

Massachusetts Institute of Technology  
Department of Urban Studies and Planning



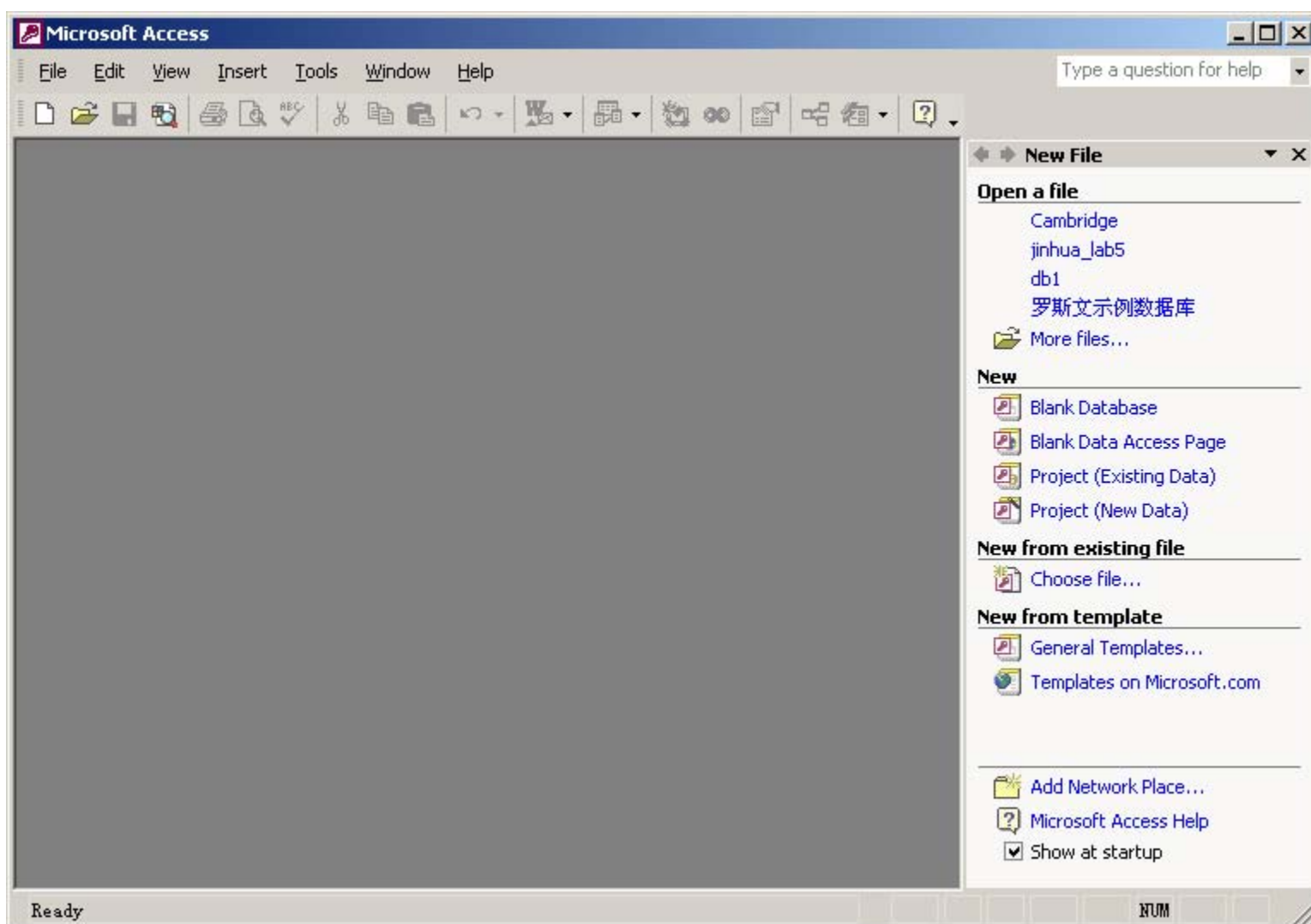
11.204: Planning, Communication & Digital Media  
Fall 2004

Lab 5:  
Using Access to Query Multiple Data Sets  
Help Section

Exploring MS Access interface and objects

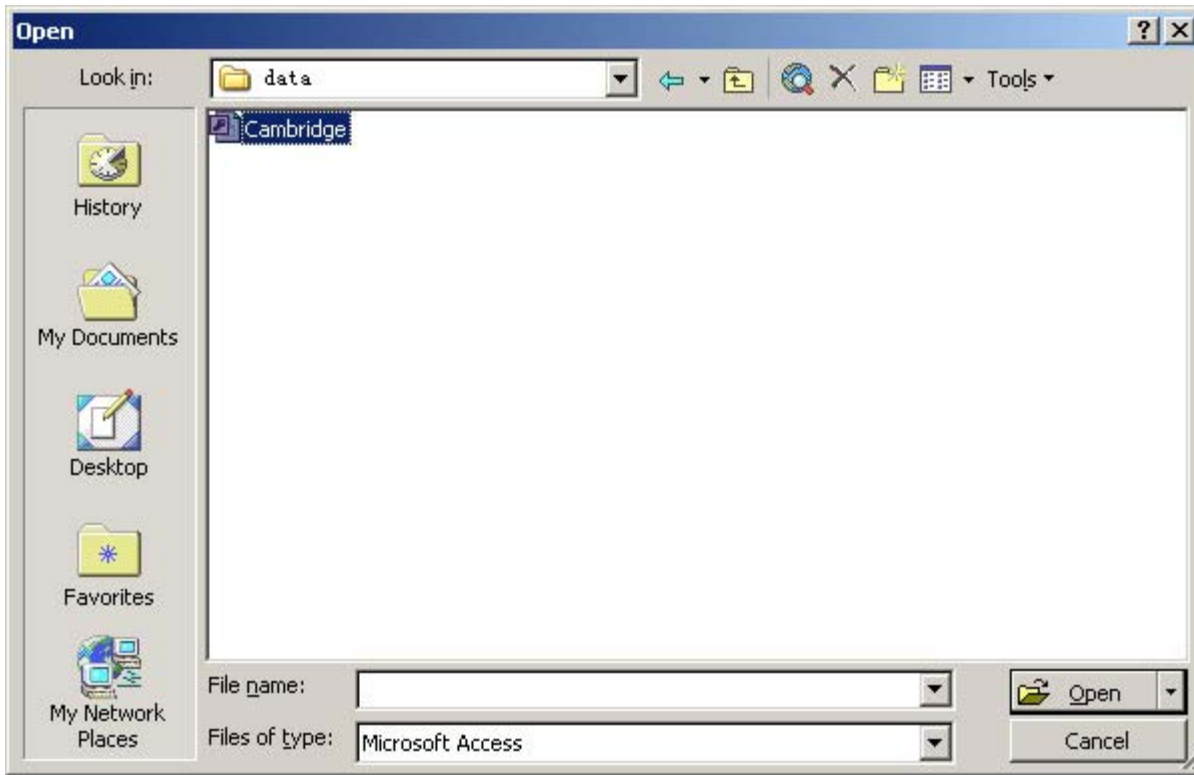
Start MS Access

To launch MS Access from the Start Menu choose Start > Programs > Microsoft > Microsoft Access.

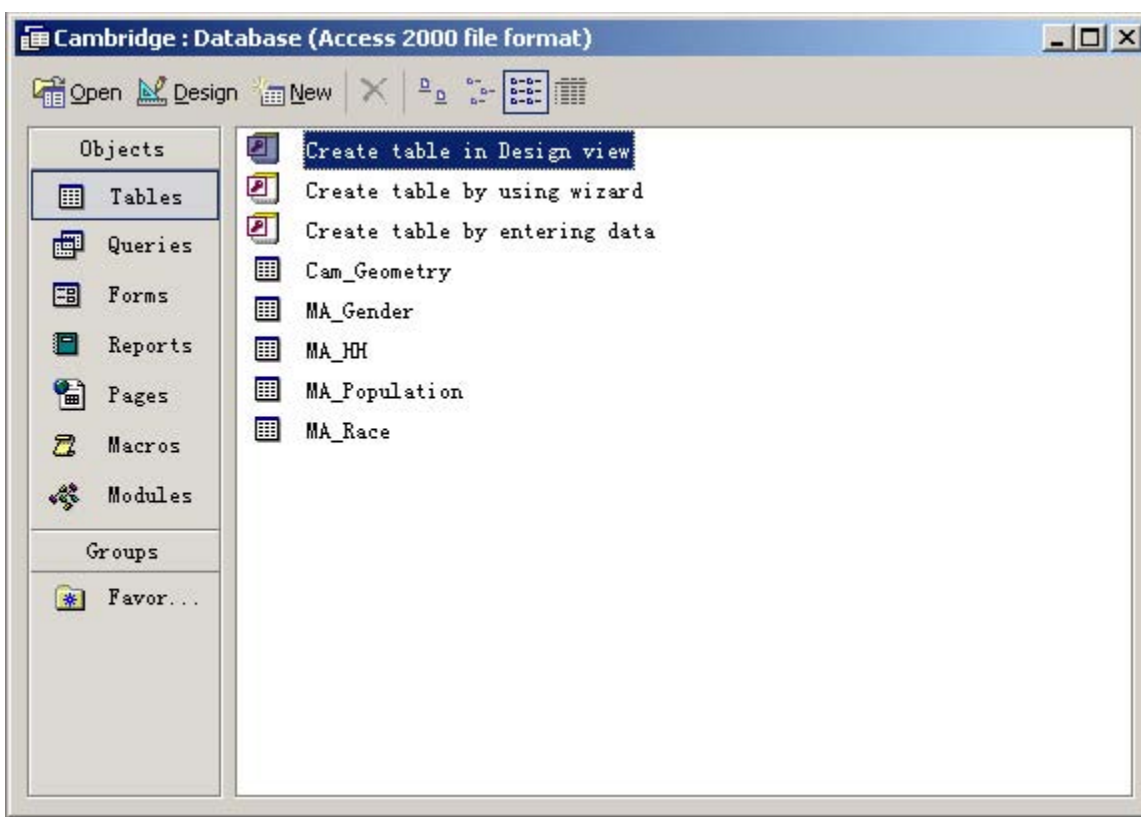


Open An Existing Database

In menu File, choose open. In the pop up windows, browse to the folder " the MIT Server\Data\," choose "Cambridge" and click "Open."




The main database window opens. In the left lane there is a list of objects; you can find Tables, Queries, Forms, Report and so on. Click each of them to see what is inside in each object category.

