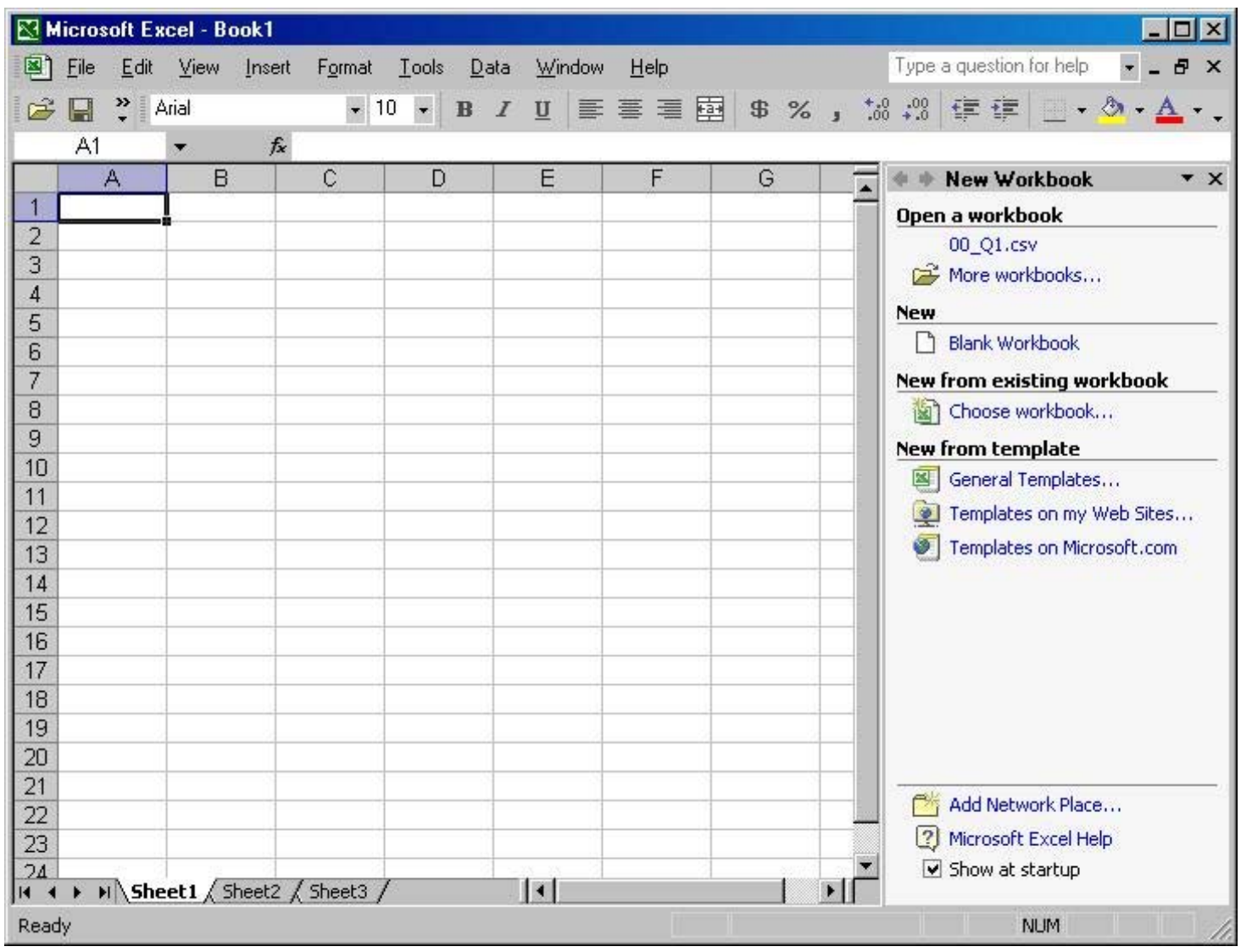
Massachusetts Institute of Technology
Department of Urban Studies and Planning

11.204: Planning, Communication & Digital Media
Fall 2004

Lab 3:
Using Excel to Understand Population Change
Help One: MS Excel XP Interface

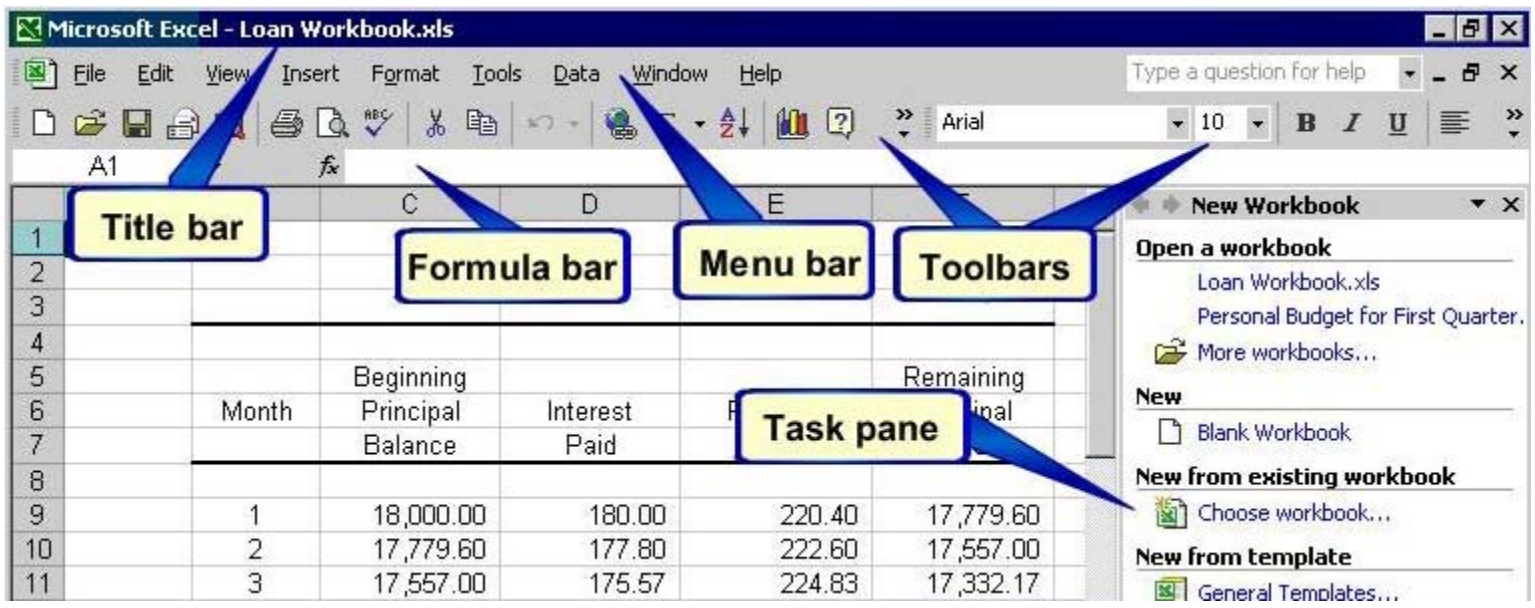
Launch MS Excel

Let's start the Excel application. Click on Start, choose Programs, Microsoft, Excel.

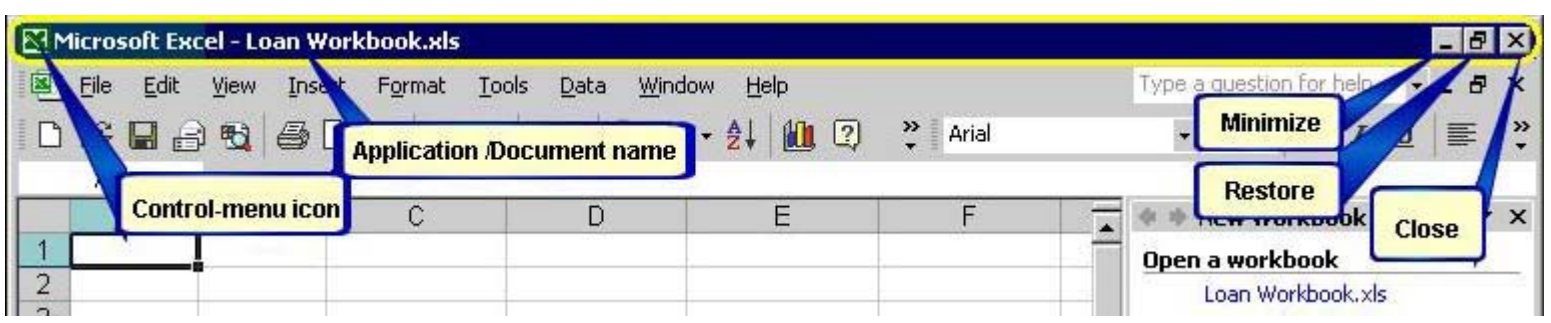


Components Layout

The components of the Excel application window are the title bar, the menu bar, the toolbars, the formula bar, the status bar and the task pane.

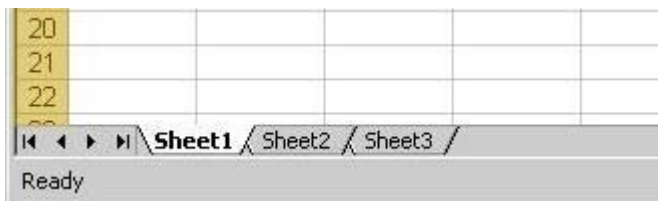


The title bar displays the name of the open application and document. The control menu icon enables you to control the size and position of the Excel application window. The three buttons at the right end of the title bar enables you to minimize, maximize and close the application window.



Worksheets

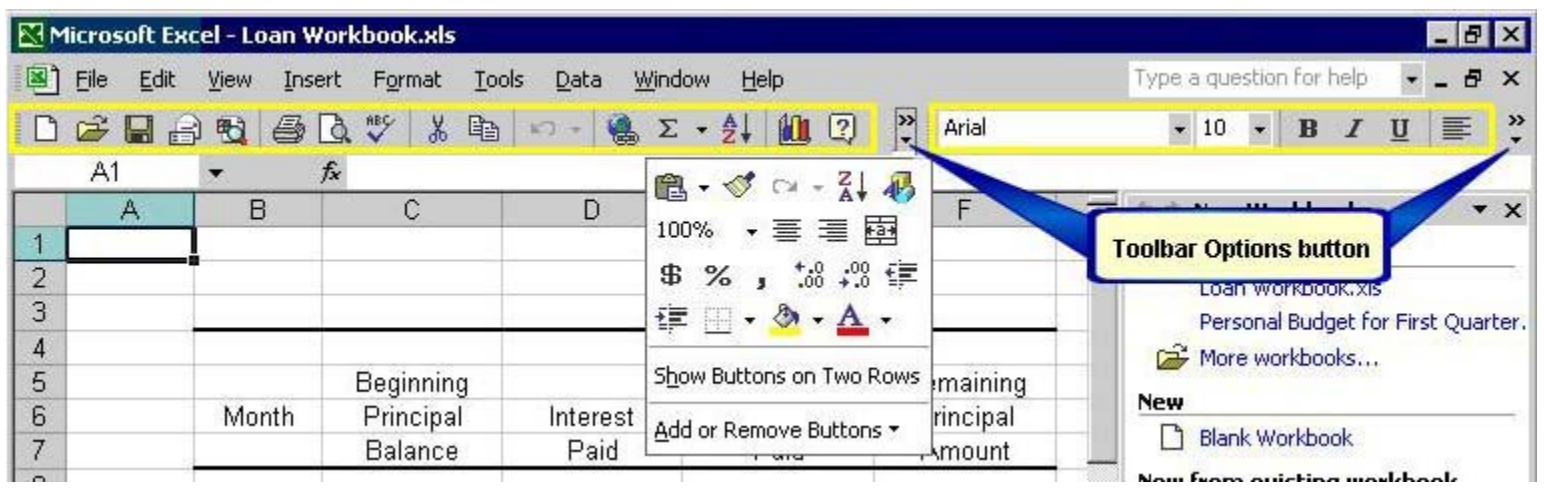
In Excel, spreadsheets are called worksheets and worksheets are contained in a file called a workbook.



