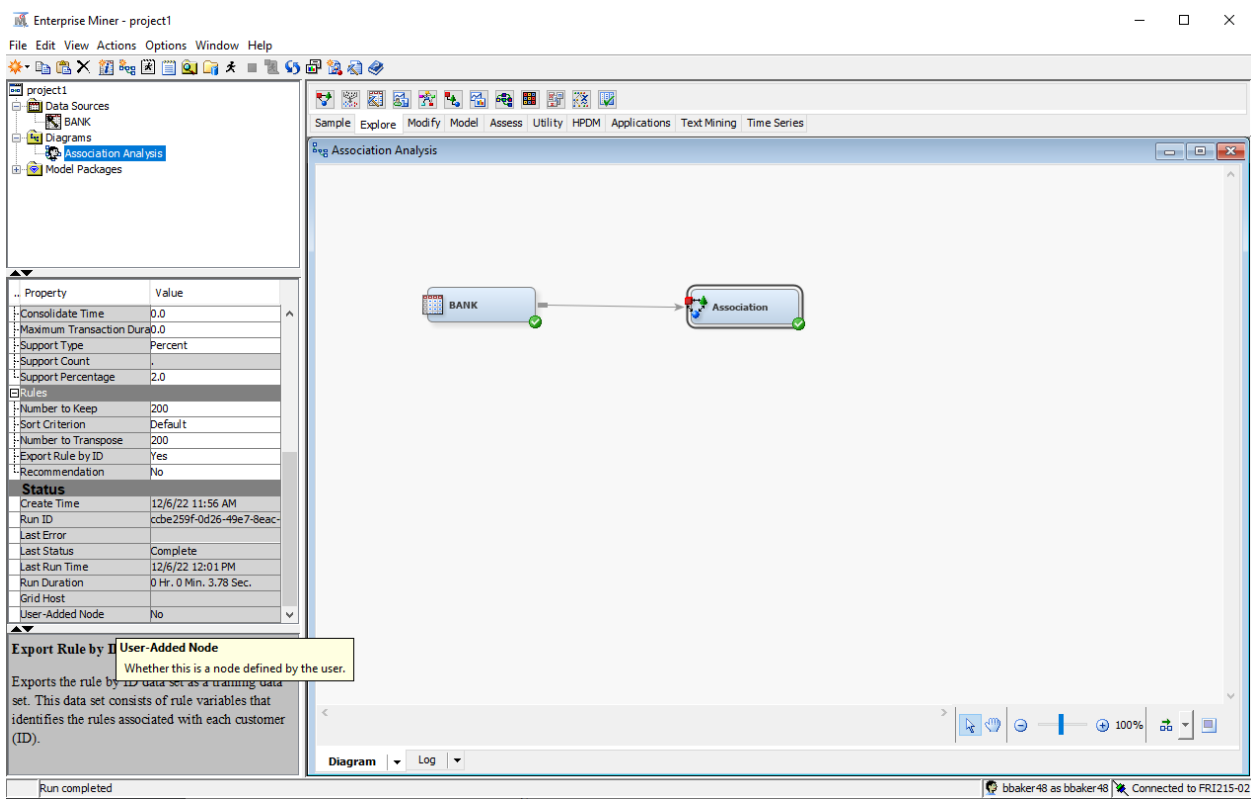


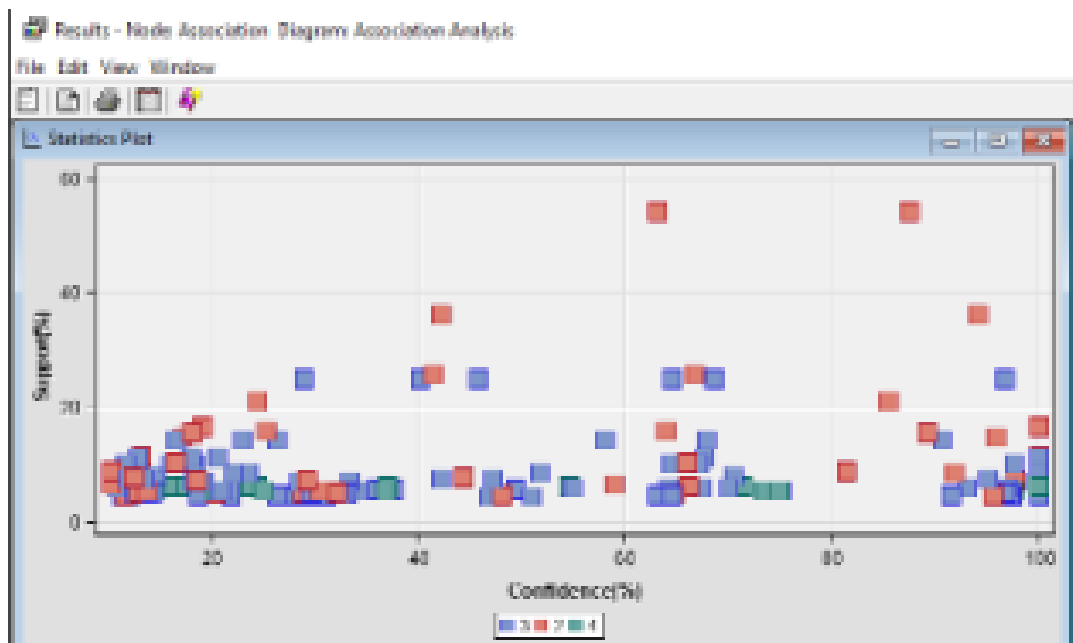
