

CSC 466 Lab 2 Report

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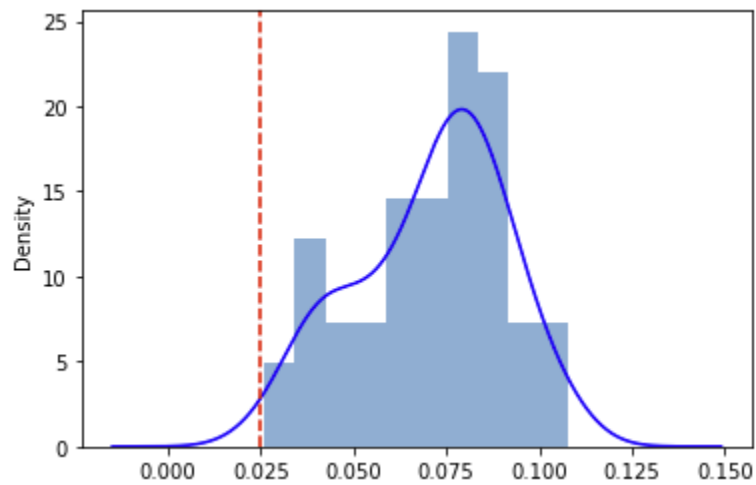
EXTENDED BAKERY Summary Table

Dataset	minSup	minConf	Number of Skyline Association Rules
1000	0.025	0.75	20
5000	0.03	0.49	19
20000	0.03	0.49	18
75000	0.03	0.49	18

Procedures to Find Best Values of minSup and minConf

EXTENDED BAKERY 1000

minSup	minConf	Number of Skyline Frequent Itemsets	Number of Skyline Association Rules
0.05	0	38	4
0.025	0	32	42
0.025	0.75	32	20



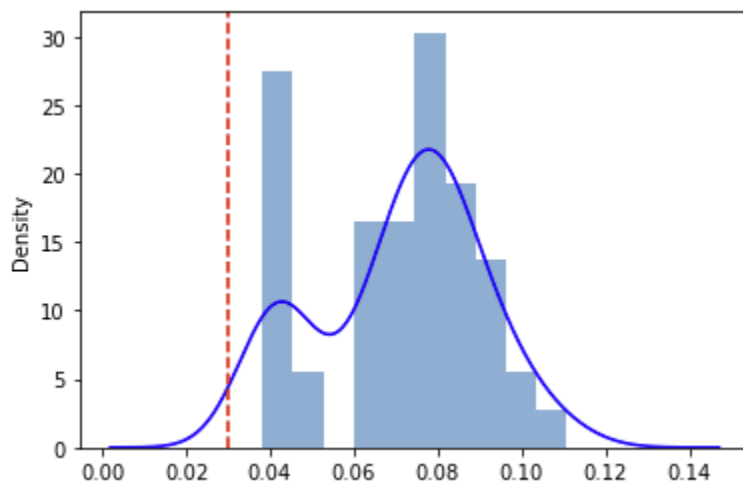
When looking at the density plot of the mean of this market basket dataset, we saw that there was a local minimum around 0.05, displaying a separation between support values. We wanted to initially include a large number of association rules in finding a good minSup. So, we ran the algorithms with minSup = 0.05 and minConf = 0. With these values, we got only 4 association rules, so we decided to lower the minSup to 0.025, resulting in 42 association rules. From here, we only wanted to assert association rules with higher confidence in order to find itemsets that had stronger relationships between items, so we increased minConf to 0.75. This decreased our number of association rules to 20.

For the remaining EXTENDED BAKERY datasets, we followed a similar process of starting with a minConf = 0 and decreasing minSup until we got enough frequent itemsets. Once we settled on a minSup value, we would increase minConf to filter our association rules.

Note: The reported support and confidence values are multiplied by 100 to represent percentages, although minSup and minConf are decimals.