Once the application is opened, a new blank workbook will be provided for you that contains three worksheets--sheet1, sheet2 and sheet3.

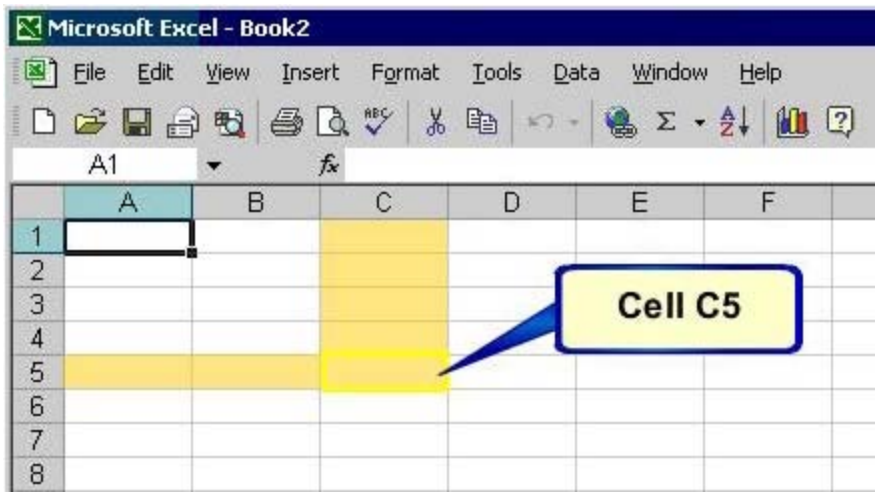
Toolbars

There are two frequently-used toolbars displayed in the following: the Standard toolbar and the Formatting toolbar. Each has buttons that provide shortcuts for accomplishing many Excel tasks. By pointing to a button with the mouse pointer, you can display a pop-up text box, called a ScreenTip, containing the button's name.



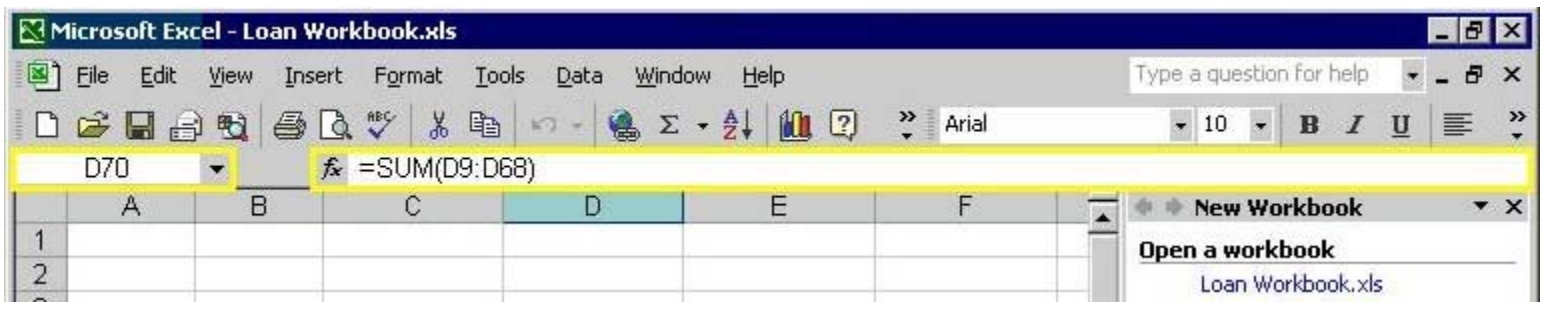
Cells

The intersection of a column and a row is called a cell.



Formula Bars

The formula bar displays the value or formula in a selected cell.



Task Panes

When you first start Excel, the task pane is located on the right-hand side of the window. It provides easy access to many common tasks performed in Excel.

Created June 2002 by Jinhua Zhao. Updated August 2002 by Lorlene Hoyt

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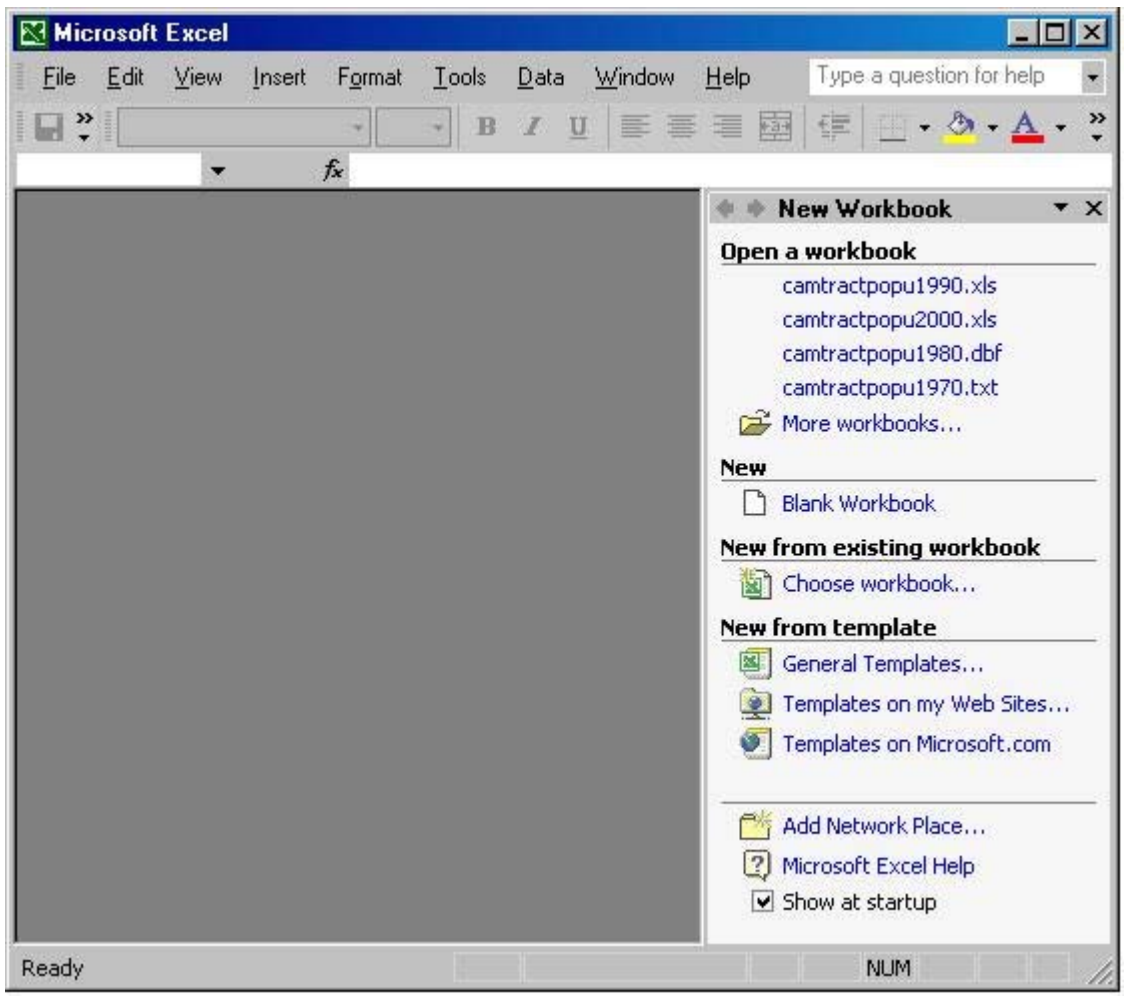
Lab 3:
Using Excel to Understand Population Change
Help Two: Data Input & Formatting

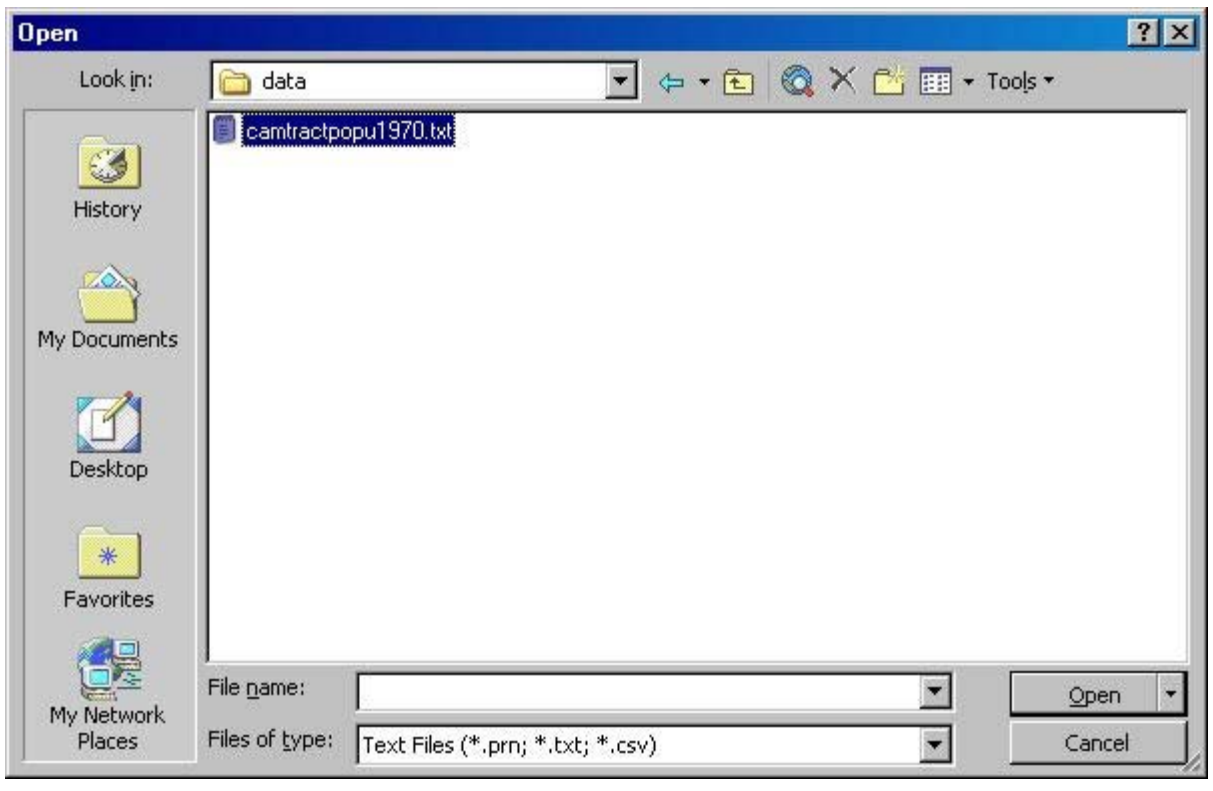
Open A New Workbook in Excel

Launch MS Excel, click on menu File, choose New... (Ctrl-N). In the task pane, choose Blank Workbook.



