

=||=Lab-7

1. Apply apriori algorithm on given dataset. Calculate support and confidence then find the association.

TID	Item	Minimum support = 2
100	1 3 4	
200	2 3 5	
300	1 2 3 5	
400	2 5	

Scan D	C ₁	Itemset	Min. Sup.	L ₁	Itemset	Min. Sup.
		{1}	2		{1}	2
		{2}	3	→ scan D	{2}	3
		{3}	3		{3}	3
X		{4}	1		{4}	3
		{5}	3			

C ₂	Itemset	Min. Sup.	Scan D	L ₂	Itemset	Min. Sup.
X	{1, 2}	1	→		{1, 3}	2
	{1, 3}	2			{2, 3}	2
X	{1, 5}	1			{2, 5}	3
	{2, 3}	2			{3, 5}	2
	{2, 5}	3				
	{3, 5}	2				

C ₃	Itemset	Min. Sup.	Scan D	L ₃	Itemset	Min. Sup.
X	{1, 2, 3}	1	→		{2, 3, 5}	2
	{2, 3, 5}	2				
X	{1, 3, 5}	1				

Rule Generation:-

Association Rule	Support	Confidence	Confidence (%)
$2^A 3 \rightarrow 5$	2	$2/2 = 1$	100%
$3^A 5 \rightarrow 2$	2	$2/2 = 1$	100%
$2^A 5 \rightarrow 3$	2	$2/3 = 0.66$	66%
$2 \rightarrow 3^A 6$	2	$2/3 = 0.66$	66%
$3 \rightarrow 2^A 5$	2	$2/3 = 0.66$	66%
$5 \rightarrow 2^A 3$	2	$2/3 = 0.66$	66%

2. TID Items

1	Bread, Milk
2	Bread, Diaper, Beer, Eggs
3	Milk, Diaper, Beer, Cola
4	Milk, Diaper, Beer, Cola
5	Bread, Milk, Diaper, Cola

Minimum Support = 2

Next let, Bread=1, Milk=2, Diaper=3, Beer=4, Eggs=5, Cola=6

TID	Items	Scan \rightarrow	C ₁	Items	Min. Sup.
1	1 2		{1}		3
2	1 3 4 5		{2}		4
3	2 3 4 6		{3}		4
4	2 3 4 6		{4}		3
5	1 2 3 6	X	{5}		1
			{6}		3

L ₁	Itemset	Min. Sup.	Scan \rightarrow	C ₂	Itemset	Min. Sup.
	{1}	3		{1}	{1 2}	2
	{2}	4		{1}	{1 3}	2
	{3}	4	X	{1}	{1 4}	1
	{4}	3	X	{1}	{1 6}	1
	{6}	3		X	{2 3}	3
					{2 4}	2
					{2 6}	3
					{3 4}	3
					{3 6}	3
					{4 6}	2

L_2	Itemset	Min. Sup.	C_3	Itemset	Min. Sup.
	$\{1, 2\}$	2		X $\{1, 2, 3\}$	1
	$\{1, 3\}$	2	scan \downarrow	X $\{1, 2, 4\}$	0
	$\{2, 3\}$	3		X $\{1, 2, 6\}$	1
	$\{2, 4\}$	2		X $\{1, 3, 4\}$	1
	$\{2, 6\}$	3		X $\{1, 3, 6\}$	1
	$\{2, 4\}$	3		$\{2, 3, 4\}$	2
	$\{3, 6\}$	3		$\{2, 3, 6\}$	3
	$\{4, 6\}$	2		$\{2, 4, 6\}$	2
				$\{3, 4, 6\}$	2

L_3	Itemset	Min. Sup.	C_4	Itemset	Min. Sup.
	$\{2, 3, 4\}$	2	scan \downarrow	$\{2, 3, 4, 6\}$	2
	$\{2, 3, 6\}$	3			
	$\{2, 4, 6\}$	2			
	$\{3, 4, 6\}$	2			

Rule Generation:-

Association Rule	Support	Confidence	Confidence (%)
$2 \rightarrow 3^A 4^B 6^C$	2	$2/4 = 0.5$	50%
$3 \rightarrow 2^A 4^B 6^C$	2	$2/4 = 0.5$	50%
$4 \rightarrow 2^A 3^B 6^C$	2	$2/3 = 0.66$	66%
$6 \rightarrow 2^A 3^B 4^C$	2	$2/3 = 0.66$	66%
$2^A 3 \rightarrow 4^B 6^C$	2	$2/3 = 0.66$	66%
$2^A 4 \rightarrow 3^B 6^C$	2	$2/2 = 1$	100%
$2^A 6 \rightarrow 3^B 4^C$	2	$2/3 = 0.66$	66%
$3^A 4 \rightarrow 2^B 6^C$	2	$2/3 = 0.66$	66%
$3^A 6 \rightarrow 2^B 4^C$	2	$2/3 = 0.66$	66%
$4^A 6 \rightarrow 2^B 3^C$	2	$2/2 = 1$	100%

