

\* Apriori Algorithm :-

(1)	TID	Itemset	Min Support
	100	1 3 4	
	200	2 3 5	
	300	1 2 3 5	
	400	2 3 4 5	
	500	1 2 4 5	
	600	2 3 4 5	

$$\rightarrow \text{Minimum Support} = 2$$

C1	Itemset	Min Sup.	L1	Itemset	Min Sup.
	{1 3}	2		{1 3}	2
	{2 3}	3		{2 3}	3
	{3 5}	3		{3 5}	3
	{4 5}	1	X	{5 4}	3
	{5 3}	3			

C2	Itemset	Min Sup.	L2	Itemset	Min Sup.
	{1, 2 3}	2	X	{1, 3 5}	2
	{1, 3 5}	2	X	{2, 3 5}	2
	{1, 5 3}	2	X	{2, 5 3}	3
	{2, 3 5}	2	X	{3, 5 3}	2
	{2, 5 3}	3			
	{3, 5 3}	2			

C3	Itemset	Min Sup.	L3	Itemset	Minsup.
	{1, 2, 3 5}	1	X	{2, 3, 5 4}	2
	{1, 3, 5 3}	1	X		
	{2, 3, 5 3}	2			

\* Rule generation :-

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

Here, Selected associative are

$$\{2^3 \rightarrow 5\}, \{3^5 \rightarrow 2\}$$

(2)	TID	T-items
	T1	Bread, Milk
	T2	Bread, Diaper, Beer, Eggs
	T3	Milk, Diaper, Beer, Cola
	T4	Bread, Milk, Diaper, Beer
	T5	Bread, Milk, Diaper, Cola

→ Minimum SUPPORT = 3

C1	Itemset	Minsup.		L1	Itemset	Minsup.
	{Bread}	4			{Bread}	4
	{Milk}	4	→		{Milk}	4
	{Diaper}	4			{Diaper}	4
	{Beer}	3			{Beer}	3
	{Eggs}	1	X			
	{Cola}	2	X			

C2	Itemset	Minsup.	L1	Itemset	Minsup.
	{Bread, Milk}	3		{Bread, Milk}	3
	{Bread, Diaper}	3		{Bread, Diaper}	3
	{Bread, Beer}	2	X →	{Milk, Diaper}	3
	{Milk, Diaper}	3		{Milk, Beer}	3
	{Milk, Beer}	2	X	{Diaper, Beer}	3
	{Diaper, Beer}	3			

C3	Itemset	Minsup.	L3	Itemset	Minsup.
	{Bread, Milk, Diaper}	2	X →		
	{Bread, Diaper, Beer}	2	X		
	{Milk, Diaper, Beer}	2	X		

\* Rule generation :-

Association Rule	Support	confidence	confidence(%)
Bread $\rightarrow$ Milk	3	$3/4 = 0.75$	75.0%
Bread $\rightarrow$ Diaper	3	$3/4 = 0.75$	75.0%
Milk $\rightarrow$ Diaper	3	$3/4 = 0.75$	75.0%
Diaper $\rightarrow$ Beer	3	$3/4 = 0.75$	75.0%
Milk $\rightarrow$ Bread	3	$3/4 = 0.75$	75.0%
Diaper $\rightarrow$ Bread	3	$3/4 = 0.75$	75.0%
Diaper $\rightarrow$ Milk	3	$3/4 = 0.75$	75.0%
Beer $\rightarrow$ Diaper	3	$3/3 = 1.0$	100.0%

Here, Selected Associative is {Beer  $\rightarrow$  Diaper}

\* FP-growth Algorithm :-

(1)	TID	Items	Minimum SUPPORT = 3
1		E K M N O Y	V O I U
2		D E K N O Y	M I U
3		A F K M	V M U
4		C K M U Y	O I U
5		C E I K O	