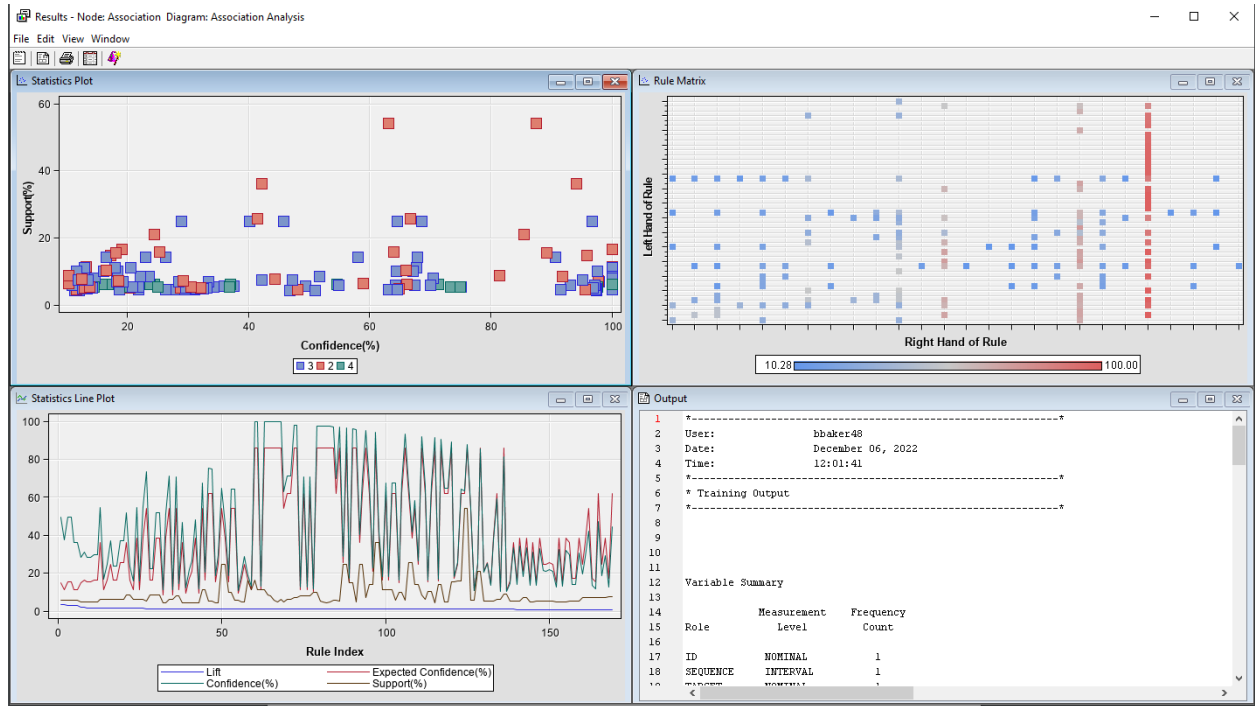
Project 1 - SAS Association Rule Mining

