

3)

Min support = 2

Item	Frequency
a	6
b	7
c	6
d	3
e	2
i	1
j	1
k	1

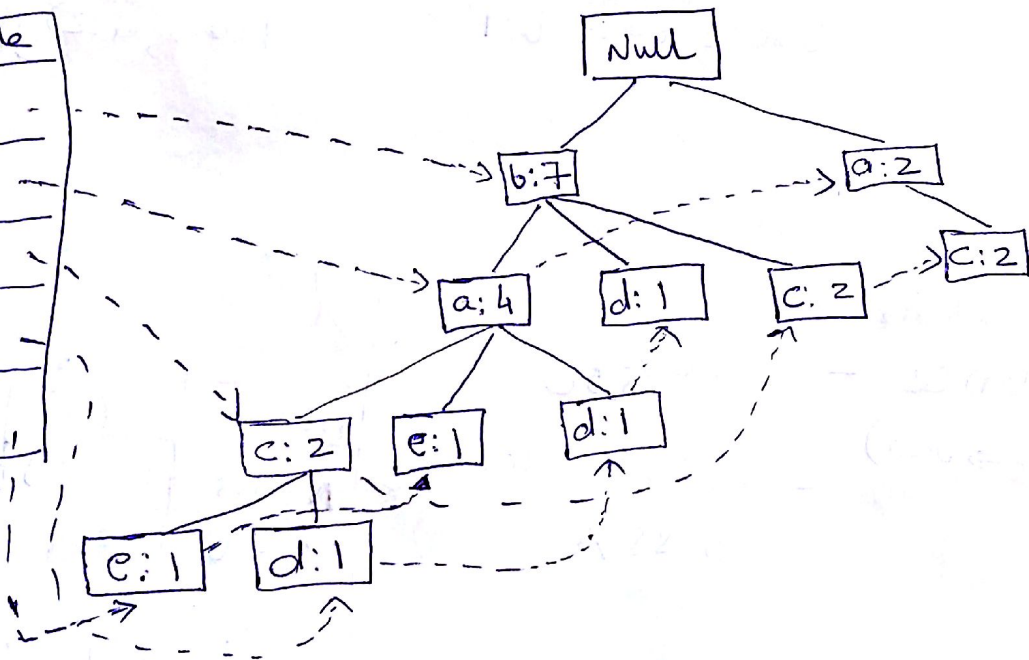
After Sorting

Removing

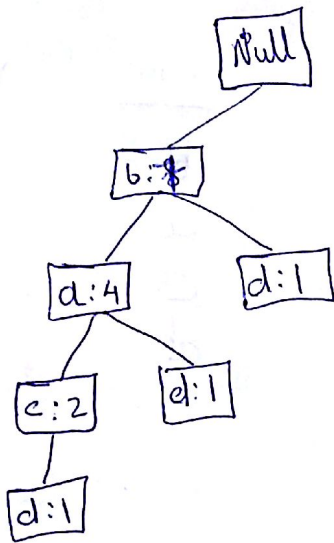
Items < min support

Item	Frequency
b	7
a	6
c	6
d	3
e	2

Header Table		
b	7	-
a	6	-
c	6	-
d	3	-
e	2	1



## d'conditional tree

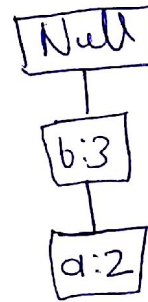


Item d  
conditional pattern base  
bac:2 ba:1 b:1

## d'conditional pattern base

bac:2 ba:1 b:1

## d'conditional FP-tree



Conditional FP-tree  
{(b:3, a:2)} | d  
Frequent pattern  
d, b, a, bac:

1) i Nuts  $\Rightarrow$  beer  
Confidence =  $50/850$   
(Nuts  $\Rightarrow$  beer) =  $0.0588 \times 100$   
= 5.88%

$$Lift = P(A \cup B) / P(A) \cdot P(B)$$

$$= \frac{50}{\frac{200}{10000} \times \frac{850}{10000}}$$

$$= 2.941$$

$$> 1$$

Positively correlated

$\chi^2$

	Beer	No Beer	Total
Nuts	50 (17)	800 (833)	850
No Nuts	150 (183)	9000 (8967)	9150
Total	200	9800	10000

$$= \frac{(50-17)^2}{17} + \frac{(800-833)^2}{833} + \frac{(150-183)^2}{183} + \frac{(9000-8967)^2}{8967}$$

$$= 71.94$$

$$\text{Confidence (Beer} \Rightarrow \text{Nuts)} = 50/200 = 25\%$$

$$\text{all confidence} = \min \{P(\text{Beer} | \text{Nuts})\}$$

$$\begin{aligned}\text{all confidence} &= \min \{ P(\text{Beer} | \text{Nuts}), P(\text{Nuts} | \text{Beer}) \} \\ &= \min \{ 25\%, 5.88\% \} \\ &= 5.88\%\end{aligned}$$

4(b) From the calculations we observe that lift tells us that they are positively correlated but the confidence levels for buying nuts with beer is 25% and buying beer when we ~~buy~~ buy nuts is 5.88% which are very less. The value of chi-square is also greater than 1 and the observed values are greater than expected values. Therefore we see that beer and nuts are correlated. Proved by lift and chi-square values.

From the ~~all~~ all confidence value it shows that they are negative correlated.

The difference might be due to number of people not buying beer and/or not buying nuts with respect to people buying beer and/or nuts.