 'Normaliser' Node in KNIME.
2. Over here, we do not need to perform PCA as it's uni-dimensional.
3. Later. We performed the K-mean clustering to get Four unique clusters.
4. We have obtained the following clusters helping us to understand our customers and plan targeted marketing strategies.
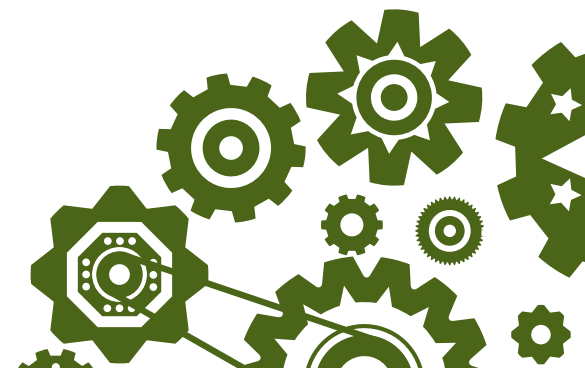
MATT'S
GROCERY STORE

Part B: Market Basket Analysis

WHAT IS MARKET BASKET ANALYSIS?

Market Basket Analysis, or association analysis, is a data mining technique that reveals patterns in items purchased together by customers. It helps businesses identify frequently co-purchased products, presenting insights through association rules. These rules optimize product placement, cross-selling, promotions, and inventory management, ultimately enhancing sales, customer satisfaction, and operational efficiency.

WHAT IS THE ASSOCIATION RULE IN MARKET BASKET ANALYSIS?

Association Rule Definition:
- Logical statement expressing relationships between items in customer transactions.
- Example: "If item A is purchased, then item B is likely to be purchased."

Business Applications:
- Optimization of product placement.
- Facilitation of cross-selling strategies.
- Implementation of targeted promotions.
- Efficient inventory management.

Implementation Using KNIME:
- Utilization of the 'Association Rule Learner' KNIME node.
- Formulation of relationships among previous orders.
- Determination of item probability based on existing basket items.

WHAT IS 'SUPPORT' IN MARKET BASKET ANALYSIS??

Support in Market Basket Analysis:
- Measure of the frequency of occurrence of an item set in transactions.
- Indicates how often items appear together in the dataset.
- Calculated as the ratio of transactions with the item set to total transactions.

Trial and Error for Support:
- Support is determined through multiple attempts.
- In the example, support concluded as '0.091'.

Practical Implication:
- Implies that items picked first are present in at least 9% of previous orders.

WHAT IS 'CONFIDENCE' IN MARKET BASKET ANALYSIS??

Confidence in Association Rules:

- Measures the likelihood of purchasing item B when item A is already in the basket.
- It is calculated as the ratio of transactions with items A and B to those with items A.

Trial and Error for Confidence:

- Confidence is determined through trial and error.
- In the example, the minimum confidence is set at '0.52'.

Practical Interpretation:

- This implies a 52% or higher chance of a specific item being present when corresponding items are added to the basket.