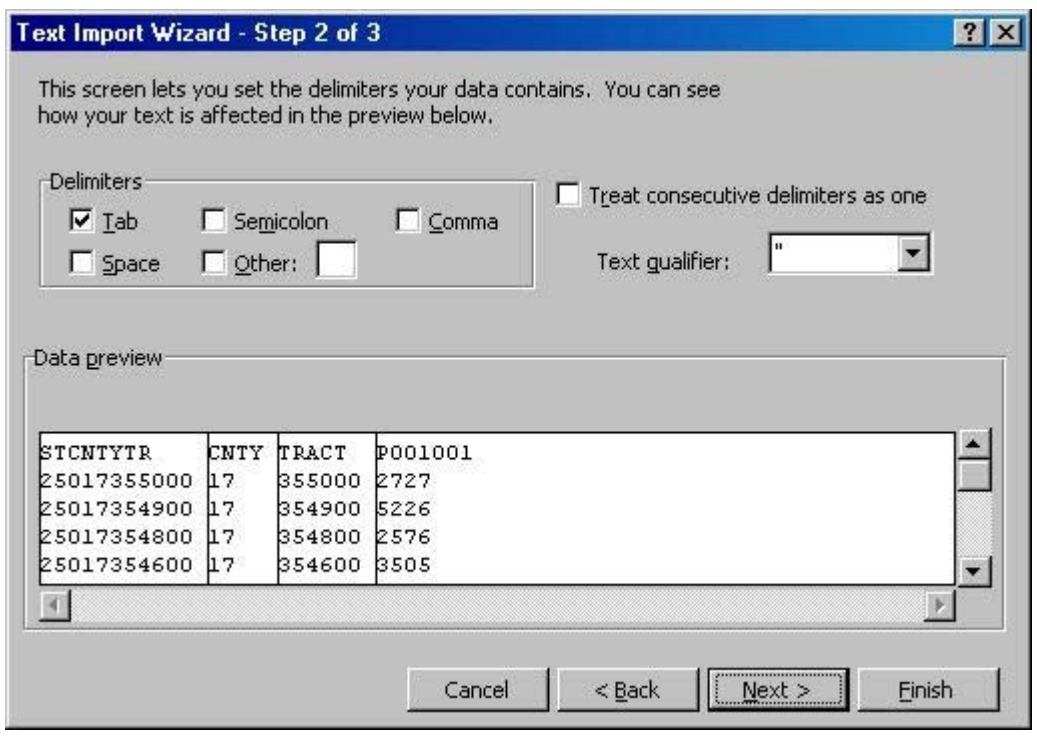
Load the text file "camtractpopu1970.txt"

Click on Menu File, choose Open...(Ctrl-O). A new window pops up, navigate to the MIT Server. Change the File Types to Text Files(*.prn, *.txt, *.csv), choose the file camtractpopu1970.txt and click the button Open.

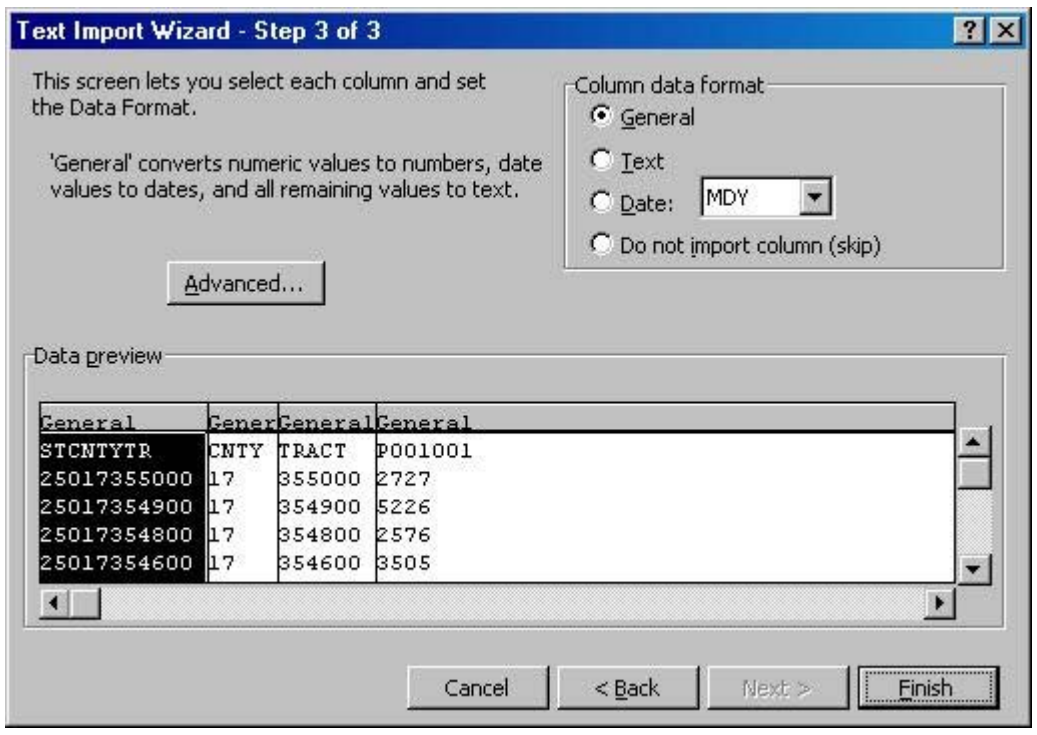


Another window titled "Text Import Wizard - Step 1 of 3" appears. In the original data type frame, choose "Delimited," press Next.

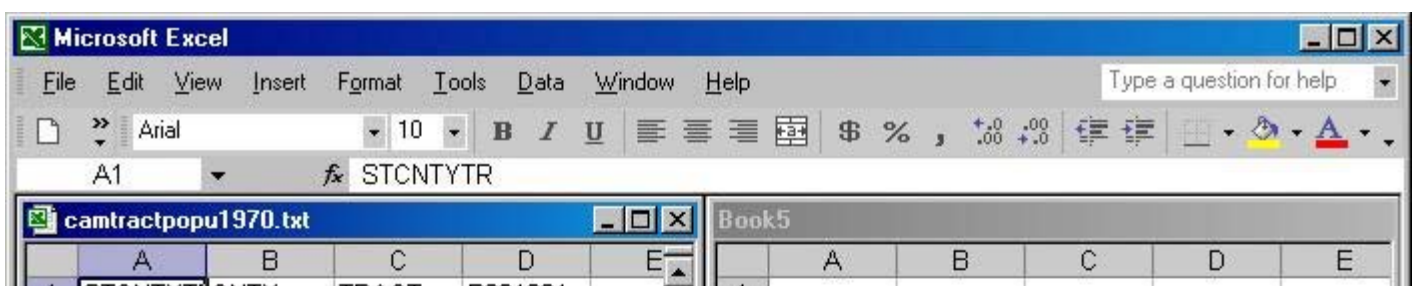
In the Delimiter frame, tick on tab. Press Next.



In "Column data format," choose General. Press Finish.



We are back in the main Excel window. In the Menu Window, choose Arrange....then in the pop-up window, choose "Vertical" and click OK. Now the window should look like,



	A	B	C	D
1	STCNTYTR	CNTY	TRACT	P001001
2	2.5E+10	17	355000	2727
3	2.5E+10	17	354900	5226
4	2.5E+10	17	354800	2576
5	2.5E+10	17	354600	3505
6	2.5E+10	17	354700	2743
7	2.5E+10	17	354300	2814
8	2.5E+10	17	354500	3048
9	2.5E+10	17	354400	2255
10	2.5E+10	17	354000	4312
11	2.5E+10	17	353600	5146
12	2.5E+10	17	354200	4143
13	2.5E+10	17	354100	3426
14	2.5E+10	17	353700	4691
15	2.5E+10	17	352900	3781
16	2.5E+10	17	352700	2707
17	2.5E+10	17	352100	1988
18	2.5E+10	17	352200	1461
19	2.5E+10	17	353800	4428
20	2.5E+10	17	352800	2343
21	2.5E+10	17	352600	2664
22	2.5E+10	17	353900	4955
23	2.5E+10	17	352500	2928
24	2.5E+10	17	353000	4217
25	2.5E+10	17	352300	2327
26	2.5E+10	17	353500	2598
27	2.5E+10	17	352400	2586
28	2.5E+10	17	353100	5601
29	2.5E+10	17	353400	1766
30	2.5E+10	17	353300	4463
31	2.5E+10	17	353200	2936
32				

In the left side window (camtractpopu1970.txt), select all the rows and columns and press Ctrl-C (shortcut for Edit/Copy). Click once Cell A1 in right side window and press Ctrl-V(shortcut for Edit/Paste).

