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LAB ASSIGNMENT 1 — Apriori Algorithm

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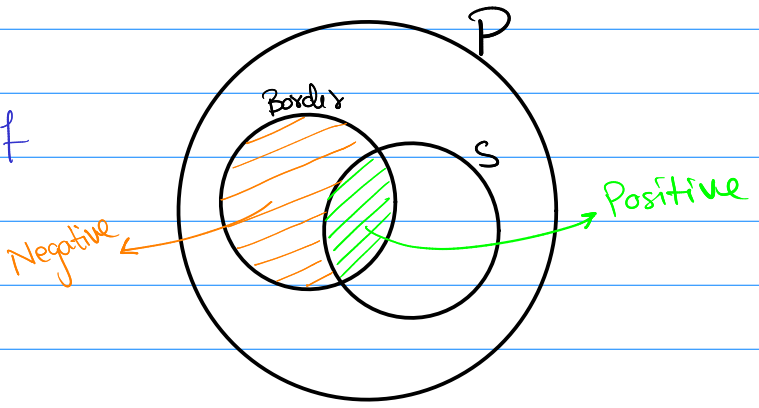
Q3) $S = \{A, B, C, E, AB, AC, AE, CE, ACE\}$ (given)

Say P is the power set of $\{A, B, C, D, E\}$:

$P = \{A, B, C, D, E,$
$AB, AC, AD, AE, BC, BD, BE, CD, CE, DE,$
$ABC, ABD, ABE, ACD, ACE, ADE, BCD, BCE, BDE, CDE,$
$ABCD, ABCE, ACDE, BCDE,$
$ABCDE\}$

- The Border elements comprises of the positive & negative items. as shown in the Venn-Dia.



- Our first step is to get the Border of frequent Itemset.

Border of Frequent Itemset

$$B = \left\{ X \in P \;\middle|\; \begin{matrix} \forall Y \in P, & Y \subset X \text{ then } Y \in S \\ Z \in P, & X \not\subset Z \text{ then } Z \in S \end{matrix} \right\}$$

$\therefore$ $\boxed{B = \{D, AB, BC, BE, ACE\}}$

For Negative Items:

- if $X \in S$ then $X \notin Neg$.
- As $\{D\} \notin S$, $\{D\} \in Neg$

Now, $\forall X \in P$ and $\{D\} \subset X \Rightarrow X \notin Neg$ (As $\{D\}$ is not frequent)

Candidates for negative = { D, BC, BE,
ABC, ABE, BCE,
ABCE }

Now we check all the subset of each itemset, and make sure that all subsets belong to the set S.

final Neg = { D, BC, BE }

lets take the example of {ABE},
subsets of {ABE} = { A, B, E, AB, AE, BE }
as we can see $\{BE\} \notin S$ $\therefore \{ABE\} \notin Neg$.

For Positive Items:

Now that we have Border & Negative:

Positive + Negative = Border

Positive = Border - Negative

Positive = { AB, AEC }

Q4>

TID	Items
T1	$I_1\ I_2\ I_5$
T2	$I_2\ I_4$
T3	$I_2\ I_3$
T4	$I_1\ I_2\ I_4$
T5	$I_1\ I_3$
T6	$I_2\ I_3$
T7	$I_1\ I_3$
T8	$I_1\ I_2\ I_3\ I_5$
T9	$I_1\ I_2\ I_3$

- Taking the following table for this question.
- Making 2 partitions, of size 4 & 5
- Min Support = 30%

TID	ItemSet	Scan 1: Min_SC = [1, 2]	Scan 2: Min_SC = 30%·9 = 3	Selected
T1	$I_1\ I_2\ I_5$	$I_1^2\ I_2^4\ I_3^1\ I_4^2\ I_5^1$	$I_1^6\ I_2^7\ I_3^6\ \cancel{I_4^2}\ \cancel{I_5^1}$	I_1^6
T2	$I_2\ I_4$	$I_1I_2^2\ \ I_1I_5^1\ \ I_2I_5^1$		
T3	$I_2\ I_3$	$I_2I_4^2\ \ I_2I_3^1\ \ I_1I_4^1$	$\cancel{I_1I_2^2}\ \ \cancel{I_1I_5^1}\ \ \cancel{I_2I_5^1}$	I_2^7
T4	$I_1\ I_2\ I_4$	$I_1I_2I_5^1\ \ \ I_1I_2I_4^1$	$\cancel{I_2I_4^2}\ \ I_2I_3^4\ \ \cancel{I_1I_4^1}$	
T5	$I_1\ I_3$	$I_1^4\ \ I_2^3\ \ I_3^5$	$I_1I_3^4$	I_3^6
T6	$I_2\ I_3$			
T7	$I_1\ I_3$	$I_1I_3^4\ \ I_2I_3^3$	$\cancel{I_1I_2I_5^1}\ \ \cancel{I_1I_2I_4^1}$	$I_2I_3^4$
T8	$I_1\ I_2\ I_3\ I_5$	$I_1I_2I_3^2$	$\cancel{I_1I_2I_3^2}$	
T9	$I_1\ I_2\ I_3$			$I_1I_3^4$