Massachusetts Institute of Technology
Department of Urban Studies and Planning

11.204: Planning, Communication & Digital Media
Fall 2004

Lab 5:
Using Access to Query Multiple Data Sets

Assigned: Rec. 6
Due: Rec. 7 at 5PM

I. Scenario

This lab exercise is designed to help you learn more about MS Access, while enhancing your understanding of Central Square. So, you should not only keep an eye toward the functions packaged in Access, but also think about the data you are manipulating as you move through the following exercise.

II. Directions

A. Introduction to relational database concepts and MS Access

1. Give two examples of **databases** from daily life.
2. List at least two database vendors and products in addition to Microsoft's Access.
3. Identify one row, one field, and one cell of one of the databases you answered to the question A1 above.

B. Exploring MS Access interface and objects

1. Launch MS Access XP and examine the interface. [Help]
2. Open the database file "Cambridge.mdb" located in the MIT Server\Data\. In the database window named "Cambridge" examine the different objects in MS Access. They are: **tables, queries, forms, reports** and so on. [Help]
3. In the Objects list, click "Tables." How many tables are there in the list? Double click on the table "Cam_geometry" to open it. Switch between **design view** and **datasheet view** to examine the table. Then, answer the following questions. How many records are there in the table? Which field is the primary key? What is the data type of the **field** "Area?" [Help]
4. Close the table "Cam_geometry" and go back to the database window. Click "Queries" in the left objects list and select the query "qryPopuDensity." Open it in the design view, and ask yourself the following questions. How many and what tables are involved in this query? What are their primary keys? How many fields are there in the query result? What is the **expression** for the last field, "PopuDense?" Can you explain the number "2589988.1005?" Think about the unit conversion between square mile and square meter. [Help]
5. Close the query "qryPopuDensity" to return to the database window. Open and examine the other two objects "Form" and "Report." There is one form in this database named "frmPopuDensity" and one report named "rptPopuDensity." They contain the same contents as the query result "qryPopuDensity," but in different formats. [Help]
6. Close all the windows you opened inside MS Access and exit the application. [Help]

C. Create your own database

1. Launch MS Access XP again. Create a new database. Save the database file to "H:\private\11.204\lab5\johndoe_lab5.mdb". Replace "johndoe" with your username. [Help]
2. Import from "the MIT Server\Data\" the data file "cambridge_geometry.xls" (which contains the areas and perimeters of all Census tracts in Cambridge) into the database. Follow the requirements below. [Help]

- Use the data from worksheet "Geometry"
- First row contains column headings
- Store the data in a new table; name it as "Cam_Geometry"
- Change the first field name to "TractID". **Index** it, and allow no duplicates. Choose this field as the primary key.

3. In the same way, import the files "MA_Gender.xls,""MA_HH.xls,""MA_Popu2k.xls," and "MA_Race.xls" according to following information. [Help]

- Change the field "AreaKey" to "TractID." Index it and allow no duplicates. Choose this field as the primary key.
- Import the four files as four individual new tables. Name them according to the Excel file names.
- Name the columns as follows:

  P001001: Total Population (Name the column as "Popu2000")
  P015001: Household Units (Name the column as "HHUnits")
  P012002: Males
  P012026: Females
  P003003: White
  P003004: Black
  P003005: NatAmer
  P003006: Asian
  P003007: Pacific

  Note: Of the five tables, "Cam_Geometry" only has 29 records (the number of Census tracts in the City of Cambridge.). The other four tables contain data for Census tracts located throughout the Commonwealth of Massachusetts; each contains more than 1,300 records.

D. Working with tables

1. To become familiar with tables, we ask you to modify the table "Cam_geometry." There are two errors in the original data source "Cambridge_geometry.xls." Modify the table you created in MS Access, not the original Excel file. [Help]

- First, the area of Census tract "25017355000" should be "482491.81312" instead of "842491.81312."
- Also, one record is missing. You should add the missing record, which is shown below.

STCNTYTR	AREA	PERIMETER
25017354900	1285551.80508	5768.48054

Now that you've modified and added records to the table, we ask you to try sorting and filtering functions.

2. Sort the table "MA_Popu2k" to find the five most populated Census tracts in Massachusetts. [Help] --simple sorting
3. Filter the table "MA_HH" to see how many Census tracts in Massachusetts have more than 3,000 households? [Help] --simple filtering
4. Use the advanced filter tool to identify tracts in MA with the male population between 2,500 and 3,000 and the female population between 2,000 and 2,500. [Help] --advanced filtering, logical operator "AND".

E. Select queries

1. Construct a select query that tells you how many Census tracts there are in the Commonwealth of Massachusetts in which there are more Black people than White people. Save this query as "qryE1." [Help]--simple query based on one table
2. Construct a select query that tells you how many Census tracts there are in the City of Cambridge in which there are more Black people than White people. Save this query as "qryE2." [Help]--query based on table join
3. Build a select query to calculate the **population density** (number of people per square mile) for each tract in the City of Cambridge. Sort the records by population density in descending order. Which tract has the greatest density? Save this query as "qryE3." [Help]--query based on table join, sort, calculation by using query, expression
4. Export the query result of "qryE3" into an Excel file, name it as "johndoe_lab5_qryE3.xls" (Replace "johndoe" with your username) at H:\private\11.204\lab5.[Help] --export a table or query result.

III. Things to ponder

In addition to your observations in the field, think about what the Census data on race, gender, income, etc. are revealing.
In Access, you were able to relate these data tables to create a relational database and ask complex queries. Now that you've completed the lab exercise, you should take a moment to tinker with Access, asking questions that are of interest to you.
Open and sort each of the tables and look for trends.

- If you had to create a presentation using the data from this lab, what argument would you formulate?
- Would it support your initial thoughts about Central Square?
- Or, are you beginning to develop a new impression of this place and its people?

IV. Materials to submit

This lab is due at 5:00pm on October 27th.

1. Print your answers to questions II-A. 1, 2, 3; B. 3, 4; D. 2, 3, 4, and E. 1, 2, 3.
2. Print out the Excel file "yourusername_lab5_qryE3.xls" you exported at the end of part E.4 (It should contain information about the population density of the City of Cambridge.)

Submit the hardcopy to the "11.204 Box".

V. Grading criteria

For this exercise, only correct answers will be counted toward your grade.

Lab 5 is worth a total of 10 percentage points toward your final grade.

VI. To learn more

Microsoft offers a wide range of support for its Office products. Visit MS-Office web site for further information. Element K also offers courses on MS-Access. Tutorials for Access is available under the "End-user Databases" category.

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