



Gradiane Online Accelerated Learning

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01: Association Rules

- [Home Page](#)
- [Handouts](#)
- [Tutorials](#)
- [Homeworks](#)
- [Lab Projects](#)
- [Reports](#)
- [Class Administration](#)
- [Question Bank](#)
- [Log Out](#)

Help

Number of questions: 5
Positive points per question: 3.0
Negative points per question: 1.0

Gradiane quiz on Association Rules. You can attempt to answer the questions as many times as you like. Questions get randomly regenerated each time. The score of the *last* submission gets saved into our records (that is, once you get a perfect score, don't submit again with a bad one).

- Imagine there are 100 baskets, numbered 1,2,...,100, and 100 items, similarly numbered. Item i is in basket j if and only if i divides j evenly. For example, basket 24 is the set of items $\{1,2,3,4,6,8,12,24\}$. Describe all the association rules that have 100% confidence. Which of the following rules has 100% confidence?
 - ☐ a) $\{1\} \rightarrow 2$
 - ☐ b) $\{1,4,7\} \rightarrow 14$
 - ☐ c) $\{8,12\} \rightarrow 96$
 - ☐ d) $\{2,3,5\} \rightarrow 45$
- Suppose ABC is a frequent itemset and BCDE is NOT a frequent itemset. Given this information, we can be sure that certain other itemsets are frequent and sure that certain itemsets are NOT frequent. Other itemsets may be either frequent or not. Which of the following is a correct classification of an itemset?
 - ☐ a) ABCD can be either frequent or not frequent.
 - ☐ b) BCF is not frequent.
 - ☐ c) BCE is frequent.
 - ☐ d) ABCD is frequent.
- Below is a table representing eight transactions and five items: Beer, Coke, Pepsi, Milk, and Juice. The items are represented by their first letters; e.g., "M" = milk. An "x" indicates membership of the item in the transaction.

	B	C	P	M	J
1	x		x		
2		x		x	
3	x	x			x
4			x	x	
5	x	x		x	
6				x	x
7			x		x
8	x	x		x	x

Find all of the rules of the form $X \rightarrow Y$, where X and Y are single items (not sets of two or more items), that have confidence exactly $1/2$ --- neither more nor less. Then, identify one of these rules in the list below.

- ☐ a) $B \rightarrow J$ ☐ b) $P \rightarrow B$ ☐ c) $M \rightarrow B$ ☐ d) $M \rightarrow P$

4. In this problem, assume all integers and pointers occupy 4 bytes. The assumption that we count represent pair-counts with triples (i, j, c) for the pair i, j with count c does not account for the space needed to build an efficient data structure to find $i-j$ pairs when we need them. Suppose we use a binary search tree, where each node is a quintuple $(i, j, c, \text{leftChild}, \text{rightChild})$. Suppose also that there are I items, and P pairs that actually appear in the data. Under what circumstances does it save space to use the above binary-search tree rather than a triangular matrix?

- ☐ a) $I = 1,000,000; P = 120,000,000,000$
☐ b) $I = 2000; P = 500,000$
☐ c) $I = 500,000; P = 20,000,000,000$
☐ d) $I = 200,000; P = 5,000,000,000$

5. In the following, 1 through 7 are items. Which of the following association rules has a confidence that is certain to be at least as great as the confidence of $12 \Rightarrow 34567$ and no greater than the confidence of $1234 \Rightarrow 5$?

- ☐ a) $134 \Rightarrow 567$
☐ b) $234 \Rightarrow 167$
☐ c) $123 \Rightarrow 467$
☐ d) $123 \Rightarrow 457$