Step - 1 frequent 1 itemset

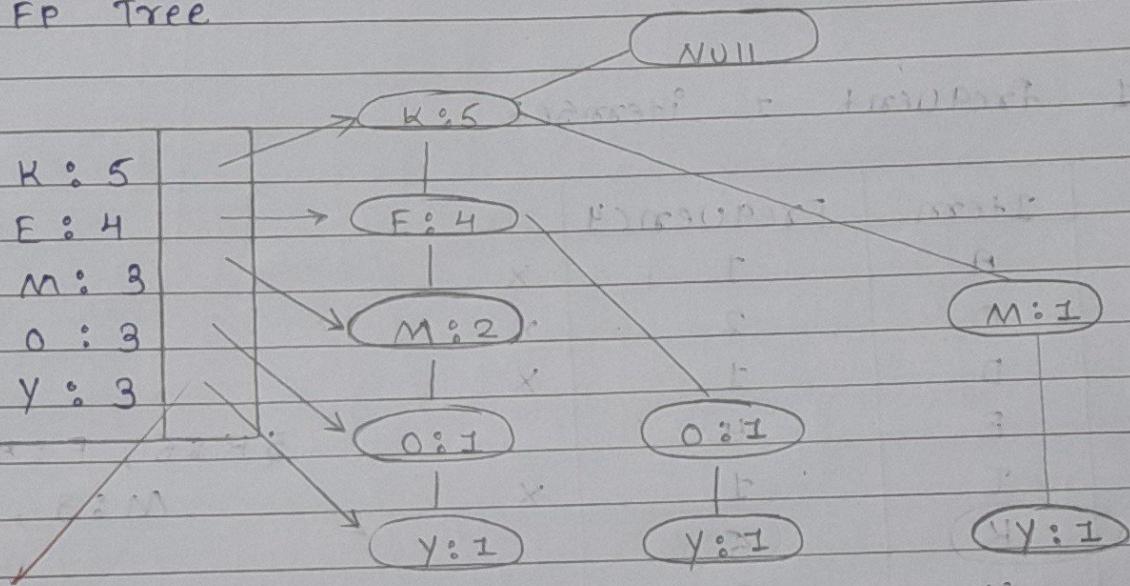
Item	Frequency	
A	1	X
C	2	X
D	1	X
E	4	S K : 5 , F : 4 , O : 3 ,
I	1	M : 3 , Y : 3
K	5	
M	3	
N	2	
O	3	
U	1	X
Y	3	

Step - 2 sorted items

F D E K M O V Y U I

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

### Step - 3 FP Tree



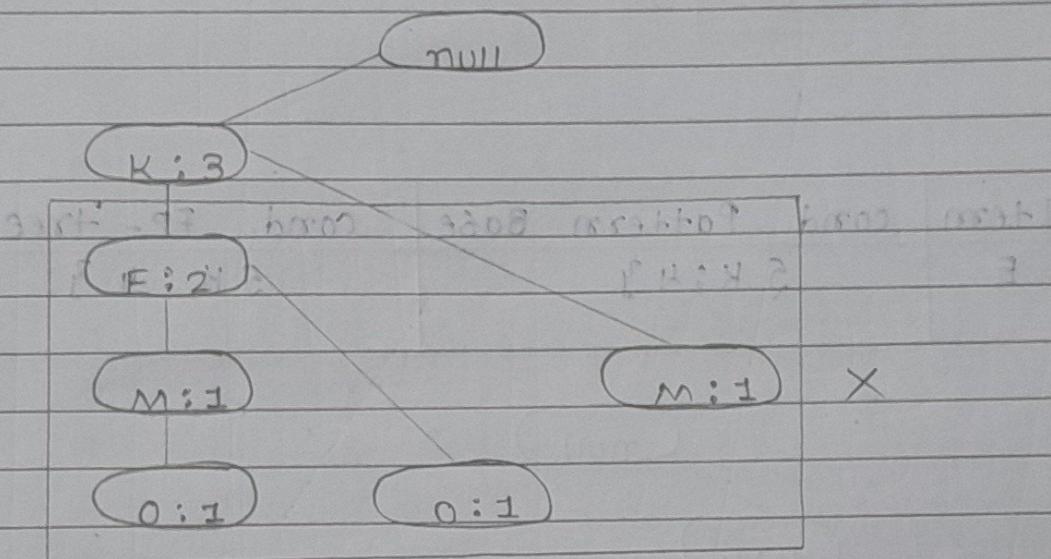
### Step - 4 conditional Pattern base

Item	conditional Patterns Base
Y	{KEMO:1} {KEFO:1} {KM:1}
O	{KEM:1} {KE:2}
M	{KF:2} {K:1}
F	{K:4}
K	-

