**CS 43105 Data Mining Techniques**

**Homework 3**

**Instructor:** Xiang Lian

**Due Date:** Please refer to the course website

1. Table 1 shows a transaction database. Please answer the following questions **[36 points]**



**Table 1.** A Transaction Database

a) Please enumerate all association rules involving 3 items {Bread, Milk, Coke}. [12 points]

b) Please compute the support and confidence of each association rule you listed in a). [24 points]

2. Please describe the *anti-monotone property* of the confidence for association rules, and discuss how to use this property to enable the pruning for the apriori algorithm. **[24 points]**

3. Please choose one reference paper about association rule mining from the lecture slides, and present the motivation, problem definition, and their solutions in this paper. **[40 points]**

**Bonus Question** [extra 20 points]

a) Please draw a lattice for association rules related to items {A, B, E}. [10 points]

b) Compute the support and confidence of association rule AB 🡪 E in Table 2. [10 points]

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| --- | --- |
| TID | Transactions |
| 100 | {A, B, E} |
| 200 | {B, D} |
| 300 | {A, B, E} |
| 400 | {A, C} |
| 500 | {B, C} |
| 600 | {A, C} |
| 700 | {A, B} |
| 800 | {A, B, C, E} |
| 900 | {A, B, C} |
| 1000 | {A, C, E} |

**Table 2.** Transaction Database for Bonus Question

**Submission**

Submit an electronic copy of your homework solution to the [Blackboard](https://learn.kent.edu/).

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