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BSIT 2-4

Assignment #8

Given

Transaction	Items
Transaction 1	🍎 🍺 🍚 🍗
Transaction 2	🍎 🍺 🍚
Transaction 3	🍎 🍺
Transaction 4	🍎 🍐
Transaction 5	🍼 🍺 🍚 🍗
Transaction 6	🍼 🍺 🍚
Transaction 7	🍼 🍺
Transaction 8	🍼 🍐

TRANSACTION	ITEMSET
Transaction 1	Apple, Beer, Rice, Chicken
Transaction 2	Apple, Beer, Rice
Transaction 3	Apple, Beer
Transaction 4	Apple, Pear
Transaction 5	Milk, Beer, Rice, Chicken
Transaction 6	Milk, Beer, Rice
Transaction 7	Milk, Beer
Transaction 8	Milk, Pear

Minimum Support	**2**
Minimum Confidence	**50%**

GENERATING CANDIDATES AND GETTING SUPPORT COUNT

CANDIDATE SET - C1

Item Set	Support_Count
Apple	4
Beer	6
Rice	4
Chicken	2
Pear	2
Milk	4

L1 (PRUNE)

Item Set	Support_Count
Apple	4
Beer	6
Rice	4
Chicken	2
Pear	2
Milk	4

CANDIDATE SET - C2

Item Set	Support_Count
Apple, Beer	3
Apple, Rice	2
Apple, Chicken	1
Apple, Pear	1
Apple, Milk	0
Beer, Rice	4
Beer, Chicken	2

Beer, Peer	0
Beer, Milk	3
Rice, Chicken	2
Rice, Pear	0
Rice, Milk	2
Chicken, Pear	0
Chicken, Milk,	1
Pear, Milk	1

FREQUENT SET - L2 (PRUNE)

Item Set	Support_Count
Apple, Beer	3
Apple, Rice	2
Beer, Rice	4
Beer, Chicken	2
Beer, Milk	3
Rice, Chicken	2

Candidate Set - C3 (Join)

Item Set	Support_Count
Apple, Beer, Rice	2
Apple, Beer, Chicken	1
Apple, Beer, Milk	0
Apple, Rice, Chicken	1
Apple, Chicken, Milk	0
Apple, Rice, Milk	0
Beer, Rice, Chicken	2
Beer, Rice, Milk	2
Beer, Chicken, Milk	1
Chicken, Milk, Rice	1

Frequent Set - L3 (Prune)

Item Set	Support_Count
Apple, Beer, Rice	2
Beer, Rice, Chicken	2
Beer, Rice, Milk	2

COMPUTING FOR CONFIDENCE
ITEM SET = [APPLE, BEER, RICE]

Rules	Support	Confidence	Remarks
Apple ^ Beer -> Rice	2	=Sup{(Apple ^ Beer) ^ Rice} / sup(Apple ^ Beer) = 2/3 = 0.667 = 66.67%	VALID
Apple ^ Rice -> Beer	2	=Sup{(Apple ^ Rice) ^ Beer} / sup(Apple ^ Rice) = 2/2 = 1 = 100%	VALID
Beer ^ Rice -> Apple	2	=Sup{(Beer ^ Rice) ^ Apple} / sup(Beer ^ Rice) = 2/4 = 0.5 = 50%	VALID
Apple -> Rice ^ Beer	2	= Sup{Apple ^ (Rice ^ Beer)} / sup(Apple) = 2/4 = 0.5 = 50%	VALID
Beer -> Apple ^ Rice	2	= Sup{Beer ^ (Apple ^ Rice)} / sup(Beer) = 2/6 = 0.3333 = 33.33%	INVALID
Rice -> Apple ^ Beer	2	= Sup{Rice ^ (Apple ^ Beer)} / sup(Apple) = 2/4 = 0.5 = 50%	VALID

COMPUTING FOR CONFIDENCE
ITEMS SET = [BEER, RICE, CHICKEN]

Rules	Support	Confidence	Remarks
Beer ^ Rice -> Chicken	2	= = Sup{(Beer ^ Rice) ^ Chicken} / sup(Beer ^ Rice) = 2/4 = 0.5 = **50%**	VALID
Beer ^ Chicken -> Rice	2	= Sup{(Beer Chicken) ^ Rice} / sup(Beer Chicken) = 2/2 = 1 = **100%**	VALID
Rice ^ Chicken -> Beer	2	= Sup{(Rice ^ Chicken) ^ Beer} / sup(Rice ^ Chicken) = 2/2 = 1 = **100%**	VALID
Beer -> Rice ^ Chicken	2	= Sup{Beer ^ (Rice Chicken)} / sup(Beer) = 2/6 = 0.3333 = **33.33%**	INVALID
Rice -> Beer ^ Chicken	2	= Sup{Rice ^ (Beer^ Chicken)} / sup(Rice) = 2/4 = 0.5 = **50%**	VALID
Chicken -> Rice ^ Beer	2	= Sup{Chicken ^ (Rice ^ Beer)} /sup(Chicken) = 2/2 = 1 = **100%**	VALID