## Step - 5 Conditional FP-tree

- as per above conditional pattern base, minimum support > 3

Item	Conditional Pattern Base	Cond. FP-tree
Y	{KEM:1} {KEF:1} {KM:1}	{K:3}



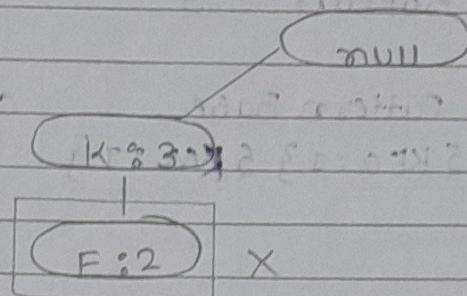
Item	cond. Pattern Base	cond. FP-tree
O	{KEM:1} {KEF:2}	{K:3} {E:3}

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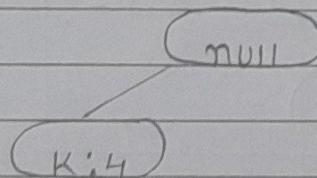
graph TD
    null((null)) --- K3((K:3))
    K3 --- F3((F:3))
    F3 --- M1((M:1))
    
```

A conditional FP-tree diagram for item O. The root node is labeled "null". It branches into one child, labeled "K:3". This child further branches into "F:3". The "F:3" node has one child, labeled "M:1", with an "X" mark at its bottom right.

Item	cond. Pattern Base	cond. FP-tree
M	{KE:2} {K:1}	{K:3}



Item	cond. Pattern Base	cond. FP-tree
E	{K:4}	{K:4}



## Step - 6 Conditional FP-tree and Frequent Patterns

Item	cond. Pattern Base	FP-tree	Frequent Pattern
Y	{KEMO:1} {KEO:1} {KM:1}	{K:3}	{K,Y:3}
O	{KEM:1} {KE:2}	{K:3, E:3}	{K,O:3}, {K,E, O:3}
M	{KF:2} {K:1}	{K:3}	{K,M:3}
E	{K:4}	{K:4}	{K,E:4}
K	-	-	-

(2)	TID	Items	
1		1, 2, 5	
2		2, 4	Minimum SUPPORT = 2
