CS-450 — Summer 2016 Dr. A. Motro 11 July 2016

Assignment No. 3: Relational Algebra

Solutions due 15 July.

Download the attached files (raeval-0.3.1 and raeval-0.2-basic-instructions). You may need to download the Java Runtime Environment.

Create a database for your design from Homework 2. You should create CSV files for each relation and load them into **raeval** (about 200 tuples altogether should be enough). Include tuples that give meaningful results to the queries listed below.

Notes: For dates use 6 digits (e.g., July 31, 2016 is coded 160731). For expiration use 4 digits (e.g., July 2016 is coded 1607). This will allow comparing dates easily with $>, \leq$, etc.). Employee numbers, Customer numbers, Supplier numbers and Items number should have the format E*nn*, C*nn*, S*nn* and I*nn*, where *nn* are two digit numbers.

Formulate each of the following 10 queries in the relational algebra. You may use any of the operators (both basic and derived). In each case, your answer should be a single relational algebra expression. Debug each of your queries in **raeval**..

How to submit. (1) Type your solutions and create a pdf file called *queries.pdf*. (2) Log your interaction with **raeval** in a file *execute.txt*. (3) Create a zip file called *hw3.zip* that combines *queries.pdf* and *execute.txt*, and upload to Blackboard only this zip file. Submissions different than this will not be graded.

About the log file. Create the log file using **log** *filename*. Start logging using **log start**. List each of your tables using the command **show** *relation*. Then execute each of your queries (as a sequence of operations). Stop logging using **log stop**.

1. Items (Item#, Desc) that are available from at least two suppliers at the same cost.
2. Items (Item#, Desc) that were purchased at least once in a quantity that is larger than at least on its procured quantities).
3. Items (Item#, Desc) with quantity-on-hand greater than 20, that have not been purchased in 2016.
4. Items (Item#, Desc) with quantity-on-hand less than 20, that have not been procured since 2015.
5. Customers (Cust#, Cname) whose credit cards have all expired.
6. Customers (Cust#, Cname) who purchased all the items that are available from supplier S01. → I01, I11, → use division
7. Customers (Cust#, Cname) that have made at least one purchase in 2015 of an item whose price was over $100.

Date/data not in tables.

8. Employees who work for one department but manage another (Emp#, Ename, Dept#-of-work-department, Dept#-of-managed-department).

9. Pairs of employees (Emp#, Ename, Emp#, Ename) in the same department who share at least one skill. ↳ how to remove duplicate tuples?

10. Pairs of employees (Emp#, Ename, Emp#, Ename) in the same department who have identical skills.