EXTENDED BAKERY 5000

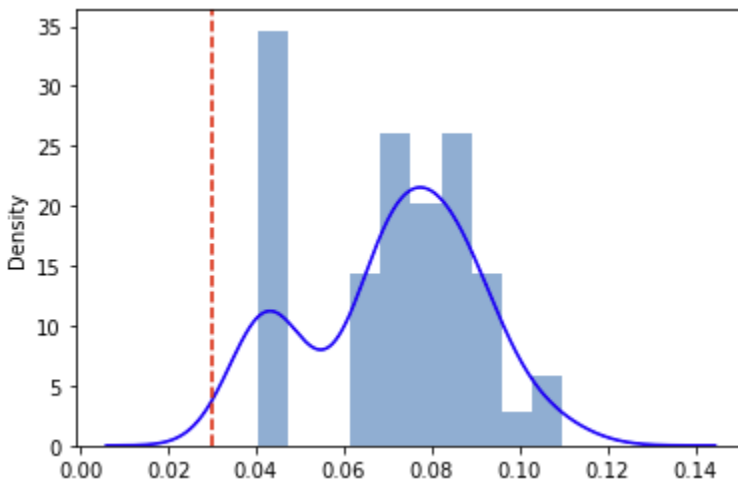
minSup	minConf	Number of Skyline Frequent Itemsets	Number of Skyline Association Rules
0.05	0	37	2
0.04	0	38	17
0.03	0	35	37
0.03	0.49	35	19



We noticed that there were association rules that had higher support values from 0.04 to 0.05 but had lower confidence values from 0.3 to 0.6. These itemsets more commonly appeared together but were not as strongly related, compared to the itemsets that had higher confidence and lower support values. Since we also found this type of relationship important, we chose a minConf of 0.49 that was high enough to show strong relationships between the items, but low enough to assert the association rules with high support. We followed this similar thought process for the 20000 and 75000 datasets. We settled on using minSup = 0.03 and minConf = 0.49 for both.

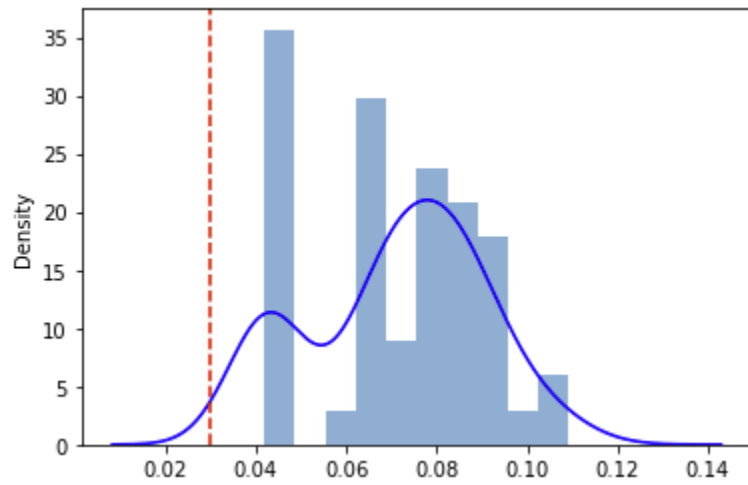
EXTENDED BAKERY 20000

minSup	minConf	Number of Skyline Frequent Itemsets	Number of Skyline Association Rules
0.05	0	37	2
0.03	0	39	40
0.03	0.49	39	18



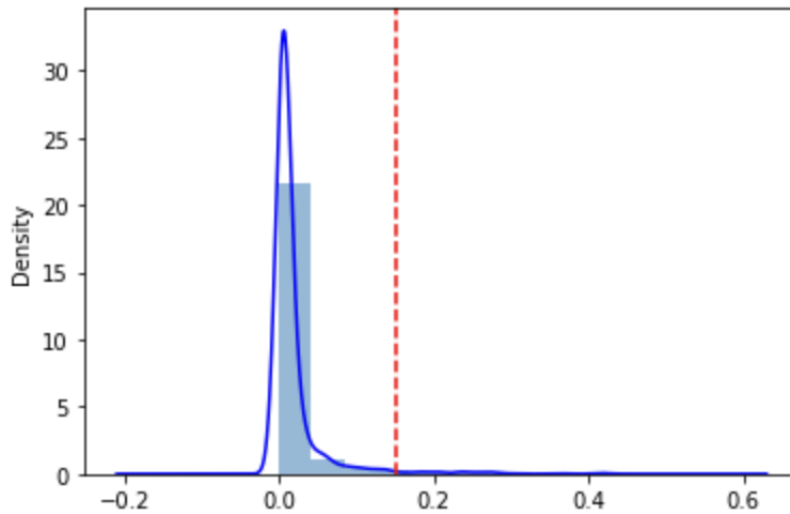
EXTENDED BASKET 75000

minSup	minConf	Number of Skyline Frequent Itemsets	Number of Skyline Association Rules
0.03	0.49	38	18