In Menu Format choose Sheet..., then click Rename and type in "Popu1970". Now the window should look like,

Microsoft Excel

File Edit View Insert Format Tools Data Window Help Type a question for help

Arial 10 B I U

B31 fx 17

camtractpopu1970.txt

	A	B	C	D	E
1	STCNTYTR	CNTY	TRACT	P001001	
2	2.5E+10	17	355000	2727	
3	2.5E+10	17	354900	5226	
4	2.5E+10	17	354800	2576	
5	2.5E+10	17	354600	3505	
6	2.5E+10	17	354700	2743	
7	2.5E+10	17	354300	2814	
8	2.5E+10	17	354500	3048	
9	2.5E+10	17	354400	2255	
10	2.5E+10	17	354000	4312	
11	2.5E+10	17	353600	5146	
12	2.5E+10	17	354200	4143	
13	2.5E+10	17	354100	3426	
14	2.5E+10	17	353700	4691	
15	2.5E+10	17	352900	3781	
16	2.5E+10	17	352700	2707	
17	2.5E+10	17	352100	1988	
18	2.5E+10	17	352200	1461	
19	2.5E+10	17	353800	4428	
20	2.5E+10	17	352800	2343	
21	2.5E+10	17	352600	2664	
22	2.5E+10	17	353900	4955	
23	2.5E+10	17	352500	2928	
24	2.5E+10	17	353000	4217	
25	2.5E+10	17	352300	2327	
26	2.5E+10	17	353500	2598	
27	2.5E+10	17	352400	2586	
28	2.5E+10	17	353100	5601	
29	2.5E+10	17	353400	1766	
30	2.5E+10	17	353300	4463	
31	2.5E+10	17	353200	2936	
32					

camtractpopu1970

Book5

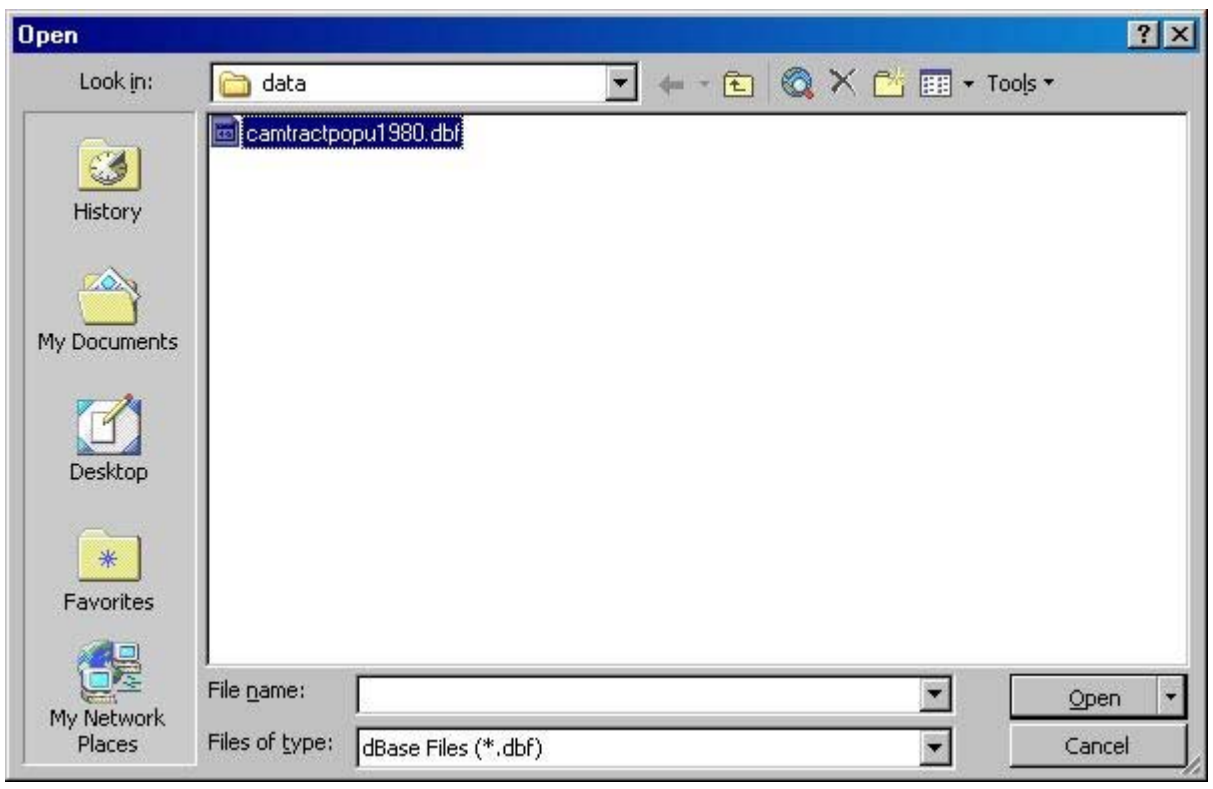
	A	B	C	D	E
1	STCNTYTR	CNTY	TRACT	P001001	
2	2.5E+10	17	355000	2727	
3	2.5E+10	17	354900	5226	
4	2.5E+10	17	354800	2576	
5	2.5E+10	17	354600	3505	
6	2.5E+10	17	354700	2743	
7	2.5E+10	17	354300	2814	
8	2.5E+10	17	354500	3048	
9	2.5E+10	17	354400	2255	
10	2.5E+10	17	354000	4312	
11	2.5E+10	17	353600	5146	
12	2.5E+10	17	354200	4143	
13	2.5E+10	17	354100	3426	
14	2.5E+10	17	353700	4691	
15	2.5E+10	17	352900	3781	
16	2.5E+10	17	352700	2707	
17	2.5E+10	17	352100	1988	
18	2.5E+10	17	352200	1461	
19	2.5E+10	17	353800	4428	
20	2.5E+10	17	352800	2343	
21	2.5E+10	17	352600	2664	
22	2.5E+10	17	353900	4955	
23	2.5E+10	17	352500	2928	
24	2.5E+10	17	353000	4217	
25	2.5E+10	17	352300	2327	
26	2.5E+10	17	353500	2598	
27	2.5E+10	17	352400	2586	
28	2.5E+10	17	353100	5601	
29	2.5E+10	17	353400	1766	
30	2.5E+10	17	353300	4463	
31	2.5E+10	17	353200	2936	
32					

Popu1970 Sheet2

Ready NUM

Load the dBASE file "camtractpopu1980.dbf"

Click on Menu File, choose Open...(Ctrl-O). A new window pops up, navigate to the MIT Server. Change the File Types to dBase Files(*.dbf), choose the file camtractpopu1980.dbf and click the button Open.



Copy all the rows and columns from camtractpopu1980.dbf to "Sheet2" of the new workbook and rename the sheet as "Popu1980."

Load the other two files (camtractpopu1990.xls, and camtractpopu2000.xls)

Repeat the same procedure as above to get all four files loaded into a new Excel workbook as four worksheets. (When loading the fourth file, we need to create a new worksheet. In Menu Insert, choose Worksheet.) This is how it looks.

Microsoft Excel - Book5

File Edit View Insert Format Tools Data Window Help Type a question for help

Arial 10 B I U

D22 5923

	A	B	C	D	E	F	G	H	I
1	STCNTYTR	COUNTY	TRACT	P001001					
2	25017355000	017	355000	2712					
3	25017354900	017	354900	5235					
4	25017354800	017	354800	2049					
5	25017354600	017	354600	4409					
6	25017354700	017	354700	2481					
7	25017354300	017	354300	3266					
8	25017354500	017	354500	2405					
9	25017354400	017	354400	1714					
10	25017354000	017	354000	4649					
11	25017353600	017	353600	4742					
12	25017354200	017	354200	3063					
13	25017354100	017	354100	2704					
14	25017353700	017	353700	5246					
15	25017352900	017	352900	2553					
16	25017352700	017	352700	2407					
17	25017352100	017	352100	3042					
18	25017352200	017	352200	2021					
19	25017353800	017	353800	4636					
20	25017352800	017	352800	2385					
21	25017352600	017	352600	2652					
22	25017353900	017	353900	5923					
23	25017352500	017	352500	3312					
24	25017353000	017	353000	3706					
25	25017352300	017	352300	2229					
26	25017353500	017	353500	2599					
27	25017352400	017	352400	1942					
28	25017353100	017	353100	8064					
29	25017353400	017	353400	2430					
30	25017353300	017	353300	3636					
31	25017353200	017	353200	3143					
32									

Popu1970 / Popu1980 / Popu1990 \ **Popu2000** /

Ready NUM

Put the data into one worksheet

Insert a new Worksheet (Insert/Worksheet) and name it as Population (Format/Sheet/Rename). Copy all columns from Sheet Popu1970 to Sheet Population. Rename the last column from "P001001" to "Popu1970".

Copy the "P001001" column from Sheet 1980, 1990, 2000 to Sheet Population. Rename the column according to their time as "Popu 1980", "Popu 1990", and "Popu 2000". Now it looks like,

Microsoft Excel - CamPopu.xls

File Edit View Insert Format Tools Data Window Help

Type a question for help

Arial 10

D9 2255

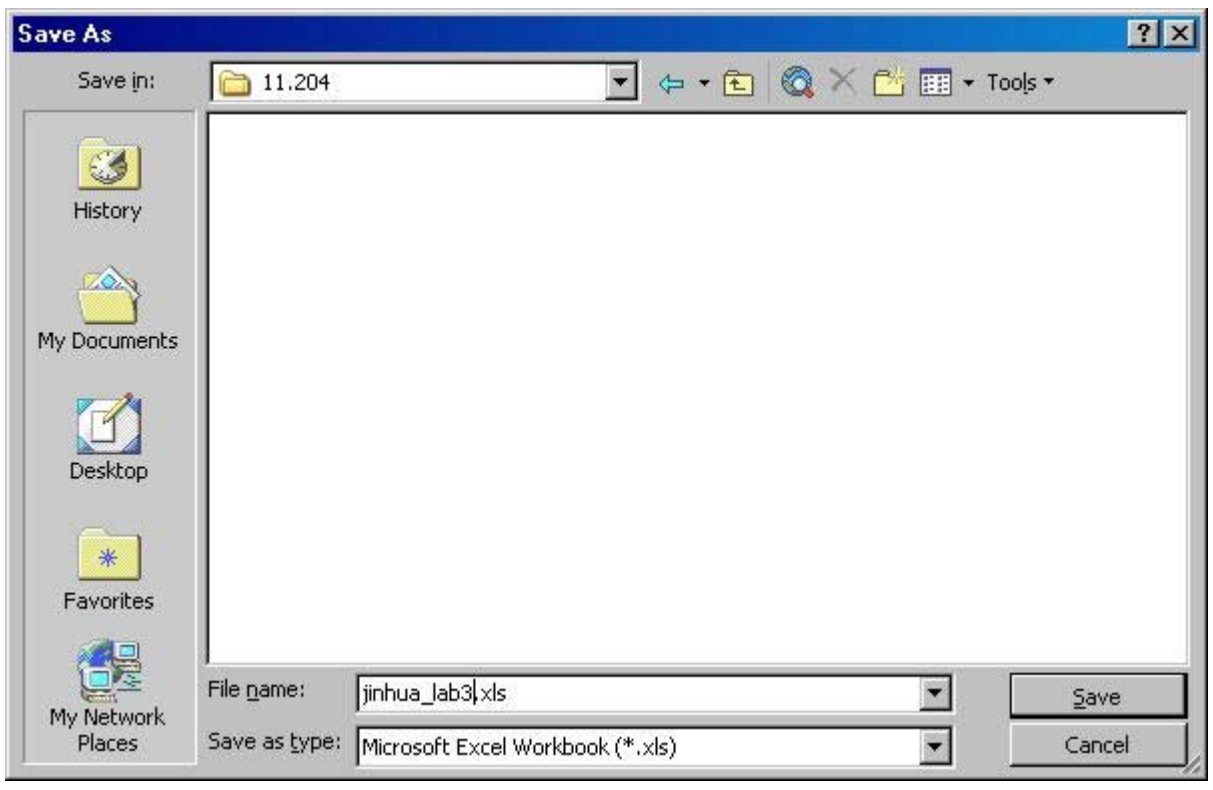
	A	B	C	D	E	F	G	H	I	J	K
1	STCNTYTR	CNTY	TRACT	Popu1970	Popu1980	Popu1990	Popu2000				
2	2.5E+10	17	355000	2727	2955	2472	2712				
3	2.5E+10	17	354900	5226	5018	5046	5235				
4	2.5E+10	17	354800	2576	1898	1985	2049				
5	2.5E+10	17	354600	3505	4160	4037	4409				
6	2.5E+10	17	354700	2743	2166	2175	2481				
7	2.5E+10	17	354300	2814	3507	3451	3266				
8	2.5E+10	17	354500	3048	2488	2447	2405				
9	2.5E+10	17	354400	2255	1829	1720	1714				
10	2.5E+10	17	354000	4312	4155	4473	4649				
11	2.5E+10	17	353600	5146	4874	4716	4742				
12	2.5E+10	17	354200	4143	3353	3110	3063				
13	2.5E+10	17	354100	3426	2857	2883	2704				
14	2.5E+10	17	353700	4691	5520	5323	5246				
15	2.5E+10	17	352900	3781	2854	2499	2553				
16	2.5E+10	17	352700	2707	2369	2197	2407				
17	2.5E+10	17	352100	1988	1791	2181	3042				
18	2.5E+10	17	352200	1461	1687	1662	2021				
19	2.5E+10	17	353800	4428	4228	4395	4636				
20	2.5E+10	17	352800	2343	2402	2441	2385				
21	2.5E+10	17	352600	2664	2673	2664	2652				
22	2.5E+10	17	353900	4955	5196	5481	5923				
23	2.5E+10	17	352500	2928	2720	2650	3312				
24	2.5E+10	17	353000	4217	3444	3656	3706				
25	2.5E+10	17	352300	2327	1902	1937	2229				
26	2.5E+10	17	353500	2598	2478	2446	2599				
27	2.5E+10	17	352400	2586	1974	2094	1942				
28	2.5E+10	17	353100	5601	6404	7123	8064				
29	2.5E+10	17	353400	1766	2102	2248	2430				
30	2.5E+10	17	353300	4463	3762	3472	3636				
31	2.5E+10	17	353200	2936	2556	2818	3143				
32											
33											