KNIME WORKFLOW

CSV Reader

Node 1

GroupBy

Node 3

Cell Splitter

Node 4

Association Rule Learner

Node 5

ASSOCIATIONS IDENTIFIED

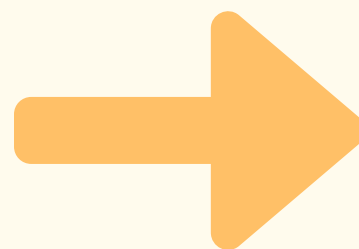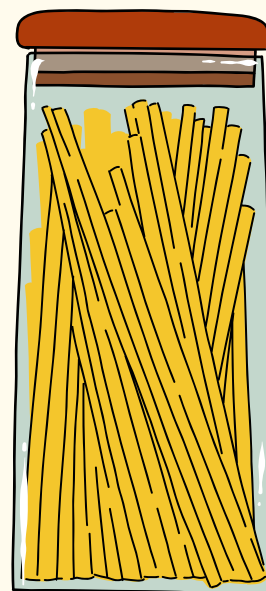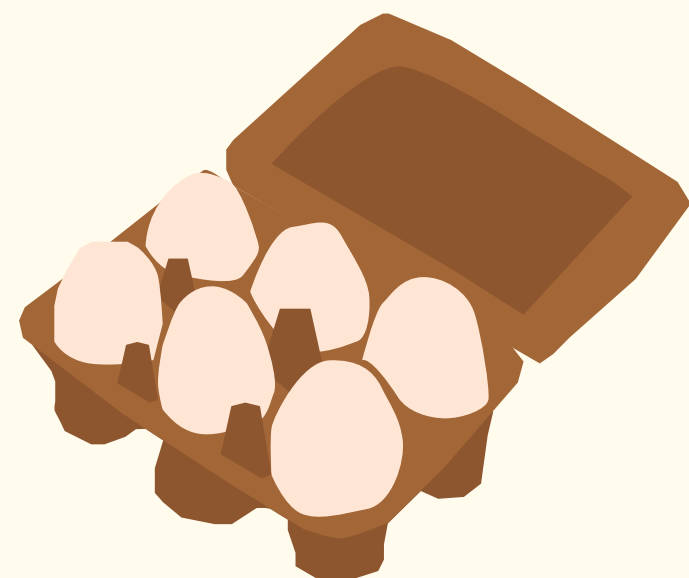| Rule No.	Support	Confidence	Lift	Consequent Item	Item Present
1	0.09920983319	0.5794871795	1.489923019	dinner rolls	[spaghetti sauce, poultry]
12	0.09920983319	0.5765306122	1.368059099	poultry	[dinner rolls, spaghetti sauce]
2	0.09569798068	0.545	1.446981352	juice	[poultry, aluminum foil]
6	0.09569798068	0.5422885572	1.410197869	aluminum foil	[poultry, juice]
18	0.09569798068	0.556122449	1.319632228	poultry	[juice, aluminum foil]
3	0.09482001756	0.5538461538	1.420790021	eggs	[dinner rolls, soda]
8	0.09482001756	0.5454545455	1.396118488	soda	[eggs, dinner rolls]
16	0.09482001756	0.5217391304	1.344481605	dishwashing liquid/detergent	[poultry, mixes]
20	0.09482001756	0.5268292683	1.250121951	poultry	[dishwashing liquid/detergent, mixes]
7	0.09306409131	0.5408163265	1.406369397	yogurt	[juice, aluminum foil]
9	0.09306409131	0.5247524752	1.393223938	juice	[yogurt, aluminum foil]
11	0.09306409131	0.5273631841	1.371385084	aluminum foil	[yogurt, juice]
4	0.09218612818	0.5526315789	1.414488468	soda	[eggs, soap]
15	0.09218612818	0.527638191	1.353558332	eggs	[soda, soap]
19	0.09218612818	0.5384615385	1.277724359	poultry	[dinner rolls, cereals]
5	0.09130816506	0.5252525253	1.41433245	pasta	[eggs, dinner rolls]
10	0.09130816506	0.5388601036	1.385466497	dinner rolls	[eggs, pasta]
13	0.09130816506	0.5279187817	1.354278136	eggs	[poultry, soda]
14	0.09130816506	0.5279187817	1.354278136	eggs	[dinner rolls, pasta]
17	0.09130816506	0.5621621622	1.333963964	poultry	[dinner rolls, lunch meat]
21	0.09130816506	0.5252525253	1.246380471	poultry	[eggs, dinner rolls]

COMBO 1

- **Spaghetti Sauce**
- **Poultry**
- **Dinner Rolls**

DISCOUNT 10%

COMBO 2

- **Cereal**
- **Dinner Rolls**
- **Poultry**

DISCOUNT 10%

BUY 2 GET 1 FREE

- Eggs
- Pasta
- Dinner Rolls