Assignment 1 Part 1

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#Assignment:Assignment1part1
#Date:10/19/2021
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1a.) Appendix 1a
1b.) Appendix 1b
1c.) Assuming a minimum support count of 2 and a minimum confidence of 60%.
The rules that are strong are:

- C => A Strong, confidence = 0.833 Lift = 1.574 Meaningful
- E => B Strong, confidence = 0.667 Lift = 1.030 Meaningful
- BC => A Strong, confidence = 0.667 Lift = 1.259 Meaningful

These rules are all strong because they have a confidence that is above .6

1d.) For the strong rules, which ones are not "interesting"? Why are they not interesting?

None of the rules are not interesting from above. This is because they all have a lift above 1.
Of these rules, E => B is the least interesting of the rules because it has the lowest lift value.

2a).

For min confidence greater than 60%: number of rules: 3
C => A STRONG, confidence = 0.8333333333333334 Lift = 1.5740740740740742 (Meaningful)
E => B STRONG, confidence = 0.6666666666666666 Lift = 1.03030303030303 (Meaningful)
BC => A STRONG, confidence = 0.6666666666666666 Lift = 1.2592592592592593 (Meaningful)

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For min confidence greater than 60%: number of rules: 3
C => A , STRONG confidence =  0.8333333333333334 , Lift =  1.5740740740740742  (Meaningful)
E => B , STRONG confidence =  0.6666666666666666 , Lift =  1.03030303030303  (Meaningful)
BC => A , STRONG confidence =  0.6666666666666666 , Lift =  1.2592592592592593  (Meaningful)

For min confidence greater than 50%: number of rules: 6
C => B , STRONG confidence =  0.5 , Lift =  0.7727272727272727
C => A , STRONG confidence =  0.8333333333333334 , Lift =  1.5740740740740742  (Meaningful)
E => B , STRONG confidence =  0.6666666666666666 , Lift =  1.03030303030303  (Meaningful)
A => C , STRONG confidence =  0.5555555555555556 , Lift =  1.5740740740740742  (Meaningful)
BC => A , STRONG confidence =  0.6666666666666666 , Lift =  1.2592592592592593  (Meaningful)
AB => C , STRONG confidence =  0.5 , Lift =  1.4166666666666665  (Meaningful)

 All of the Rules: number of rules (Strong Conf >.5): 14
C => B , STRONG confidence =  0.5 , Lift =  0.7727272727272727
C => A , STRONG confidence =  0.8333333333333334 , Lift =  1.5740740740740742  (Meaningful)
C => AB ,  confidence =  0.3333333333333333 , Lift =  1.4166666666666665  (Meaningful)
E => B , STRONG confidence =  0.6666666666666666 , Lift =  1.03030303030303  (Meaningful)
A => B ,  confidence =  0.4444444444444444 , Lift =  0.6868686868686869
A => C , STRONG confidence =  0.5555555555555556 , Lift =  1.5740740740740742  (Meaningful)
A => BC ,  confidence =  0.2222222222222222 , Lift =  1.2592592592592593  (Meaningful)
B => C ,  confidence =  0.2727272727272727 , Lift =  0.7727272727272727
B => A ,  confidence =  0.36363636363636365 , Lift =  0.6868686868686869
B => E ,  confidence =  0.36363636363636365 , Lift =  1.03030303030303  (Meaningful)
B => AC ,  confidence =  0.18181818181818182 , Lift =  0.618181818181818
BC => A , STRONG confidence =  0.6666666666666666 , Lift =  1.2592592592592593  (Meaningful)
AB => C , STRONG confidence =  0.5 , Lift =  1.4166666666666665  (Meaningful)
AC => B ,  confidence =  0.4 , Lift =  0.618181818181818
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2b).