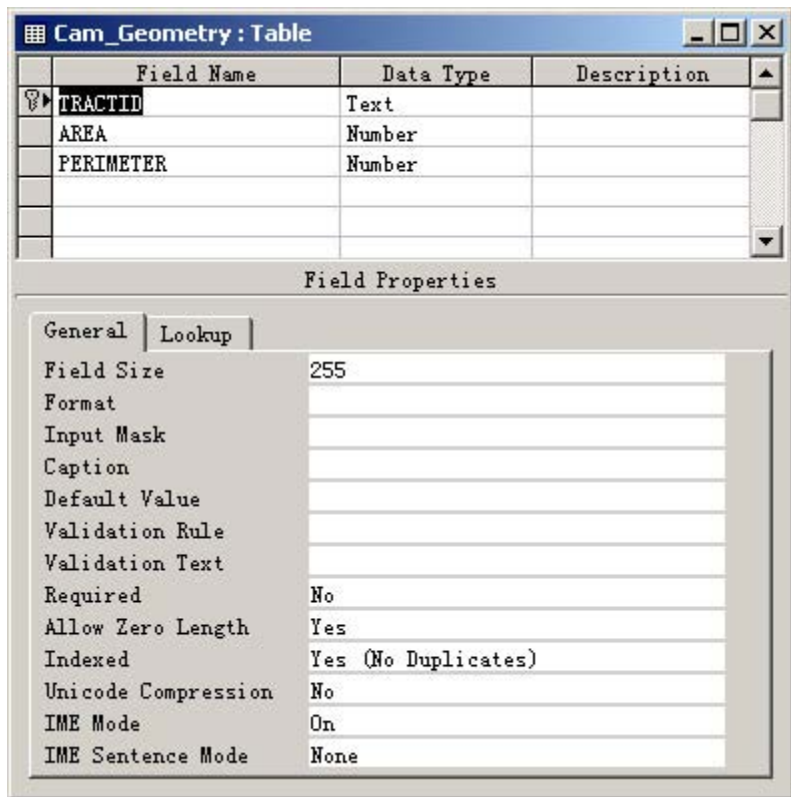


### Examine Tables


In the left lane of the Objects list, click "Tables." All the tables in this database are listed on the right of the window. Double click on the table "Cam\_geometry" to open it. The table Cam\_Geometry" shows in the datasheet view. You can tell the total records number from the bottom status bar.

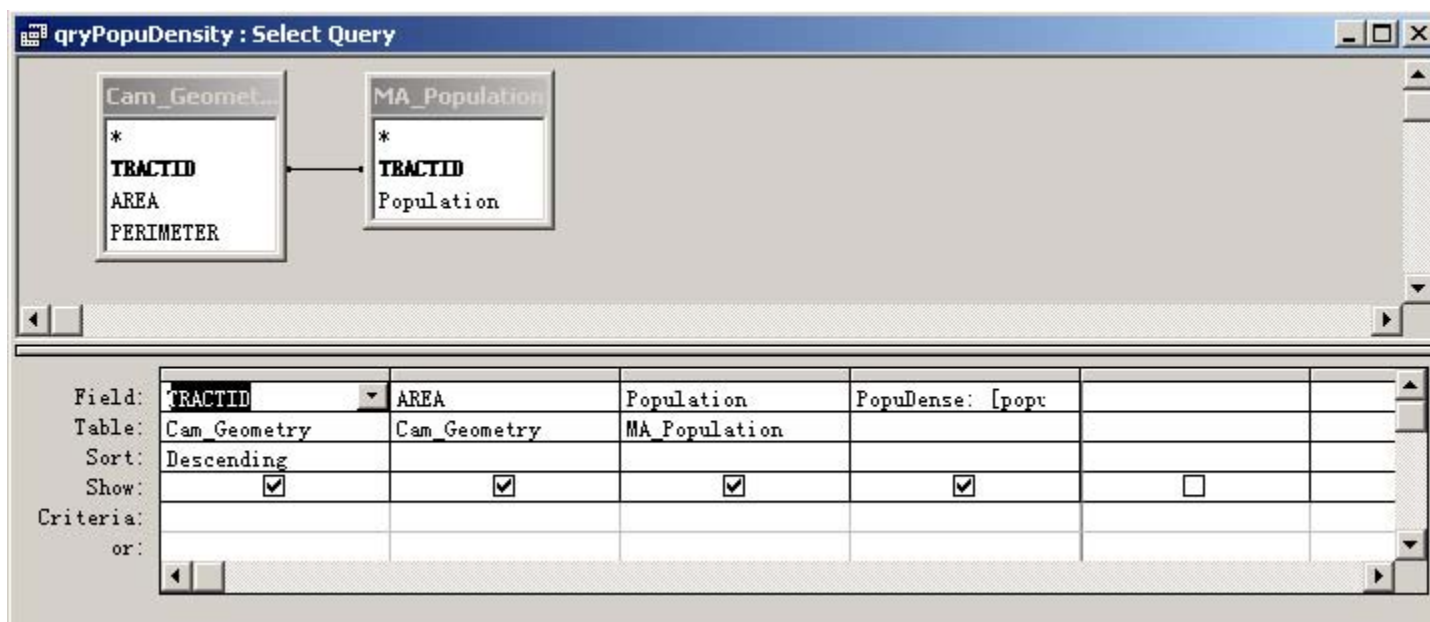
TRACTID	AREA	PERIMETER
25017352100	1042324.3296	5258.27113
25017352200	141962.65074	1641.45628
25017352300	596193.50317	3194.13006
25017352400	451455.91827	3889.53577
25017352500	206456.89193	1973.90435
25017352600	242700.8687	2014.10485
25017352700	153925.7415	2619.85262
25017352800	162164.77028	2211.17891
25017352900	287454.40502	2409.86394
25017353000	332967.28356	2684.44809
25017353100	2036426.21677	8136.86953
25017353200	523658.70777	3639.62115
25017353300	516833.94644	3854.32143
25017353400	323578.47867	2559.59137
25017353500	211619.18804	2143.72134
25017353600	726866.67794	3610.61639
25017353700	552034.19767	3915.82092
25017353800	298396.52597	2532.68955
25017353900	380374.77933	2988.86471
25017354000	488519.0508	3916.51264
25017354100	625705.12558	4066.6027

In the tool bar of the main window, click on , the view switch button to switch to the design view. In the upper table, all the fields names and data types are listed. There is a key symbol left to the field "TRACTID," indicating that it is the primary key. You can tell the datatype of the field "Area" from the column "Data Type" in the upper table.

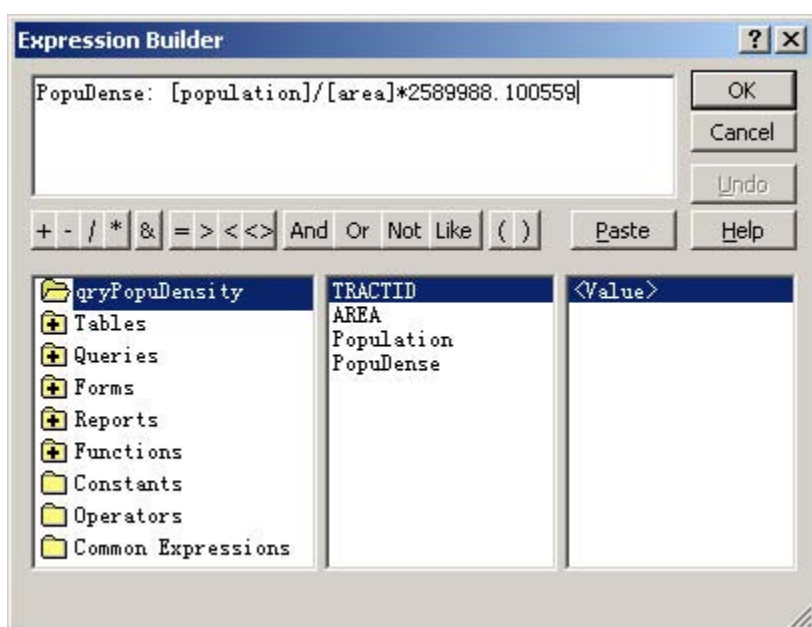


## Examining Queries

Close the table "Cambride\_geometry" and go back to the database window. Click "Queries" in the left lane and select the query "qryPopuDensity." Double click it to open it in the datasheet view and click on  to switch to design view.



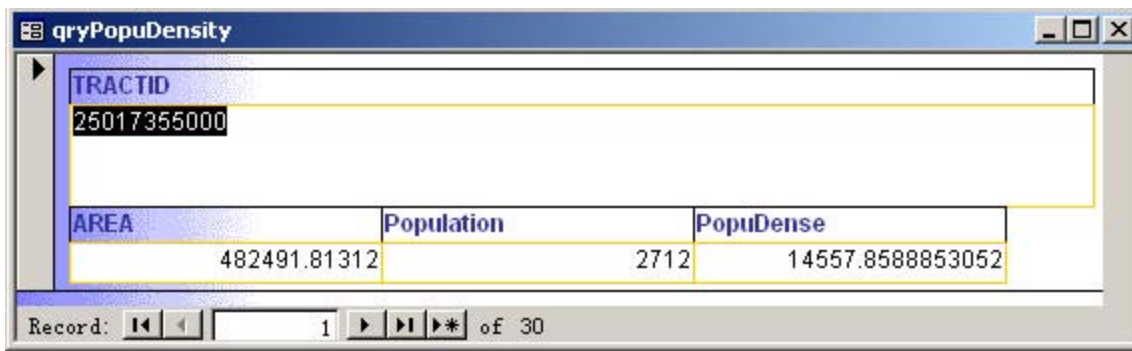
There are two tables shown in the upper part of the window, which are linked by a line. The field names in bold font are the primary keys for each table. In the lower part, four fields are listed and all four boxes in the "Show" row are ticked on. Right click on the PopuDense field, in the pop up context menu, choose "Build... ." The expression builder window appears.



In the top left of the window, we can see the expression for the field "PopuDense" is "PopuDense: [population]/[area]\*2589988.100559." The number "2589988.100559" is used to convert population per square meter to population per square mile.

## Examining Forms and Reports

Close the query, "qryPopuDensity," to return to the database window. Click "Forms" in the left lane and select the form named "frmPopuDensity." Double click to open it.



Click the arrow on the bottom of the window, and the record will change accordingly.

Close the form to return to the database window. Click "Reports" in the objects list and select "rptPopuDensity." Double click to open it.

TRACTID	AREA	Population	PopuDense
25017355000	482491.81312	2712	14557.8588853052
25017354900	120551.00000	5235	10546.5010000000
25017354800	320000.00000	2549	10000.0000000000
25017354700	32574.00000	2491	10225.2700000000
25017354600	150050.74000	4409	3375.8600470000
25017354500	407052.00000	2405	15266.735727747
25017354400	290304.40222	1714	15135.2000230000
25017354300	180000.00000	3260	4529.8073900000
25017354200	102000.00000	3000	4670.0000000000
25017354100	102000.00000	2704	11102.0000000000
25017354000	48019.00000	4040	24047.6000740000
25017353900	38004.77000	5025	41026.6000000000
25017353800	20000.00000	4000	40000.0000000000
25017353700	10000.00000	5000	20000.0000000000
25017353600	70000.00000	4742	10000.0000000000
25017353500	21000.00000	2500	31000.0000000000
25017353400	32000.00000	2400	19000.0000000000
25017353300	50000.00000	3000	16000.0000000000
25017353200	52000.00000	3143	15000.0000000000
25017353100	20000.00000	8004	10000.0000000000
25017353000	30000.00000	3700	20000.0000000000
25017352900	20000.00000	2000	25000.0000000000
25017352800	10000.00000	2500	30000.0000000000
25017352700	15000.00000	2400	40000.0000000000
25017352600	20000.00000	2000	20000.0000000000
25017352500	20000.00000	3012	41000.0000000000
25017352400	40000.00000	1942	11000.0000000000
25017352300	50000.00000	2200	9000.0000000000

