Programming Exercise 03
Joins and Subqueries

T-SQL Fundamentals

Your deliverable should be a plain text file (`.txt`) that contains a header showing your name, the name of the assignment, and the date. The body of the text file should echo the SQL statement you use to complete each step of the exercise and the results of the query.

Formatting requirements All the reports except for 6. (the last one) should be formatted as follows: (1) The columns should be in CSV, comma separated format. (2) The columns that consist of strings with embedded spaces or commas should be delimited with double quotes. The dollar amounts should be formatted as decimals with two digits following the decimal point. It is not necessary to round the dollar amounts. We have not covered this in class and this is not in the book. You must review the documentation and discover how to do this on your own.

Query hints These queries (except for the last one) all require the group by clause, the having clause, the order by clause, joins of multiple tables, that is, more than two tables, aggregate functions, and core functions. If you can get one of the first four, you shouldn't have too much trouble with the remaining ones.

1. We have noticed that certain customers prefer to make their orders with certain employees. We want to increase business by encouraging the customer/employee pairs that are more productive, and to channel the pairs that are less productive into other relationships. To this end, we have ordered this query and the following three. First, I need the customer ID, the customer contact name, the employee ID, the employee name, the order ID, the number of orders, and the total amount of each order, where the customer/employee pair has produced five or more orders between them, ordered by the dollar amount of the order from highest to lowest. The output needs to be in a comma separated format with strings that include spaces and commas delimited by double quotes. The dollar amount should be formatted as a decimal number with two decimal places. Here is the output.

```
CustomerID,ContactName,EmployeeID,emp_name,OrderID,num_orders,order_total
ERNSH,"Roland Mendel",3,"Janet Leverling",10514,5,8623.45
BLONP,"Frédérique Citeaux",4,"Margaret Peacock",10360,5,7390.20
QUICK,"Horst Kloss",3,"Janet Leverling",11021,5,6941.49
SAVEA,"Jose Pavarotti",5,"Steven Buchanan",10607,5,6475.40
SAVEA,"Jose Pavarotti",1,"Nancy Davolio",10612,5,6375.00
SAVEA,"Jose Pavarotti",4,"Margaret Peacock",10847,6,6164.90
SAVEA,"Jose Pavarotti",9,"Anne Dodsworth",10324,5,6155.90
KOENE,"Philip Cramer",9,"Anne Dodsworth",10893,5,5502.11
ERNSH,"Roland Mendel",8,"Laura Callahan",10979,6,4813.50
SAVEA,"Jose Pavarotti",1,"Nancy Davolio",11064,5,4722.30
ERNSH,"Roland Mendel",7,"Robert King",10836,5,4705.50
SAVEA,"Jose Pavarotti",2,"Andrew Fuller",10657,6,4371.60
QUICK,"Horst Kloss",8,"Laura Callahan",10845,5,4059.00
SUPRD,"Pascale Cartrain",7,"Robert King",10458,5,3891.00
SAVEA,"Jose Pavarotti",6,"Michael Suyama",10555,5,3680.50
ERNSH,"Roland Mendel",4,"Margaret Peacock",10698,5,3600.73
QUICK,"Horst Kloss",8,"Laura Callahan",10962,5,3584.00
WHITC,"Karl Jablonski",4,"Margaret Peacock",10861,5,3523.40
SAVEA,"Jose Pavarotti",1,"Nancy Davolio",10393,5,3302.60
SAVEA,"Jose Pavarotti",5,"Steven Buchanan",10714,5,2941.00
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ERNSH,"Roland Mendel",4,"Margaret Peacock",10382,5,2900.00
VAFFE,"Palle Ibsen",1,"Nancy Davolio",10465,5,2719.00
FRANK,"Peter Franken",4,"Margaret Peacock",10337,5,2467.00
SAVEA,"Jose Pavarotti",6,"Michael Suyama",11031,5,2393.50
FRANK,"Peter Franken",4,"Margaret Peacock",10670,5,2301.75
AROUT,"Thomas Hardy",1,"Nancy Davolio",10558,5,2142.90
QUICK,"Horst Kloss",3,"Janet Leverling",10273,5,2142.40
QUEEN,"Lúcia Carvalho",7,"Robert King",10406,5,2018.20
RATTC,"Paula Wilson",4,"Margaret Peacock",10294,5,1887.60
RICSU,"Michael Holz",1,"Nancy Davolio",10537,5,1823.80
HUNGO,"Patricia McKenna",3,"Janet Leverling",10309,5,1762.00
WARTH,"Pirkko Koskitalo",2,"Andrew Fuller",10553,5,1546.30
KOENE,"Philip Cramer",1,"Nancy Davolio",10325,5,1497.00
FRANK,"Peter Franken",8,"Laura Callahan",10623,5,1429.75
RATTC,"Paula Wilson",1,"Nancy Davolio",11077,25,1374.60
QUICK,"Horst Kloss",2,"Andrew Fuller",10515,5,10588.50
QUICK,"Horst Kloss",2,"Andrew Fuller",10691,5,10164.80
```