$2^1 3^1 4 \rightarrow 36$	2	$2/2 = 1$	100%	
$2^1 4^1 6 \rightarrow 3$	2	$2/2 = 1$	100%	
$3^1 4^1 6 \rightarrow 2$	2	$2/2 = 1$	100%	
$2^1 3^1 6 \rightarrow 4$	2	$2/3 = 0.66$	66%	

=ⁱⁱ Lab-08

Generate the frequent pattern tree for the given dataset.

TID	Itemset	Minimum Support = 3
1	E K M N O Y	
2	D E K N O Y	
3	A E K M	
4	C K M U Y	
5	C E I K O	
6		

Step-1

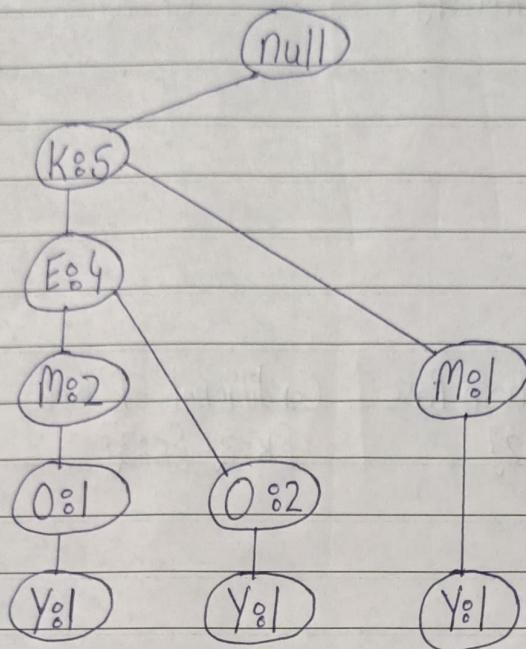
Item	Frequency
A	1
C	2
D	1
E	4
I	1
K	5
M	3
N	2
O	3
U	1
Y	3

Step-2

$\{K:5, E:4, O:3, M:3, Y:3\}$

TID	Sorted Items
1	K E M O Y
2	K E O Y
3	K E M
4	K M Y
5	K E O

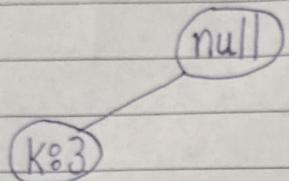
Step-3 Building the FP-tree



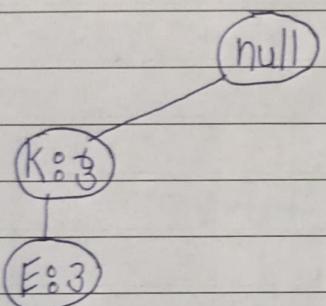
Conditional Pattern Base:-

Item	Conditional Pattern Base
Y	{KEMO:1} {KEO:1} {KM:1}
O	{KEM:1} {KE:2}
M	{KE:2} {Ka:1}
E	{K:4}
K	-

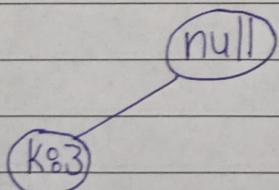
Item	Conditional Pattern Base	Conditional FP tree
y	$\{KEM:1\} \{KEO:1\}$ $\{KM:1\}$	$\{K:3\}$



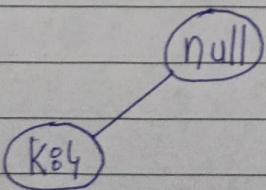
Item	Conditional Pattern Base	Conditional FP tree
o	$\{KEM:1\} \{KE:2\}$	$\{K:3\} \{E:3\}$