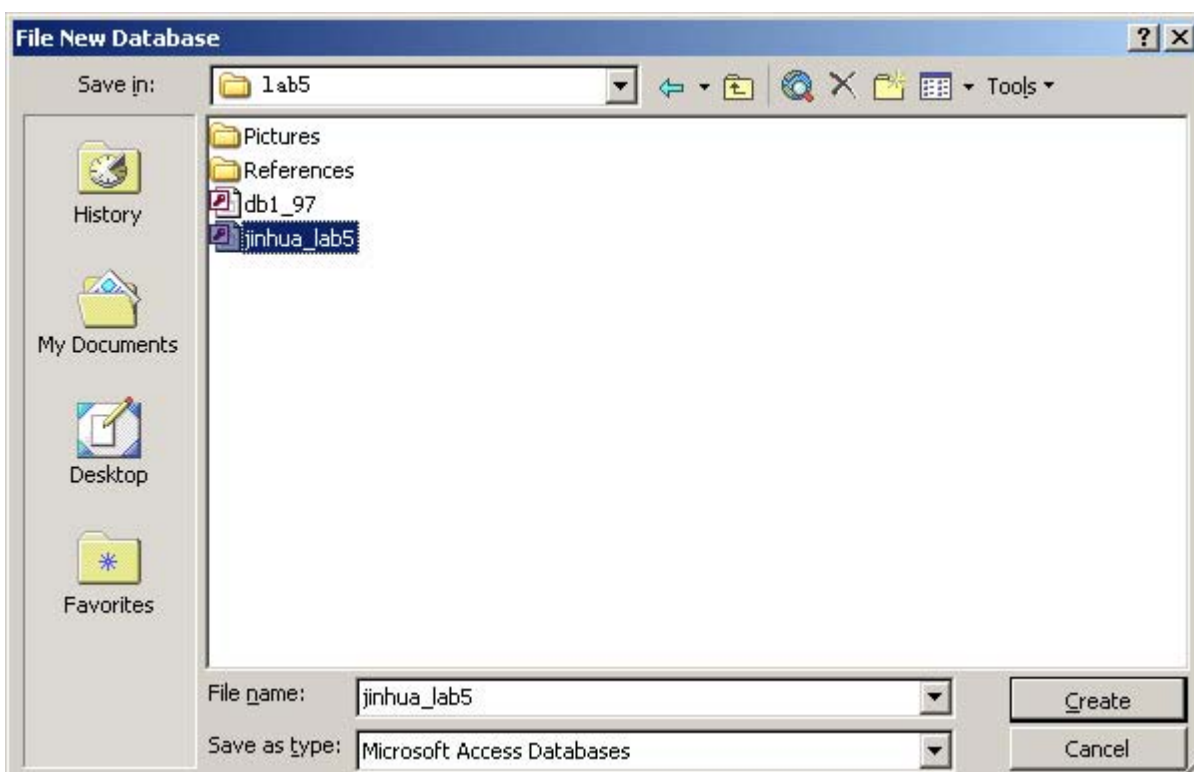
### Close MS Access

From menu File, choose "Exit" to close MS Access.

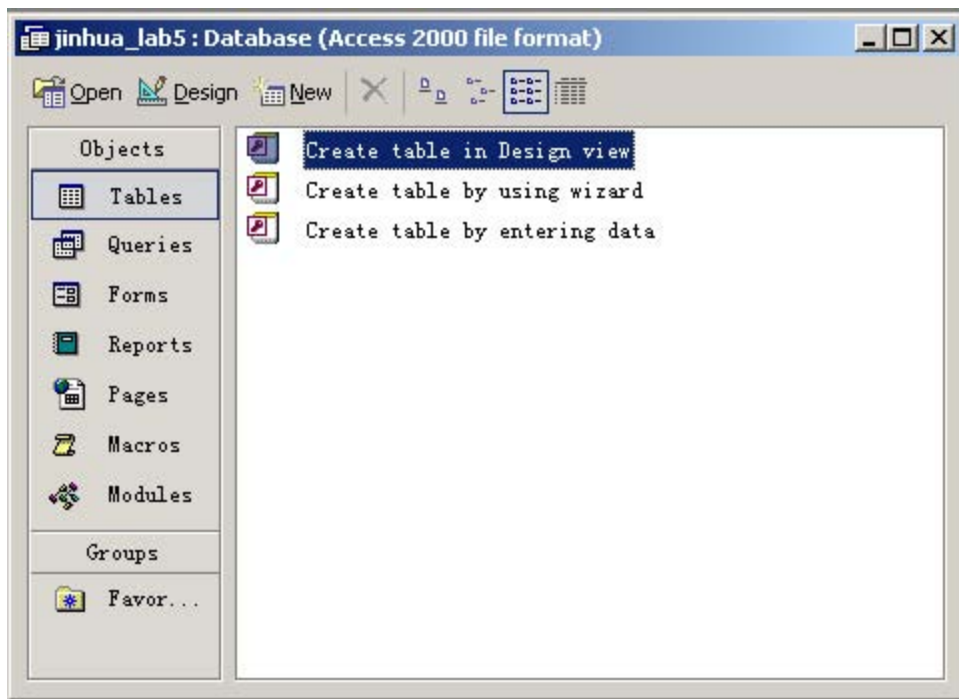
## Create your own database

### Create a new database

Launch MS Access again and in the menu File, choose "New." In the right task panel, choose "Blank Database." In the new window titled, "File New Database," browse to "H:\private\11.204\lab5," use "yourusername\_lab5.mdb" as the file name and click "Create."

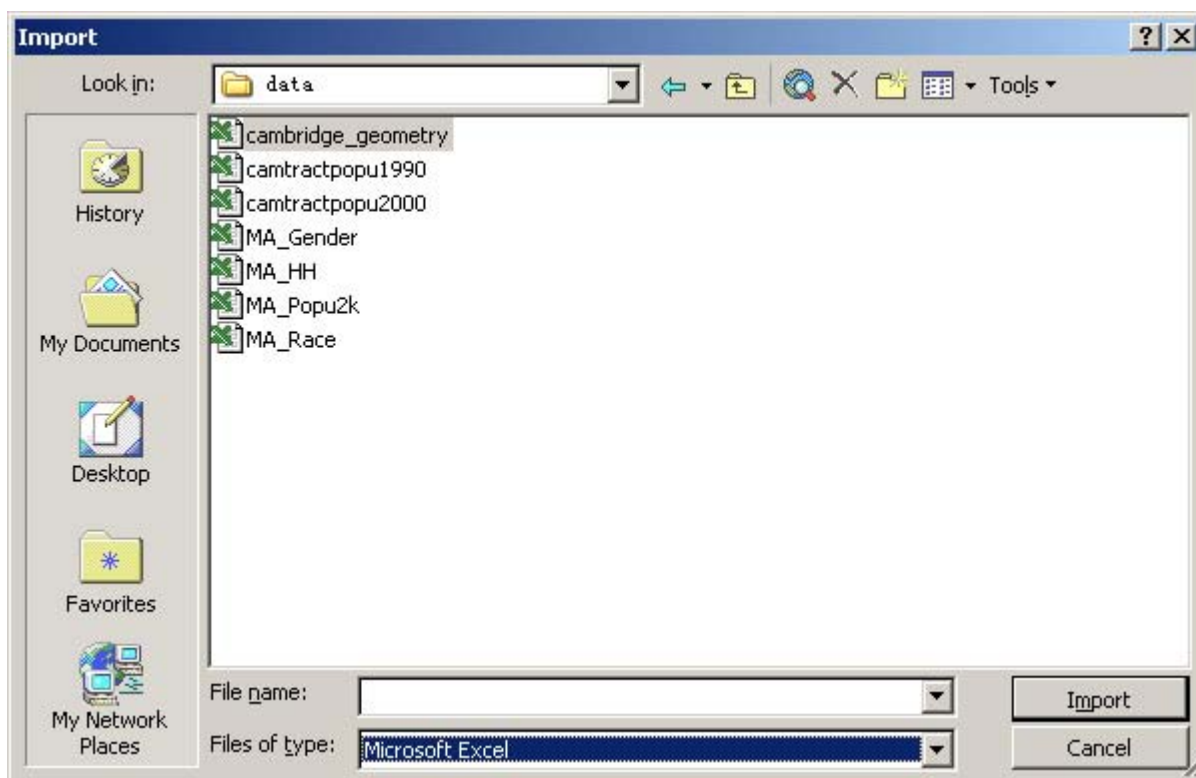


The empty database file appears as follows,

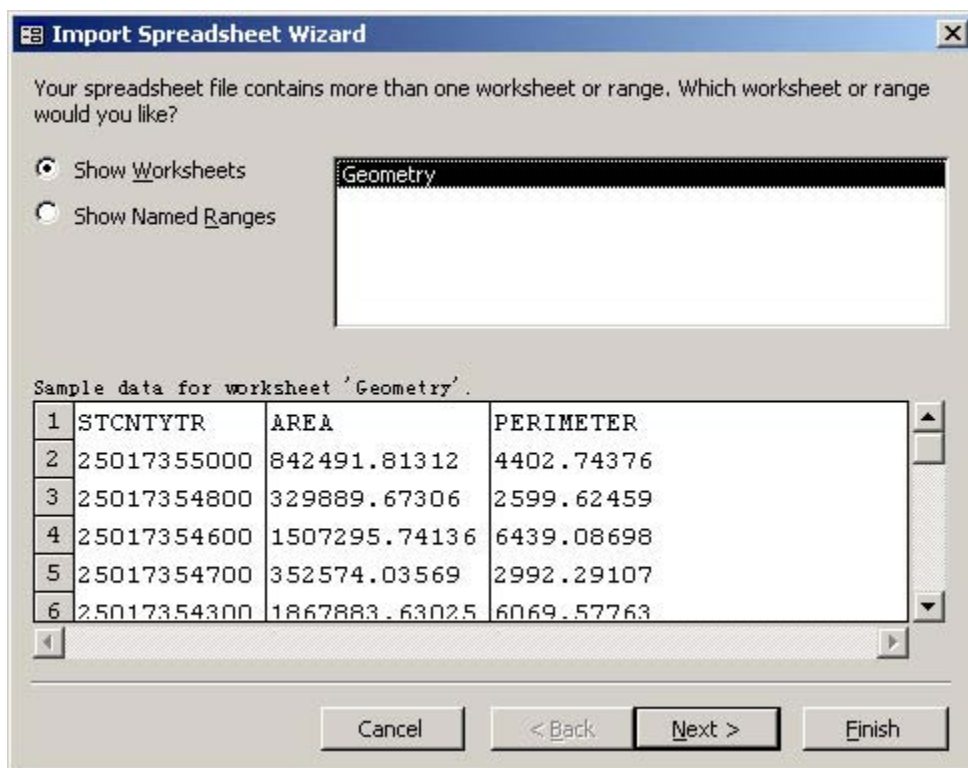


### Import data files

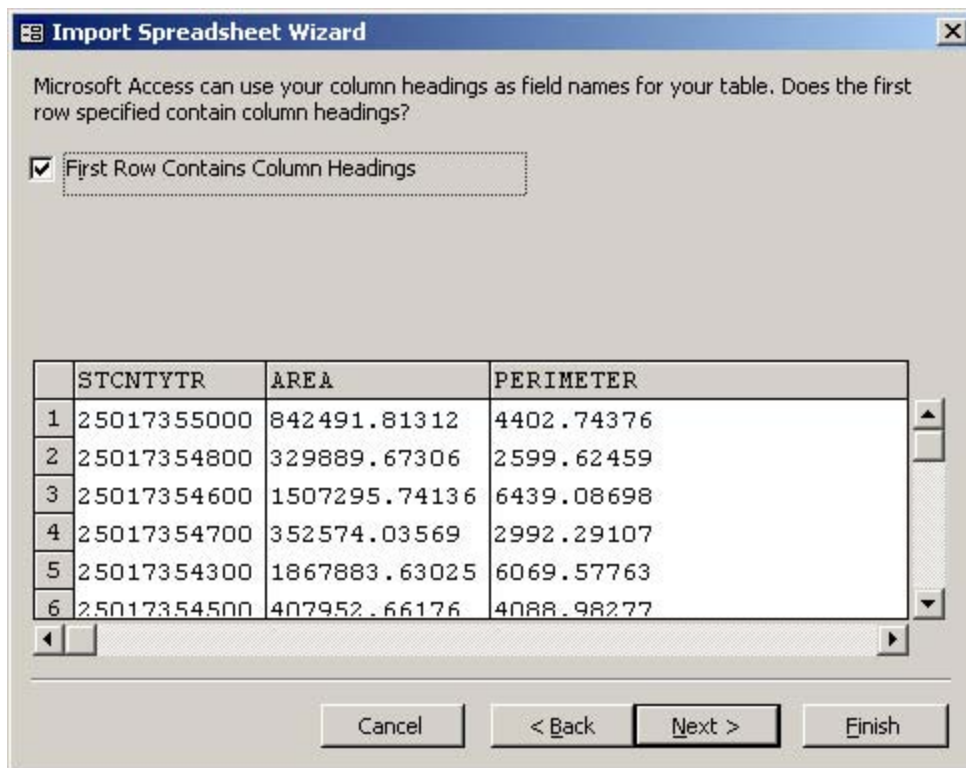
In the menu file, choose Get External Data > Import.