For min confidence greater than 50%: number of rules: 6
C => B , STRONG confidence = 0.5 , Lift = 0.7727272727272727
C => A , STRONG confidence = 0.8333333333333334 , Lift = 1.5740740740740742 (Meaningful)
E => B , STRONG confidence = 0.6666666666666666 , Lift = 1.03030303030303 (Meaningful)
A => C , STRONG confidence = 0.5555555555555556 , Lift = 1.5740740740740742 (Meaningful)
BC => A , STRONG confidence = 0.6666666666666666 , Lift = 1.2592592592592593 (Meaningful)
AB => C , STRONG confidence = 0.5 , Lift = 1.4166666666666665 (Meaningful)

When changing from 60% to 50% there are now three more rules that are strong: C => B; A=>C; AB=>C
These are highlighted above. Of these rules two of them are interesting. They are highlighted in Blue: A=>C; AB=>C
They are interesting because there lift is above 1. There is one that is not interesting and this is because the lift is below one. This rule is highlighted in yellow. C =>B

#	Transactions
1	A,B
2	A,B,C
3	A,B,C
4	A
5	A,C
6	B
7	B,E
8	A,E
9	E
10	A,C
11	A,C
12	A,B
13	B
14	B,E
15	B,E
16	B
17	B,C,E

Transaction:1
Values: AB
Combinations: A, B, AB

Dictionary	
A	1
B	1
AB	1

Transaction:2
Values: ABC
Combinations: A, B, C, AB, AC, BC, ABC

Dictionary	
A	2
B	2
AB	2
C	1
AC	1
BC	1
ABC	1

Transaction:3
Values: ABC
Combinations: A, B, C, AB, AC, BC, ABC

Dictionary	
A	3
B	3
AB	3
C	2
AC	2
BC	2
ABC	2

Transaction:4
Values: A
Combinations: A

Dictionary	
A	4
B	3
AB	3
C	2