2. Second, I want the least productive pairs with the same columns. The total of orders should be less than three, the dollar amount of the order is less than $50.00, and the orders are ranked by increasing dollar amounts, starting with the least order. Here is the expected output.

```
CustomerID,ContactName,EmployeeID,emp_name,OrderID,num_orders,order_total
CACTU,"Patricio Simpson",9,"Anne Dodsworth",10782,1,12.50
FRANS,"Paolo Accorti",4,"Margaret Peacock",10807,1,18.40
REGGC,"Maurizio Moroni",9,"Anne Dodsworth",10586,1,28.00
SUPRD,"Pascale Cartrain",4,"Margaret Peacock",10767,1,28.00
OCEAN,"Yvonne Moncada",4,"Margaret Peacock",10898,1,30.00
LONEP,"Fran Wilson",8,"Laura Callahan",10883,1,36.00
SAVEA,"Jose Pavarotti",2,"Andrew Fuller",10815,1,40.00
ISLAT,"Helen Bennett",4,"Margaret Peacock",10674,1,45.00
WELLI,"Paula Parente",1,"Nancy Davolio",10900,1,45.00
LAMAI,"Annette Roulet",7,"Robert King",11051,1,45.00
NORTS,"Simon Crowther",3,"Janet Leverling",11057,1,45.00
SPLIR,"Art Braunschweiger",6,"Michael Suyama",10271,1,48.00
FRANS,"Paolo Accorti",2,"Andrew Fuller",10422,1,49.80
```

3. Third, I need the most productive pairs as in the first report above, omitting the order ID but ranked by the average amount from highest to lowest of all orders by the customer/employee pair. Include only pairs where the amount of the average exceeds $2,500.00. Here is the expected output.

```
CustomerID,ContactName,EmployeeID,emp_name,OrderID,num_orders,order_avg
QUICK,"Horst Kloss",2,"Andrew Fuller",10865,2,8625.00
RATTC,"Paula Wilson",9,"Anne Dodsworth",10889,2,5690.00
HUNGO,"Patricia McKenna",3,"Janet Leverling",10897,2,5417.62
PICCO,"Georg Pipps",7,"Robert King",10353,2,5370.80
GREAL,"Howard Snyder",4,"Margaret Peacock",10816,2,4445.50
HUNGO,"Patricia McKenna",2,"Andrew Fuller",10912,2,4133.70
SAVEA,"Jose Pavarotti",7,"Robert King",11030,4,4080.48
MEREP,"Jean Fresnière",7,"Robert King",10424,3,3831.07
FOLKO,"Maria Larsson",7,"Robert King",10993,2,3263.63
QUEEN,"Lúcia Carvalho",5,"Steven Buchanan",10372,4,3070.30
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WHITC,"Karl Jablonski",2,"Andrew Fuller",11032,3,2967.50
KOENE,"Philip Cramer",3,"Janet Leverling",10817,4,2872.68
SIMOB,"Jytte Petersen",4,"Margaret Peacock",10417,4,2820.80
RATTC,"Paula Wilson",3,"Janet Leverling",10479,4,2623.90
QUICK,"Horst Kloss",3,"Janet Leverling",10540,4,2547.93
HANAR,"Mario Pontes",1,"Nancy Davolio",10981,1,15810.00
```