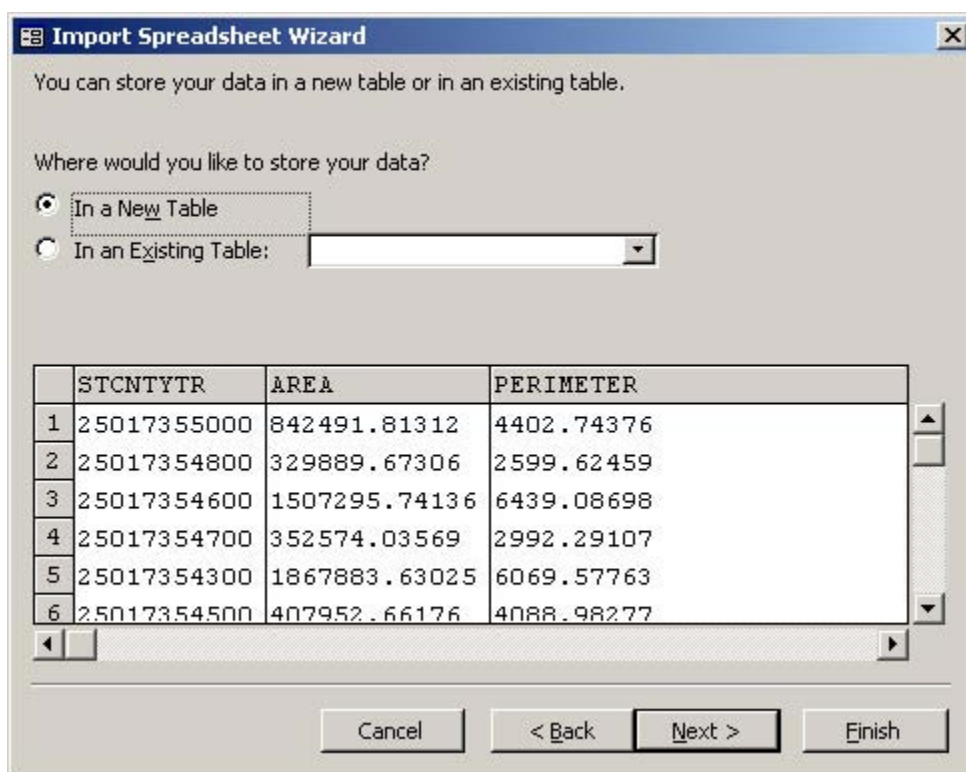
Browse to the folder "the MIT Server\Data\." In the drop down list called "Files of type," choose "Microsoft Excel." Select the file "cambridge\_geometry.xls" and click "Import." An data import wizard windows pops up.



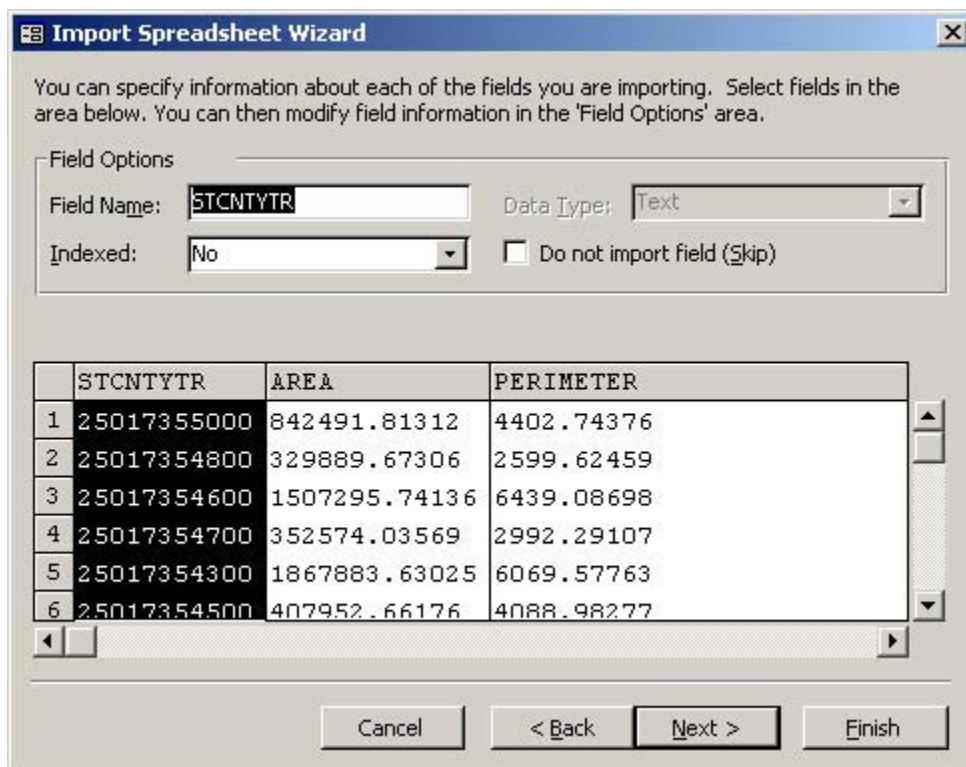
Choose "Show Worksheets." Only one worksheet "Geometry" is displayed. Click Next.



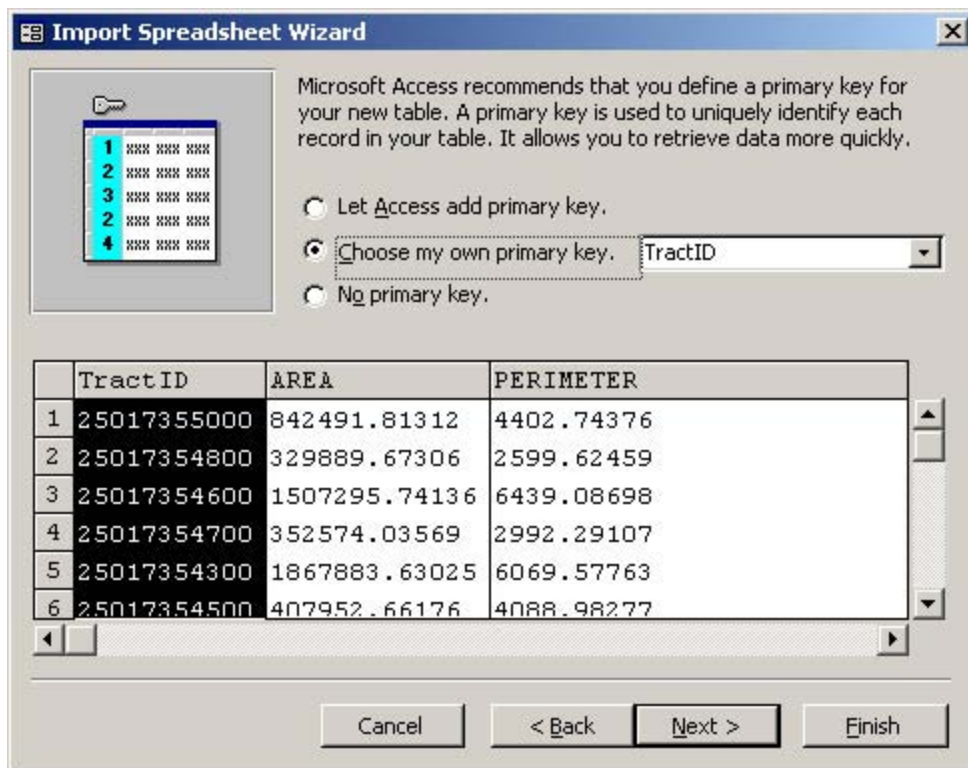
The first row of this table contains the fields names so keep the box ticked on and click Next.



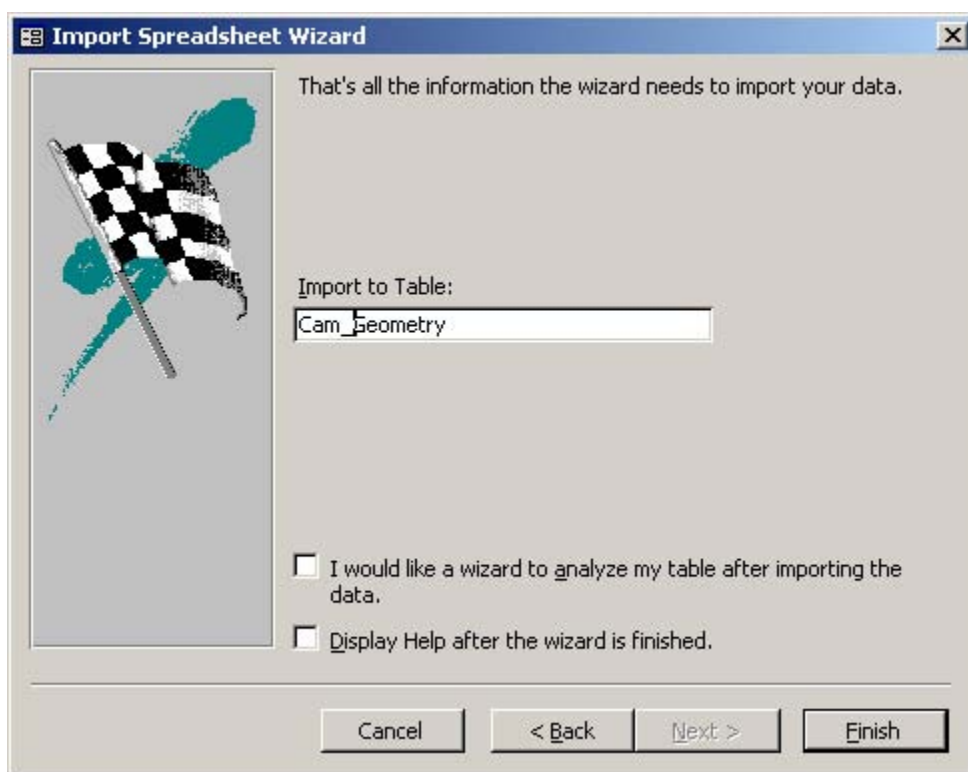
Choose "Store the data in a new table" and click Next.