Popu1970 / Popu1980 / Popu1990 / Popu2000 \ Population /

Ready NUM

Save the file.

In Menu File, choose Save. Navigate to your CRN locker.



Created June 2002 by Jinhua Zhao. Updated July 2004 by Lorlene Hoyt.

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Department of Urban Studies and Planning

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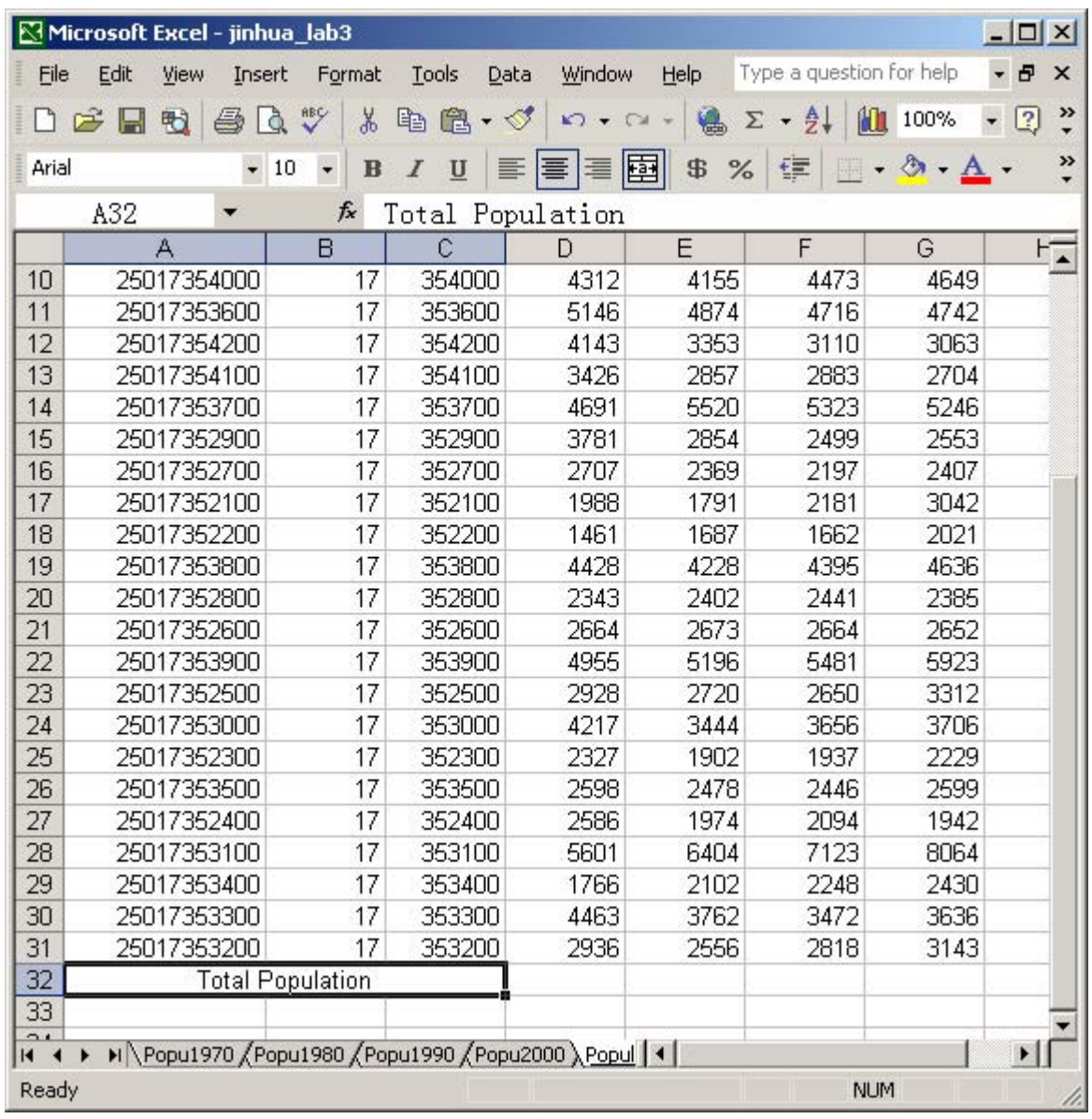
Lab 3:
Using Excel to Understand Population Change
Help Three: Basic Statistical Analyses

Calculate the Total Population

Merge Button

As shown in the following, add one new cell with "Total Population" at Cell A32; drag the mouse through A32, B32 and C32, and click the button  to merge the three cells.



	A	B	C	D	E	F	G
10	25017354000	17	354000	4312	4155	4473	4649
11	25017353600	17	353600	5146	4874	4716	4742
12	25017354200	17	354200	4143	3353	3110	3063
13	25017354100	17	354100	3426	2857	2883	2704
14	25017353700	17	353700	4691	5520	5323	5246
15	25017352900	17	352900	3781	2854	2499	2553
16	25017352700	17	352700	2707	2369	2197	2407
17	25017352100	17	352100	1988	1791	2181	3042
18	25017352200	17	352200	1461	1687	1662	2021
19	25017353800	17	353800	4428	4228	4395	4636
20	25017352800	17	352800	2343	2402	2441	2385
21	25017352600	17	352600	2664	2673	2664	2652
22	25017353900	17	353900	4955	5196	5481	5923
23	25017352500	17	352500	2928	2720	2650	3312
24	25017353000	17	353000	4217	3444	3656	3706
25	25017352300	17	352300	2327	1902	1937	2229
26	25017353500	17	353500	2598	2478	2446	2599
27	25017352400	17	352400	2586	1974	2094	1942
28	25017353100	17	353100	5601	6404	7123	8064
29	25017353400	17	353400	1766	2102	2248	2430
30	25017353300	17	353300	4463	3762	3472	3636
31	25017353200	17	353200	2936	2556	2818	3143
32	Total Population						
33							

Sum Function

Click cell D32, type in "=SUM(D2:D31)" and press enter. "SUM(D2:D31):" is a built-in function of Excel, which returns the sum of from cell D2 to D31. This is our first time using formula, in which we input the expression instead of the value. When we click the cell, the expression (this time it is a function) "=SUM(D2:D31)" is shown in the formula bar while the calculated value of the expression "100361" is shown in the cell.

Microsoft Excel - jinhua_lab3

File Edit View Insert Format Tools Data Window Help function

Arial 10 B I U $ % 100%

D32 =SUM(D2:D31)

	A	B	C	D	E	F	G	H
10	25017354000	17	354000	4312	4155	4473	4649	
11	25017353600	17	353600	5146	4874	4716	4742	
12	25017354200	17	354200	4143	3353	3110	3063	
13	25017354100	17	354100	3426	2857	2883	2704	
14	25017353700	17	353700	4691	5520	5323	5246	
15	25017352900	17	352900	3781	2854	2499	2553	
16	25017352700	17	352700	2707	2369	2197	2407	
17	25017352100	17	352100	1988	1791	2181	3042	
18	25017352200	17	352200	1461	1687	1662	2021	
19	25017353800	17	353800	4428	4228	4395	4636	
20	25017352800	17	352800	2343	2402	2441	2385	
21	25017352600	17	352600	2664	2673	2664	2652	
22	25017353900	17	353900	4955	5196	5481	5923	
23	25017352500	17	352500	2928	2720	2650	3312	
24	25017353000	17	353000	4217	3444	3656	3706	
25	25017352300	17	352300	2327	1902	1937	2229	
26	25017353500	17	353500	2598	2478	2446	2599	
27	25017352400	17	352400	2586	1974	2094	1942	
28	25017353100	17	353100	5601	6404	7123	8064	
29	25017353400	17	353400	1766	2102	2248	2430	
30	25017353300	17	353300	4463	3762	3472	3636	
31	25017353200	17	353200	2936	2556	2818	3143	
32	Total Population			100361				
33								

Popu1970 / Popu1980 / Popu1990 / Popu2000 \ Popul

Ready NUM

Auto-Fill Handle and Relative Cell References

Position the mouse pointer over the lower-right corner of cell D32 until the mouse pointer changes to a solid plus sign. Then, click and drag to cell G32. By using the fill handle, we are able to copy the sum formula quickly to cells D32, E32, F32, and G32. And typically, MS Excel adjusts copied formulas so cell references change according to the formula's new location. These self-adjusting references are called relative cell references. For example, when we copy the cell D32 to E32, MS Excel will automatically change D32=SUM(D2:D31) to E32=SUM (E2:E31).

