Tutorial 3B Association Rules Mining Answers to Q 6 & 7

Apply the Apriori algorithm to find all itemsets with support >= 0.2 from the following data: Items in Transaction Milk, Bread, Eggs Milk, Juice Juice, Butter

Milk, Bread, Eggs Coffee, Eggs Coffee Coffee, Juice Milk, Bread, Cookies, Eggs Cookies, Butter Milk. Bread

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Apriori Principle Step 1: Count up the occurrences of 1 item:

Itemset	Count
Milk	5
Bread	4
Eggs	4
Juice	3
Butter	2
Coffee	3
Cookies	2

*Note: since it is out of 10, 0.2 support means if it appears twice in the list.

Apriori Principle Step 2: Look for frequent

Milk, Bread Milk, Eggs Milk, Juice	4 3 +	
Milk, Juice		
Milk, Cookies	1	
Bread, Eggs	3	
Bread, Cookies	+	
Eggs, Coffee	1	
Eggs, Cookies	+	
Juice, Butter	+	
Juice, Coffee	4	
Butter, Cookies	+	

Apriori Principle Step 3: Look for frequent occurrences of 3 items (in bold, not strikethrough):

Itemset
Milk, Bread, Eggs 3 Count

Therefore, the most frequent and highest itemset {Milk, Bread, Eggs}.

- Using the data set in question 2 ({Milk, Bread, Eggs)), find all the association rules with support >= 0.2 and confidence >= 0.8.
- "{Milk, Bread} -> Eggs" where {Milk, Bread} is X and Eggs is Y.
- Support = {itemset (X and Y)}/transactions
- Confidence = {itemset (X and Y)}/{itemset (X)}
- To do this, we check each permutation of the association rules.

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Association Rules for {Milk, Bread, Eggs}: {Milk, Bread} -> {Eggs} Milk, Bread, Eggs Support = Milk, Juice Confidence = Juice, Butter Milk, Bread, Eggs {Milk Eggs} -> {Bread} Coffee, Eggs Coffee Support = Coffee, Juice Confidence = Milk, Bread, Cookies, Eggs Cookies, Butter {Eggs, Bread} -> {Milk} Support = Confidence =



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Association Rules for {Milk, Bread, Eggs}:

{Milk, Bread} -> {Eggs}
Support = 3/10 - 0.3
Confidence - 3/4 - 0.75

{Milk Bread, Eggs
Support = 3/10 = 0.3
Confidence - 3/3 = 1

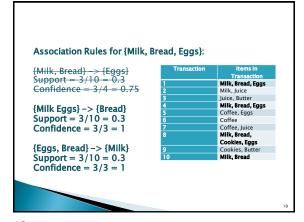
{Milk, Bread, Eggs
Support = 3/10 = 0.3
Confidence - 3/3 = 1

{Eggs, Bread} -> {Milk}
Support = 3/10 = 0.3
Confidence = 3/3 = 1

{Eggs, Bread} -> {Milk}
Support = 10

Milk, Bread, Eggs
Coffee, Eggs
Coffee, Eggs
Coffee, Juice
Milk, Bread,
Milk, Bread,
Milk, Bread,
Milk, Bread
Milk, Bread
Milk, Bread
Support = 10

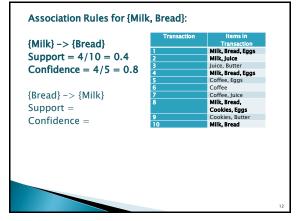
Milk, Bread
Milk, Bread



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Association Rules for {Milk, Bread}:

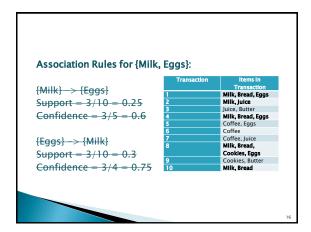
{Milk} -> {Bread}
Support = 2 Milk, Bread, Eggs
Confidence = 4 Milk, Bread, Eggs
5 Coffee, Eggs
6 Coffee
{Bread} -> {Milk}
Support = 7 Confidence = 9 Cookes, Butter
Confidence = 10 Milk, Bread



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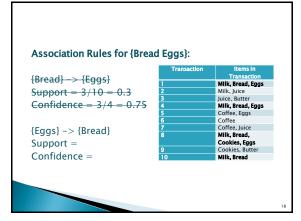


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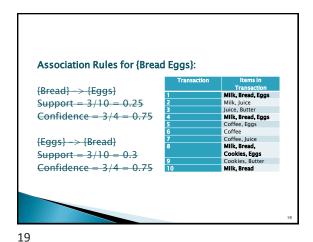


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	Transaction	Items in
Bread} -> {Eggs}		Transaction
, , , , , ,	2	Milk, Bread, Egg: Milk, Juice
upport =	3	Juice, Butter
onfidence =	4	Milk, Bread, Egg
	5	Coffee, Eggs
	6	Coffee
gs} -> {Bread}	7	Coffee, Juice
•	8	Milk, Bread,
port =	9	Cookies, Eggs Cookies, Butter
onfidence =	10	Milk, Bread



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Therefore, the only Association Rules that satisfy the restriction of having support >= 2 and confidence >= 0.8 is:

• {Milk, Eggs} -> {Bread} (s=0.3, c=1)
• {Eggs, Bread} -> {Milk} (s=0.3, c=1)
• {Milk} -> {Bread} (s=0.4, c=0.8)
• {Bread} -> {Milk} (s=0.4, c=1)