

A) 0 or null because all 4 do not occur together

B) support :

i) { milk, bread } \rightarrow { Eggs }

101, 104, 108 = 3

$$s = \frac{3}{10} = 0.3$$

ii) { Milk } \rightarrow { Bread }

101, 104, 108, 110 = 4

$$s = \frac{4}{10} = 0.4$$

confidence :

Support of $X \cup Y$

Support of X

i) $\frac{3}{4} = 75\%$

ii) $\frac{4}{5} = 80\%$

Support count $\Rightarrow \sigma(x \cup y)$

$$\text{Support} = \frac{\sigma(x \cup y)}{N}$$

$$\text{Confidence} = \frac{\sigma(x \cup y)}{\sigma(x)}$$

\Rightarrow min confidence = 80% $N = 5$

Support Threshold = 60% $\text{min sup} = 3$

$$\frac{60}{100} \times 5 = 3$$

TID

Items

- 1 Bread, Milk, Diapers
- 2 Bread, Diapers, Honey, Eggs
- 3 Milk, Diaper, Honey, Cola
- 4 Bread, Milk, Diapers, Honey
- 5 Bread, Milk, Diapers, Cola

C1 $\{Bread, Milk\} \rightarrow \{Diapers\} \Rightarrow 3/3 = 100\%$ C2 $\{Bread, Diapers\} \rightarrow \{Milk\} \Rightarrow 3/4 = 75\%$

<u>Item</u>	<u>SC</u>
Bread	4
Milk	4
Diapers	5
Honey	3
Eggs	1
Cola	2

<u>2 Items</u>	<u>SC</u>	
Bread, Milk	3	
Bread, Diapers	4	
Bread, Honey	2	X
Milk, Diapers	4	
Milk, Honey	2	X
Diapers, Honey	3	

C3

<u>2 Items</u>	<u>ASC</u>	<u>TD</u>
Bread, Milk, Diapers	B	1
	B	2
	B	3
	B	4
	B	5

Confidence:

- $\{Bread, Milk\} \rightarrow \{Diapers\} \Rightarrow 3/3 = 100\%$
- $\{Bread, Diapers\} \rightarrow \{Milk\} \Rightarrow 3/4 = 75\%$ X
- $\{Milk, Diapers\} \rightarrow \{Bread\} \Rightarrow 3/4 = 75\%$ X
- $\{Milk\} \rightarrow \{Bread, Diapers\} \Rightarrow 3/4 = 75\%$ X

$\{ \text{Bread} \} \rightarrow \{ \text{Milk, diaper} \} \Rightarrow 3/4 = 75\%$ X

$\{ \text{Diaper} \} \rightarrow \{ \text{Milk, Bread} \} \Rightarrow 3/5 = 60\%$ X

$\therefore \{ \text{Bread, Milk} \} \rightarrow \{ \text{Diaper} \}$

3)

Min sup = 2

Min confidence = 70%

TID

Items

1

A B E

2

B D

3

B C

4

A B D

5

A C

6

B C

7

A C

8

A B C E

9

A B C

C1

Item

SC

A

5

B

7

C

6

D

2

E

2

C2

Item

SC

{A, B}

4

{A, C}

4

{A, D}

1

X

{A, E}

2

{B, C}

4

{B, D}

2

{B, E}

2

{C, D}

X

{C, E}

X

{D, E}

0

X

C3

Item

SC

A B C

2

A B E

2

{C, D}

X

{C, E}

X

{D, E}

0

X

C4

Item

SC

A B C E

φ

• [A B C]

$\{A B\} \rightarrow \{C\} \Rightarrow 2/4 = 50\% \quad \times$ mit 2

$\{A C\} \rightarrow \{B\} \Rightarrow 2/4 = 50\% \quad \times$ A

$\{B C\} \rightarrow \{A\} \Rightarrow 2/4 = 50\% \quad \times$ B

$\{C\} \rightarrow \{A B\} \Rightarrow 2/6 = 33\% \quad \times$ C

$\{B\} \rightarrow \{A C\} \Rightarrow 2/7 = 28\% \quad \times$ D

$\{A\} \rightarrow \{B C\} \Rightarrow 2/6 = 33\% \quad \times$ E

• [A B E]

$\{A B\} \rightarrow \{E\} \Rightarrow 2/4 = 0.5 = 50\% \quad \times$ mit 2

$\{A E\} \rightarrow \{B\} \Rightarrow 2/2 = 1 = 100\% \quad \times$ B A

$\{B E\} \rightarrow \{A\} \Rightarrow 2/2 = 1 = 100\% \quad \times$ B A

$\{E\} \rightarrow \{A B\} \Rightarrow 2/2 = 1 = 100\% \quad \times$ A

$\{B\} \rightarrow \{A E\} \Rightarrow 2/1 = 200\%$

$\{A\} \rightarrow \{B E\} \Rightarrow 2/6 = 33\%$

A B C

min sup = 40%

min conf = 60%

TID Items

T₁ 1 3 4

T₂ 2 3 5

T₃ 1 2 3 5

T₄ 2 5

T₅ 1 3 5

min sup = 40%

$$\frac{40}{100} \times 5 = 2$$

4

Items SC

1 3

2 3

3 4

4 1 α

5 4

C₂

Items SC

[1 2] 1 α

[1 3] 3

[1 5] 2

[2 3] 2

[2 5] 3

[3 5] 3

C₃

Items SC

2

[1 3 5]

[1 2 3]

[1 2 5]

[2 3 5]

1 α

1 α

2

C₄

Items SC

[1 2 3 5] 1 α

[1 3 5]

$$\{1, 3\} \rightarrow \{5\} \Rightarrow 2/3 = 66\%$$

$$\{1, 5\} \rightarrow \{3\} \Rightarrow 2/2 = 100\%$$

$$\{3, 5\} \rightarrow \{1\} \Rightarrow 2/3 = 66\%$$

$$\{5\} \rightarrow \{1, 3\} \Rightarrow 2/4 = 50\% \quad X$$

$$\{3\} \rightarrow \{1, 5\} \Rightarrow 2/4 = 50\% \quad X$$

$$\{1\} \rightarrow \{3, 5\} \Rightarrow 2/3 = 66\%$$

[2 3 5]

$$\{2, 3\} \rightarrow \{5\} \Rightarrow 2/2 = 100\%$$

$$\{2, 5\} \rightarrow \{3\} \Rightarrow 2/3 = 66\%$$

$$\{3, 5\} \rightarrow \{2\} \Rightarrow 2/3 = 66\%$$

$$\{5\} \rightarrow \{2, 3\} \Rightarrow 2/4 = 50\% \quad X$$

$$\{3\} \rightarrow \{2, 5\} \Rightarrow 2/4 = 50\% \quad X$$

$$\{2\} \rightarrow \{3, 5\} \Rightarrow 2/3 = 66\%$$