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 Frequent 1 itemset

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

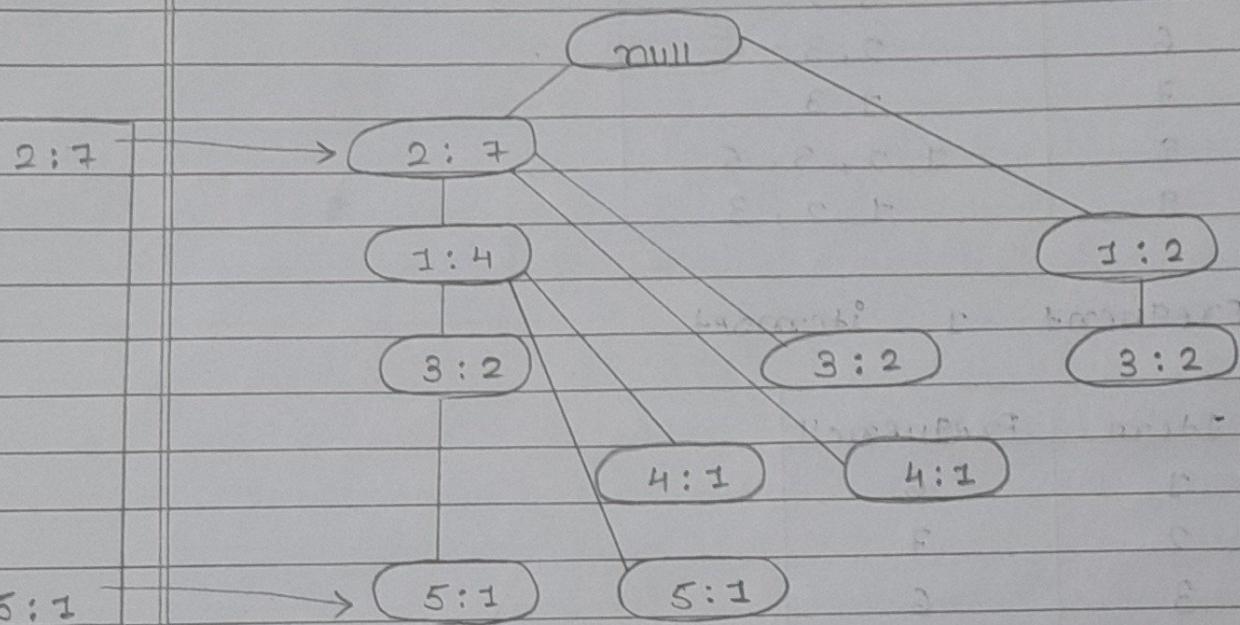
{ 2:7, 1:6, 3:6, 4:2, 5:2 }

Step-2 Sorted Items

TID	Sorted 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	2	1	3
9	2	1	3

Step - 3 FP - tree



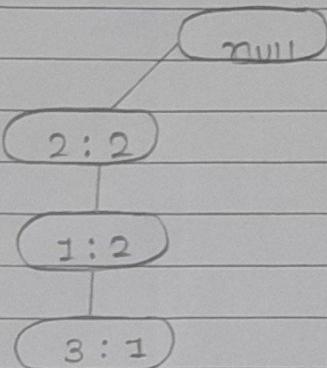
Step - 4 Conditional Pattern Base

Item	conditional pattern Base
5	2 2 1 3 : 1 3    2 2 1 : 1 3
4	2 2 1 : 1 3    2 2 : 1 3
3	2 2 1 : 2 3    2 2 : 2 3    2 1 : 2 3
1	2 2 : 4 3
2	-

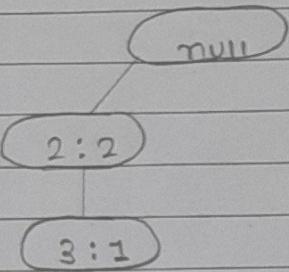
Step - 5 conditional FP - Tree

as per above conditional pattern

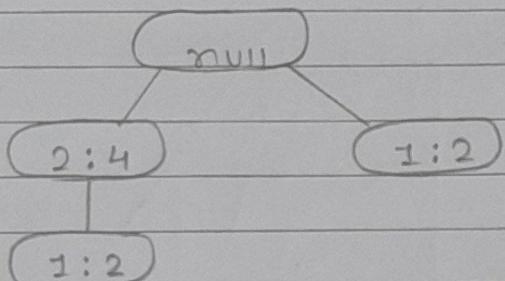
- For 5



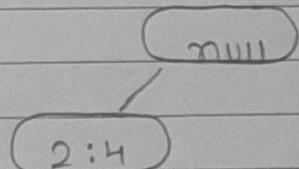
- For 4



- For 3



- For 1



Step - 6 conditional FP-tree & Frequent Pattern Generated

Item	conditional pattern Base	conditional FP-tree	Frequent Pattern Generated
5	{2 1 3 : 1 }	{2 : 2 }	{2 5 : 2 }
	{2 1 : 1 }	{1 : 2 }	{1 5 : 2 }
			{2 1 5 : 2 }
4	{2 1 : 1 } {2 : 1 }	{2 : 2 }	{2 4 : 2 }
3	{2 1 : 2 } {2 : 2 }	{2 : 4 }	{2 3 : 4 } {1 3 : 4 }
	{1 : 2 }	{1 : 2 } {1 : 2 }	{2 1 3 : 2 }
1	{2 : 4 }	{2 : 4 }	{2 1 : 4 }
2	-	-	-