

Lab: 7

Apply apriori algorithm on given dataset, calculate support and confidence then find the association.

cid	TID	Items	
1001	100	1 3 4	
1002	200	2 3 5	
1003	300	1 2 3 5	
1004	400	2 5	

min support = 2.

Scanned D	C1		L1	
	ItemSet	Min. Supp.	ItemSet	Min. Supp.
	{1}	2	{1}	2
	{2}	3	{2}	3
	{3}	3	{3}	3
	{4}	1	{5}	3
	{5}	3		

C2	↓			L2	
ItemSet	Min. Supp.			ItemSet	Min. Supp.
{1, 2}	1			{1 3}	2
{1, 3}	2	→		{2 3}	2
{1, 5}	1			{2 5}	3
{2, 3}	2			{3 5}	2
{2, 5}	3				
{3, 5}	2				

	↓	Scanned
Itemset	Min. Supp.	

Scanned D	
Itemset	Min. Supp.
{1, 2, 3}	1
{1, 3, 5}	1
{2, 3, 5}	2

Rule Generation:~

Association Rule	Support	Confidence	Confidence (C.I.)
$2 \wedge 3 \rightarrow 5$	2	$2/2 = 1$	100%
$3 \wedge 5 \rightarrow 2$	2	1	100%
$2 \wedge 5 \rightarrow 3$	2	$2/3 = 0.66$	66%
$2 \rightarrow 3 \wedge 5$	2	0.66	66%
$3 \rightarrow 2 \wedge 5$	2	0.66	66%
$5 \rightarrow 2 \wedge 3$	2	0.66	66%

(ii)

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

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

TID

Items

Items

Min. Supp.

1 2

1 2

2 1 y

3

2

1 3 4 5

2 2 y

4

3

1 3 4 6

Item D

2 3 y

4

4

1 3 4 6

2 4 y

3

5

1 2 3 6

2 5 y

1

2 6 y

3

C1

C1

Itemset

Min. Supp.

Itemset

Min. Supp.

2 1 y

3

2 1 2 y

2

2 2 y

4

2 1 3 y

2

2 3 y

4

2 1 4 y

1

2 4 y

3

2 1 6 y

1

2 6 y

3

2 2 3 y

3

2 2 4 y

2

2 2 6 y

3

2 3 4 y

3

2 3 6 y

3

2 4 6 y

2

C₃

itemset	Min. supp.	itemset	Min. supp.
$\{1, 2\}$	2	$\{1, 2, 3\}$	1
$\{1, 3\}$	2	$\{1, 2, 4\}$	0
$\{2, 3\}$	3	$\{1, 2, 6\}$	1
$\{2, 4\}$	2	$\{1, 3, 4\}$	1
$\{2, 6\}$	2	$\{1, 3, 6\}$	1
$\{3, 4\}$	3	$\{2, 3, 4\}$	2
$\{3, 6\}$	3	$\{2, 3, 6\}$	3
$\{4, 6\}$	2	$\{2, 4, 6\}$	2
Scanned		$\{3, 4, 6\}$	2

L₃

itemset	Min. supp.	itemset	min. supp.
$\{2, 3, 4\}$	2	$\{2, 3, 4, 6\}$	2
$\{2, 3, 6\}$	3		
$\{2, 4, 6\}$	2	Scanned	
$\{3, 4, 6\}$	2		

Association Rule	Confidence	Confidence (%)
$2 \rightarrow 3 \wedge 4 \wedge 6$	$2/4 = 0.5$	50%
$3 \rightarrow 2 \wedge 4 \wedge 6$	$2/4 = 0.5$	50%
$4 \rightarrow 2 \wedge 3 \wedge 6$	$2/3 = 0.66$	66%
$6 \rightarrow 2 \wedge 3 \wedge 4$	$2/3 = 0.66$	66%
$2 \wedge 3 \rightarrow 4 \wedge 6$	$2/3 = 0.66$	66%
$2 \wedge 4 \rightarrow 3 \wedge 6$	$2/2 = 0.1$	100%
$2 \wedge 6 \rightarrow 3 \wedge 4$	$2/3 = 0.66$	66%
$3 \wedge 4 \rightarrow 2 \wedge 6$	$2/3 = 0.66$	66%
$3 \wedge 6 \rightarrow 2 \wedge 4$	$2/3 = 0.66$	66%
$4 \wedge 6 \rightarrow 2 \wedge 3$	$2/2 = 0.1$	100%
$2 \wedge 3 \wedge 4 \rightarrow 6$	$2/2 = 0.1$	100%
$2 \wedge 4 \wedge 6 \rightarrow 3$	$2/2 = 0.1$	100%
$3 \wedge 4 \wedge 6 \rightarrow 2$	$2/2 = 0.1$	100%

Association Rule

Confidence

Confidence (%)

 $2 \wedge 3 \wedge 6 \rightarrow 4$ $2 \wedge 3 = 0.66$

66%

LAB

A.

8

Generate the Frequent Pattern tree for the given dataset.

