# > Association Rules

Tid	Items	
10	A, B, C	
20	A, C, D, F	
30	B, C, D, E	
40	В, С, Е	
50	C, E, F	
60	C, E, F	
70	A, B, C, F	
80	A, B	
90	В, С, Е	
100	B, F	

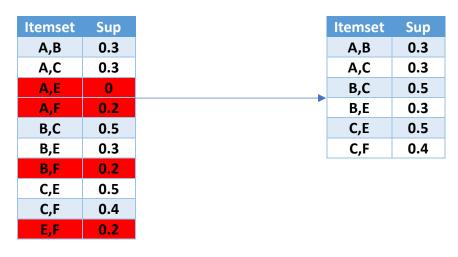
We will use apriori algorithm to generate candidate itemsets.

a) Minimum support=0.25 and confidence=0.75

#### 1st scan:

temset	Sup	ltomast
Α	0.4	Itemset
В	0.7	A
C	0.8	В
_		С
D	0.2	E
E	0.5	-
F	0.5	<b>-</b>

# 2<sup>nd</sup> scan:



### 3<sup>rd</sup> Scan:

Itemset	Sup
A,B,C	0.2
A,C,F	0.1
B,C,E	0.3

So, the association rules with minimum support=0.25 and confidence=0.75 are:

- A->B
- A->C
- E->C
- F->C
- B,E->C

b)

We want to find association rules with minimum support=0.25 and confidence=0.5

The candidate itemsets are the same as previously as we want minimum support=0.25

So, the association rules with minimum support=0.25 and confidence=0.5 are:

- A->B
- A->C
- B->C
- C->B
- E->B
- C->E
- E->C
- C->F
- F->C
- E->B,C
- B,C->E

B,E->C

# c) Minimum support=0.35 and confidence=0.5

#### 1st Scan:

Itemset	Sup			
Α	0.4		Itemset	Sup
В	0.7		Α	0.4
С	0.8	<b></b>	В	0.7
D	0.2		С	0.8
E	0.5		Ε	0.5
F	0.5		F	0.5

### 2<sup>nd</sup> Scan:

Itemset	Sup
A,B	0.3
A,C	0.3
A,E	0
A,F	0.2
В,С	0.5
B,E	0.3
B,F	0.2
C,E	0.5
C,F	0.4
E,F	0.2

If we do 3<sup>rd</sup> scan, we will observe that we will generate itemsets with length=3 that will contain subsets that are not frequent(support<0.35). So, we will not generate them.

So, the association rules with minimum support=0.35 and confidence=0.5 are:

B->C

C->B

C->E

E->C

C->F

F->C

### **Discussion-Results:**

We used Apriori algorithm to generate association rules for a transactional database with different support and confidence thresholds. In the first case (a) with support=25% and confidence=75% we found strong association rules. By reducing the confidence threshold in the second case (b) to 50% we found additional association rules, forming a superset of the rules in part (a). In the third case (c) by increasing the support threshold to 35% we result in a subset of the association rules from part (b). Overall, with a lower confidence threshold more rules were generated, while increasing the support threshold fewer rules were generated. Additionally, it is noteworthy that two association rules (E->C and F->C) consistently appeared in all three parts (a, b, and c) regardless of the change in support and confidence thresholds. That indicates that these two rules (E->C and F->C) are robust and can be deemed as reliable rules within the context of the transactional database.