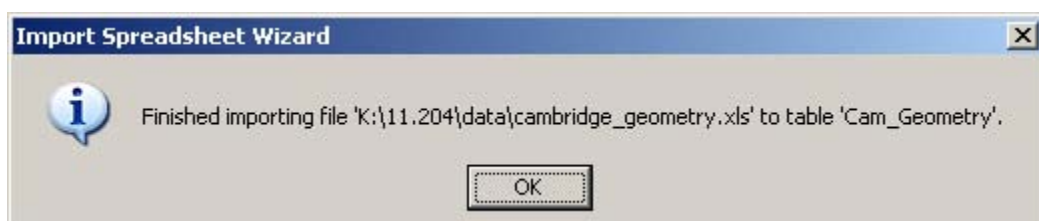
Change the name of the first field from "STCNTYTR" to "TractID." In the drop down list called "Indexed" choose "Yes (No Duplicates)." Leave the other field unchanged and click Next.



Change to "Choose my own primary key." Select TractID as the primary key and click "Next."



Change the table name to "Cam\_Geometry" and Click Finish. A message shows the table "Cambridge\_geometry" has been imported.



In the same way, import the files "MA\_gender.xls," "MA\_HH.xls," "MA\_Popu2k.xls" and "MA\_Race.xls" following the directions above. Rename the columns as follows (the opportunity to do this appears on the fourth page of the wizard).

- P001001: Total Population in 2000 (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

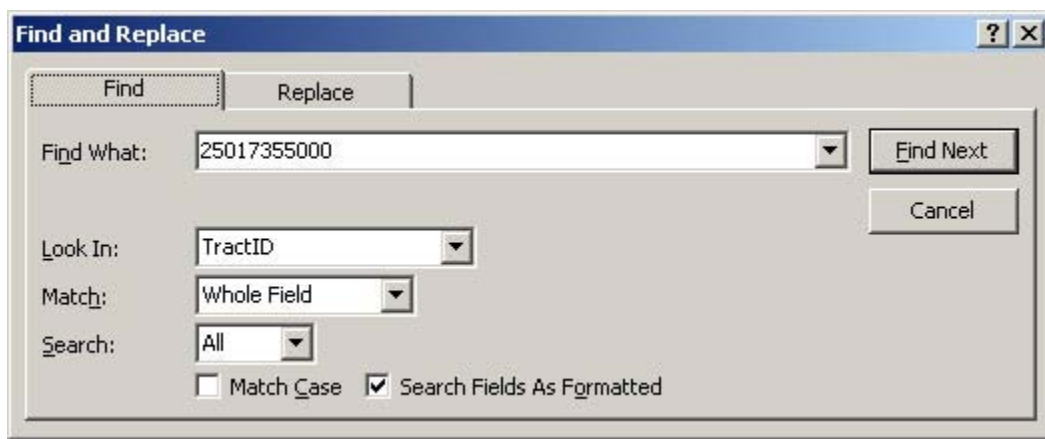
Notice that of the five tables, only "Cambridge\_Geometry" has 30 records (the number of tracts in the City of Cambridge). The other four tables contain records for the Commonwealth of Massachusetts, therefore, each contains more than 1,300 records (the number of tracts in MA).

## Working with tables

### Modifying Tables

In the database window, click "Tables" from the left lane, select "Cam\_Geometry" and double click to open it. In menu Edit, choose "Find..."

or press Ctrl+F.



Type "25017355000" in the "Find What" section. Choose "TractID" as the *Look In* field and press "Find Next." MS Access locates the record "25017355000."

TractID	AREA	PERIMETER
25017352100	1042324.3296	5258.27113
25017352200	141962.65074	1641.45628
25017352300	596193.50317	3194.13006
25017352400	451455.91827	3889.53577
25017352500	206456.89193	1973.90435
25017352600	242700.8687	2014.10485
25017352700	153925.7415	2619.85262
25017352800	162164.77028	2211.17891
25017352900	287454.40502	2409.86394
25017353000	332967.28356	2684.44809
25017353100	2036426.21677	8136.86953
25017353200	523658.70777	3639.62115
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25017353600	726866.67794	3610.61639
25017353700	552034.19767	3915.82092
25017353800	298396.52597	2532.68955
25017353900	380374.77933	2988.86471
25017354000	488519.0508	3916.51264
25017354100	625705.12558	4066.6027
25017354200	1625805.36198	6487.69136
25017354300	1867883.63025	6069.57763
25017354400	293304.48222	2491.44482
25017354500	407952.66176	4088.98277
25017354600	1507295.74136	6439.08698
25017354700	352574.03569	2992.29107
25017354800	329889.67306	2599.62459
25017355000	842491.81312	4402.74376
*		

Record: 29 of 29

Click on the cell and change the contents to "482491.81312."

25017354700	352574.03569	2992.29107
25017354800	329889.67306	2599.62459
25017355000	482491.81312	4402.74376
*		

Record: 29 of 29

A pencil icon appears to the left of the record to indicate the change. Press to move to the next record.

25017354600	1507295.74136	6439.08698
25017354700	352574.03569	2992.29107
25017354800	329889.67306	2599.62459
25017355000	482491.81312	4402.74376
*		

Record: 30 of 30

The pencil icon disappears, showing that the change has been written into the database.

Now click "add new record" button . In the TractID field, type "25017354900;" in the area field, type "1285551.80508;" in the perimeter field, type "5768.48054." Click to confirm adding the new record.


25017354700	352574.03569	2992.29107
25017354800	329889.67306	2599.62459
25017355000	482491.81312	4402.74376
25017354900	1285551.80508	5768.48054
*		

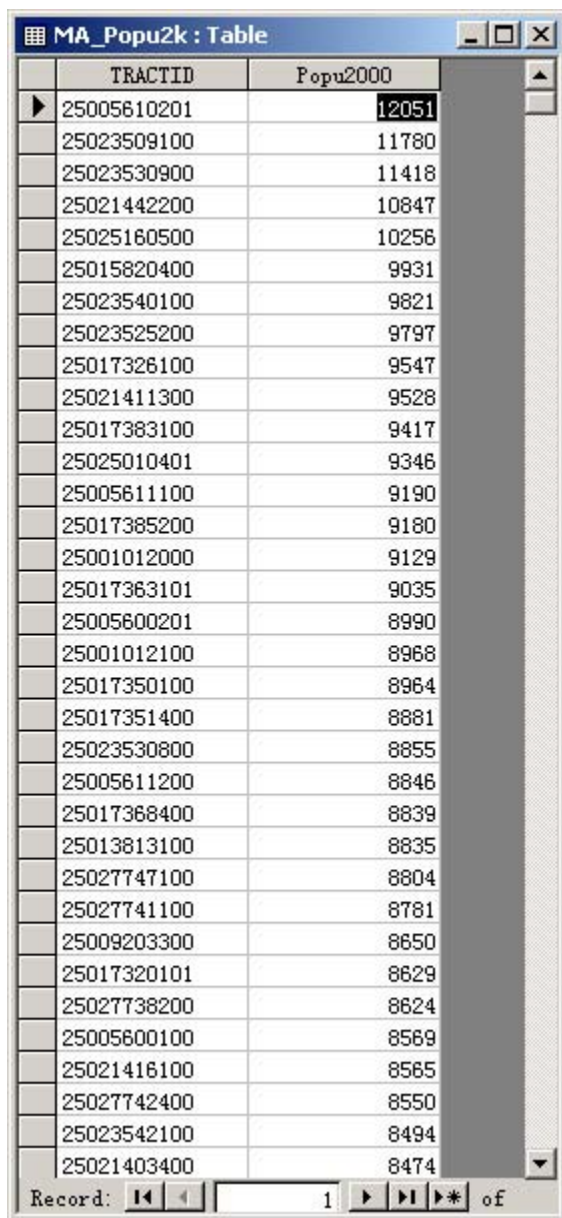
Record: 1 of 30

Two errors in the original table have been corrected.



## Simple Sorting

Go back to the database window, double click on the table called "MA\_Popu2k" to open it. Click on the column "Popu2000" to select it. In the menu Record, choose Sort> Sort Descending (or hit ) . The table should look like this,

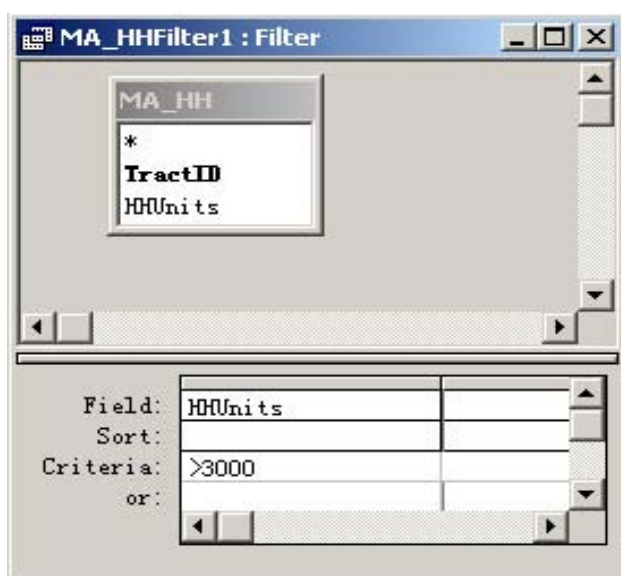


TRACTID	Popu2000
25005610201	12051
25023509100	11780
25023530900	11418
25021442200	10847
25025160500	10256
25015820400	9931
25023540100	9821
25023525200	9797
25017326100	9547
25021411300	9528
25017383100	9417
25025010401	9346
25005611100	9190
25017385200	9180
25001012000	9129
25017363101	9035
25005600201	8990
25001012100	8968
25017350100	8964
25017351400	8881
25023530800	8855
25005611200	8846
25017368400	8839
25013813100	8835
25027747100	8804
25027741100	8781
25009203300	8650
25017320101	8629
25027738200	8624
25005600100	8569
25021416100	8565
25027742400	8550
25023542100	8494
25021403400	8474


The first five records are the most populous Census tracts in Massachusetts.

## Filtering Tables

Open the table "MA\_HH." In menu Record, choose Filter>Advanced Filter/Sort.



Field:	Sort:	Criteria:	or:
HHUnits		>3000	

In the first field, choose "HHUnits" and in the criteria row, type ">3000." Then click on the "Apply Filter" button .

TractID	HHUnits
25001011800	3109
25001012000	4437
25001012100	3974
25001012600	3168
25003925100	3008
25005610201	4173
25005611200	3109
25005613900	3162
25005630100	3143
25005631100	3082
25005653201	3025
25009202100	3397
25009203300	4146
25009211400	3108
25009220100	3490
25011040500	3045
25011041500	3039
25013800100	3097
25013801900	3022
25013812000	3184
25013812102	3101
25013812200	4049
25013812402	3147
25013813100	3318
25013813203	3564
25013813302	3172
25013813700	3095
25015820203	3012
25015821902	3253
25015822600	3190
25017317300	3238
25017326100	3268
25017333100	3061
25017335300	3322


Record: 1 of 87 (Filtered)

The filter results are shown in the table. You can observe the number of records on the bottom line of the table.

### Advance Filtering

Go back to the database window and open the table "MA\_Gender." In the menu Record, choose Filter>Advanced Filter/Sort.