Fantasy Bingo

minSup	minConf	Number of Skyline Frequent Itemsets	Number of Skyline Association Rules
0.05	0	405	821
0.15	0	29	12
0.15	0.4	29	9



First, we tested the minSup at 0.05 seeing that there was the highest density of support values around this area. However, at this minSup value we found too many frequent itemsets and association rules. We found that increasing minSup to 0.15 reduced our frequent itemsets to 29 and our association rules to 12. To only retain association rules with a higher confidence, we increased minConf to 0.4, resulting in a total of 9 association rules.

EXTENDED BAKERY 1000 Results

Number of Skyline Frequent Itemsets: 32

Itemset 1: Chocolate Eclair [sup=0.034]
 Itemset 2: Vanilla Eclair [sup=0.037]
 Itemset 3: Almond Tart [sup=0.041]
 Itemset 4: Apricot Tart [sup=0.056]
 Itemset 5: Pecan Tart [sup=0.04]
 Itemset 6: Ganache Cookie [sup=0.044]
 Itemset 7: Chocolate Meringue [sup=0.038]
 Itemset 8: Vanilla Meringue [sup=0.047]
 Itemset 9: Walnut Cookie [sup=0.061]
 Itemset 10: Almond Croissant [sup=0.049]
 Itemset 11: Chocolate Croissant [sup=0.042]
 Itemset 12: Almond Bear Claw [sup=0.026]
 Itemset 13: Blueberry Danish [sup=0.055]
 Itemset 14: Green Tea [sup=0.062]
 Itemset 15: Single Espresso [sup=0.059]
 Itemset 16: Lemon Cake, Lemon Tart [sup=0.04]
 Itemset 17: Napoleon Cake, Strawberry Cake [sup=0.049]
 Itemset 18: Truffle Cake, Gongolais Cookie [sup=0.058]
 Itemset 19: Blackberry Tart, Coffee Eclair [sup=0.031]
 Itemset 20: Hot Coffee, Coffee Eclair [sup=0.026]
 Itemset 21: Apple Pie, Hot Coffee [sup=0.029]
 Itemset 22: Bottled Water, Berry Tart [sup=0.034]
 Itemset 23: Chocolate Tart, Vanilla Frappuccino [sup=0.026]
 Itemset 24: Marzipan Cookie, Tuile Cookie [sup=0.053]
 Itemset 25: Cheese Croissant, Orange Juice [sup=0.038]
 Itemset 26: Hot Coffee, Almond Twist [sup=0.025]
 Itemset 27: Chocolate Cake, Casino Cake, Chocolate Coffee
 [sup=0.038]
 Itemset 28: Apricot Danish, Cherry Tart, Opera Cake [sup=0.038]
 Itemset 29: Apple Pie, Almond Twist, Coffee Eclair [sup=0.027]
 Itemset 30: Blueberry Tart, Apricot Croissant, Hot Coffee
 [sup=0.032]
 Itemset 31: Cherry Soda, Apple Danish, Apple Tart, Apple Croissant
 [sup=0.031]
 Itemset 32: Raspberry Cookie, Lemon Cookie, Raspberry Lemonade, Lemon
 Lemonade [sup=0.028]

