

4.2.5.4 练习4.2

FP-Growth & Apriori

TID	Items
1	A B
2	B C D
3	A C D E
4	A D E
5	A B C
6	A B C D
7	A
8	A B C
9	A B D
10	B C E

min sup = 2

Q(a) FP-Growth

(b) Apriori

Solution (a) ① construct FP-tree

TID	Items
1	A B
2	B C D
3	A C D E
4	A D E
5	A B C
6	A B C D
7	A
8	A B C
9	A B D
10	B C E

Header Table. same.

items	σ
A	8
B	7
C	6
D	5
E	3

Sorted frequent list

Same.

frequent patterns

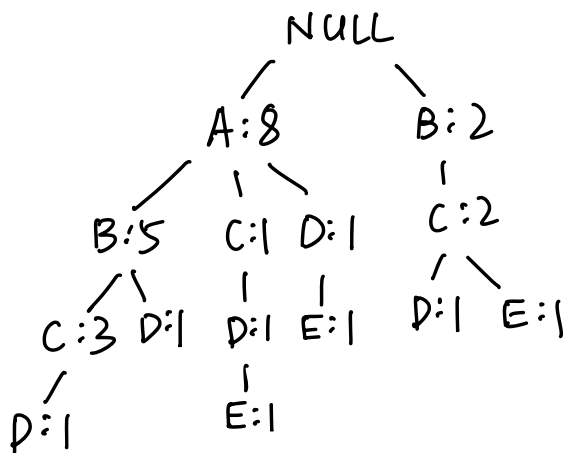
$$E = 3$$

$$D = 5$$

$$C = 6$$

$$B = 7$$

$$A = 8$$

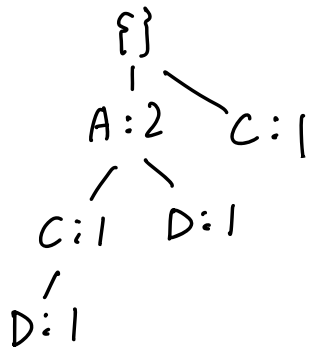


② E - conditional pattern base

$\{ACD:1, AD:1, BC:1\}$

$\Rightarrow \{A:2, \cancel{B:1}, C:2, D:2\}$

$\Rightarrow \{ACD:1, AD:1, C:1\}$



$\Rightarrow FP$

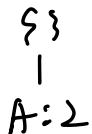
$AE = 2 \quad CE = 2 \quad DE = 2$

③ DE conditional pattern tree

$\{AC:1, A:1\}$

$\Rightarrow \{A:2, \cancel{C:1}\}$

$\Rightarrow \{A:2\}$



$\Rightarrow FP$

$ADE = 2$

④ CE conditional pattern base

$\{A:1\} \Rightarrow \{\cancel{A}:1\} \Rightarrow \{\} \Rightarrow \text{no tree} \Rightarrow \text{no FP}$

⑤ AE conditional pattern base

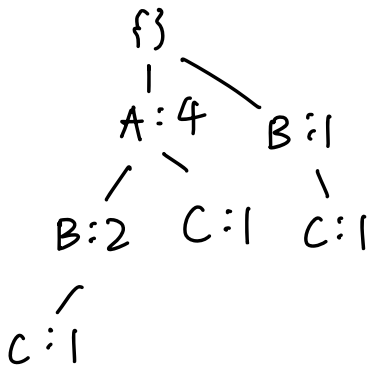
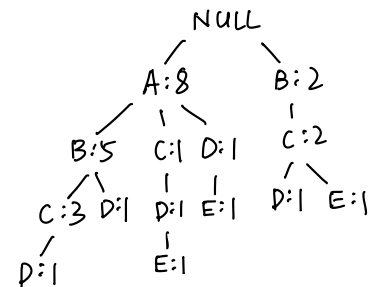
$\{\} \Rightarrow \{\} \Rightarrow \{\} \Rightarrow \text{no tree} \Rightarrow \text{no FP}$

⑥ D conditional pattern base

$\{ABC:1, AB:1, AC:1, A:1, BC:1\}$

$\Rightarrow \{A:4, B:3, C:3\}$

$\Rightarrow \{ABC:1, AB:1, AC:1, A:1, BC:1\}$



$\Rightarrow \text{FP}$

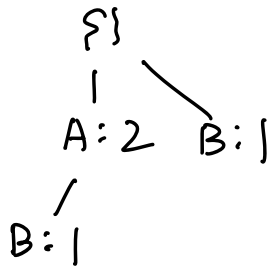
$AD=4, BD=3, CD=3$

⑦ CD conditional pattern base

$\{AB:1, A:1, B:1\}$

$\Rightarrow \{A:2, B:2\}$

$$\Rightarrow \{AB:1, A:1, B:1\}$$



$$\Rightarrow FP$$

$$ACD=2 \quad BCD=2$$

$$\textcircled{8} BCD \quad CPB$$

$$\{A:1\} \Rightarrow \{\cancel{A:1}\} \Rightarrow \{\} \Rightarrow \text{No free} \Rightarrow \text{no FP}$$

$$\textcircled{9} ACD \quad CPB$$

$$\{\} \Rightarrow \{\} \Rightarrow \{\} \Rightarrow \text{No free} \Rightarrow \text{no FP}$$