Ben Baker

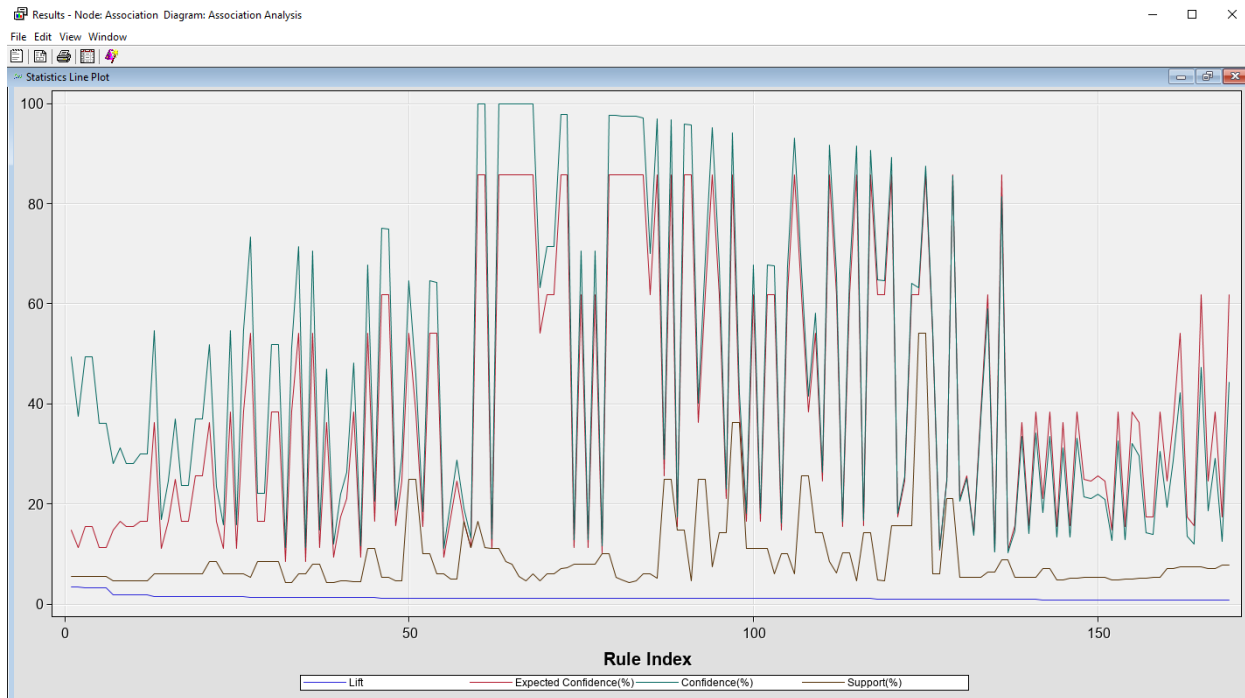
Robbie Brouillard

Market Basket Analysis:





- Interpretation of Stat. Plot.
 - Confidence level does not seem to have an influence over the value of support. As most Support values tend to be within the range of 0-20 for all values of confidence level



Interpretation of Statistics Line plot:

- This plot graphs, 'Lift', 'Expected Confidence', 'Actual Confidence', and 'Support' for each of the association rules by rule index.
- Consider the Rule CKCRD => CCRD
 - **Support** of CKCRD => CCRD is the probability that a customer has both a checking card and a credit card.
 - **Confidence** of CKCRD => CCRD is the probability that a customer has a credit card given that they have a checking card
 - **Expected Confidence** of CKCRD => CCRD is the probability that a customer has a credit card
 - Throughout the Graph Exp. Conf. tends to be lower than actual confidence, until large rules are examined in which this relationship flips.
 - **Lift** of CKCRD => CCRD is the measure of strength of association between the two. Here lift for CKCRD => CCRD, which is Rule index 3 is equal to 3.19, meaning a customer that has a checking card is 3.19 times more likely to also have a credit card than a customer chosen at random.

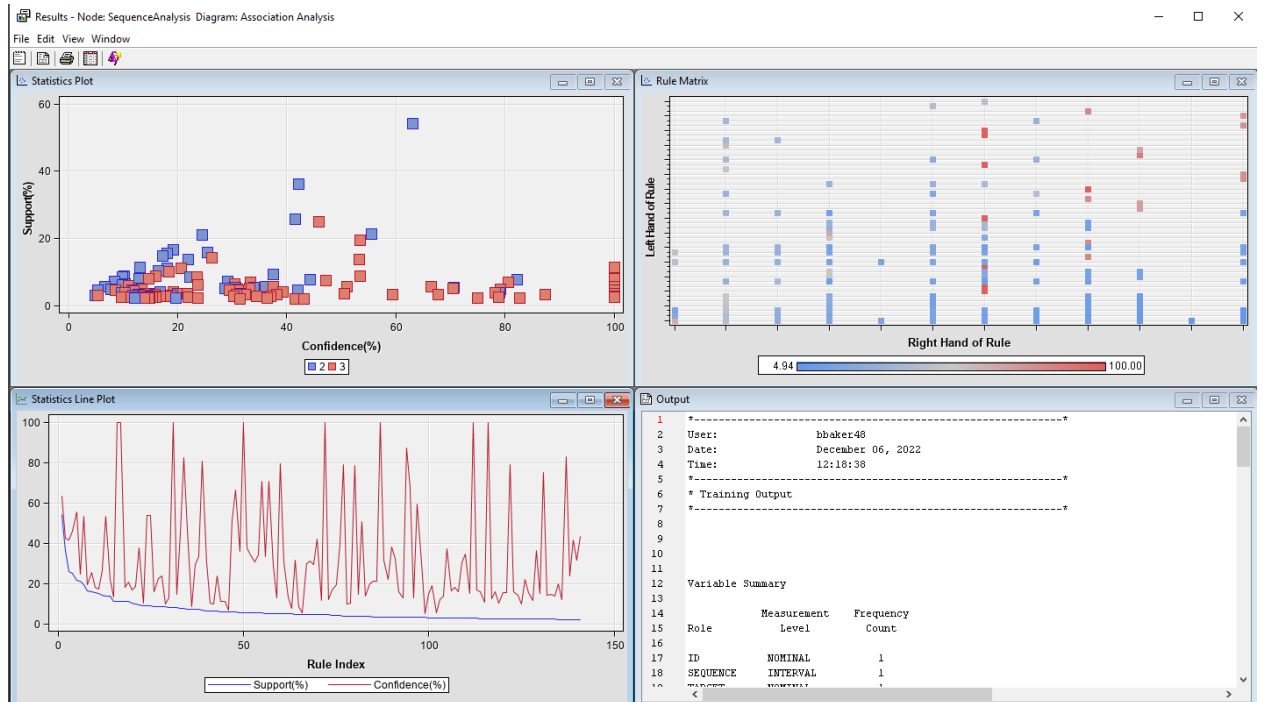
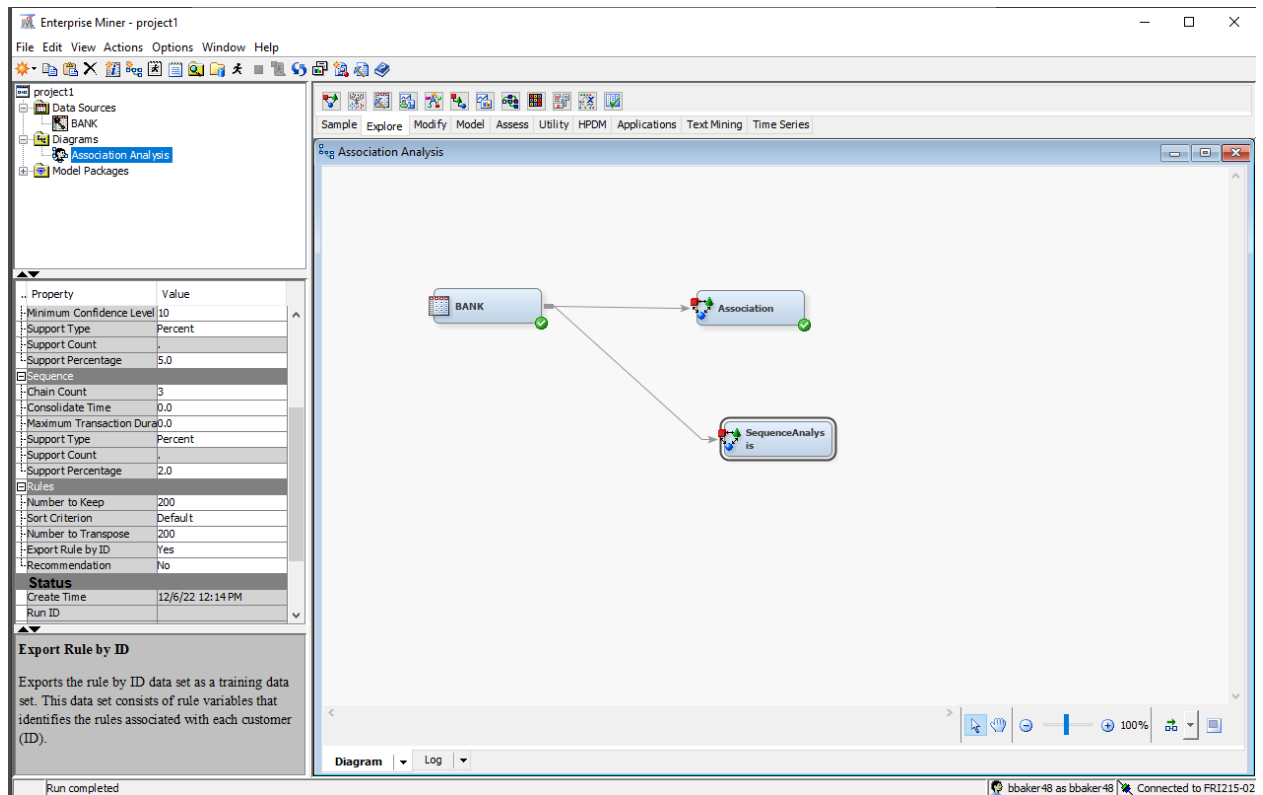