Number of Skyline Association Rules: 20

- Rule 1: Casino Cake, Chocolate Coffee --> Chocolate Cake
[sup=3.8, conf=97.4359]
- Rule 2: Chocolate Cake, Chocolate Coffee --> Casino Cake
[sup=3.8, conf=80.85106]
- Rule 3: Chocolate Cake, Casino Cake --> Chocolate Coffee
[sup=3.8, conf=95.0]
- Rule 4: Cherry Tart, Opera Cake --> Apricot Danish [sup=3.8,
conf=92.68293]
- Rule 5: Opera Cake, Apricot Danish --> Cherry Tart [sup=3.8,
conf=97.4359]
- Rule 6: Cherry Tart, Apricot Danish --> Opera Cake [sup=3.8,
conf=82.6087]
- Rule 7: Almond Twist, Coffee Eclair --> Apple Pie [sup=2.7,
conf=90.0]
- Rule 8: Apple Pie, Coffee Eclair --> Almond Twist [sup=2.7,
conf=81.81818]
- Rule 9: Apple Pie, Almond Twist --> Coffee Eclair [sup=2.7,
conf=93.10345]
- Rule 10: Apricot Croissant, Hot Coffee --> Blueberry Tart
[sup=3.2, conf=100.0]
- Rule 11: Blueberry Tart, Hot Coffee --> Apricot Croissant
[sup=3.2, conf=96.9697]
- Rule 12: Blueberry Tart, Apricot Croissant --> Hot Coffee
[sup=3.2, conf=80.0]
- Rule 13: Apple Danish, Apple Tart, Apple Croissant --> Cherry Soda
[sup=3.1, conf=77.5]
- Rule 14: Cherry Soda, Apple Tart, Apple Croissant --> Apple Danish
[sup=3.1, conf=100.0]
- Rule 15: Cherry Soda, Apple Danish, Apple Croissant --> Apple Tart
[sup=3.1, conf=100.0]
- Rule 16: Cherry Soda, Apple Danish, Apple Tart --> Apple Croissant
[sup=3.1, conf=100.0]
- Rule 17: Lemon Cookie, Raspberry Lemonade, Lemon Lemonade -->
Raspberry Cookie [sup=2.8, conf=100.0]
- Rule 18: Lemon Lemonade, Raspberry Lemonade, Raspberry Cookie -->
Lemon Cookie [sup=2.8, conf=100.0]

Rule 19: Lemon Cookie, Lemon Lemonade, Raspberry Cookie -->
 Raspberry Lemonade [sup=2.8, conf=100.0]
 Rule 20: Lemon Cookie, Raspberry Lemonade, Raspberry Cookie -->
 Lemon Lemonade [sup=2.8, conf=96.55172]

EXTENDED BAKERY 5000 Results

Number of Skyline Frequent Itemsets: 35

Itemset 1: Chocolate Eclair [sup=3.82]
 Itemset 2: Vanilla Eclair [sup=4.6]
 Itemset 3: Almond Tart [sup=3.86]
 Itemset 4: Apricot Tart [sup=4.22]
 Itemset 5: Pecan Tart [sup=4.44]
 Itemset 6: Ganache Cookie [sup=3.88]
 Itemset 7: Raspberry Cookie [sup=6.4]
 Itemset 8: Lemon Cookie [sup=6.42]
 Itemset 9: Chocolate Meringue [sup=4.52]
 Itemset 10: Vanilla Meringue [sup=3.98]
 Itemset 11: Walnut Cookie [sup=7.06]
 Itemset 12: Almond Croissant [sup=4.56]
 Itemset 13: Chocolate Croissant [sup=4.32]
 Itemset 14: Almond Bear Claw [sup=4.28]
 Itemset 15: Blueberry Danish [sup=4.0]
 Itemset 16: Lemon Lemonade [sup=6.48]
 Itemset 17: Raspberry Lemonade [sup=6.78]
 Itemset 18: Green Tea [sup=6.2]
 Itemset 19: Cherry Soda [sup=6.7]
 Itemset 20: Lemon Cake, Lemon Tart [sup=3.36]
 Itemset 21: Napoleon Cake, Strawberry Cake [sup=4.22]
 Itemset 22: Truffle Cake, Gongolais Cookie [sup=4.72]
 Itemset 23: Blackberry Tart, Coffee Eclair [sup=3.56]
 Itemset 24: Apple Tart, Apple Croissant [sup=3.16]
 Itemset 25: Apple Tart, Apple Danish [sup=3.24]
 Itemset 26: Bottled Water, Berry Tart [sup=3.66]
 Itemset 27: Single Espresso, Blackberry Tart [sup=3.14]
 Itemset 28: Chocolate Tart, Vanilla Frappuccino [sup=3.48]
 Itemset 29: Marzipan Cookie, Tuile Cookie [sup=4.96]
 Itemset 30: Apple Danish, Apple Croissant [sup=3.3]

