

Exercise

Which one of these association rules has a support of **at least 50%** and the **highest** confidence?

- a) Item 3 \rightarrow Item 5
- b) Item 4 \rightarrow Item 5
- c) Item 2 \rightarrow Item 1
- d) Item 5 \rightarrow Item 3

| | Item 1 | Item 2 | Item 3 | Item 4 | Item 5 |
|---------|--------|--------|--------|--------|--------|
| Cart 1 | 0 | 0 | 1 | 0 | 1 |
| Cart 2 | 1 | 1 | 0 | 1 | 0 |
| Cart 3 | 1 | 1 | 0 | 0 | 1 |
| Cart 4 | 1 | 1 | 0 | 1 | 0 |
| Cart 5 | 1 | 1 | 1 | 0 | 1 |
| Cart 6 | 0 | 0 | 1 | 0 | 1 |
| Cart 7 | 0 | 0 | 0 | 0 | 0 |
| Cart 8 | 1 | 0 | 0 | 1 | 1 |
| Cart 9 | 1 | 1 | 0 | 0 | 0 |
| Cart 10 | 1 | 0 | 0 | 1 | 1 |

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$$\text{SUPPORT} = \frac{\# \text{ of instances meeting criteria}}{\text{total \# of instances}}$$

$$\text{CONFIDENCE} = P(\{i_1 \wedge i_2 \wedge i_3\} | \{i_1 \wedge i_2\}) \text{ as an example.}$$

ex)

| rule | | support | confidence |
|-------------------|--------------|---------|------------------------------|
| 3 \rightarrow 5 | "3 infers 5" | .3 | $\frac{5 \cap 3}{3} = 100\%$ |
| 4 \rightarrow 5 | | .2 | $\frac{2}{.5}$ |
| 2 \rightarrow 1 | | .5 | $\frac{5}{.5}$ |
| 5 \rightarrow 3 | | .3 | $\frac{3}{.6}$ |

- association rules are evaluated via basic unconditional & conditional probabilities.

support \rightarrow confidence

- a common application is to use confidence to determine if two retail goods are substitutes or complements.