Course name: Data Science (ITE4005)

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**< Programming Assignment #1 >**

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**Due Date: 30 March 2017, 11:59 pm**

**1. Environment**

* OS: Windows, Mac OS, or Linux
* Languages: C, C++, C#, Java, or Python

**2. Goal:** find association rules using the **Apriori** algorithm

**3. Requirements**

The program must meet the following requirements:

* Execution file name: apriori.exe
* Execute the program with three arguments: minimum support, input file name, output file name
  + Example:



* + - Minimum support = 5%, input file name = ‘input.txt’, output file name = ‘output.txt’
* Input file format

[*item\_id*]\t[*item\_id*]\n

[*item\_id*]\t[*item\_id*]\t[*item\_id*]\t[*item\_id*]\t[*item\_id*]\n

[*item\_id*]\t[*item\_id*]\t[*item\_id*]\t[*item\_id*]\n

* Row: transaction
* *item\_id* is a numerical value
* There is no duplication of items in each transaction
* Example:

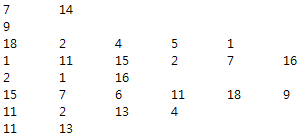


Figure 1. Input file example

* Output file format

[*item\_set*]\t[*associative\_item\_set*]\t[*support*(%)]\t[*confidence*(%)]\n

[*item\_set*]\t[*associative\_item\_set*]\t[*support*(%)]\t[*confidence*(%)]\n

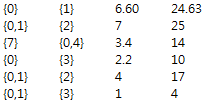
* + [*item\_set*]\t[*associative*\_*item\_set*]: association rules with minimum support
    - [*item\_set*]🡪[*associative*\_*item\_set*]
    - Use braces to represent item sets: {[*item\_id*],[*item\_id*],…} (*Important!!*)
      * e.g., {0}, {0,4}, {0,3,1}
  + *Support*: probability that a transaction contains [*item\_set*] [*associative*\_*item\_set*]
  + *Confidence*: conditional probability that a transaction having [*item\_set*] also contains [*associative*\_*item\_set*]
  + The value of support and confidence should be rounded to two decimal places.
    - e.g., 24.631 rounded to two decimal places should become 24.63.
  + An additional penalty will be imposed if you don’t keep the output file format.
  + Example:

Figure 2. Output file example

**4. Submission**

* Please submit the program files and the report to GitLab
  + Report
    - Should be written in *English*
    - File format must be \*.docx, \*.doc, \*.hwp, \*.pdf, or \*.odt.
    - Guideline
      * Summary of your algorithm
      * Detailed description of your codes (for each function)
      * Instructions for compiling your source codes at TA's computer (e.g. screenshot) (*Important!!*)
      * Any other specification of your implementation and testing
  + Program files
    - A executable file (.exe)
    - All source files
      * MakeFile if you use Linux
  + Note: submission details for GitLab will be announced later.

**5. Penalty**

* Late submission
  + 1 week delay: 20%
  + 2 weeks delay: 50%
  + Delay more than 2 weeks: 100%
* Requirements unsatisfied
  + Significant penalty up to 30% will be given when the requirements are not satisfied