Itemset 31: Cheese Croissant, Orange Juice [sup=4.3]
 Itemset 32: Chocolate Cake, Casino Cake, Chocolate Coffee
 [sup=3.12]
 Itemset 33: Apricot Danish, Cherry Tart, Opera Cake [sup=4.08]
 Itemset 34: Blueberry Tart, Apricot Croissant, Hot Coffee
 [sup=3.28]
 Itemset 35: Almond Twist, Coffee Eclair, Apple Pie, Hot Coffee
 [sup=3.08]

Number of Skyline Association Rules: 19

Rule 1: Napoleon Cake --> Strawberry Cake [sup=4.22,
 conf=51.58924]
 Rule 2: Gongolais Cookie --> Truffle Cake [sup=4.72,
 conf=49.47589]
 Rule 3: Truffle Cake --> Gongolais Cookie [sup=4.72,
 conf=53.88128]
 Rule 4: Tuile Cookie --> Marzipan Cookie [sup=4.96,
 conf=49.6994]
 Rule 5: Marzipan Cookie --> Tuile Cookie [sup=4.96,
 conf=59.33014]
 Rule 6: Cheese Croissant --> Orange Juice [sup=4.3,
 conf=55.84416]
 Rule 7: Casino Cake, Chocolate Coffee --> Chocolate Cake
 [sup=3.12, conf=90.17341]
 Rule 8: Chocolate Cake, Chocolate Coffee --> Casino Cake
 [sup=3.12, conf=79.18782]
 Rule 9: Chocolate Cake, Casino Cake --> Chocolate Coffee
 [sup=3.12, conf=91.22807]
 Rule 10: Cherry Tart, Opera Cake --> Apricot Danish [sup=4.08,
 conf=93.57798]
 Rule 11: Opera Cake, Apricot Danish --> Cherry Tart [sup=4.08,
 conf=94.44444]
 Rule 12: Cherry Tart, Apricot Danish --> Opera Cake [sup=4.08,
 conf=79.6875]
 Rule 13: Apricot Croissant, Hot Coffee --> Blueberry Tart
 [sup=3.28, conf=94.25287]
 Rule 14: Blueberry Tart, Hot Coffee --> Apricot Croissant
 [sup=3.28, conf=93.71429]

Rule 15: Blueberry Tart, Apricot Croissant --> Hot Coffee
 [sup=3.28, conf=74.54545]
 Rule 16: Apple Pie, Hot Coffee, Coffee Eclair --> Almond Twist
 [sup=3.08, conf=100.0]
 Rule 17: Hot Coffee, Apple Pie, Almond Twist --> Coffee Eclair
 [sup=3.08, conf=100.0]
 Rule 18: Hot Coffee, Almond Twist, Coffee Eclair --> Apple Pie
 [sup=3.08, conf=100.0]
 Rule 19: Apple Pie, Almond Twist, Coffee Eclair --> Hot Coffee
 [sup=3.08, conf=80.62827]

EXTENDED BAKERY 20000 Results

Number of Skyline Frequent Itemsets: 39

Itemset 1: Chocolate Eclair [sup=4.26]
 Itemset 2: Vanilla Eclair [sup=4.27]
 Itemset 3: Almond Tart [sup=4.055]
 Itemset 4: Apple Tart [sup=6.925]
 Itemset 5: Apricot Tart [sup=4.275]
 Itemset 6: Pecan Tart [sup=4.155]
 Itemset 7: Ganache Cookie [sup=4.33]
 Itemset 8: Raspberry Cookie [sup=6.945]
 Itemset 9: Lemon Cookie [sup=6.825]
 Itemset 10: Chocolate Meringue [sup=4.45]
 Itemset 11: Vanilla Meringue [sup=4.24]
 Itemset 12: Almond Croissant [sup=4.205]
 Itemset 13: Apple Croissant [sup=7.1]
 Itemset 14: Chocolate Croissant [sup=4.46]
 Itemset 15: Apple Danish [sup=6.755]
 Itemset 16: Almond Bear Claw [sup=4.425]
 Itemset 17: Blueberry Danish [sup=4.115]
 Itemset 18: Lemon Lemonade [sup=6.655]
 Itemset 19: Raspberry Lemonade [sup=6.845]
 Itemset 20: Green Tea [sup=6.215]
 Itemset 21: Cherry Soda [sup=6.53]
 Itemset 22: Lemon Cake, Lemon Tart [sup=3.7]
 Itemset 23: Napoleon Cake, Strawberry Cake [sup=4.455]
 Itemset 24: Truffle Cake, Gongolais Cookie [sup=4.335]