COMPUTING FOR CONFIDENCE
ITEMS SET = [BEER, RICE, MILK]

Rules	Support	Confidence	Remarks
Beer ^ Rice -> Milk	2	= Sup{(Beer ^ Rice) ^ Milk} / sup(Beer ^ Rice) = 2/4 = 0.5 = **50%**	VALID
Beer ^ Milk -> Rice	2	= Sup{(Beer ^ Milk) ^ Rice} / sup(Beer ^ Milk) = 2/6 = 0.3333 = **33.33%**	INVALID
Rice ^ Milk -> Beer	2	= Sup{(Rice ^ Milk) ^ Beer} / sup(Rice ^ Milk) = 2/2 = 1 = **100%**	VALID
Beer -> Rice ^ Milk	2	= Sup{Beer ^ (Rice Milk)} / sup(Beer) = 2/6 = 0.3333 = **33.33%**	INVALID
Rice -> Beer ^ Milk	2	= Sup{Rice ^ (Beer ^ Milk)} / sup(Rice) = 2/4 = 0.5 = **50%**	VALID
Milk -> Rice ^ Beer	2	= Sup{Milk ^ (Rice ^ Beer)} / sup(Milk) = 2/4 = 0.5 = 50%	VALID

COMPUTING FOR LIFT

ITEMS SET = [APPLE, BEER, RICE]

Rules	Support	Confidence	Remarks
Apple ^ Beer -> Rice	2	= Sup{(Apple ^ Beer) ^ Rice} / sup(Apple ^ Beer) * sup(Rice) = 1.33	GREATER THAN 1
Apple ^ Rice -> Beer	2	= Sup{(Apple ^ Rice) ^ Beer} / sup(Apple ^ Rice) * sup(Beer) = 1.33	GREATER THAN 1
Beer ^ Rice -> Apple	2	= Sup{(Beer ^ Rice) ^ Apple} / sup(Beer^ Rice) * sup(Apple) = 1	EQUALS TO 1
Apple -> Rice ^ Beer	2	= Sup{Apple ^ (Beer ^ Rice)} / sup(Apple) * sup(Beer ^ Rice) = 1	EQUALS TO 1
Beer -> Apple ^ Rice	2	= Sup{Beer ^ (Apple ^ Rice)} / sup(Beer) * sup(Apple ^ Rice) = 1.33	GREATER THAN 1
Rice -> Apple ^ Beer	2	= Sup{Rice ^ (Apple ^ Rice)} / sup (Rice) * sup(Apple ^ Rice) =1.33	GREATER THAN 1

COMPUTING FOR LIFT

ITEMS SET = [BEER, RICE, MILK]

Rules	Support	Confidence	Remarks
Beer ^ Rice -> Chicken	2	= Sup{(Beer ^ Rice) ^ Chicken} / sup(Beer ^ Rice) * sup (Chicken) = 2	GREATER THAN 1

Beer ^ Chicken -> Rice	2	Sup{(Beer Chicken) ^ Rice} / sup(Beer Chicken) * sup(Rice) = **2**	GREATER THAN 1
Rice ^ Chicken -> Beer	2	= Sup{(Rice ^ Chicken) ^ Beer} / sup (Rice Chicken) * sup(Beer) = **1.33**	GREATER THAN 1
Beer -> Rice ^ Chicken	2	= Sup{Beer ^ (Rice Chicken)} / sup(Beer) * sup(Rice Chicken) = **1.33**	GREATER THAN 1
Rice -> Beer ^ Chicken	2	= Sup{Rice (Beer Chicken)} / sup(Rice) * sup(Beer Chicken) = **2**	GREATER THAN 1
Chicken -> Rice ^ Beer	2	= Sup{Chicken ^ (Rice^ Beer)} / sup (Chicken) * sup(Rice Beer) = **2**	GREATER THAN 1

COMPUTING FOR LIFT
ITEMS SET = [BEER, RICE, CHICKEN]

