

6. We define a transaction as an unordered set of pages visited by a user in the same session, so the dataset in Exercise 3 becomes the following transactions:

T1: {P1,P2,P3,P5,P7}

T2: {P1,P4,P5,P6,P7}

T3: {P1,P4,P6}

T4: {P1,P4,P5,P6,P7}

T5: {P3,P5}

T6: {P1,P2,P3,P7}

T7: {P2,P7}

T8: {P1,P2,P3,P4,P6,P7}

Let $\text{min_sup}=3$.

(a) Use the Apriori Algorithm to discover all the frequent itemsets. Note that in this case, the frequent itemsets are the sets of pages that are often visited together by a user.

(b) Draw the Frequent Itemsets Graph as shown in [\[MobasherDLN01\]](#).

a) Here we use the Apriori algorithm to discover all frequent itemsets:

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C1	Sup. Count	L1	C2	Sup. Count	L2	C3	Sup.Count	L3
P1	6	P1	P1,P2	3	P1,P2	P1,P2,P3	3	P1,P2,P3
P2	4	P2	P1,P3	3	P1,P3	P1,P2,P7	3	P1,P2,P7
P3	4	P3	P1,P4	4	P1,P4	P1,P3,P7	3	P1,P3,P7
P4	4	P4	P1, P5	3	P1,P5	P1,P4,P6	4	P1,P4,P6
P5	4	P5	P1, P6	4	P1,P6	P1,P4,P7	3	P1,P4,P7
P6	4	P6	P1, P7	5	P1,P7	P1, P5, P7	3	P1,P5,P7
P7	6	P7	P2, P3	3	P2,P3	P1, P6, P7	3	P1,P6,P7
			P2, P4	1		P2,P3,P7	3	P2,P3,P7
			P2, P5	1		P4,P6,P7	3	P4,P6,P7
			P2, P6	1				
			P2, P7	4	P2,P7			
			P3, P4	1				
			P3, P5	1				
			P3, P6	1				
			P3, P7	3	P3,P7			
			P4, P5	2				
			P4, P6	4	P4,P6			
			P4, P7	3	P4,P7			
			P5, P6	2				
			P5, P7	3	P5,P7			
			P6, P7	3	P6,P7			

C4	Sup. Count	L4
P1,P2,P3,P7	3	P1, P2, P3, P7
P1,P4,P6, P7	3	P1, P4, P6, P7

This concludes the Apriori algorithms execution.

b) Here is what the Frequent Itemsets Graph looks like:

This table represents the frequent itemsets that we discovered using the Apriori algorithm. If these were not sorted, we would need to sort them first to construct the graph.

Size 1	Size 2	Size 3	Size 4
P1	P1, P2	P1,P2,P3	P1, P2, P3, P7
P2	P1,P3	P1,P2,P7	P1, P4, P6, P7
P3	P1,P4	P1,P3,P7	
P4	P1,P5	P1,P4,P6	
P5	P1,P6	P1,P4,P7	
P6	P1,P7	P1,P5,P7	
P7	P2,P3	P1,P6,P7	
	P2,P7	P2,P3,P7	
	P3,P7	P4,P6,P7	
	P4,P6		
	P4,P7		
	P5,P7		
	P6,P7		

The graph looks like this: (Note, letter P is dropped from the graph for clarity)