Itemset 25: Blackberry Tart, Coffee Eclair [sup=3.675]
 Itemset 26: Hot Coffee, Coffee Eclair [sup=3.17]
 Itemset 27: Apple Pie, Hot Coffee [sup=3.085]
 Itemset 28: Bottled Water, Berry Tart [sup=3.57]
 Itemset 29: Single Espresso, Blackberry Tart [sup=3.015]
 Itemset 30: Chocolate Tart, Walnut Cookie [sup=3.055]
 Itemset 31: Chocolate Tart, Vanilla Frappuccino [sup=3.675]
 Itemset 32: Marzipan Cookie, Tuile Cookie [sup=4.855]
 Itemset 33: Walnut Cookie, Vanilla Frappuccino [sup=3.095]
 Itemset 34: Cheese Croissant, Orange Juice [sup=4.39]
 Itemset 35: Hot Coffee, Almond Twist [sup=3.085]
 Itemset 36: Chocolate Cake, Casino Cake, Chocolate Coffee
 [sup=3.39]
 Itemset 37: Apricot Danish, Cherry Tart, Opera Cake [sup=4.1]
 Itemset 38: Apple Pie, Almond Twist, Coffee Eclair [sup=3.415]
 Itemset 39: Blueberry Tart, Apricot Croissant, Hot Coffee
 [sup=3.26]

Number of Skyline Association Rules: 18

Rule 1: Napoleon Cake --> Strawberry Cake [sup=4.455,
 conf=52.72189]
 Rule 2: Truffle Cake --> Gongolais Cookie [sup=4.335,
 conf=51.21087]
 Rule 3: Bottled Water --> Berry Tart [sup=3.57, conf=49.48025]
 Rule 4: Tuile Cookie --> Marzipan Cookie [sup=4.855,
 conf=49.21439]
 Rule 5: Marzipan Cookie --> Tuile Cookie [sup=4.855,
 conf=56.15963]
 Rule 6: Cheese Croissant --> Orange Juice [sup=4.39,
 conf=53.73317]
 Rule 7: Casino Cake, Chocolate Coffee --> Chocolate Cake
 [sup=3.39, conf=94.95798]
 Rule 8: Chocolate Cake, Chocolate Coffee --> Casino Cake
 [sup=3.39, conf=76.958]
 Rule 9: Chocolate Cake, Casino Cake --> Chocolate Coffee
 [sup=3.39, conf=94.56067]
 Rule 10: Cherry Tart, Opera Cake --> Apricot Danish [sup=4.1,
 conf=93.92898]

Rule 11: Opera Cake, Apricot Danish --> Cherry Tart [sup=4.1, conf=94.57901]
 Rule 12: Cherry Tart, Apricot Danish --> Opera Cake [sup=4.1, conf=78.02093]
 Rule 13: Almond Twist, Coffee Eclair --> Apple Pie [sup=3.415, conf=94.2069]
 Rule 14: Apple Pie, Coffee Eclair --> Almond Twist [sup=3.415, conf=91.67785]
 Rule 15: Apple Pie, Almond Twist --> Coffee Eclair [sup=3.415, conf=94.99305]
 Rule 16: Apricot Croissant, Hot Coffee --> Blueberry Tart [sup=3.26, conf=92.87749]
 Rule 17: Blueberry Tart, Hot Coffee --> Apricot Croissant [sup=3.26, conf=91.31653]
 Rule 18: Blueberry Tart, Apricot Croissant --> Hot Coffee [sup=3.26, conf=77.89725]