Field:	Males	Females
Sort:		
Criteria:	>2500 And <3000	>2000 and <2500
or:		

In the first field, choose "Males" and enter ">2500 and <3000" as the criteria. In the second field, choose "females" and enter ">2000 and <2500." Then click on the "Apply Filter" button .

TractID	Males	Females
25017311700	2505	2418
25025050200	2566	2331
*		

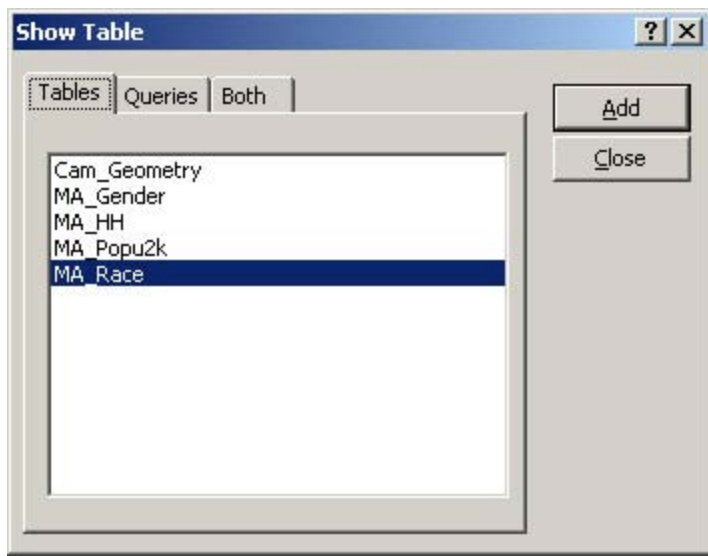
Record: 1 of 2 (Filtered)

Only two records meet these conditions. This example shows how to use the logical operation "AND."

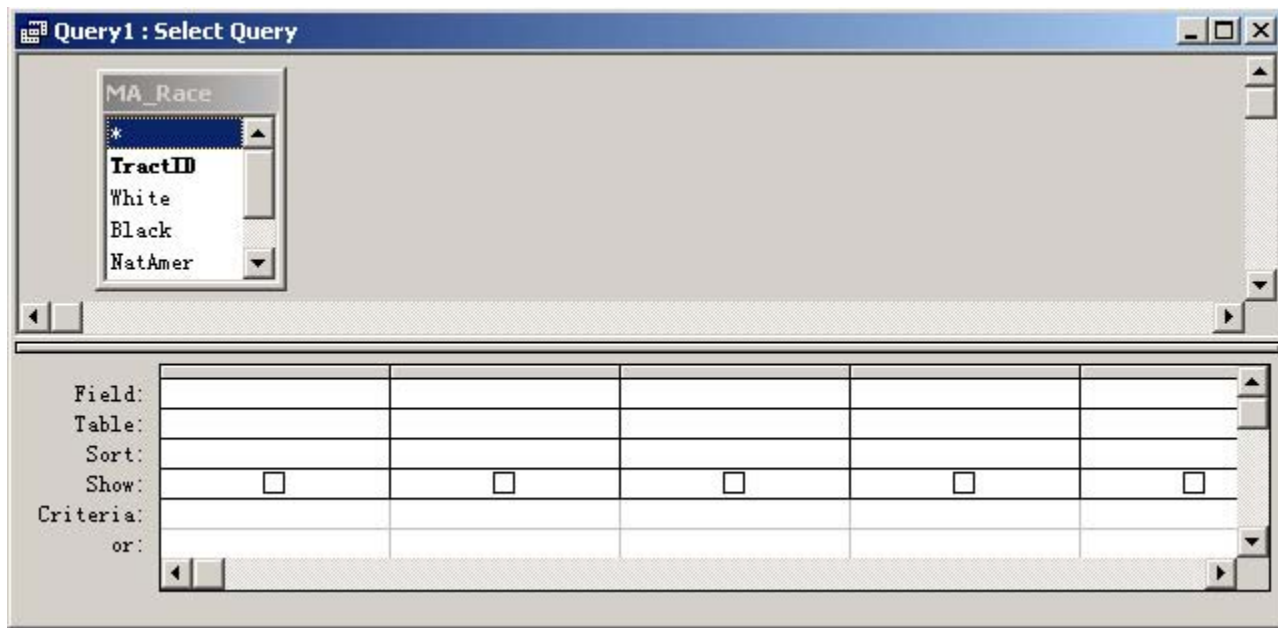
### Select queries

#### Simple Query

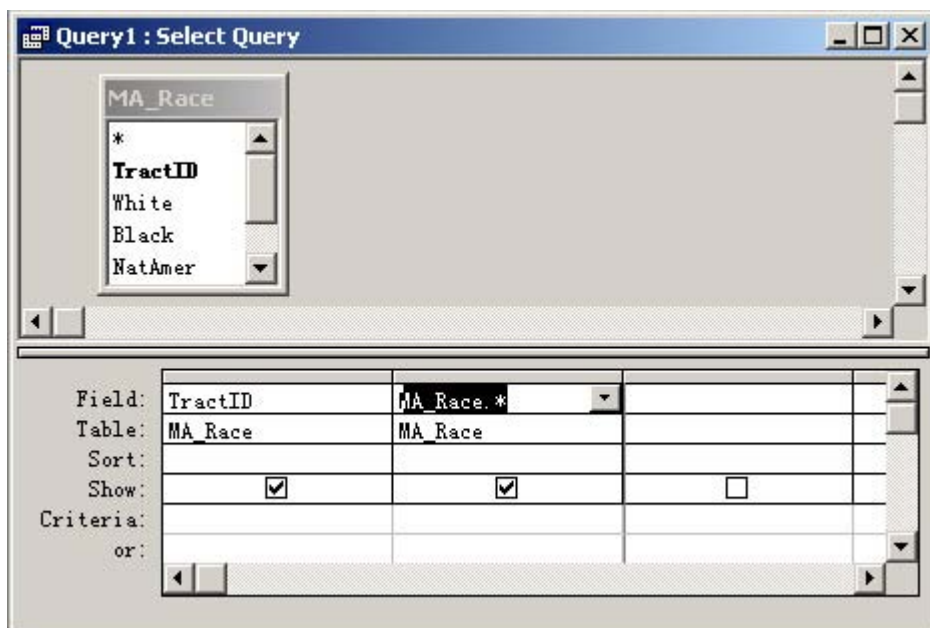
Go back to the database window, click on "Queries." From the right side of the window, click "Create queries in design view."



In the "Show Table" window, select "MA\_Race," click Add then Close. The query design window looks like,

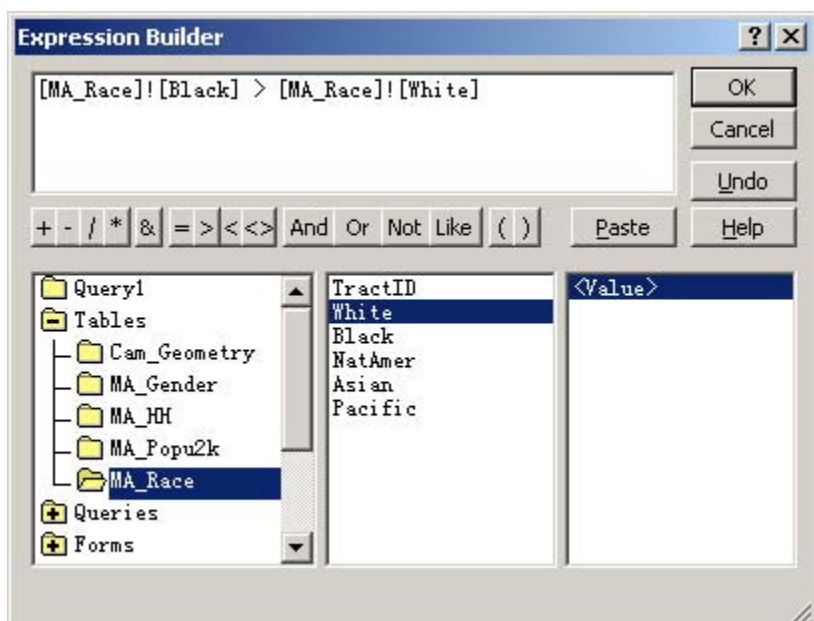


Drag TractID from the upper pane to the first field in the lower pane of the window and drag "\*" to the second field.



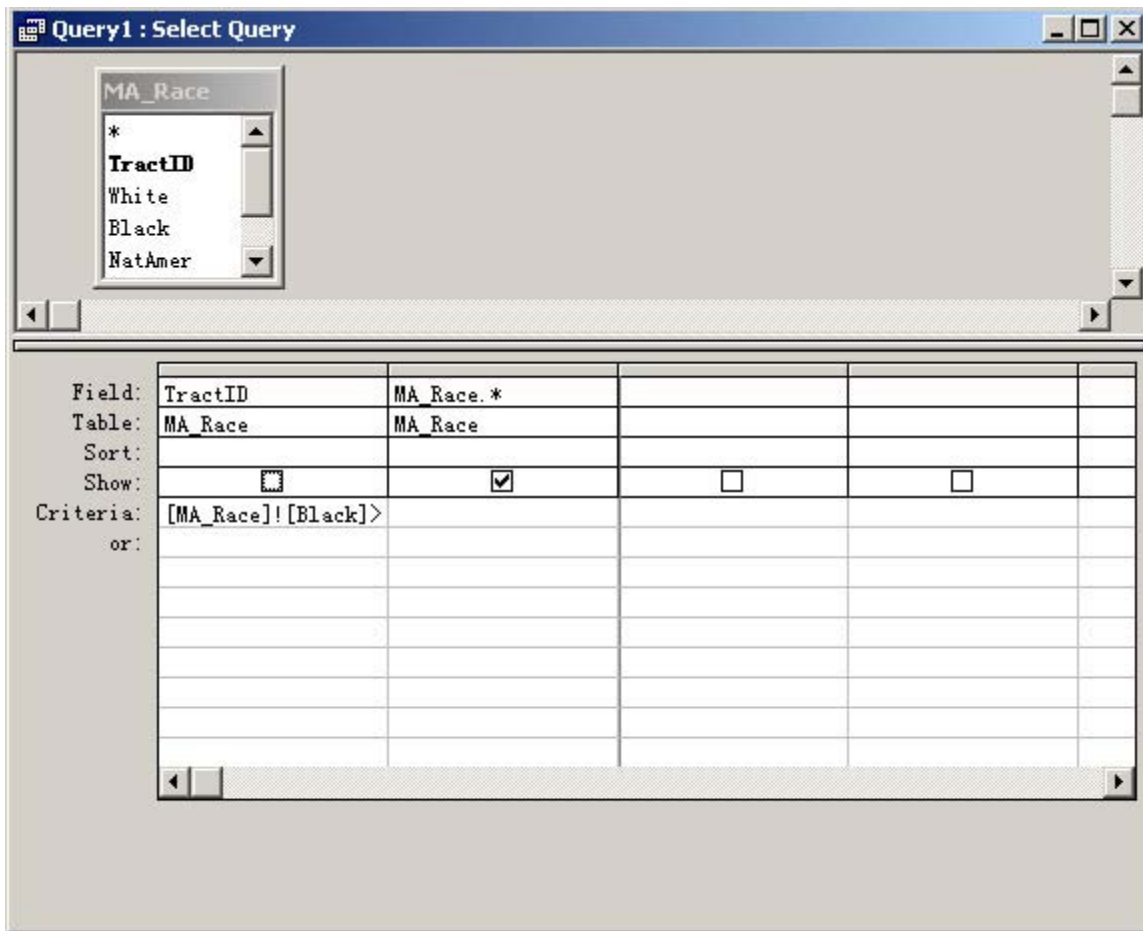
Tick off the Show box in the TractID column and leave the box for MA\_Race on.