$$\textcircled{10} BD \quad CPB$$

$$\{A:2\} \Rightarrow \{A:2\} \Rightarrow \{A:2\} \Rightarrow \begin{matrix} \{? \\ A:2 \end{matrix} \Rightarrow FP: ABD=2$$

$$\textcircled{11} AD \quad CPB$$

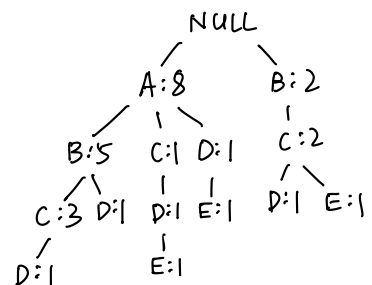
$$\{\} \Rightarrow \{\} \Rightarrow \{\} \Rightarrow \text{No free} \Rightarrow \text{no FP}$$

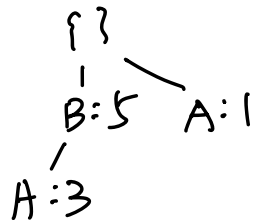
$$\textcircled{12} C \quad CPB$$

$$\{AB:3, A:1, B:2\}$$

$$\Rightarrow \{A:4, B:5\}$$

$$\Rightarrow \{BA:3, A:1, B:2\} \quad \text{sorted CPB}$$





$\Rightarrow FP$

$$BC = 5 \quad AC = 4$$

why $ABC=3$?

⑬ AC CPB

$$\{B:3\} \Rightarrow \{B:3\} \Rightarrow \{B:3\} \Rightarrow \begin{matrix} \{ \} \\ | \\ B:3 \end{matrix} \Rightarrow FP: \text{BAC}=3$$

⑭ BC CPB

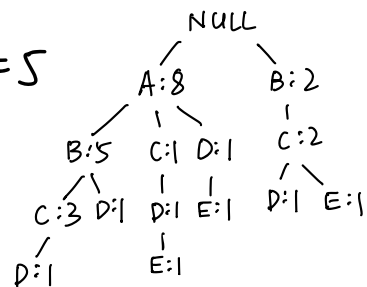
$$\{ \} \Rightarrow \{ \} \Rightarrow \{ \} \Rightarrow \text{No free} \Rightarrow \text{no FP}$$

⑮ B CPB

$$\{A:5\} \Rightarrow \{A:5\} \Rightarrow \{A:5\} \Rightarrow \begin{matrix} \{ \} \\ | \\ A:5 \end{matrix} \Rightarrow FP: AB=5$$

⑯ A CPB

$$\{ \} \Rightarrow \{ \} \Rightarrow \{ \} \Rightarrow \text{No free} \Rightarrow \text{no FP}$$



⑰ Final FP

$$E=3 \quad AE=2 \quad CE=2 \quad DE=2 \quad ADE=2$$

$$D=5 \quad AD=4, \quad BD=3, \quad CD=3$$

$$ACD=2, \quad BCD=2, \quad ABD=2$$

$$C=6 \quad BC=5, \quad AC=4, \quad \text{BAC}=3$$

$$B=7 \quad AB=5$$

$$A=8$$

cb) A priori:

TID	Items
1	A B
2	B C D
3	A C D E
4	A D E
5	A B C
6	A B C D
7	A
8	A B C
9	A B D
10	B C E

items	σ
A	8
B	7
C	6
D	5
E	3

$$C_1' = \{A, B, C, D, E\}$$

$$C_1 = \{A:8, B:7, C:6, D:5, E:3\}$$

$$L_1 = \{A:8, B:7, C:6, D:5, E:3\}$$

$$C_2' = \{AB, AC, AD, AE, BC, BD, BE, CD, CE, DE\}$$

$$C_2 = \{AB:5, AC:4, AD:4, AE:2, BC:5, BD:3, \cancel{BE:1}, CD:3, CE:2, DE:2\}$$

$$L_2 = \{AB:5, AC:4, AD:4, AE:2, BC:5, BD:3, CD:3, CE:2, DE:2\}$$

$$C_3' = \{ABC, ABD, \cancel{ABE}, ACD, ACE, ADE, BCD, \cancel{BCE}, \cancel{BDE}, CDE\}$$

$$C3 = \{ABC : 3, ABD : 2, ACD : 2, \cancel{ACE : 1}, ADE : 2, BCD : 2, \cancel{CDE : 1}\}$$

$$L3 = \{ABC : 3, ABD : 2, ACD : 2, ADE : 2, BCD : 2\}$$

$$C4' = \{ABCD, \cancel{ABDE}, \cancel{ACDE}\}$$

$$C4 = \{\cancel{ABCD} : 1\}$$

$$L4 = \{\}$$

Final FP

$$L3 \{ABC : 3, ABD : 2, ACD : 2, ADE : 2, BCD : 2\}$$

$$L2 \{AB : 5, AC : 4, AD : 4, AE : 2, BC : 5, BD : 3, CD : 3, CE : 2, DE : 2\}$$

$$L1 \{A : 8, B : 7, C : 6, D : 5, E : 3\}$$