Item	Conditional Pattern Base	Conditional FP tree
m	$\{KE:2\} \{K:1\}$	$\{K:3\}$



Item	Conditional Pattern Base	Conditional FP tree
e	$\{K:4\}$	$\{K:4\}$



Item	Conditional Pattern Base	Conditional FP tree	Frequent Patterns Generated
Y	$\{KEM\circ 1\} \{KEO\circ 1\}$ $\{KEM\circ 1\}$	$\{K\circ 3\}$	$\{KY\circ 3\}$
O	$\{KEM\circ 1\} \{KE\circ 2\}$	$\{K\circ 3, E\circ 3\}$	$\{KO\circ 3\} \{EO\circ 3\} \{KEO\circ 3\}$
M	$\{KE\circ 2\} \{K\circ 1\}$	$\{K\circ 3\}$	$\{KM\circ 3\}$
E	$\{K\circ 4\}$	$\{K\circ 4\}$	$\{KE\circ 4\}$
K	-	-	-

2.	TID	Items	Minimum Support = 2
	1	1 2 5	
	2	2 4	
	3	2 3	
	4	1 2 4	
	5	1 3	
	6	2 3	
	7	1 3	
	8	1 2 3 5	
	9	1 2 3	

Step-1

Item	Frequency
1	6
2	7
3	6
4	2
5	2

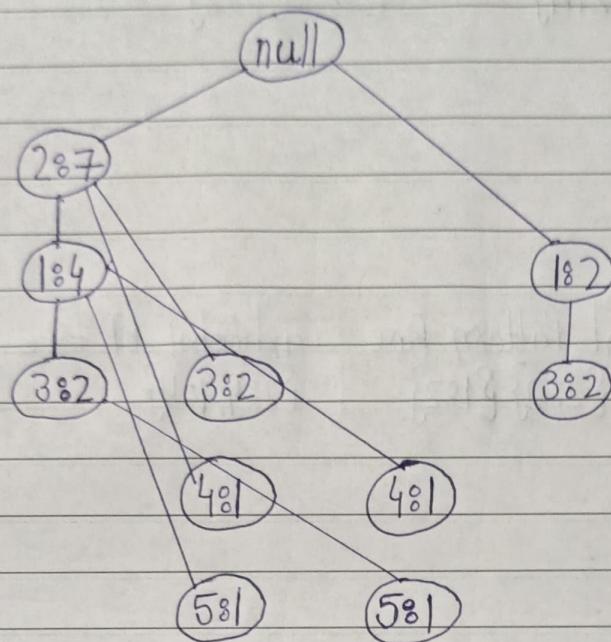
Step-2

$$\{2:7, 1:6, 3:6, 4:2, 5:2\}$$

TID	Items
1	2 1 5
2	2 4
3	2 3
4	2 1 4
5	1 3
6	2 3
7	1 3
8	1 3 5
9	2 1 3

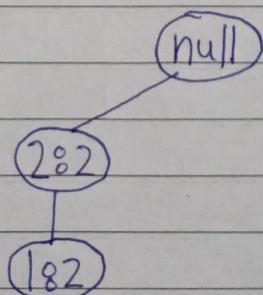


Step-3 Building the FP-tree

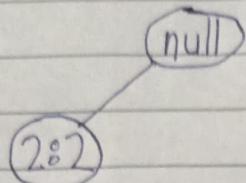


Item	Conditional Pattern Base
5	{2 1:1} {2 3:1}
4	{2:1} {2 1:1}
3	{2 1:2} {2 2:2} {1:2}
1	{2:4}
2	-

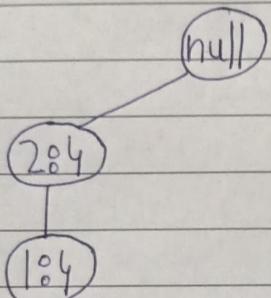
Item	Conditional Pattern Base	Conditional FP tree
5	{2 1:1} {2 3:1}	{2:2, 1:2}



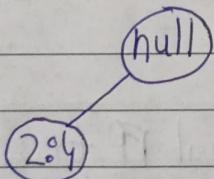
Item	Conditional Pattern Base	Conditional FP tree
4	{2:1} {2:1}	{2:2}



Item	Conditional Pattern Base	Conditional FP tree
3	{2:2} {2:2} {1:2}	{2:4, 1:4}



Item	Conditional Pattern Base	Conditional FP tree
1	{2:4}	{2:4}



Item	Conditional Pattern Base	Conditional FP tree	Frequent Pattern Generated
5	{21:1}{213:1}	{2:2}{1:2}	{25:2}{15:2}{215:2}
4	{2:1}{21:1}	{2:2}	{24:2}
3	{21:2}{2:2}{1:2}	{2:4}{1:4}	{23:4}{21:4}{213:4}
2	{2:4}	{2:4}	{22:4}
1	-	-	-