Right click the Criteria cell in the TractID column. From the context menu, choose "Build."



In the expression builder window, type "[MA\_Race]![Black] > [MA\_Race]![White]" in the upper blank and press OK.

Now we are back to the query design view.



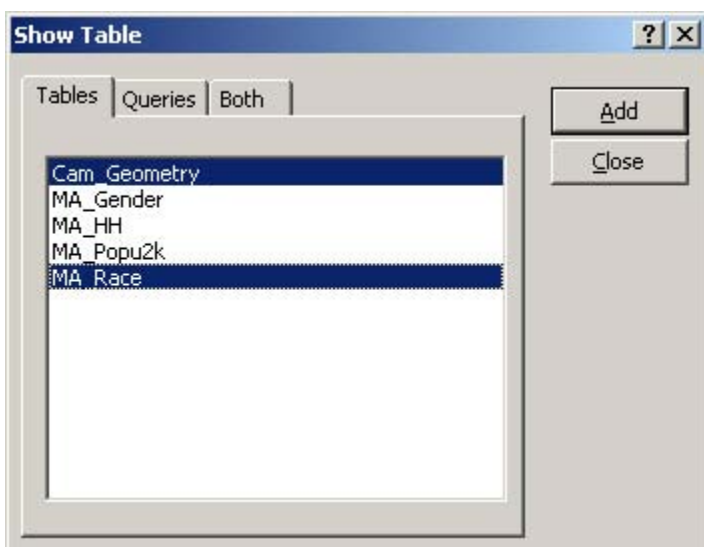
In the tool bar, click the "Run" button  to execute the query.

TractID	White	Black	NatAmer	Asian	Paci
25013801300	1185	2670	23	33	
25013801401	805	2634	10	24	
25013801700	2163	4019	35	120	
25013801800	797	2501	25	40	
25017352400	709	724	3	161	
25025070400	145	385	11	1145	
25025080100	658	1637	30	34	
25025080300	148	1144	15	9	
25025080400	90	448	4	26	
25025080500	387	2488	28	37	
25025080600	543	1093	25	85	
25025080800	256	262	2	162	
25025081200	731	1198	39	62	
25025081300	561	2226	43	13	
25025081400	519	1572	10	28	
25025081500	166	1211	5	6	
25025081700	194	3111	42	13	
25025081800	155	2193	11	27	
25025081900	146	2500	16	2	
25025082000	109	2311	13	5	
25025082100	239	3241	25	37	
25025090100	117	3776	38	16	
25025090200	117	1358	16	7	
25025090300	220	2255	18	19	
25025090400	325	1979	37	21	

From the query result window, we can tell that there are 49 Census tracts that meet the condition in V.1 from the bottom line of the window. Save the query as "qryE1."

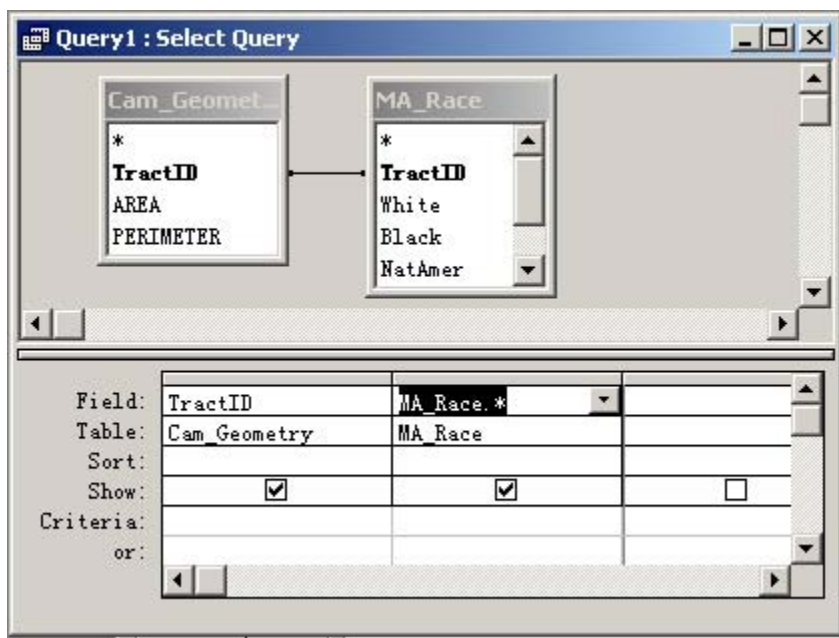
### Table Join

Go back to the database window, click on "Queries." From the right side of the window, click "Create queries in design view." In the "Show table" window, select two tables "Cam\_geometry" and "MA\_Race."



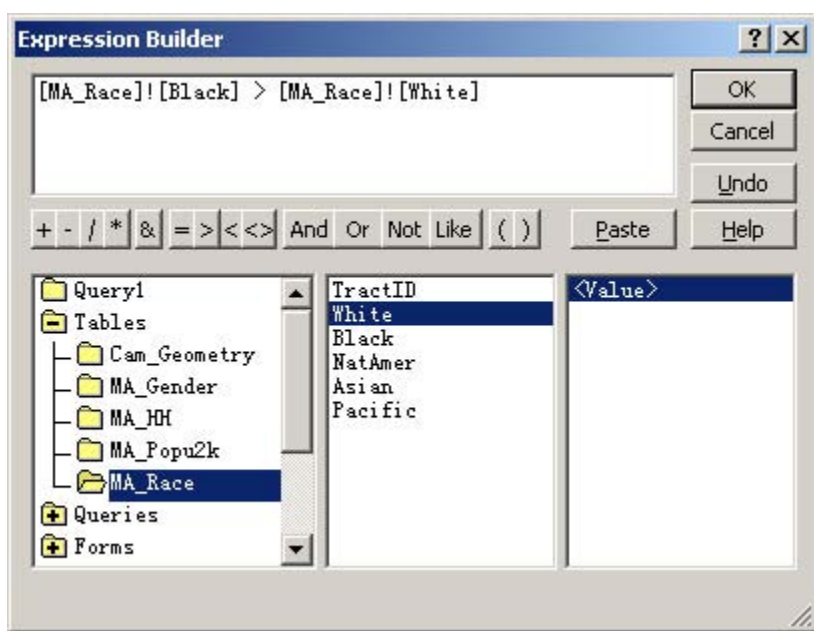
Since the two tables share one column with the same name and data type--"TractID," MS Access automatically linked them. You can see that they are linked, as shown by the line spanning from one table to the next.

In the query design window, drag TractID in the Cam\_Geometry table to the first field and "\*" in the MA\_Race table to the second field.



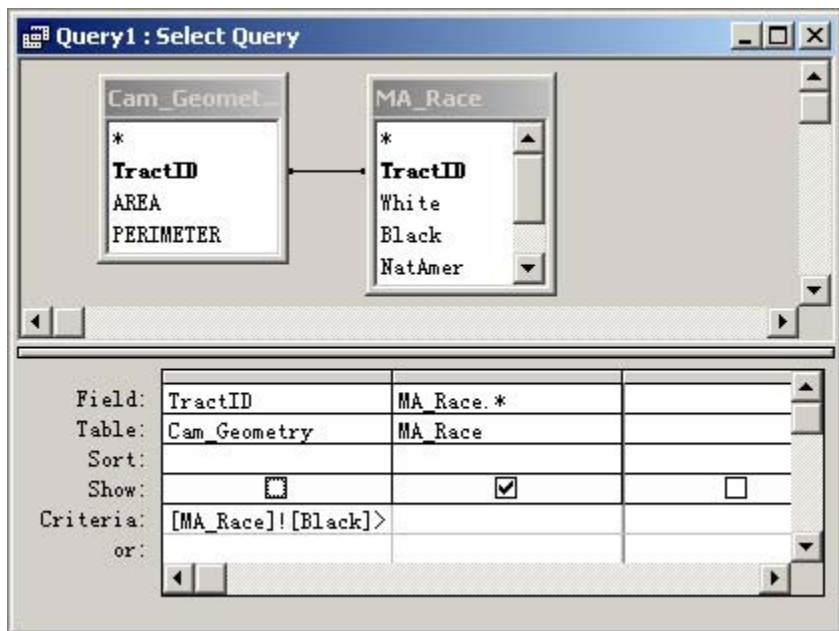
Tick off the Show box in the TractID column, but leave MA\_Race\* on.


Right click the Criteria cell in the TractID column. From the context menu, choose "Build."

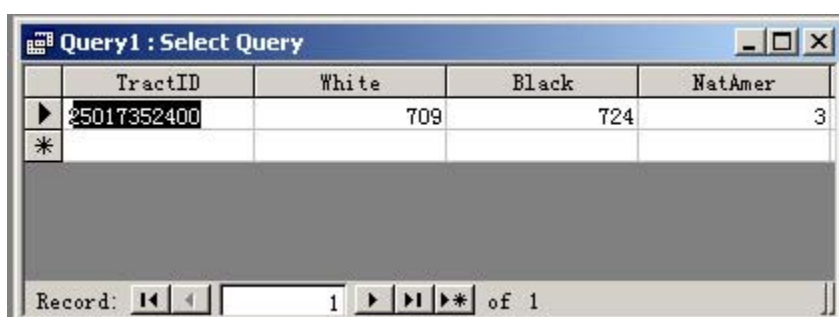


In the expression builder window, type "[MA\_Race]![Black] > [MA\_Race]![White]" in the blank space and press OK.

Go back to the query design view.



In the tool bar, click the "Run" button  to execute the query.

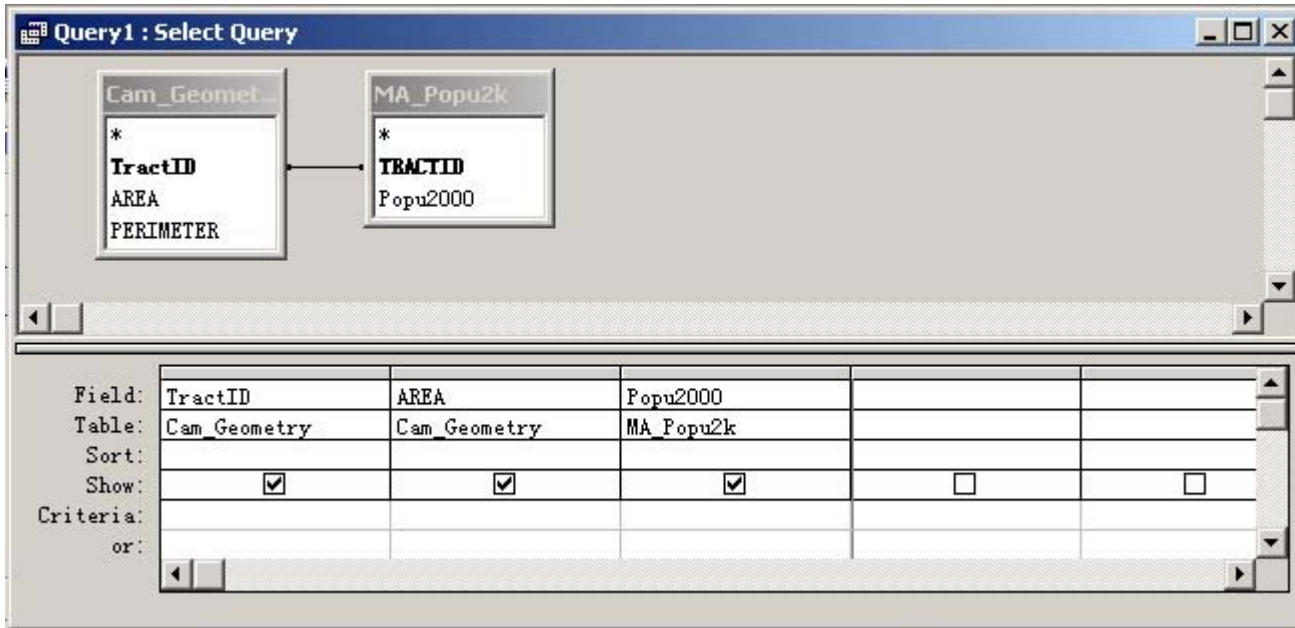


Only one Census tract in Cambridge meets these conditions. Here, we ran a query against two joined tables. We use the Cam\_geometry table to identify which Census tracts are in the City of Cambridge. Save the query as "qryE2."