Microsoft Excel - jinhua_lab3

File Edit View Insert Format Tools Data Window Help function

Arial 10 B I U $ % , 100%

D32 =SUM(D2:D31)

	A	B	C	D	E	F	G	H
10	25017354000	17	354000	4312	4155	4473	4649	
11	25017353600	17	353600	5146	4874	4716	4742	
12	25017354200	17	354200	4143	3353	3110	3063	
13	25017354100	17	354100	3426	2857	2883	2704	
14	25017353700	17	353700	4691	5520	5323	5246	
15	25017352900	17	352900	3781	2854	2499	2553	
16	25017352700	17	352700	2707	2369	2197	2407	
17	25017352100	17	352100	1988	1791	2181	3042	
18	25017352200	17	352200	1461	1687	1662	2021	
19	25017353800	17	353800	4428	4228	4395	4636	
20	25017352800	17	352800	2343	2402	2441	2385	
21	25017352600	17	352600	2664	2673	2664	2652	
22	25017353900	17	353900	4955	5196	5481	5923	
23	25017352500	17	352500	2928	2720	2650	3312	
24	25017353000	17	353000	4217	3444	3656	3706	
25	25017352300	17	352300	2327	1902	1937	2229	
26	25017353500	17	353500	2598	2478	2446	2599	
27	25017352400	17	352400	2586	1974	2094	1942	
28	25017353100	17	353100	5601	6404	7123	8064	
29	25017353400	17	353400	1766	2102	2248	2430	
30	25017353300	17	353300	4463	3762	3472	3636	
31	25017353200	17	353200	2936	2556	2818	3143	
32	Total Population			100361	95322	95802	101355	
33								
34								

Popu1970 / Popu1980 / Popu1990 / Popu2000 \ Population /

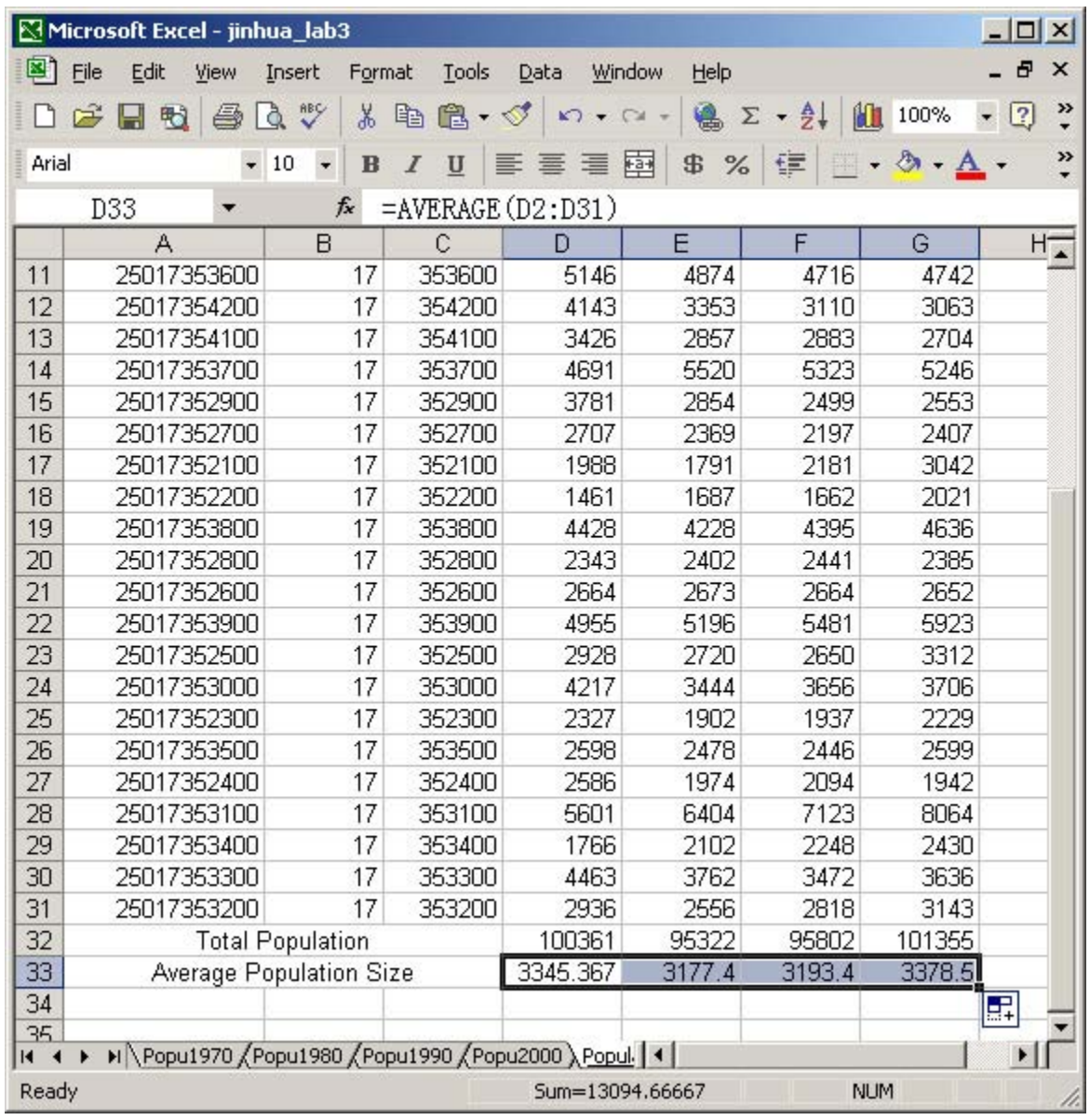
Ready Sum=392840 NUM

Now we get the answer for question 1 in the section titled, "Basic Statistical Analyses."

Calculate the Total Population

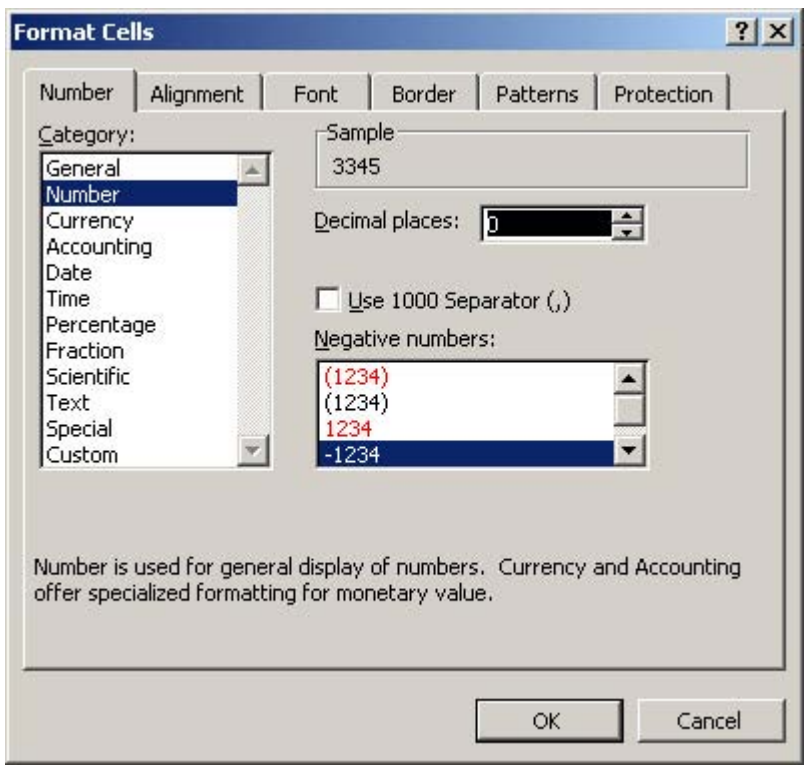
Average Function

The procedure to calculate the average is almost the same as that of the sum except that we use the function AVERAGE(D2:D31), which calculates the average of the numbers from Cell D2 to Cell D31. Alternatively, we can use the result from the sum, then divide the sum by the number of census tracts (30) to get the average.

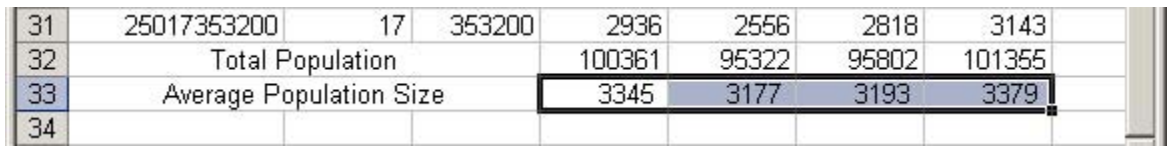


Number Formats

We find that the results "3345.367", "3177.4" and so on have decimal fractions which do not make sense for the population. We want them to be rounded to full integer values. Select the four cells, under Menu Format, and choose Cell. In the pop-up window, in the first table "Number," click "Number" in Category, and change the "Decimal Places" to zero, press OK.



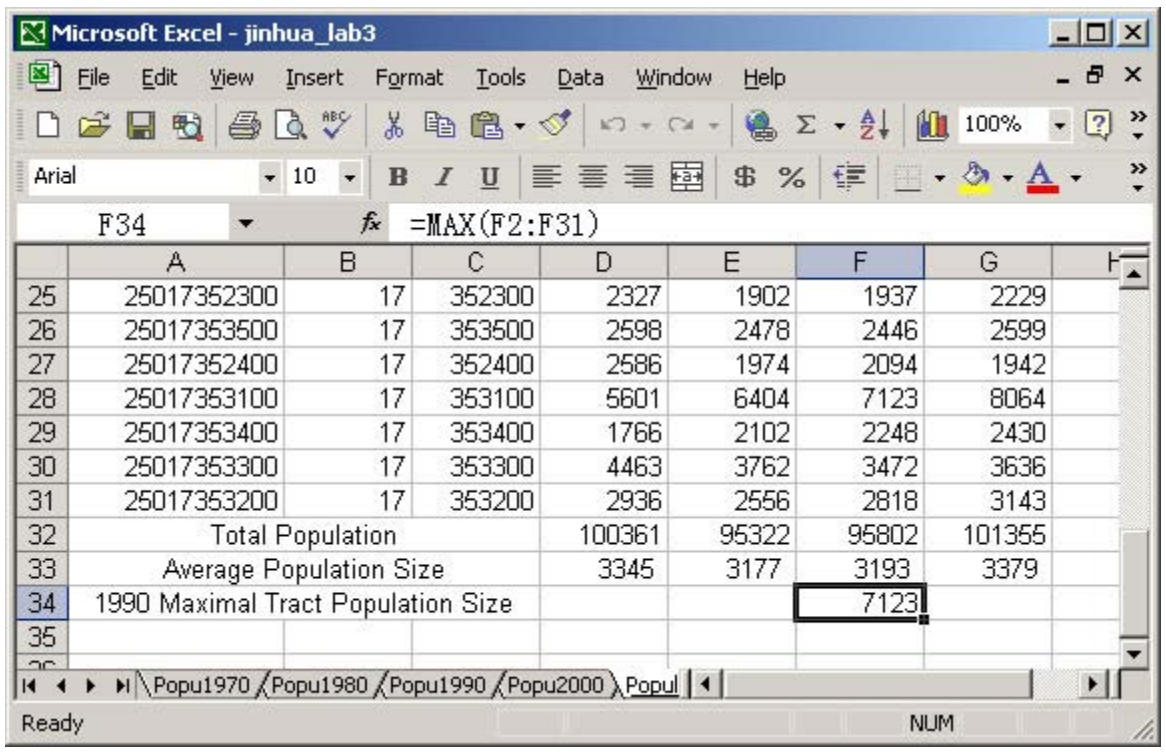
Now, the worksheet looks like,



Calculate the Maximum

Max Function

The Max Function is similar to calculate sum or average functions, however, this time use MAX function at cell F34=MAX(F2:F31).

