(3) FP Growth

Avoid candidate generation by using a FP tree which can compactly and completely represent the frequent itemsets

Steps:

- ▶ Find the frequent singletons;
- ▶ Build FP tree: remove infrequent items, sort the remaining items and insert them into a tree;
- ▶ Construct conditional pattern-base for each node in the FP tree;
- ▶ Construct conditional FP tree from each conditional pattern-base by summing the counts for each item;
- ▶ Recursively mine conditional FP trees.

(3) FP Growth

TID	Items
1	A, B, C, E, F
2	A, C, D, E, F
3	A, B, C, G, I
4	A, B, C, G
5	B, E, F, H, I, J

(3) FP Growth

TID	Items
1	A, B, C, E, F
2	A, C, D, E, F
3	A, B, C, G, I
4	A, B, C, G
5	B, E, F, H, I, J

Item	Count
A	4
B	4
C	4
D	1
E	3
F	3
G	2
H	1
I	2
J	1

(3) FP Growth

TID	Items
1	A, B, C, E, F
2	A, C, D, E, F
3	A, B, C, G, I
4	A, B, C, G
5	B, E, F, H, I, J

Item	Count
A	4
B	4
C	4
~~D~~	~~1~~
E	3
F	3
~~G~~	~~2~~
~~H~~	~~1~~
~~I~~	~~2~~
~~J~~	~~1~~

min. sup
$s = 3$

(3) FP Growth

TID	Items
1	A, B, C, E, F
2	A, C, D, E, F
3	A, B, C, G, I
4	A, B, C, G
5	B, E, F, H, I, J

TID	Items
1	A, B, C, E, F
2	A, C, E, F
3	A, B, C
4	A, B, C
5	B, E, F

(3) FP Growth

TID	Items
1	A, B, C, E, F
2	A, C, E, F
3	A, B, C
4	A, B, C
5	B, E, F
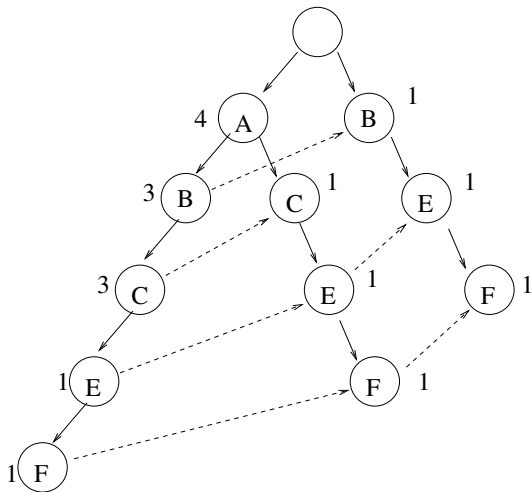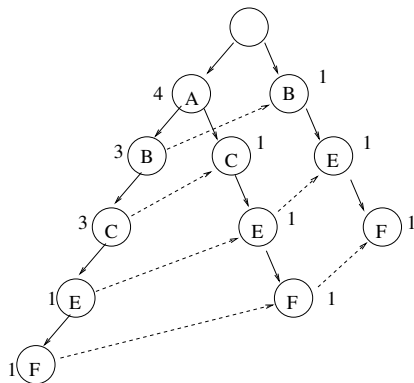
(3) FP Growth

Items	Conditional Pattern Base
F	
E	
C	
B	

(3) FP Growth
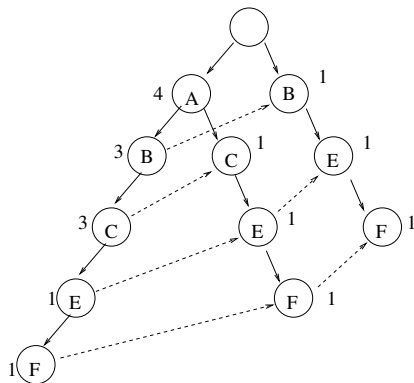
Items	Conditional Pattern Base
F	{A,B,C,E : 1}, {A,C,E : 1}, {B,E : 1}
E	
C	
B	

(3) FP Growth
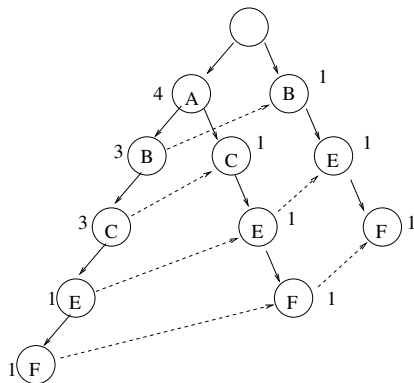
Items	Conditional Pattern Base
F	{A,B,C,E : 1}, {A,C,E : 1}, {B,E : 1}
E	{A,B,C : 1}, {A,C : 1}, {B : 1}
C	
B	

