Q6 - FP-Tree

Consider the following data set shown in Table 4 and answer the following questions using FP-Tree.

TID	Items Bought
T1	{B,D,F,H}
T2	{C,D,F,G}
T3	{A,D,F,G}
T4	{A,B,C,D,H}
T5	{A,C,F,G}
T6	{D,H}
T7	{A,B,E,F}
T8	{A,D,F,G,H}
T9	{A,C,D,F,G}
T10	{D,F,G,H}
T11	{A,C,D,E}
T12	{B,E,F,H}
T13	{D,F,G}
T14	{C,F,G,H}
T15	{A,C,D,F,H}

(a) Construct an FP-tree for the set of transactions in the table below as the first step towards identifying the itemsets with minimum support count of 2 (at least 2 occurrences). Do not forget to include the header table that locates the starts of the corresponding linked item lists through the FP-tree. For consistency, please form your header table in the order of {F, D, G, H, A, C, B, E}

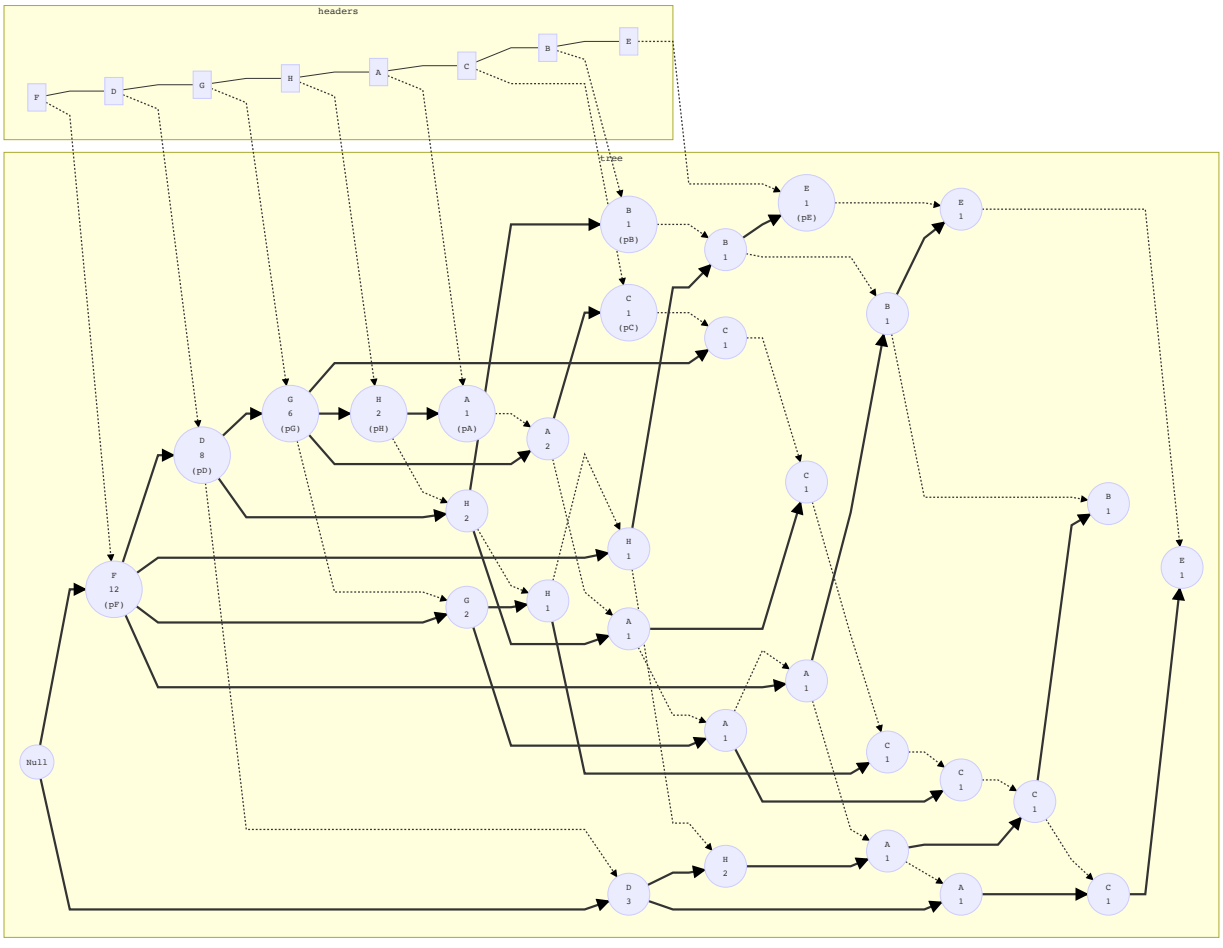
Support Counts / Header Table

Item	Support
F	12
D	11
G	8
H	8
A	8
C	7
B	4
E	3

Ordered Itemsets

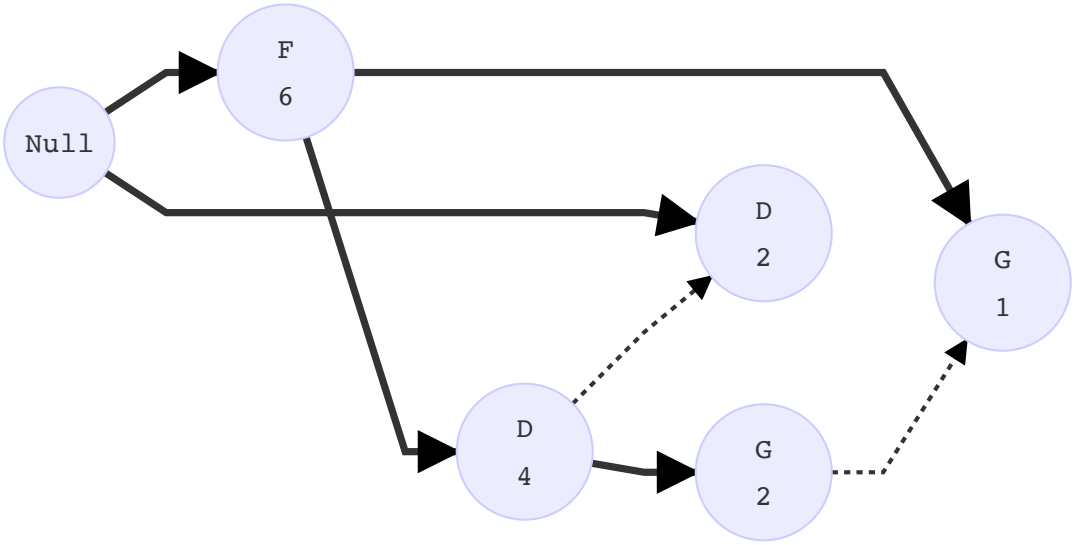
TID	Items Bought	Ordered ItemSets
T1	{B,D,F,H}	{F,D,H,B}
T2	{C,D,F,G}	{F,D,G,C}
T3	{A,D,F,G}	{F,D,G,A}
T4	{A,B,C,D,H}	{D,H,A,C,B}
T5	{A,C,F,G}	{F,G,A,C}
T6	{D,H}	{D,H}
T7	{A,B,E,F}	{F,A,B,E}