EXTENDED BAKERY 75000 Results

Number of Skyline Frequent Itemsets: 38

Itemset 1: Chocolate Eclair [sup=4.23733]
 Itemset 2: Vanilla Eclair [sup=4.252]
 Itemset 3: Almond Tart [sup=4.204]
 Itemset 4: Apple Tart [sup=6.82267]
 Itemset 5: Apricot Tart [sup=4.236]
 Itemset 6: Pecan Tart [sup=4.33733]
 Itemset 7: Ganache Cookie [sup=4.324]
 Itemset 8: Raspberry Cookie [sup=6.764]
 Itemset 9: Lemon Cookie [sup=6.80133]
 Itemset 10: Chocolate Meringue [sup=4.19333]
 Itemset 11: Vanilla Meringue [sup=4.23867]
 Itemset 12: Walnut Cookie [sup=6.78533]
 Itemset 13: Almond Croissant [sup=4.27333]
 Itemset 14: Apple Croissant [sup=6.72933]
 Itemset 15: Chocolate Croissant [sup=4.324]
 Itemset 16: Apple Danish [sup=6.76933]
 Itemset 17: Almond Bear Claw [sup=4.244]
 Itemset 18: Blueberry Danish [sup=4.40933]

Itemset 19: Lemon Lemonade [sup=6.824]
 Itemset 20: Raspberry Lemonade [sup=6.77467]
 Itemset 21: Green Tea [sup=6.24667]
 Itemset 22: Cherry Soda [sup=6.19867]
 Itemset 23: Single Espresso [sup=6.79733]
 Itemset 24: Lemon Cake, Lemon Tart [sup=3.68533]
 Itemset 25: Napoleon Cake, Strawberry Cake [sup=4.31467]
 Itemset 26: Truffle Cake, Gongolais Cookie [sup=4.392]
 Itemset 27: Blackberry Tart, Coffee Eclair [sup=3.64133]
 Itemset 28: Hot Coffee, Coffee Eclair [sup=3.156]
 Itemset 29: Apple Pie, Hot Coffee [sup=3.10267]
 Itemset 30: Bottled Water, Berry Tart [sup=3.78]
 Itemset 31: Chocolate Tart, Vanilla Frappuccino [sup=3.596]
 Itemset 32: Marzipan Cookie, Tuile Cookie [sup=5.092]
 Itemset 33: Cheese Croissant, Orange Juice [sup=4.30667]
 Itemset 34: Hot Coffee, Almond Twist [sup=3.092]
 Itemset 35: Chocolate Cake, Casino Cake, Chocolate Coffee
 [sup=3.33867]
 Itemset 36: Apricot Danish, Cherry Tart, Opera Cake [sup=4.11067]
 Itemset 37: Apple Pie, Almond Twist, Coffee Eclair [sup=3.432]
 Itemset 38: Blueberry Tart, Apricot Croissant, Hot Coffee
 [sup=3.28267]

Number of Skyline Association Rules: 18

Rule 1: Napoleon Cake --> Strawberry Cake [sup=4.31467,
 conf=52.14309]
 Rule 2: Truffle Cake --> Gongolais Cookie [sup=4.392,
 conf=53.40467]
 Rule 3: Bottled Water --> Berry Tart [sup=3.78, conf=50.26596]
 Rule 4: Tuile Cookie --> Marzipan Cookie [sup=5.092,
 conf=50.54262]
 Rule 5: Marzipan Cookie --> Tuile Cookie [sup=5.092,
 conf=56.72063]
 Rule 6: Cheese Croissant --> Orange Juice [sup=4.30667,
 conf=52.38404]
 Rule 7: Casino Cake, Chocolate Coffee --> Chocolate Cake
 [sup=3.33867, conf=94.74082]
 Rule 8: Chocolate Cake, Chocolate Coffee --> Casino Cake
 [sup=3.33867, conf=75.80987]

