

## CS 6220 Data Mining — Assignment 4

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### Association Rules

To complete this assignment you will need to download the following resources:

1. A notebook with helper functions for implementing the Apriori [LINK](https://goo.gl/1HtnFQ) (<https://goo.gl/1HtnFQ>). Add your portion of the assignment solution to the end of this file and submit that as your response in the assignment.
2. The dataset you'll be using `grocery.csv` [LINK](https://www.dropbox.com/s/mz6j5glhnd3skfs/grocery.csv) (<https://www.dropbox.com/s/mz6j5glhnd3skfs/grocery.csv>). Download the file and place it in the same directory as your notebook.

#### Objectives:

1. Define association rules and state their usefulness
2. Programmatically apply association rules to a data set and analyze the results

#### Submission:

Submit your ipynb file on the Assignment submission portal on Blackboard .

#### Grading Criteria:

Follow the instructions in the pdf, and complete each task. You will be graded on the application of the modules' topics, the completeness of your answers to the questions in the assignment notebook, and the clarity of your writing and code.

## WHAT TO DO

### Part 1 [40pts]:

The dataset above contains thousands of transactions recorded from a grocery store. Each row in the dataset refers to a given transaction where the items purchased are separated by commas. For example, on the second row we have a transaction with three items: {tropical fruit, yogurt, and coffee}. The attached notebook file (first download link above) contains a helper function that allows you to quickly load that file into a format that can be easily processed in Python.

Your task here is to make use of the provided functions to generate candidate itemsets, select those that are frequent using Apriori, and subsequently list association rules derived from these.

Note that because we have thousands of transactions, it may be hard to find itemsets with high supports (e.g., 20%), so in order to see interesting results, make sure you experiment with lower *min\_support* parameters. Make sure to document your code and leave some commentary on the results you obtained, which you will further discuss on the Collaborative Activity for this lesson.

### Part 2 [40pts]:

Repeat the above process but this time use FP-growth. You may use the code provided [here](https://goo.gl/Rv8KAa)(<https://goo.gl/Rv8KAa>), or some other Python implementation that you might find online (just be sure to cite your sources).

### Part 3 [20pts]:

After experimenting with several parameters, observing the frequent itemsets and resulting rules, select one (or more) particular rule that you found interesting/unexpected and post it to the discussion forum on the thread for this Module on Blackboard.

Write two short paragraphs describing the following:

1. How could this exercise directly impact the day-to-day business of a grocery store?
2. What are other potential applications for association rules?