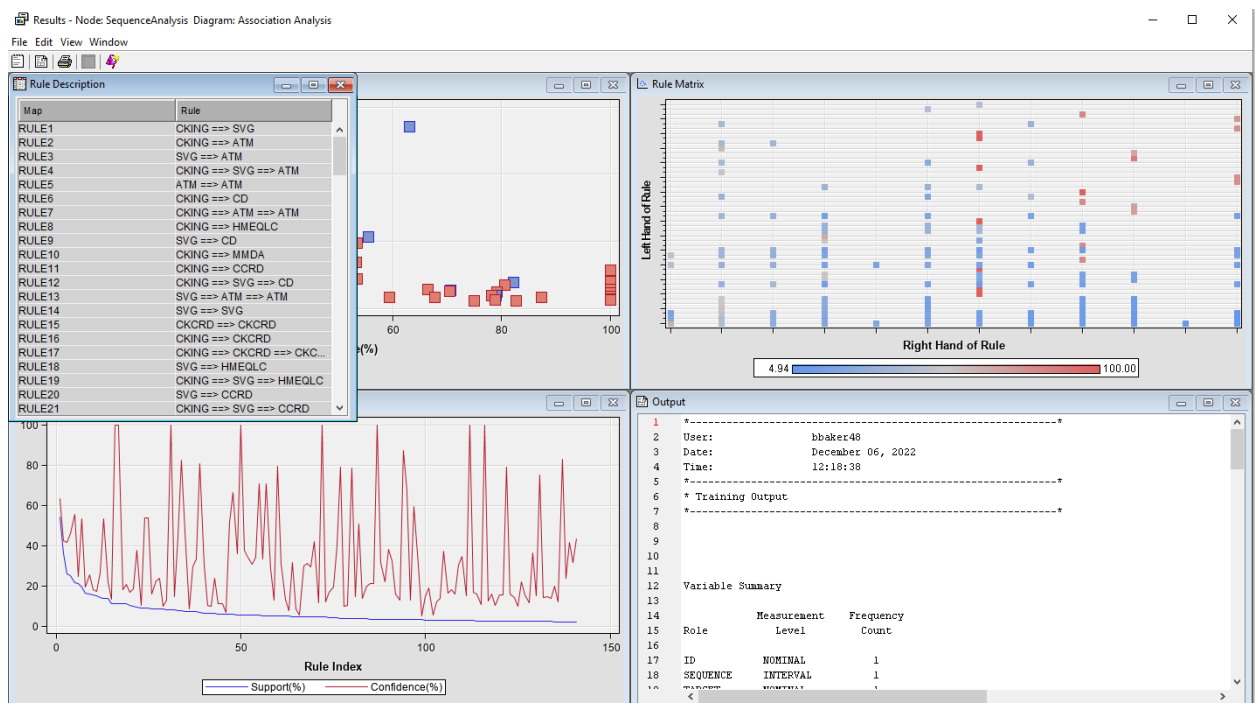
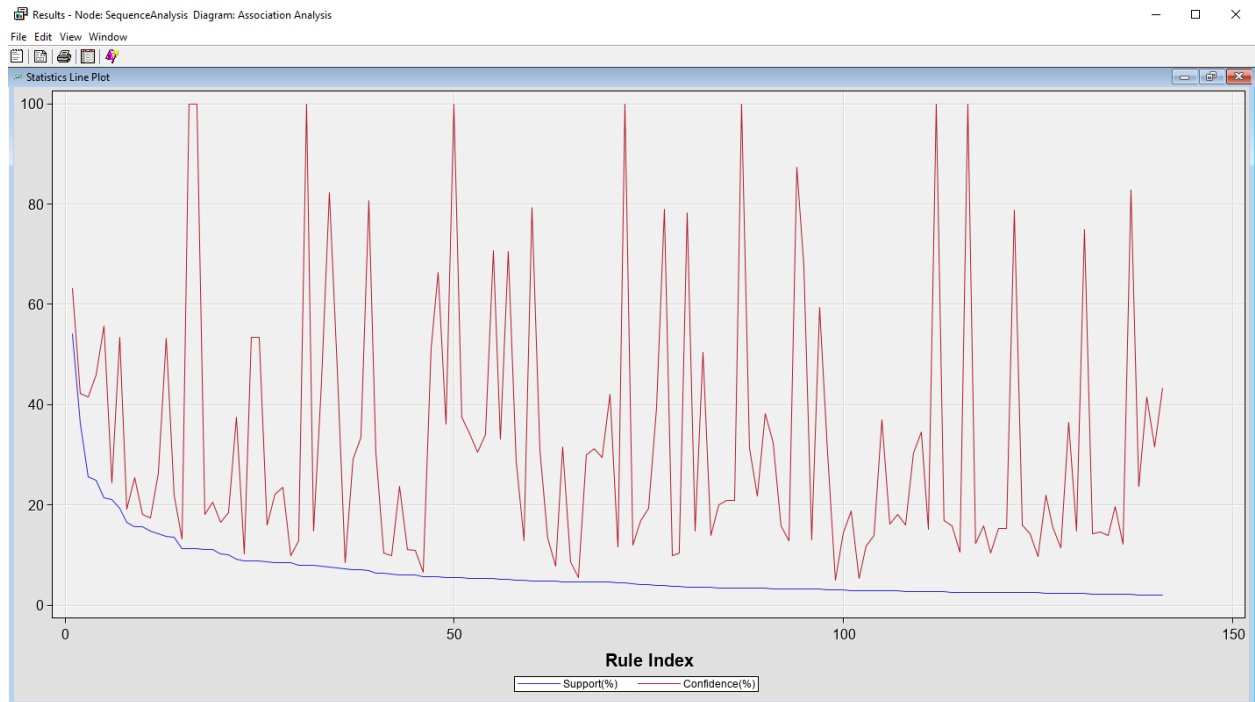
Map	Rule
RULE1	CKING & CCRD ==> CKCRD
RULE2	CKCRD ==> CKING & CCRD
RULE3	CKCRD ==> CCRD
RULE4	CKING & CKCRD ==> CCRD
RULE5	CCRD ==> CKCRD
RULE6	CCRD ==> CKING & CKCRD
RULE7	HMEQLC ==> CKING & CCRD
RULE8	CKING & CCRD ==> HMEQLC
RULE9	HMEQLC ==> CCRD
RULE10	HMEQLC & CKING ==> CCRD
RULE11	CCRD ==> HMEQLC
RULE12	CCRD ==> HMEQLC & CKING
RULE13	SVG & HMEQLC ==> CKING &...
RULE14	CKING & ATM ==> SVG & HM...
RULE15	SVG & CKING & ATM ==> HM...
RULE16	HMEQLC ==> SVG & CKING &...
RULE17	SVG & ATM ==> HMEQLC
RULE18	SVG & ATM ==> HMEQLC & C...
RULE19	HMEQLC ==> SVG & ATM
RULE20	HMEQLC & CKING ==> SVG &...
RULE21	HMEQLC ==> CKING & ATM