Rules	Support	Confidence	Remarks
Beer ^ Rice -> Milk	2	= Sup{(Beer ^ Rice) ^ Milk} / sup(Beer ^ Rice) * sup(Milk) = **1.33**	GREATER THAN 1
Beer ^ Milk -> Rice	2	= Sup{(Beer ^ Milk) ^ Rice} / sup(Beer ^ Milk) * sup(Rice) = **1**	EQUALS TO 1
Rice ^ Milk -> Beer	2	= Sup{(Rice ^ Milk) ^ Beer} / sup(Rice Milk) * sup(Beer) = **1.33**	GREATER THAN 1
Beer -> Rice ^ Milk	2	= Sup{Beer ^ (Rice Milk)} / sup(Beer) * sup(Rice ^ Milk) = **1.33**	GREATER THAN 1

Rice -> Beer ^ Milk	2	= Sup{Rice ^ (Beer ^ Milk)} / sup (Rice) * sup (Beer ^ Milk) = **1.33**	GREATER THAN 1
Milk -> Rice ^ Beer	2	= Sup{Milk ^ (Rice^ Beer)} / sup(Milk) * sup (Rice ^ Beer) = **1**	EQUALS TO 1

FIND THE CONVICTION BASED ON 1 AND 2

RULES	SUPPORT (B)	CONFIDENCE	LIFT	CONVICTION	REMARKS
		Apple, Beer, Rice			
Apple ^ Beer → Rice	= 0.5	= 0.6667	= 1.33	$= \dfrac{1 - Sup(Rice)}{1 - Conf(\text{Apple ^ Beer} \rightarrow \text{Rice})}$ $= \dfrac{1 - 0.5}{1 - 0.6667} = \dfrac{0.5}{0.3333}$ $= \mathbf{1.5}$	POSITIVE CORRELATION
Apple ^ Rice → Beer	= 0.75	= 1	= 1.33	$= \dfrac{1 - Sup(Beer)}{1 - Conf(\text{Apple ^ Rice} \rightarrow \text{Beer})}$ $= \dfrac{1 - 0.75}{1 - 1} = \dfrac{0.25}{0}$ $= \mathbf{Undefined}$	Undefined
Beer ^ Rice → Apple	= 0.5	= 0.5	= 1	$= \dfrac{1 - Sup(Apple)}{1 - Conf(\text{Beer ^ Rice} \rightarrow \text{Apple})}$ $= \dfrac{1 - 0.5}{1 - 0.5} = \dfrac{0.5}{0.5}$ $= \mathbf{1}$	NO RELATIONSHIP
Apple → Beer ^ Rice	= 0.5	= 0.5	= 1	$= \dfrac{1 - Sup(\text{Beer ^ Rice})}{1 - Conf(\text{Apple} \rightarrow \text{Beer ^ Rice})}$ $= \dfrac{1 - 0.5}{1 - 0.R} = \dfrac{0.5}{0.5}$	NO RELATIONSHIP

				$= \mathbf{1}$	
Beer → Apple ^ Rice	= 0.25	= 0.3333	= 1.33	$= \dfrac{1 - \text{Sup(Apple ^ Rice)}}{1 - Conf(\text{Beer} \rightarrow \text{Apple ^ Rice})}$ $= \dfrac{1 - 0.25}{1 - 0.3333} = \dfrac{0.75}{0.6667}$ $= \mathbf{1.125}$	POSITIVE CORRELATION
Rice → Apple ^ Beer	= 0.375	= 0.5	= 1.33	$= \dfrac{1 - \text{Sup(Apple ^ Beer)}}{1 - Conf(\text{Rice} \rightarrow \text{Apple ^ Beer})}$ $= \dfrac{1 - 0.375}{1 - 0.5} = \dfrac{0.625}{0.5}$ $= \mathbf{1.25}$	POSITIVE CORRELATION
Beer, Chicken, Rice					
Beer ^ Chicken → Rice	= 0.5	= 1	= 2	$= \dfrac{1 - \text{Sup(Rice)}}{1 - Conf(\text{Beer ^ Chicken} \rightarrow \text{Rice})}$ $= \dfrac{1 - 0.5}{1 - 1} = \dfrac{0.5}{0}$ $= \mathbf{Undefined}$	Undefined
Beer ^ Rice → Chicken	= 0.25	= 0.5	= 2	$= \dfrac{1 - \text{Sup(Chicken)}}{1 - Conf(\text{Beer ^ Rice} \rightarrow \text{Chicken})}$ $= \dfrac{1 - 0.25}{1 - 0.5} = \dfrac{0.75}{0.5}$ $= \mathbf{1.5}$	POSITIVE CORRELATION
Rice ^ Chicken → Beer	= 0.75	= 1	= 1.33	$= \dfrac{1 - \text{Sup(Beer)}}{1 - Conf(\text{Rice ^ Chicken} \rightarrow \text{Beer})}$ $= \dfrac{1 - 0.75}{1 - 1} = \dfrac{0.35}{0}$ $= \mathbf{Undefined}$	Undefined
Beer → Rice ^ Chicken	= 0.25	= 0.3333	= 1.33	$= \dfrac{1 - \text{Sup(Rice ^ Chicken)}}{1 - Conf(\text{Beer} \rightarrow \text{Rice ^ Chicken})}$ $= \dfrac{1 - 0.25}{1 - 0.3333} = \dfrac{0.75}{0.6667}$ $= \mathbf{1.125}$	POSITIVE CORRELATION