(3) FP Growth
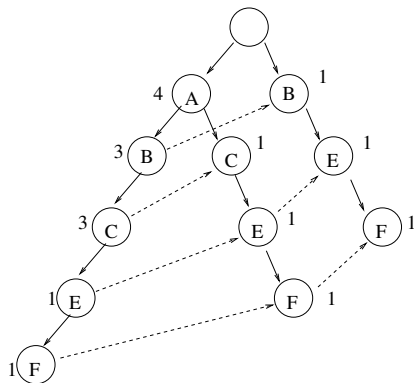
Items	Conditional Pattern Base
F	{A,B,C,E : 1}, {A,C,E : 1}, {B,E : 1}
E	{A,B,C : 1}, {A,C : 1}, {B : 1}
C	{A,B : 3}, {A : 1}
B	

(3) FP Growth

Items	Conditional Pattern Base
F	{A,B,C,E : 1}, {A,C,E : 1}, {B,E : 1}
E	{A,B,C : 1}, {A,C : 1}, {B : 1}
C	{A,B : 3}, {A : 1}
B	{A : 3}

(3) FP Growth

Items	Conditional Pattern Base	Cond FP Tree
F	{A,B,C,$\underline{E}$: 1}, {A,C,$\underline{E}$: 1}, {B,$\underline{E}$: 1}	
E	{A,B,C : 1}, {A,C : 1}, {B : 1}	
C	{$\underline{A}$,$\underline{B}$: 3}, {$\underline{A}$: 1}	
B	{$\underline{A}$: 3}	

(3) FP Growth

Items	Conditional Pattern Base	Cond FP Tree
F	{A,B,C,$\underline{E}$: 1}, {A,C,$\underline{E}$: 1}, {B,$\underline{E}$: 1}	{(E:3)}	F
E	{A,B,C : 1}, {A,C : 1}, {B : 1}	
C	{$\underline{A}$,$\underline{B}$: 3}, {$\underline{A}$: 1}	
B	{$\underline{A}$: 3}	

(3) FP Growth

Items	Conditional Pattern Base	Cond FP Tree
F	{A,B,C,<u>E</u> : 1}, {A,C,<u>E</u> : 1}, {B,<u>E</u> : 1}	{(E:3)} | F
E	{A,B,C : 1}, {A,C : 1}, {B : 1}	Empty
C	{<u>A</u>,<u>B</u> : 3}, {<u>A</u> : 1}	
B	{<u>A</u> : 3}	

(3) FP Growth

Items	Conditional Pattern Base	Cond FP Tree
F	$\{A,B,C,\underline{E} : 1\}$, $\{A,C,\underline{E} : 1\}$, $\{B,\underline{E} : 1\}$	$\{(E:3)\}$ | F
E	$\{A,B,C : 1\}$, $\{A,C : 1\}$, $\{B : 1\}$	Empty
C	$\{\underline{A},\underline{B} : 3\}$, $\{\underline{A} : 1\}$	$\{(A:4), (B:3)\}$ | E
B	$\{\underline{A} : 3\}$	

(3) FP Growth

Items	Conditional Pattern Base	Cond FP Tree
F	{A,B,C,E̲ : 1}, {A,C,E̲ : 1}, {B,E̲ : 1}	{(E:3)} | F
E	{A,B,C : 1}, {A,C : 1}, {B : 1}	Empty
C	{A̲,B̲ : 3}, {A̲ : 1}	{(A:4), (B:3)} | E
B	{A̲ : 3}	{(A:3)} | B

(3) FP Growth

Cond FP Tree	Freq Patt.
{(E:3)} | F	
Empty	
{(A:4), (B:3)} | C	
{(A:3)} | B	

(3) FP Growth

Cond FP Tree	Freq Patt.
{(E:3)} | F	{E,F : 3}
Empty	
{(A:4), (B:3)} | C	
{(A:3)} | B	

(3) FP Growth

Cond FP Tree	Freq Patt.
{(E:3)} | F	{E,F : 3}
Empty	Empty
{(A:4), (B:3)} | C	
{(A:3)} | B	

(3) FP Growth

Cond FP Tree	Freq Patt.
{(E:3)} | F	{E,F : 3}
Empty	Empty
{(A:4), (B:3)} | C	{A,C : 4},{B,C : 3}, {A,B,C : 3}
{(A:3)} | B	

(3) FP Growth

Cond FP Tree	Freq Patt.
{(E:3)} | F	{E,F : 3}
Empty	Empty
{(A:4), (B:3)} | C	{A,C : 4},{B,C : 3}, {A,B,C : 3}
{(A:3)} | B	{ A,B : 3}