Stevens Institute of Technology
Castle Point on Hudson
Hoboken, NJ 07030

CS561 – Programming Assignment 1

Due Dates: Sec. B-10/21/2013 (Mon.) & Sec. A-10/23/2013 (Wed.)

Objectives

- To become familiar with the concept of *database application programming* and *query evaluation/processing*.

Description

"Simple Database Application Program #1" (`sdap1.cpp`)

- Generate 2 separate reports based on the following queries (one report for query #1 and another for queries #2 & #3):
  1. For each combination of *customer* and *product*, output the *average sales quantities for NY, NJ and CT in 3 separate columns*. Furthermore, for averages for NJ and CT, include only the sales that occurred between 1990 and 1995; for NY, include all sales.
  2. For each combination of *customer* and *product*, compute the *maximum* and *minimum* sales quantities along with the *corresponding dates* (i.e., dates of those maximum and minimum sales quantities) and the *state* in which the sale transaction took place.
  3. For the same combination of *product* and *customer*, compute the *average* sales quantity.

     For the final output, only include the MAX and MIN from the 3 states, "NY", "NJ" and "CT" (i.e., do NOT output the row if the MAX or MIN quantity is associated with "PA").

For this assignment, you can use a simple data structure (e.g., an array) to maintain the list of "information" being captured (we will discuss the type of information you will need to capture and maintain internally for the report over the next couple of lectures).

The following is a sample report output:
(NOTE – the following output can be generated with a single scan of the base table).

```
CUSTOMER  PRODUCT   NY_AVG  NJ_AVG  CT_AVG
========  =======   ======  ======  ======
Sam       Egg         2893     234    1435
Helen     Cookies      159    2342      56
Bloom     Butter      3087     923    1512

CUSTOMER  PRODUCT   MAX_Q  DATE        ST  MIN_Q  DATE        ST  AVG_Q
========  ========  =====  ==========  ==  =====  ==========  ==  =====
Bloom     Pepsi      2893  01/01/1996  NJ     12  09/25/1991  NY   1435
Sam       Milk        159  02/15/1992  NJ      1  03/23/1994  CT     56
Emily     Bread      3087  07/01/1995  NY      2  02/02/1991  NJ   1512
Knuth     Soap        234  12/15/1992  CT     11  04/23/1994  NY    121
```

Make sure that:

1. "**`select * from sales`**" is the ONLY SQL statement allowed in your program.
2. Character string data (e.g., customer name and product name) are left justified.
3. Numeric data (e.g., Maximum/minimum Sales Quantities) are right justified.
4. The Date fields are in the format of `MM/DD/YYYY` (i.e., 01/02/1992 instead of 1/2/1992).

Grading

- (80 pts.) Logic/Correctness
- (20 pts.) Programming Style (e.g., comments, indentation, use of functions, etc.)

NOTE: A program with compilation errors will earn no more than 50 points.

Sample Command Line

```
$ sdap1 [sales], where 'sales' is an optional argument for the table name.
```

Submission

Submit your source code (file) (with your name and CWID on it) on Moodle.
Please be sure to verify your program and its output on the Postgres server (`postgres.cs.stevens.edu`) before submitting it.

Please remember the following points when you're working on your programming assignments:

1. Your program must compile and execute on Linux using your account provided by Stevens (i.e., if your programs contain special functions for other compilers and does not compile on Linux, you WILL lose 50% of the grade for the assignment).
2. Programming style is 20% of the grade. Please make sure to provide comments for the program, functions, etc. as well as in-line comments as needed. Also, make sure to use meaningful names for your classes, variables, methods/functions, etc. Use proper indentation.
3. In the header comments for your program (i.e., at the beginning of your program), please provide a general instruction regarding how to execute your program (e.g., command line for the program and whatever arguments it requires).
4. Also, in the header comments, please justify your choice of data structures for your program -- e.g., if you're using a linked list to maintain whatever information necessary for your program, justify why it's a data structure of your choice, as opposed to, say, arrays. If you're using other more sophisticated data structures, please provide a brief description of the data structures and again justify as to why you chose the data structures for your program.
5. If you're using a single scan for the Programming Assignment #1 (or "minimal scans" for subsequent assignments which I will review in detail later in class), please provide a detailed description of your algorithm, e.g., how you're computing and maintaining the necessary information for your query output.
6. Remember the only SQL statement allowed in your program is the simple select statement, "select * from sales". Points will be deducted if you use any other SQL statements in your programs.

Most importantly, make sure it's your own work! If we determine that your program is a copy of someone else's, both you and that someone else will receive 0 for the assignment and possibly additional penalties for the course.

7. Student Name:_____

Major Area	Item	Max	Deduct	Score	%	Total
Compilation	If fails, subtract …	**50**				
	Correct avg( ) for NY	10				
	Correct avg( ) for NJ	10				
	Correct avg( ) for CT	10				
	Correct max( )	10				
	Correct min( )	10				
	Correct max & min DATES	10				
	Correct STATE	10				
	Correct avg( )	10				
	Output Format	20				
	Single Scan (YES/NO)					
	Total	**100**			**80%**	
Style	Header Comment	20				
	Function Comment	10				
	Line Comment	20				
	Indentation	10				
	Line/Block Spacing	10				
	Meaningful Identifier Names	20				
	Other	10				
	Total	**100**			**20%**	
Total		**100**			**100%**	