AC	2
BC	2
ABC	2

Transaction:5
Values: AC
Combinations: A, C, AC

Dictionary	
A	5
B	3
AB	3
C	3
AC	3
BC	2
ABC	2

Transaction:6
Values: B
Combinations: B

Dictionary	
A	5
B	4
AB	3
C	3
AC	3
BC	2
ABC	2

Transaction:7
Values: BE
Combinations: B, E, BE

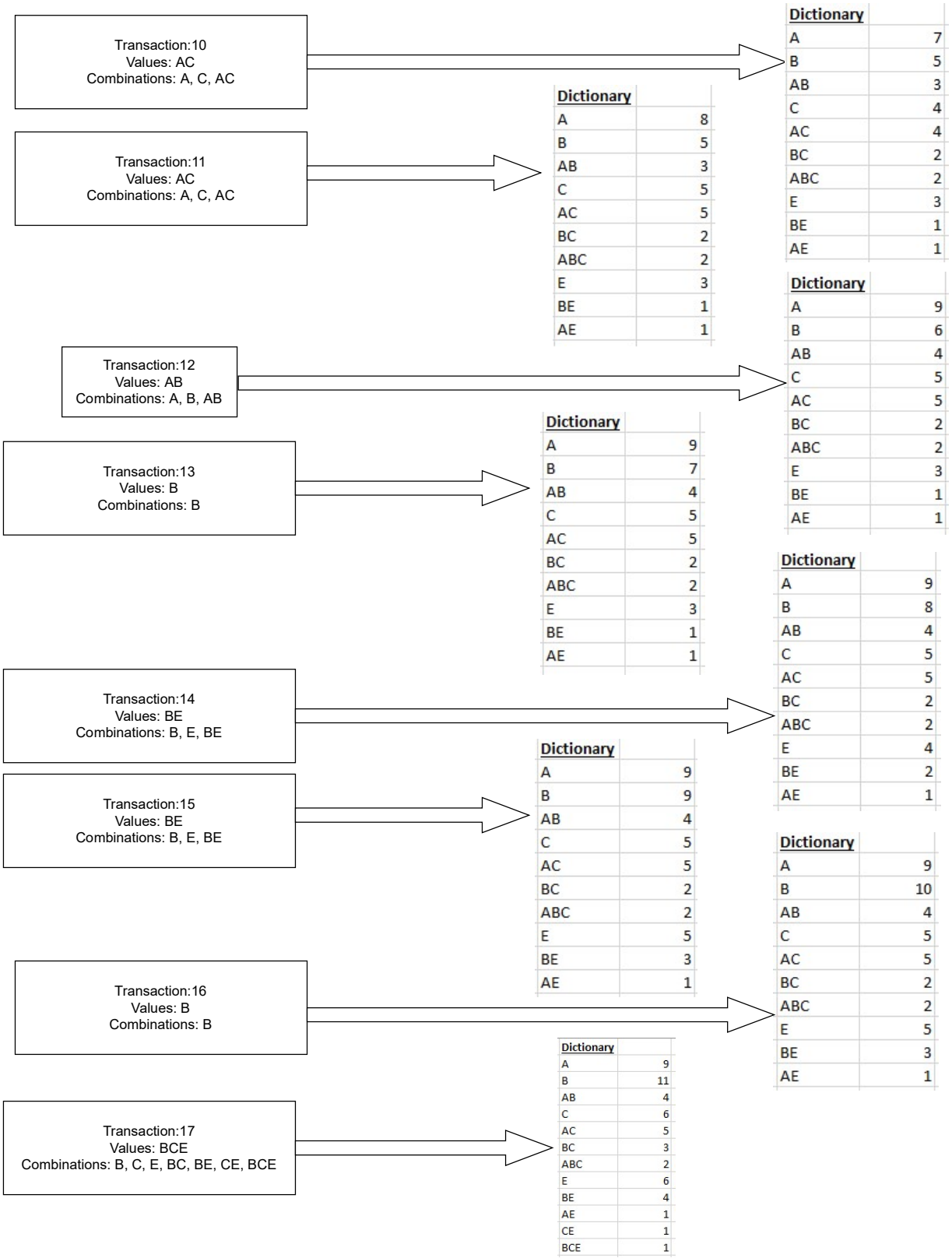
Dictionary	
A	5
B	5
AB	3
C	3
AC	3
BC	2
ABC	2
E	1
BE	1

Transaction:8
Values: AE
Combinations: A, E, AE

Dictionary	
A	6
B	5
AB	3
C	3
AC	3
BC	2
ABC	2
E	2
BE	1
AE	1

Transaction:9
Values: E
Combinations: E

Dictionary	
A	6
B	5
AB	3
C	3
AC	3
BC	2
ABC	2
E	3
BE	1
AE	1


Transaction:10
Values: AC
Combinations: A, C, AC
Transaction:11
Values: AC
Combinations: A, C, AC
Transaction:12
Values: AB
Combinations: A, B, AB
Transaction:13
Values: B
Combinations: B
Transaction:14
Values: BE
Combinations: B, E, BE
Transaction:15
Values: BE
Combinations: B, E, BE
Transaction:16
Values: B
Combinations: B
Transaction:17
Values: BCE
Combinations: B, C, E, BC, BE, CE, BCE
Dictionary
A 7
B 5
AB 3
C 4
AC 4
BC 2
ABC 2
E 3
BE 1
AE 1
Dictionary
A 8
B 5
AB 3
C 5
AC 5
BC 2
ABC 2
E 3
BE 1
AE 1
Dictionary
A 9
B 6
AB 4
C 5
AC 5
BC 2
ABC 2
E 3
BE 1
AE 1
Dictionary
A 9
B 7
AB 4
C 5
AC 5
BC 2
ABC 2
E 3
BE 1
AE 1
Dictionary
A 9
B 8
AB 4
C 5
AC 5
BC 2
ABC 2
E 4
BE 2
AE 1
Dictionary
A 9
B 9
AB 4
C 5
AC 5
BC 2
ABC 2
E 5
BE 3
AE 1
Dictionary
A 9
B 10
AB 4
C 5
AC 5
BC 2
ABC 2
E 5
BE 3
AE 1
Dictionary
A 9
B 11
AB 4
C 6
AC 5
BC 3
ABC 2
E 6
BE 4
AE 1
CE 1
BCE 1