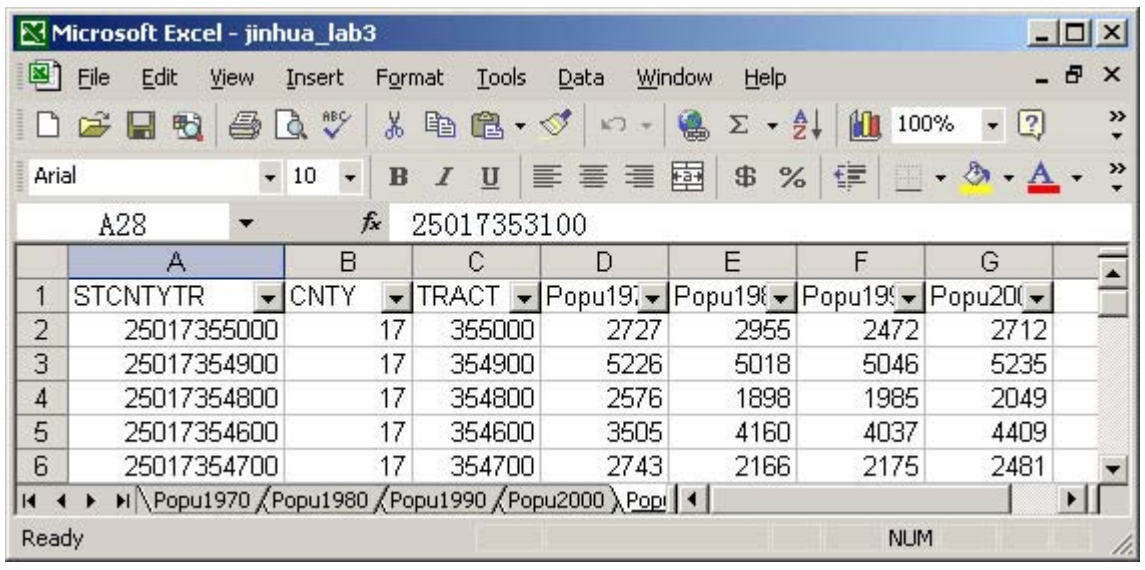


	A	B	C	D	E	F	G
25	25017352300	17	352300	2327	1902	1937	2229
26	25017353500	17	353500	2598	2478	2446	2599
27	25017352400	17	352400	2586	1974	2094	1942
28	25017353100	17	353100	5601	6404	7123	8064
29	25017353400	17	353400	1766	2102	2248	2430
30	25017353300	17	353300	4463	3762	3472	3636
31	25017353200	17	353200	2936	2556	2818	3143
32	Total Population			100361	95322	95802	101355
33	Average Population Size			3345	3177	3193	3379
34	1990 Maximal Tract Population Size					7123	
35							

Filtering Rows

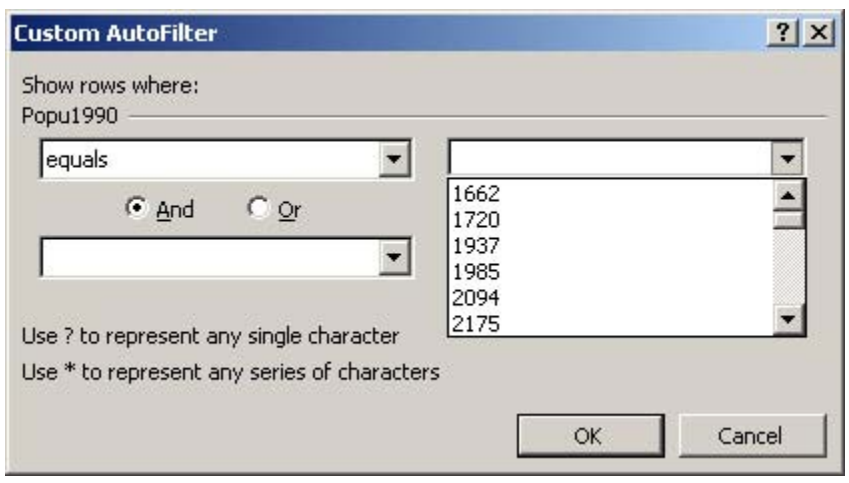
We can easily see that the maximum population in 1990 is 7,123, but in which census tract does it belong? Because this is a short database, we can just explore the column F and find that 7,123 corresponds with the census tract "25017353100, but what if we had a dataset that contained thousands of records?

Let's try filtering the rows. Under Menu Data, choose Filter then AutoFilter. The first Row in this worksheet changes to,

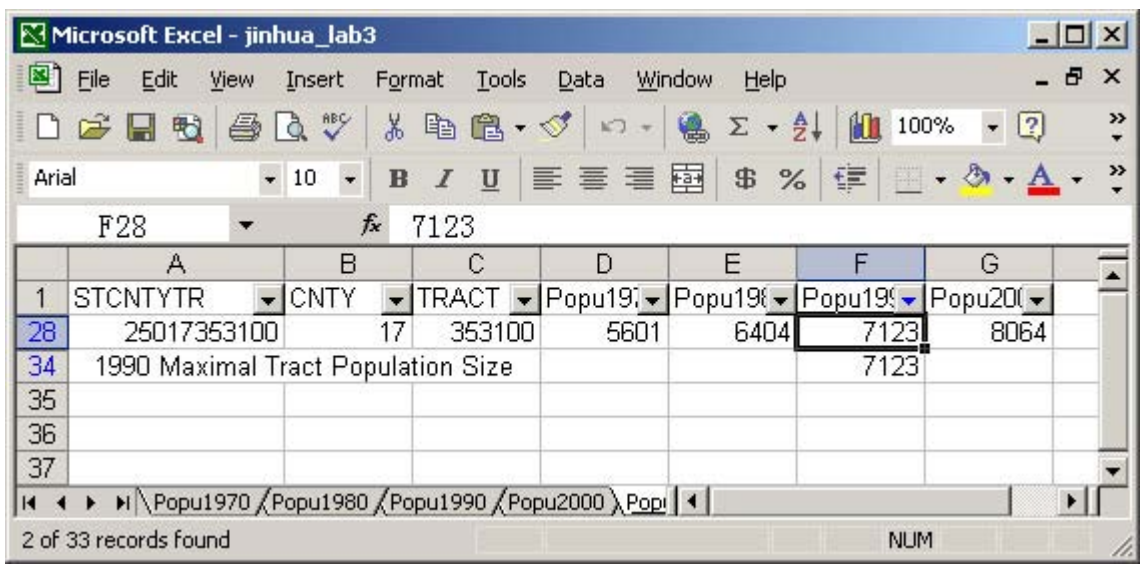


	A	B	C	D	E	F	G
1	STCNTYTR	CNTY	TRACT	Popu19	Popu19	Popu19	Popu20
2	25017355000	17	355000	2727	2955	2472	2712
3	25017354900	17	354900	5226	5018	5046	5235
4	25017354800	17	354800	2576	1898	1985	2049
5	25017354600	17	354600	3505	4160	4037	4409
6	25017354700	17	354700	2743	2166	2175	2481

Click on the button in F1, and choose "Custom." A window pops up.



Type 7,123 and press OK. We identify census tract "25017353100" easily.



	A	B	C	D	E	F	G
1	STCNTYTR	CNTY	TRACT	Popu19	Popu19	Popu19	Popu20
28	25017353100	17	353100	5601	6404	7123	8064
34	1990 Maximal Tract Population Size					7123	
35							
36							
37							

Calculate the Percentage Changes

Cancel Row Filtering

Click on the button in F1, and choose "All." The window changes to the status before filtering. (i.e. all rows are displayed.)

Add in One New Column

Click Cell H1, type in "PopuChange."

Population Change Calculation

Click Cell H2, put the expression "=(G2-D2)/D2." Use the auto fill handle to drag the mouse from cell H2 to cell H32. MS Excel will calculate the population change for all the cells in Column H. Again, relative cell referencing is assumed.

Microsoft Excel - jinhua_lab3

File Edit View Insert Format Tools Data Window Help — Type a question for help

Arial 10 — 100%

H2 =(G2-D2)/D2

	A	B	C	D	E	F	G	H	I
1	STCNTYTR	CNTY	TRACT	Popu19	Popu19	Popu19	Popu20	PopuChange	
2	25017355000	17	355000	2727	2955	2472	2712	-0.00550055	
3	25017354900	17	354900	5226	5018	5046	5235	0.00172216	
4	25017354800	17	354800	2576	1898	1985	2049	-0.20458075	
5	25017354600	17	354600	3505	4160	4037	4409	0.25791726	
6	25017354700	17	354700	2743	2166	2175	2481	-0.09551586	
7	25017354300	17	354300	2814	3507	3451	3266	0.16062544	
8	25017354500	17	354500	3048	2488	2447	2405	-0.21095801	
9	25017354400	17	354400	2255	1829	1720	1714	-0.23991131	
10	25017354000	17	354000	4312	4155	4473	4649	0.07815399	
11	25017353600	17	353600	5146	4874	4716	4742	-0.07850758	
12	25017354200	17	354200	4143	3353	3110	3063	-0.26068067	
13	25017354100	17	354100	3426	2857	2883	2704	-0.21074139	
14	25017353700	17	353700	4691	5520	5323	5246	0.11831166	
15	25017352900	17	352900	3781	2854	2499	2553	-0.3247818	
16	25017352700	17	352700	2707	2369	2197	2407	-0.11082379	
17	25017352100	17	352100	1988	1791	2181	3042	0.53018109	
18	25017352200	17	352200	1461	1687	1662	2021	0.38329911	
19	25017353800	17	353800	4428	4228	4395	4636	0.0469738	
20	25017352800	17	352800	2343	2402	2441	2385	0.01792574	
21	25017352600	17	352600	2664	2673	2664	2652	-0.0045045	
22	25017353900	17	353900	4955	5196	5481	5923	0.19535822	
23	25017352500	17	352500	2928	2720	2650	3312	0.13114754	
24	25017353000	17	353000	4217	3444	3656	3706	-0.12117619	
25	25017352300	17	352300	2327	1902	1937	2229	-0.04211431	
26	25017353500	17	353500	2598	2478	2446	2599	0.00038491	
27	25017352400	17	352400	2586	1974	2094	1942	-0.24903326	
28	25017353100	17	353100	5601	6404	7123	8064	0.4397429	
29	25017353400	17	353400	1766	2102	2248	2430	0.37599094	
30	25017353300	17	353300	4463	3762	3472	3636	-0.18530137	
31	25017353200	17	353200	2936	2556	2818	3143	0.07050409	
32	Total Population			100361	95322	95802	101355	0.00990425	
33	Average Population Size			3345	3177	3193	3379		
34	1990 Maximal Tract Population Size					7123			

Popu1970 / Popu1980 / Popu1990 / Popu2000 / Population

Ready — Sum=0.474011777 — NUM

Number Formatting

In order to show the percentage change clearly, we want to reformat the cells in Column H. Select the cells from H2 to H32. Under Menu Format, choose Cell. In the pop-up window and in the first table "Number" click "Percentage" in Category, and change the "Decimal Places" to one, press OK.