Rice → Beer ^ Chicken	= 0.25	= 0.5	= 2	$= \dfrac{1 - \text{Sup}(\text{Beer} \wedge \text{Chicken})}{1 - Conf(\text{Rice} \rightarrow \text{Beer} \wedge \text{Chicken})}$ $= \dfrac{1 - 0.25}{1 - 0.5} = \dfrac{0.75}{0.5}$ $= \mathbf{1.5}$	**POSITIVE CORRELATION**
Chicken → Beer ^ Rice	= 0.5	= 1	= 2	$= \dfrac{1 - \text{Sup}(\text{Beer} \wedge \text{Rice})}{1 - Conf(\text{Chicken} \rightarrow \text{Beer} \wedge \text{Rice})}$ $= \dfrac{1 - 0.5}{1 - 1} = \dfrac{0.5}{0}$ $= \mathbf{Undefined}$	Undefined
		Beer, Milk, Rice			
Beer ^ Milk → Rice	= 0.5	= 0.6667	= 1.33	$= \dfrac{1 - \text{Sup}(\text{Rice})}{1 - Conf(\text{Beer} \wedge \text{Milk} \rightarrow \text{Rice})}$ $= \dfrac{1 - 0.5}{1 - 0.6667} = \dfrac{0.5}{0.3333}$ $= \mathbf{1.5}$	**POSITIVE CORRELATION**
Beer ^ Rice → Milk	= 0.5	= 0.5	= 1	$= \dfrac{1 - \text{Sup}(\text{Milk})}{1 - Conf(\text{Beer} \wedge \text{Rice} \rightarrow \text{Milk})}$ $= \dfrac{1 - 0.5}{1 - 0.5} = \dfrac{0.5}{0.5}$ $= \mathbf{1}$	NO RELATIONSHIP
Rice ^ Milk → Beer	= 0.75	= 1	= 1.33	$= \dfrac{1 - \text{Sup}(\text{Beer})}{1 - Conf(\text{Rice} \wedge \text{Milk} \rightarrow \text{Beer})}$ $= \dfrac{1 - 0.75}{1 - 1} = \dfrac{0.25}{0}$ $= \mathbf{Undefined}$	Undefined
Beer → Rice ^ Milk	= 0.25	= 0.3333	= 1.33	$= \dfrac{1 - \text{Sup}(\text{Rice} \wedge \text{Milk})}{1 - Conf(\text{Beer} \rightarrow \text{Rice} \wedge \text{Milk})}$ $= \dfrac{1 - 0.25}{1 - 0.3333} = \dfrac{0.75}{0.6667}$ $= \mathbf{1.125}$	**POSITIVE CORRELATION**

Rice → Beer ^ Milk	= 0.375	= 0.5	= 1.33	$= \dfrac{1 - \text{Sup}(\text{Beer ^ Milk})}{1 - Conf(\text{Rice} \rightarrow \text{Beer ^ Milk})}$ $= \dfrac{1 - 0.375}{1 - 0.5} = \dfrac{0.625}{0.5}$ $= \mathbf{1.25}$	<mark>POSITIVE CORRELATION</mark>
Milk → Beer ^ Rice	= 0.5	= 0.5	= 1	$= \dfrac{1 - \text{Sup}(\text{Beer ^ Rice})}{1 - Conf(\text{Milk} \rightarrow \text{Beer ^ Rice})}$ $= \dfrac{1 - 0.5}{1 - 0.5} = \dfrac{0.5}{0.5}$ $= \mathbf{1}$	NO RELATIONSHIP

<mark>9 established rules</mark>.