4. Finally, I need the least productive pairs as ranked by average order amount, from lowest to highest, formatted as above. Omit the order ID. Include only pairs where the average order amount is less than $50.00. Here is the expected output.

```
CustomerID,ContactName,EmployeeID,emp_name,OrderID,OrderID,num_orders,order_avg
CACTU,"Patricio Simpson",9,"Anne Dodsworth",10782,10782,1,12.50
FRANS,"Paolo Accorti",4,"Margaret Peacock",10807,10807,1,18.40
REGGC,"Maurizio Moroni",9,"Anne Dodsworth",10586,10586,1,28.00
SUPRD,"Pascale Cartrain",4,"Margaret Peacock",10767,10767,1,28.00
LAUGB,"Yoshi Tannamuri",2,"Andrew Fuller",10620,10620,2,28.75
ROMEY,"Alejandra Camino",4,"Margaret Peacock",10281,10281,3,28.83
OCEAN,"Yvonne Moncada",4,"Margaret Peacock",10898,10898,1,30.00
LONEP,"Fran Wilson",8,"Laura Callahan",10883,10883,1,36.00
RANCH,"Sergio Gutiérrez",6,"Michael Suyama",11019,11019,2,38.00
SAVEA,"Jose Pavarotti",2,"Andrew Fuller",10815,10815,1,40.00
FRANS,"Paolo Accorti",3,"Janet Leverling",10753,10753,2,44.00
ANATR,"Ana Trujillo",7,"Robert King",10308,10308,2,44.40
REGGC,"Maurizio Moroni",4,"Margaret Peacock",10288,10288,2,44.50
ISLAT,"Helen Bennett",4,"Margaret Peacock",10674,10674,1,45.00
WELLI,"Paula Parente",1,"Nancy Davolio",10900,10900,1,45.00
LAMAI,"Annette Roulet",7,"Robert King",11051,11051,1,45.00
NORTS,"Simon Crowther",3,"Janet Leverling",11057,11057,1,45.00
FRANS,"Paolo Accorti",1,"Nancy Davolio",10710,10710,2,46.75
SPLIR,"Art Braunschweiger",6,"Michael Suyama",10271,10271,1,48.00
FRANS,"Paolo Accorti",2,"Andrew Fuller",10422,10422,1,49.80
```

5. Please create a report with the order ID, the customer ID, the customer name, the customer country, and the dollar amount of the order, sorted alphabetically by country and numerically from highest to lowest by the dollar amount of the order, where the order total exceeds $5,000.00. Here is the output.

```
OrderID,CustomerID,CompanyName,Country,total_order
10514,ERNSH,"Ernst Handel",Austria,8623.45
10776,ERNSH,"Ernst Handel",Austria,6984.50
11017,ERNSH,"Ernst Handel",Austria,6750.00
10633,ERNSH,"Ernst Handel",Austria,6483.05
10895,ERNSH,"Ernst Handel",Austria,6379.40
10595,ERNSH,"Ernst Handel",Austria,6300.00
10430,ERNSH,"Ernst Handel",Austria,5796.00
10351,ERNSH,"Ernst Handel",Austria,5677.60
11072,ERNSH,"Ernst Handel",Austria,5218.00
10353,PICCO,"Piccolo und mehr",Austria,10741.60
10981,HANAR,"Hanari Carnes",Brazil,15810.00
10372,QUEEN,"Queen Cozinha",Brazil,12281.20
10424,MEREP,"Mère Paillarde",Canada,11493.20
10417,SIMOB,"Simons bistro",Denmark,11283.20
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10360,BLONP,"Blondesddsl père et fils",France,7390.20
11021,QUICK,QUICK-Stop,Germany,6941.49
10893,KOENE,"Königlich Essen",Germany,5502.11
10865,QUICK,QUICK-Stop,Germany,17250.00
10817,KOENE,"Königlich Essen",Germany,11490.70
10515,QUICK,QUICK-Stop,Germany,10588.50
10540,QUICK,QUICK-Stop,Germany,10191.70
10691,QUICK,QUICK-Stop,Germany,10164.80
10912,HUNGO,"Hungry Owl All-Night Grocers",Ireland,8267.40
10687,HUNGO,"Hungry Owl All-Night Grocers",Ireland,6201.90
10897,HUNGO,"Hungry Owl All-Night Grocers",Ireland,10835.24
10993,FOLKO,"Folk och fä HB",Sweden,6527.25
11032,WHITC,"White Clover Markets",USA,8902.50
10816,GREAL,"Great Lakes Food Market",USA,8891.00
10607,SAVEA,"Save-a-lot Markets",USA,6475.40
10612,SAVEA,"Save-a-lot Markets",USA,6375.00
10847,SAVEA,"Save-a-lot Markets",USA,6164.90
10324,SAVEA,"Save-a-lot Markets",USA,6155.90
10440,SAVEA,"Save-a-lot Markets",USA,5793.10
10678,SAVEA,"Save-a-lot Markets",USA,5256.50
10616,GREAL,"Great Lakes Food Market",USA,5032.00
11030,SAVEA,"Save-a-lot Markets",USA,16321.90
10889,RATTC,"Rattlesnake Canyon Grocery",USA,11380.00
10479,RATTC,"Rattlesnake Canyon Grocery",USA,10495.60
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6. I want to know the unique (distinct) cities, regions, and postal codes: (a) where we have both customers and employees, (b) where we have customers but no employees AND both customers and employees, and (c) where we have employees but no customers AND both customers and employees. Write three queries, using inner and outer joins. Report the results of the queries. There is no need for any further reporting.