**Answers to Selected Exercises**

**28.14** - Apply the Apriori algorithm to the following data set:

|  |  |
| --- | --- |
| **Trans ID** | **Items Purchased** |
| 101 | milk, bread, eggs |
| 102 | milk, juice |
| 103 | juice, butter |
| 104 | milk, bread, eggs |
| 105 | coffee, eggs |
| 106 | coffee |
| 107 | coffee, juice |
| 108 | milk, bread, cookies, eggs |
| 109 | cookies, butter |
| 110 | milk, bread |

The set of items is {milk, bread, cookies, eggs, butter, coffee, juice}. Use 0.2 for the minimum support value.

***Answer:***

First, we compute the support for 1-item sets

(e.g., milk appears in 5 out of the 10 transactions, support is 0.5):

1-ITEM SETS SUPPORT

milk 0.5

bread 0.4

eggs 0.4

coffee 0.3

juice 0.3

cookies 0.2

butter 0.2

The min support required is 0.2, so all 1-item sets satisfy

this requirement, i.e. they are all frequent.

For the next iteration, we examine 2-item sets composed of

the frequent 1-item sets. The number of potential 2-item sets

is 21 (i.e., 7 items taken 2 at a time). The 2-item sets that

satisfy the min support of 0.2 are the following:

2-ITEM SETS SUPPORT

milk,bread 0.4

milk,eggs 0.3

bread,eggs 0.3

For the next iteration, we examine 3-item sets composed of

the frequent 2-item sets. The 3-item sets that satisfy the

min support of 0.2 are the following:

3-ITEM SETS SUPPORT

milk,bread,eggs 0.3

**28.15** - Show two rules that have a confidence of 0.7 or greater for an itemset containing three items from Exercise 28.14.

***Answer:***

There is only one frequent itemset of size 3, i.e., {milk,bread,eggs}. We can try the rule milk,eggs -> bread. The confidence of this rule is 0.3/0.3 which exceeds the min confidence value of 0.7. Another rule we can try is bread -> milk,eggs. The confidence of this rule is 0.3/0.4 which again satisfies the min confidence requirement.