Rule 9: Chocolate Cake, Casino Cake --> Chocolate Coffee
 [sup=3.33867, conf=93.95872]
 Rule 10: Cherry Tart, Opera Cake --> Apricot Danish
 [sup=4.11067, conf=94.77405]
 Rule 11: Opera Cake, Apricot Danish --> Cherry Tart
 [sup=4.11067, conf=95.53765]
 Rule 12: Cherry Tart, Apricot Danish --> Opera Cake
 [sup=4.11067, conf=77.42341]
 Rule 13: Almond Twist, Coffee Eclair --> Apple Pie [sup=3.432,
 conf=92.4569]
 Rule 14: Apple Pie, Coffee Eclair --> Almond Twist [sup=3.432,
 conf=92.09302]
 Rule 15: Apple Pie, Almond Twist --> Coffee Eclair [sup=3.432,
 conf=93.56598]
 Rule 16: Apricot Croissant, Hot Coffee --> Blueberry Tart
 [sup=3.28267, conf=92.8006]
 Rule 17: Blueberry Tart, Hot Coffee --> Apricot Croissant
 [sup=3.28267, conf=93.68341]
 Rule 18: Blueberry Tart, Apricot Croissant --> Hot Coffee
 [sup=3.28267, conf=75.45204]

Fantasy Bingo Results

Number of Skyline Frequent Itemsets: 29

Itemset 1: *N/A [sup=18.107]
 Itemset 2: Aaron, Rachel / Bach, Rachel [sup=23.45679]
 Itemset 3: Abercrombie, Joe [sup=18.107]
 Itemset 4: Addison, Katherine / Monette, Sarah [sup=24.69136]
 Itemset 5: Arden, Katherine [sup=20.57613]
 Itemset 6: Ball, Krista D. / Ball, K. [sup=20.16461]
 Itemset 7: Brennan, Marie [sup=27.57202]
 Itemset 8: Butcher, Jim [sup=16.04938]
 Itemset 9: Chambers, Becky [sup=20.57613]
 Itemset 10: Eames, Nicholas [sup=26.33745]
 Itemset 11: Gladstone, Max [sup=18.107]
 Itemset 12: Hobb, Robin / Lindholm, Megan [sup=28.39506]
 Itemset 13: King, Stephen [sup=18.107]
 Itemset 14: Le Guin, Ursula K. [sup=23.45679]

Itemset 15: Lynch, Scott [sup=19.75309]
 Itemset 16: McClellan, Brian [sup=17.28395]
 Itemset 17: Mieville, China [sup=25.92593]
 Itemset 18: Novik, Naomi [sup=26.33745]
 Itemset 19: Rowe, Andrew [sup=24.27984]
 Itemset 20: Schafer, Courtney [sup=16.04938]
 Itemset 21: Sullivan, Michael J. [sup=23.04527]
 Itemset 22: Valente, Catherynne M. [sup=20.57613]
 Itemset 23: VanderMeer, Jeff [sup=23.45679]
 Itemset 24: Bancroft, Josiah, Lawrence, Mark [sup=17.28395]
 Itemset 25: Bancroft, Josiah, Pratchett, Terry [sup=16.46091]
 Itemset 26: Bancroft, Josiah, Sanderson, Brandon [sup=20.57613]
 Itemset 27: Sanderson, Brandon, Gaiman, Neil [sup=15.22634]
 Itemset 28: Jemisin, N. K., Sanderson, Brandon [sup=16.87243]
 Itemset 29: Sanderson, Brandon, Lawrence, Mark [sup=16.04938]

Number of Skyline Association Rules: 9

Rule 1: Lawrence, Mark --> Bancroft, Josiah [sup=17.28395, conf=56.0]
 Rule 2: Bancroft, Josiah --> Lawrence, Mark [sup=17.28395, conf=41.58416]
 Rule 3: Pratchett, Terry --> Bancroft, Josiah [sup=16.46091, conf=58.82353]
 Rule 4: Sanderson, Brandon --> Bancroft, Josiah [sup=20.57613, conf=49.01961]
 Rule 5: Bancroft, Josiah --> Sanderson, Brandon [sup=20.57613, conf=49.50495]
 Rule 6: Gaiman, Neil --> Sanderson, Brandon [sup=15.22634, conf=56.92308]
 Rule 7: Sanderson, Brandon --> Jemisin, N. K. [sup=16.87243, conf=40.19608]
 Rule 8: Jemisin, N. K. --> Sanderson, Brandon [sup=16.87243, conf=46.59091]
 Rule 9: Lawrence, Mark --> Sanderson, Brandon [sup=16.04938, conf=52.0]