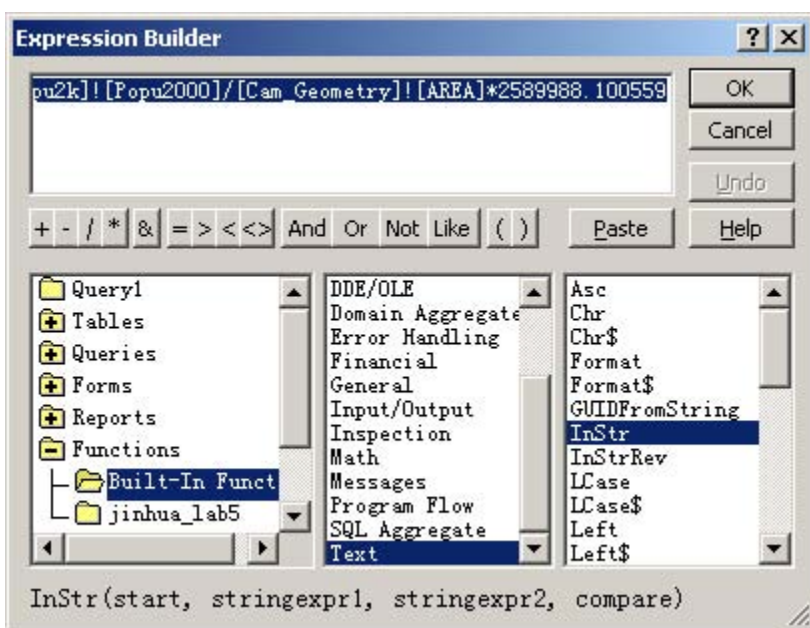
## Population Density

Start a new query in design view from the database window. Add the two tables for the query -- "Cam\_Geometry" and "MA\_Popu2k."


Drag "TractID" in Cam\_geometry table in the upper panel to the first field in the lower panel, "Area" in Cam\_geometry table to the second field and "Popu2000" in MA\_Popu2k to the third field.



Add the fourth field by right clicking the cell and choosing "Build" from the context menu.

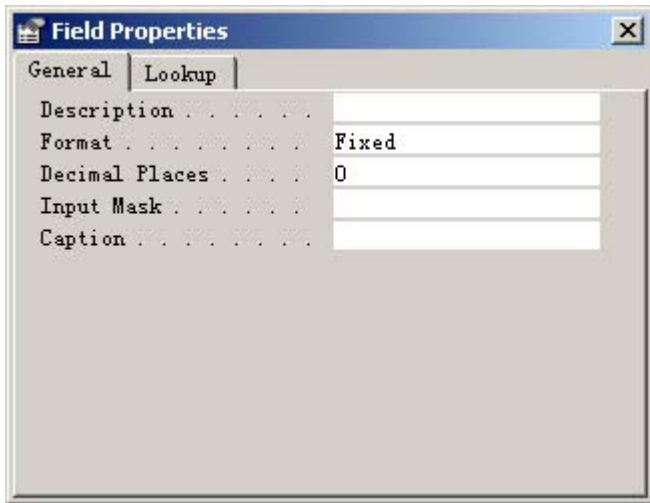


In the expression builder window, type "PopuDensity: [MA\_Popu2k]![Popu2000]/[Cam\_Geometry]![AREA]\*2589988.100559" in the upper blank and press OK. Tick on the show box in this field.

In the tool bar, click the "Run" button  to execute the query.

TractID	AREA	Popu2000	PopuDensity
25017355000	482491.81312	2712	14557.8588853052
25017354800	329889.67306	2049	16086.8497907789
25017354600	1507295.74136	4409	7575.99004762084
25017354700	352574.03569	2481	18225.2798760732
25017354300	1867883.63025	3266	4528.60178195017
25017354500	407952.66176	2405	15268.735727747
25017354400	293304.48222	1714	15135.2600231604
25017354000	488519.0508	4649	24647.6665746825
25017353600	726866.67794	4742	16896.8036994875
25017354200	1625805.36198	3063	4879.51001856138
25017354100	625705.12558	2704	11192.6969072209
25017353700	552034.19767	5246	24612.7461539162
25017352900	287454.40502	2553	23002.7423662792
25017352700	153925.7415	2407	40500.7070116697
25017352100	1042324.3296	3042	7558.821739222
25017352200	141962.65074	2021	36871.4300835106
25017353800	298396.52597	4636	40239.0235447939
25017352800	162164.77028	2385	38091.6373461853
25017352600	242700.8687	2652	28300.8811607211
25017353900	380374.77933	5923	40329.9596956245
25017352500	206456.89193	3312	41548.8216879668
25017353000	332967.28356	3706	28827.1442108276
25017352300	596193.50317	2229	9683.23781700093
25017353500	211619.18804	2599	31808.9259093107
25017352400	451455.91827	1942	11141.1916152519
25017353100	2036426.21677	8064	10256.0376953086
25017353400	323578.47867	2430	19450.2153240449
25017353300	516833.94644	3636	18220.9330453215
25017353200	523658.70777	3143	15545.1107358121
25017354900	1285551.80508	5235	10546.9010683569

You can refine the format of the population density value. Right click the PopuDensity cell in the design view, and choose Property in the context menu.



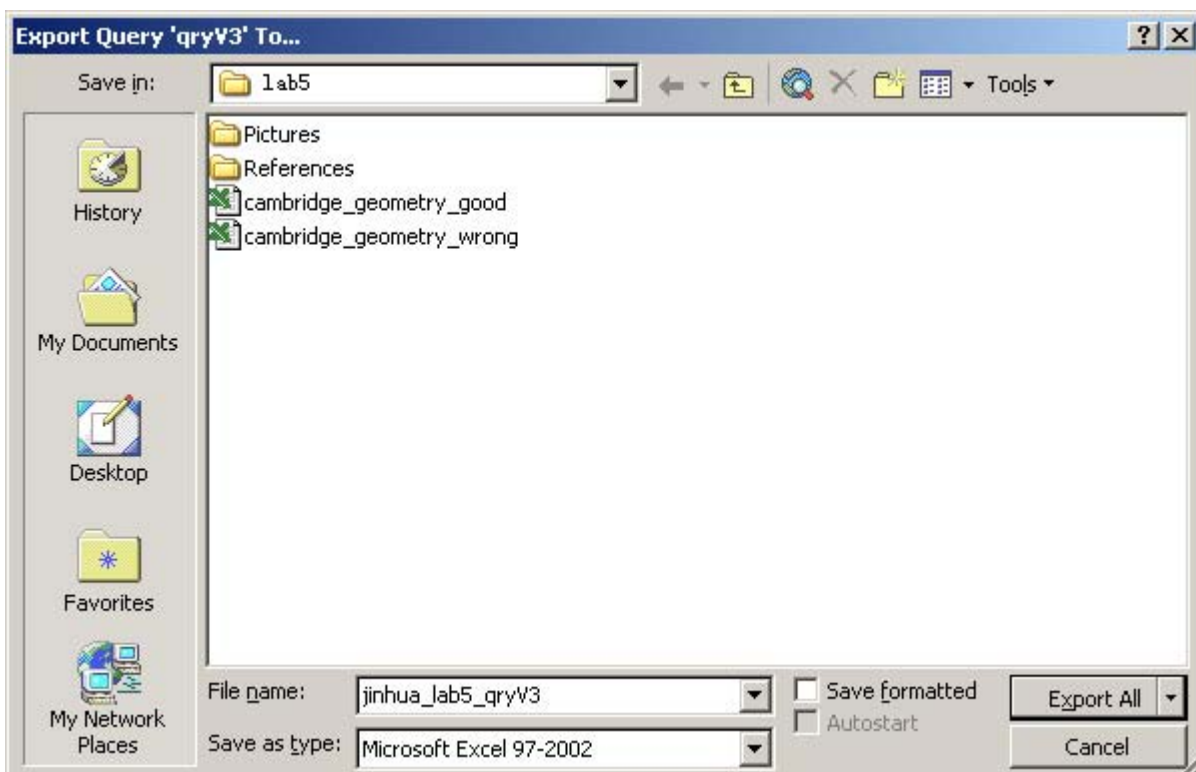
In the field property window, choose "Fixed" as the format and "0" in the decimal place. When we re-run the query, we get,

TractID	AREA	Popu2000	PopuDensity
25017355000	482491.81312	2712	14558
25017354800	329889.67306	2049	16087
25017354600	1507295.74136	4409	7576
25017354700	352574.03569	2481	18225
25017354300	1867883.63025	3266	4529
25017354500	407952.66176	2405	15269
25017354400	293304.48222	1714	15135
25017354000	488519.0508	4649	24648
25017353600	726866.67794	4742	16897
25017354200	1625805.36198	3063	4880
25017354100	625705.12558	2704	11193
25017353700	552034.19767	5246	24613
25017352900	287454.40502	2553	23003
25017352700	153925.7415	2407	40501
25017352100	1042324.3296	3042	7559
25017352200	141962.65074	2021	36871
25017353800	298396.52597	4636	40239
25017352800	162164.77028	2385	38092
25017352600	242700.8687	2652	28301
25017353900	380374.77933	5923	40330
25017352500	206456.89193	3312	41549
25017353000	332967.28356	3706	28827
25017352300	596193.50317	2229	9683
25017353500	211619.18804	2599	31809
25017352400	451455.91827	1942	11141
25017353100	2036426.21677	8064	10256
25017353400	323578.47867	2430	19450
25017353300	516833.94644	3636	18221
25017353200	523658.70777	3143	15545
25017354900	1285551.80508	5235	10547

All the values in the population density column are now integers. Save the query as "qryE3."

### Export Tables

Go back to the database window. In the query list, select "qryE3" and open it. In the File menu, choose Export.



Browse to H:\private\11.204\lab5, change the save as type to "Microsoft Excel 97-2002." Name it as johndoe\_lab5\_qryE3.xls (Replace

"johndoe" with your username.) and click "Export All." You can check the results by opening the exported file in MS Excel.

Created July 2002 by Jinhua Zhao. Updated August 2002 by Lorlene Hoyt. Updated October 2002 by Jinhua Zhao. Updated October 2002 by Lorlene Hoyt. Updated July 2004 by Lorlene Hoyt.