● Interpretation of Rule Description

- The highest lift rule is 'Checking, and credit card imply check card', this makes sense as most check cards include credit card logos. And the second highest is 'Check card implies credit card and checking account. This makes sense as lifts are symmetric.
- One of the higher rules is 'checking account and credit card implies home equity line of credit. This information could be used to offer checking accounts and credit cards to individuals with home equity lines of credit that don't already have them.

Sequence Analysis:





Map	Rule
RULE1	CKING ==> SVG
RULE2	CKING ==> ATM
RULE3	SVG ==> ATM
RULE4	CKING ==> SVG ==> ATM
RULE5	ATM ==> ATM
RULE6	CKING ==> CD
RULE7	CKING ==> ATM ==> ATM
RULE8	CKING ==> HMEQLC
RULE9	SVG ==> CD
RULE10	CKING ==> MMDA
RULE11	CKING ==> CCRD
RULE12	CKING ==> SVG ==> CD
RULE13	SVG ==> ATM ==> ATM
RULE14	SVG ==> SVG
RULE15	CKCRD ==> CKCRD
RULE16	CKING ==> CKCRD
RULE17	CKING ==> CKCRD ==> CKC...
RULE18	SVG ==> HMEQLC
RULE19	CKING ==> SVG ==> HMEQLC
RULE20	SVG ==> CCRD
RULE21	CKING ==> SVG ==> CCRD

- **Interpretation:**

- The confidence level for many of the rules experience a change after the order of service acquisition is considered. From the Rule description above, If a customer already has a checking and savings, they are more likely to get an ATM card next, shown by rule #4. Therefore it may be beneficial to add an ATM card to a cross-sell offer with checking and savings accounts.
- The same interpretation can be made for a home equity line of credit, which has a similar relationship with checking and savings accounts, shown in rule #18.