Dictionary	Count	Probability	
B	11	2/3	0.647059
A	9	1/2	0.529412
C	6	1/3	0.352941
E	6	1/3	0.352941
AC	5	2/7	0.294118
AB	4	1/4	0.235294
BE	4	1/4	0.235294
BC	3	1/6	0.176471
ABC	2	1/8	0.117647
AE	1	1/17	0.058824
BCE	1	1/17	0.058824
CE	1	1/17	0.058824
Total Num Transactions	17		

Association Rules			Confidence			Lift			
C	=>	E	count(CE)/count(C)	1/6	0.166666667	prob(CE)/prob(C)prob(E)	0.472222		
C	=>	B	count(CB)/count(C)	3/6	0.5	prob(CB)/prob(C)prob(B)	0.772727		
C	=>	A	count(CA)/count(C)	5/6	0.833333333	prob(CA)/prob(C)prob(A)	1.574074	Strong	Meaningful
C	=>	BE	count(CBE)/count(C)	1/6	0.166666667	prob(CBE)/prob(C)prob(BE)	0.708333		
C	=>	AB	count(CAB)/count(C)	2/6	0.333333333	prob(CAB)/prob(C)prob(AB)	1.416667		
E	=>	A	count(EA)/count(E)	1/6	0.166666667	prob(EA)/prob(E)prob(A)	0.314815		
E	=>	C	count(EC)/count(E)	1/6	0.166666667	prob(EC)/prob(E)prob(C)	0.472222		
E	=>	B	count(EB)/count(E)	4/6	0.666666667	prob(EB)/prob(E)prob(B)	1.030303	Strong	Meaningful
E	=>	BC	count(EBC)/count(E)	1/6	0.166666667	prob(EBC)/prob(E)prob(BC)	0.944444		
A	=>	E	count(AE)/count(A)	1/9	0.111111111	prob(AE)/prob(A)prob(E)	0.314815		
A	=>	B	count(AB)/count(A)	4/9	0.444444444	prob(AB)/prob(A)prob(B)	0.686869		
A	=>	C	count(AC)/count(A)	5/9	0.555555556	prob(AC)/prob(A)prob(C)	1.574074		
A	=>	BC	count(ABC)/count(A)	2/9	0.222222222	prob(ABC)/prob(A)prob(BC)	1.259259		
B	=>	C	count(BC)/count(B)	3/11	0.272727273	prob(BC)/prob(B)prob(C)	0.772727		
B	=>	A	count(BA)/count(B)	4/11	0.363636364	prob(BA)/prob(B)prob(A)	0.686869		
B	=>	E	count(BE)/count(B)	4/11	0.363636364	prob(BE)/prob(B)prob(E)	1.030303		
B	=>	CE	count(BCE)/count(B)	1/11	0.090909091	prob(BCE)/prob(B)prob(CE)	1.545455		
B	=>	AC	count(BAC)/count(B)	2/11	0.181818182	prob(BAC)/prob(B)prob(AC)	0.618182		
CE	=>	B	count(CEB)/count(CE)	1/1	1	prob(CEB)/prob(CE)prob(B)	1.545455		
BC	=>	E	count(BCE)/count(BC)	1/3	0.333333333	prob(BCE)/prob(BC)prob(E)	0.944444		
BC	=>	A	count(BCA)/count(BC)	2/3	0.666666667	prob(BCA)/prob(BC)prob(A)	1.259259	Strong	Meaningful
AB	=>	C	count(ABC)/count(AB)	2/4	0.5	prob(ABC)/prob(AB)prob(C)	1.416667		
BE	=>	C	count(BEC)/count(BE)	1/4	0.25	prob(BEC)/prob(BE)prob(C)	0.708333		
AC	=>	B	count(ACB)/count(AC)	2/5	0.4	prob(ACB)/prob(AC)prob(B)	0.618182		