TID	Items	Min. 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 D	

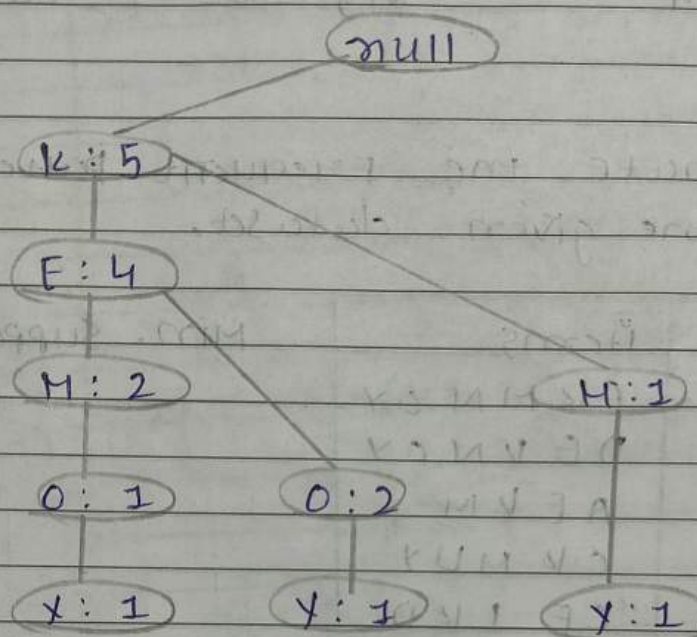
Step - 1

Item	Frequency	Step - 2
A	1	
C	2	TID Sorted Items
D	1	1 K E M O Y
E	4	2 K E O Y
I	1	3 K E M
K	5	4 K M Y
M	3	5 K E O
N	2	
O	3	
U	1	
Y	3	

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



Step-3 Building the F-P tree



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

	item	Conditional pattern Base	Conditional FP Tree
c i)	x	$\{KEM:1\} \{KEO:1\}$ $\{KM:1\}$	$\{K:3\}$
c ii)	o	$\{KEM:1\} \{KE:2\}$	$\{K:3\}, E:3\}$
c iii)	M	$\{KE:2\} \{K:1\}$	$\{K:3\}$
c iv)	E	$\{K:4\}$	$\{K:4\}$

Items	Conditional Pattern Base	Conditional FP tree	Frequent Pattern Generated
X	$\{KEM\}:3$ $\{KE\}:2$ $\{KM\}:1$	$\{K\}:3$	$\{K, X\}:3$
O	$\{KEM\}:2$ $\{KE\}:2$	$\{K\}:3, E:3$	$\{K, O\}:3, \{E, O\}:3, \{K, E, O\}:3$
M	$\{KE\}:2$ $\{K\}:1$	$\{K\}:3$	$\{K, M\}:3$
E	$\{K\}:4$	$\{K\}:4$	$\{K, E\}:4$
K	-	-	-

(ii)

TID

Items

Min 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

Step - 2

Item

Frequency

1

6

2

7

3

6

4

2

5

2

1:6, 2:7,
3:6, 4:2, 5:2

TID

Sorted Items

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

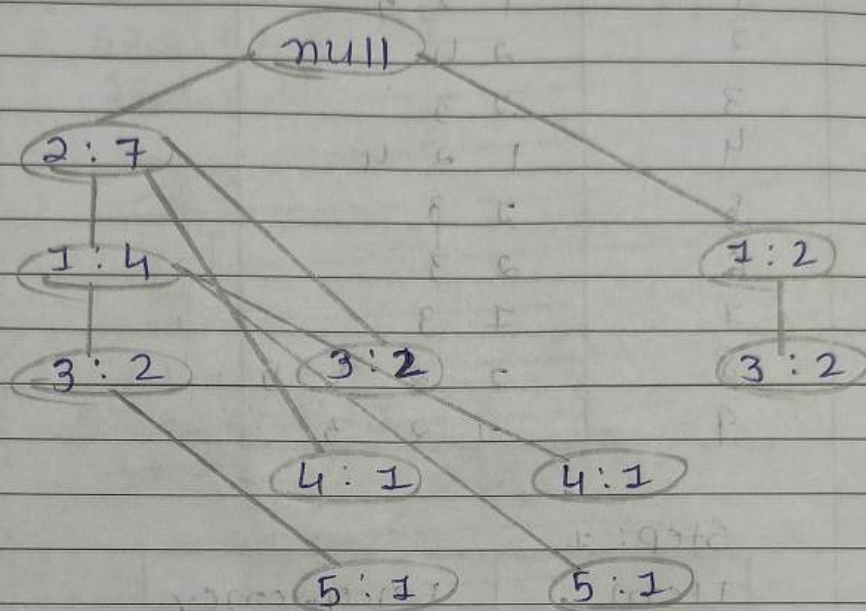
9

1 2 3



Step-3

Building FP tree



item	Conditional Pattern Base
5	$\{2,1:1\}$ $\{2,1,3:1\}$
4	$\{2:1\}$ $\{2,1:1\}$
3	$\{2,1:2\}$ $\{2:2\}$ $\{1:2\}$
1	$\{2:4\}$
2	-

	Item	Conditional Pattern Base	Conditional FP
(i)	5	$\{2,1:1\}$ $\{2,1:1\}$ $\{2,1,3:1\}$	$\{2:2, 1:2\}$
(ii)	4	$\{2:1\}$ $\{2,1:1\}$ $\{2:1\}$	$\{2:2\}$
(iii)	3	$\{2,1:2\}$ $\{2:2\}$ $\{1:2\}$	$\{2:4, 1:4\}$
(iv)	4	$\{2:4\}$	$\{2:4\}$

Items	Conditional Pattern Base	Conditional FP tree	Frequent Pattern generated
5	$\{2,1\}:1y$ $\{2,1,3\}:2y$	$\{2\}:2y,$ $\{1\}:2y$	$\{2,5\}:2y, \{1,5\}:2y$ $\{2,1,5\}:2y$
4	$\{2\}:1y$ $\{2,1\}:1y$	$\{2\}:2y$	$\{2,4\}:2y$
3	$\{2,1\}:2y$ $\{2\}:2y,$ $\{1\}:2y$	$\{2\}:4y,$ $\{1\}:4y$	$\{2,3\}:4y, \{2,1\}:4y,$ $\{2,1,3\}:4y$
2	$\{2\}:4y$	$\{2\}:4y$	$\{2\}:4y$
1	-	-	-