Assignment Problem

Apriori Algorithm

Transaction ID	Items Bought
1	{Bread, Butter, Milk}
2	{Bread, Butter}
3	{Beer, Cookies, Diapers}
4	{Milk, Diapers, Bread, Butter}
5	{Beer, Diapers}

Assume that Min- support = 40%
Min confidence = 70 %

FP-Growth

Find all frequent itemsets or frequent patterns and association rules from the following database by using the FP- Growth algorithm

Take minimum support = 2

Tid	List of items IDs
1	I1, I2, I5
2	I2, I4
3	I2, I3
4	I1, I2, I4
5	I1, I3
6	I2, I3
7	I1, I3
8	I1, I2, I3, I5
9	I1, I2, I3

(3) Item Frequency count

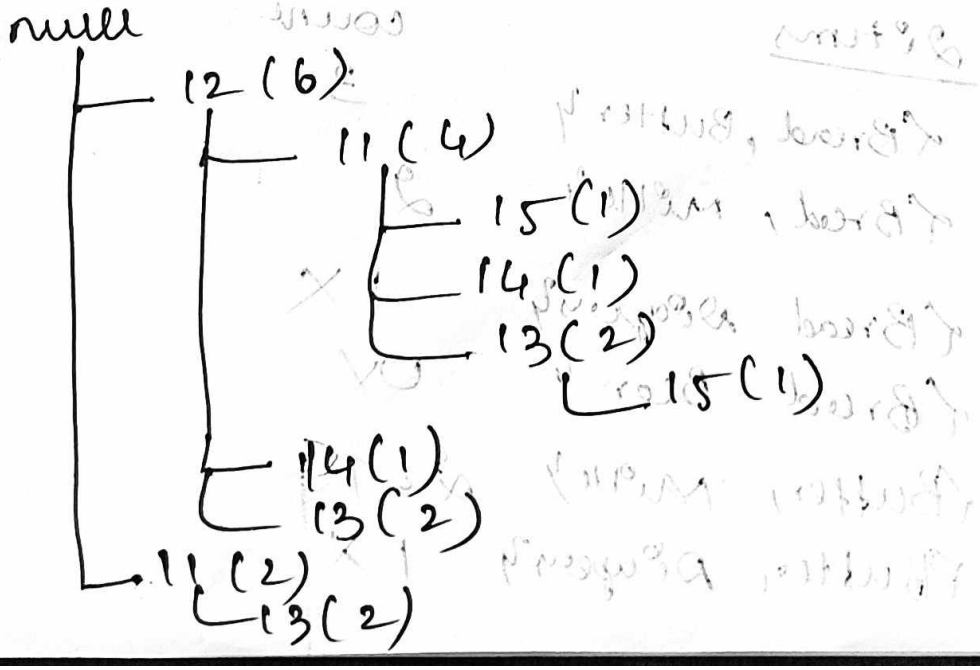
Item	count
I1	6
I2	7
I3	5
I4	2
I5	2

All have support ≥ 2 so all are frequent

* we'll sort each transaction using this global frequency order

I2 > I1 > I3 > I4 > I5

TID	Sorted Items
1	I2, I1, I5
2	I2, I4
3	I2, I3
4	I2, I1, I4
5	I1, I3
6	I2, I3
7	I1, I3
8	I2, I1, I3, I5
9	I2, I1, I3



Final Header Table

Item	Frequency	Node links (on FP-tree)
I2	7	All 12 nodes
I1	6	All 11 nodes
I3	5	All 13 nodes
I4	2	All 14 nodes
I5	2	All 15 nodes.

(1) Minimum support = 40%.
Minimum count = 0.40 × 5
= 2 transactions
Minimum confidence = 70%

(L1) Single items with count ≥ 2

Item	Count
Bread	3
Butter	3
Milk	2
Diapers	2
Beer	2
Coolies	1 X

Frequent 1-item sets:
{Bread}, {Butter}, {milk}, {Diapers}, {Beers}

(L2) 2 items

	count
{Bread, Butter}	3
{Bread, Milk}	2
{Bread Diapers}	1 X
{Bread Beer}	0 X
{Butter, Milk}	2
{Butter, Diapers}	1 X

{Butter, Beer} 0 ✗
{Milk, Diapers} 1 ✗
{Milk, Beer} 0 ✗
{Diapers, Beer} 2

Frequent 2 Itemsets :-
{Bread, Butter}, {Bread, Milk}, {Butter, Milk},
{Diapers, Beer}

(L3) 3 Itemsets

Itemset	count
{Bread, Butter, Milk}	2
{Beer, Diapers, cookies}	1

Frequent 3 Itemset
{Bread, Butter, Milk}

Step2 Generate Association Rules Confidence ≥ 70%
From {Bread, Butter, Milk} (support = 2/5 = 40%

1) {Bread, Butter} ⇒ Milk
support ({Bread, Butter, Milk}) = 2
support ({Bread, Butter}) = 3
confidence = 2/3 = 66.67% ✗

2) {Bread, Milk} ⇒ Butter
support ({Bread, Milk}) = 2
support ({Bread, Butter, Milk}) = 2
confidence = 2/2 = 100% ✓

3) {Butter, Milk} ⇒ Bread
confidence = 2/2 = 100% ✓

4) {Milk} ⇒ {Bread, Butter}

Support ({Milk}) = 2

Support ({Bread, Butter, Milk}) = 2

Confidence = 2/2 = 100%.

5) {Bread} ⇒ Butter

Support ({Bread}) = 3

Support ({Bread, Butter}) = 3

Confidence = 3/3 = 100%

6) {Butter} ⇒ Bread

same as above confidence = 100%

Final valid Association Rules
(Confidence ≥ 70%)

Rule	Confidence
{Bread, Milk} ⇒ Butter	100%
{Butter, Milk} ⇒ Bread	100%
{Milk} ⇒ {Bread, Butter}	100%
{Bread} ⇒ Butter	100%
{Butter} ⇒ Bread	100%
{Diapers} ⇒ Beer	100%
{Beer} ⇒ Diapers	100%