T8	{A,D,F,G,H}	{F,D,G,H,A}
T9	{A,C,D,F,G}	{F,D,G,A,C}
T10	{D,F,G,H}	{F,D,G,H}
T11	{A,C,D,E}	{D,A,C,E}
T12	{B,E,F,H}	{F,H,B,E}
T13	{D,F,G}	{F,D,G}
T14	{C,F,G,H}	{F,G,H,C}
T15	{A,C,D,F,H}	{F,D,H,A,C}

Graph


headers
F
D
G
H
A
C
B
E
time
Null
F 12 (pF)
D 8 (pD)
G 6 (pG)
H 2 (pH)
A 1 (pA)
B 1 (pB)
C 1 (pC)
E 1 (pE)
A 2
B 1
C 1
E 1
H 2
H 1
G 2
A 1
C 1
B 1
E 1
A 1
C 1
C 1
C 1
A 1
H 2
D 3
A 1
C 1

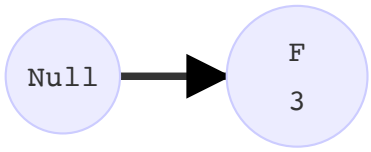
(b) Using the FP-Tree constructed and support=3, generate all the frequent patterns with the base of item H step by step.

(i) Conditional FP-Tree with Base H



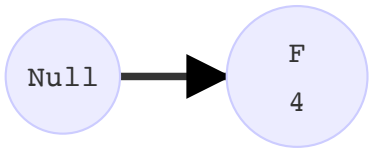
F, D and G are frequent, so we generate itemsets {F,H}, {D,H} and {G,H}.

(ii) Conditional FP-Tree with Base GH



Only F is frequent, so we generate itemset {F,G,H}

(iii) Conditional FP-Tree with Base DH



F is frequent, so we generate itemset {F,D,H}

(iv) Conditional FP-Tree with base FH

Only Null node remains, so no new itemsets.

As H was frequent too, we generate itemset {H} also. Hence, we have the following frequent patterns - **{H}, {F,H}, {D,H}, {G,H}, {F,D,H}, {F,G,H}**.