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1.

a. find support

$support(\{e3\}) = \dfrac{8}{10} = 0.8$

$support(\{b,d3\}) = \dfrac{2}{10} = 0.2$

$support(\{b,d,e3\}) = \dfrac{2}{10} = 0.2$

b. confident for association rule?

$\{b,d\}3 \rightarrow \{e3\}$

$$\dfrac{\{b,d,e3\}}{\{b,d\}3} = \dfrac{0.2}{0.2} = 1$$

$\{e3\} \rightarrow \{b,d\}3$

$$\dfrac{\{b,d,e3\}}{\{e3\}} = \dfrac{0.2}{0.8} = 0.25$$

C. Create new table

CUSTID	a	b	c	d	e
1	1	1	1	1	1
2	1	1	1	1	1
3	0	1	1	1	1
4	1	1	1	1	0
5	1	1	0	1	1

Find Support

$$\text{support}(\{e\}) = \frac{4}{5} = 0.8$$

$$\text{support}(\{b,d\}) = \frac{5}{5} = 1$$

$$\text{support}(\{b,d,e\}) = \frac{4}{5} = 0.8$$

d. confident for association rules

$$\{b,d\} \rightarrow \{e\}$$

$$\frac{\{b,d,e\}}{\{b,d\}} = \frac{0.8}{1} = 0.8$$

$$\{e\} \rightarrow \{b,d\}$$

$$\frac{\{b,d,e\}}{\{e\}} = \frac{0.8}{0.8} = 1$$

2. Unique Items = [F, G, H, I, J]

minimum support = 50%

{F} = 1/6 → 3/6 > {F} < 50% reject

{G} = 6/6 = 1

{H} = 4/6 = 2/3

{I} = 4/7 = 2/3

{J} = 5/5

{G} = 5/6

GH = 4/6 = 2/3

GI = 4/6 = 2/3

GJ = 5/6 •

HI = 2/6 = 1/3 → HI < 50% reject

HJ = 3/6 = 1/2

IJ = 3/6 = 1/2

GHJ = 3/6 = 1/2

GIJ = 3/6 = 1/2

HJI = 1/6 → HJI < 50% reject

GHIJ = 1/6 → GHIJ < 50% reject

frequent itemsets = [G, H, I, J, GH, GI, GJ, HJ, IJ, GHJ, GIJ]

3 Examples of strong Association rules

1. $I \rightarrow G$

support $= \frac{4}{6} = \frac{2}{3}$ confident $= \frac{4}{4} = 1$

2. $G \rightarrow I$

support $= \frac{5}{6}$ confident $= \frac{5}{6}$

3. $I \rightarrow G$

support $= \frac{5}{6}$ confident $= \frac{5}{5} = 1$

Size	Support	Item 1	Item 2	Item 3
1	1.000	Items_G		
1	0.667	Items_H		
1	0.667	Items_I		
1	0.667	Items_J		
2	0.667	Items_G	Items_H	
2	0.667	Items_G	Items_I	
2	0.667	Items_G	Items_J	
2	0.500	Items_H	Items_J	
3	0.500	Items_G	Items_H	Items_J

No.	Premises		Conclusion	Support	Confidence	LaPlace	Gain	p-s	Lift	Convicti...
3	Items_H		Items_G, Items_J	0.500	0.750	0.900	-0.833	0.056	1.125	1.333
4	Items_G, Items_H		Items_J	0.500	0.750	0.900	-0.833	0.056	1.125	1.333
5	Items_J		Items_G, Items_H	0.500	0.750	0.900	-0.833	0.056	1.125	1.333