Microsoft Excel - jinhua_lab3

File Edit View Insert Format Tools Data Window Help — Type a question for help — 100%

Arial 10 B I U

H2 =(G2-D2)/D2

	A	B	C	D	E	F	G	H	I
1	STCNTYTR	CNTY	TRACT	Popu197	Popu198	Popu199	Popu200	PopuChange	
2	25017355000	17	355000	2727	2955	2472	2712	-0.6%	
3	25017354900	17	354900	5226	5018	5046	5235	0.2%	
4	25017354800	17	354800	2576	1898	1985	2049	-20.5%	
5	25017354600	17	354600	3505	4160	4037	4409	25.8%	
6	25017354700	17	354700	2743	2166	2175	2481	-9.6%	
7	25017354300	17	354300	2814	3507	3451	3266	16.1%	
8	25017354500	17	354500	3048	2488	2447	2405	-21.1%	
9	25017354400	17	354400	2255	1829	1720	1714	-24.0%	
10	25017354000	17	354000	4312	4155	4473	4649	7.8%	
11	25017353600	17	353600	5146	4874	4716	4742	-7.9%	
12	25017354200	17	354200	4143	3353	3110	3063	-26.1%	
13	25017354100	17	354100	3426	2857	2883	2704	-21.1%	
14	25017353700	17	353700	4691	5520	5323	5246	11.8%	
15	25017352900	17	352900	3781	2854	2499	2553	-32.5%	
16	25017352700	17	352700	2707	2369	2197	2407	-11.1%	
17	25017352100	17	352100	1988	1791	2181	3042	53.0%	
18	25017352200	17	352200	1461	1687	1662	2021	38.3%	
19	25017353800	17	353800	4428	4228	4395	4636	4.7%	
20	25017352800	17	352800	2343	2402	2441	2385	1.8%	
21	25017352600	17	352600	2664	2673	2664	2652	-0.5%	
22	25017353900	17	353900	4955	5196	5481	5923	19.5%	
23	25017352500	17	352500	2928	2720	2650	3312	13.1%	
24	25017353000	17	353000	4217	3444	3656	3706	-12.1%	
25	25017352300	17	352300	2327	1902	1937	2229	-4.2%	
26	25017353500	17	353500	2598	2478	2446	2599	0.0%	
27	25017352400	17	352400	2586	1974	2094	1942	-24.9%	
28	25017353100	17	353100	5601	6404	7123	8064	44.0%	
29	25017353400	17	353400	1766	2102	2248	2430	37.6%	
30	25017353300	17	353300	4463	3762	3472	3636	-18.5%	
31	25017353200	17	353200	2936	2556	2818	3143	7.1%	
32	Total Population			100361	95322	95802	101355	1.0%	
33	Average Population Size			3345	3177	3193	3379		
34	1990 Maximal Tract Population Size					7123			

Popu1970 / Popu1980 / Popu1990 / Popu2000 / Population

Ready — Sum=47.4% — NUM

Max Function

Use the Max function again to calculate the maximum percentage change. In Cell 35, put "=MAX(H2:H31)".

Microsoft Excel - jinhua_lab3

File Edit View Insert Format Tools Data Window Help — Type a question for help — 100%

Arial 10 B I U

SUM =MAX(H2:H31)

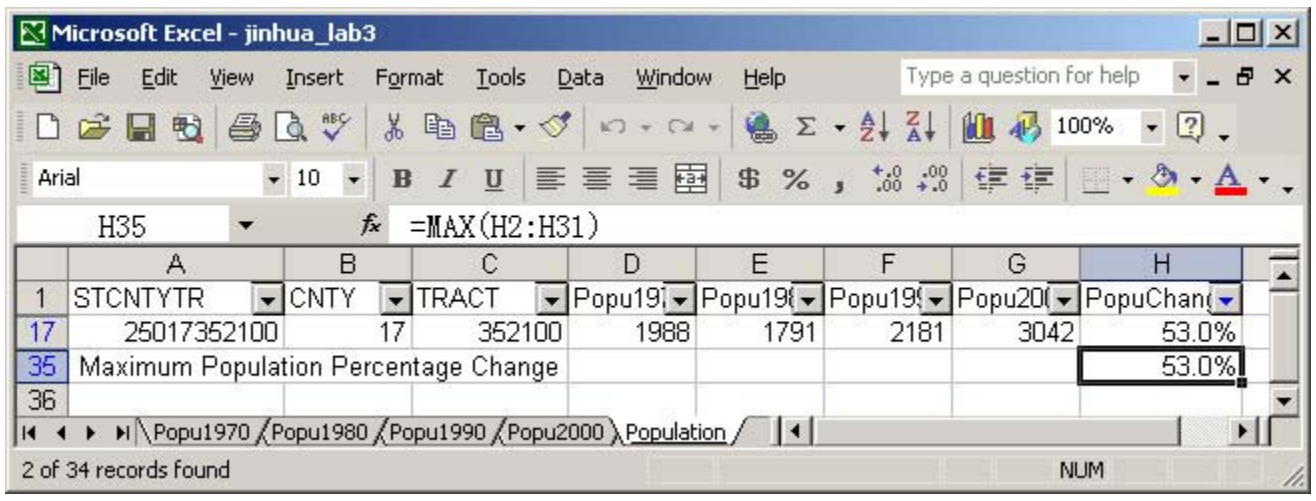
	A	B	C	D	E	F	G	H
10	25017354000	17	354000	4312	4155	4473	4649	7.8%
11	25017353600	17	353600	5146	4874	4716	4742	-7.9%
12	25017354200	17	354200	4143	3353	3110	3063	-26.1%
13	25017354100	17	354100	3426	2857	2883	2704	-21.1%
14	25017353700	17	353700	4691	5520	5323	5246	11.8%
15	25017352900	17	352900	3781	2854	2499	2553	-32.5%
16	25017352700	17	352700	2707	2369	2197	2407	-11.1%
17	25017352100	17	352100	1988	1791	2181	3042	53.0%
18	25017352200	17	352200	1461	1687	1662	2021	38.3%
19	25017353800	17	353800	4428	4228	4395	4636	4.7%
20	25017352800	17	352800	2343	2402	2441	2385	1.8%
21	25017352600	17	352600	2664	2673	2664	2652	-0.5%
22	25017353900	17	353900	4955	5196	5481	5923	19.5%
23	25017352500	17	352500	2928	2720	2650	3312	13.1%
24	25017353000	17	353000	4217	3444	3656	3706	-12.1%
25	25017352300	17	352300	2327	1902	1937	2229	-4.2%
26	25017353500	17	353500	2598	2478	2446	2599	0.0%
27	25017352400	17	352400	2586	1974	2094	1942	-24.9%
28	25017353100	17	353100	5601	6404	7123	8064	44.0%
29	25017353400	17	353400	1766	2102	2248	2430	37.6%
30	25017353300	17	353300	4463	3762	3472	3636	-18.5%
31	25017353200	17	353200	2936	2556	2818	3143	7.1%
32	Total Population			100361	95322	95802	101355	1.0%
33	Average Population Size			3345	3177	3193	3379	
34	1990 Maximum Tract Population Size					7123		
35	Maximum Population Percentage Change							=MAX(H2:H31
36								

Popu1970 / Popu1980 / Popu1990 / Popu2000 / Population

Edit — NUM

Filtering Rows

Again, by filtering the rows (same method we used in finding the census tract that has the largest population) we can find the census tract that has the sharpest population change.



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

Massachusetts Institute of Technology
Department of Urban Studies and Planning

11.204: Planning, Communication & Digital Media
Fall 2004

Lab 3:
Using Excel to Understand Population Change
Help Four: Making Charts

Chart One

Sort the Rows by Population Size

Before we start to create the chart, we need to sort the rows by their population size. Select the rectangular regions from A1 to H31; the area with the rows we want to sort. In Menu Data, choose sort. In the pop-up window, choose sort by "Popu2000", click "Ascending" and press OK.

The rows show ordering by the population size (for the year 2000) from the minimum to the maximum value.

Microsoft Excel - jinhua_lab3

File Edit View Insert Format Tools Data Window Help

Arial 10

H31 =(G31-D31)/D31

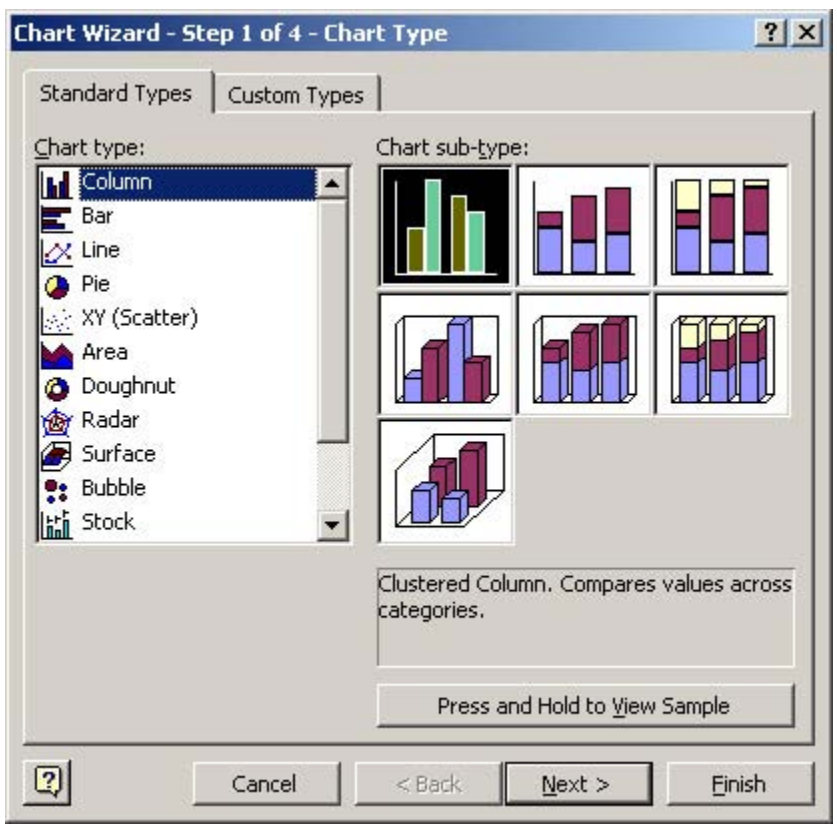
	A	B	C	D	E	F	G	H	I
1	STCNTYTR	CNTY	TRACT	Popu19	Popu19	Popu19	Popu2000	PopuChan	
2	25017354400	17	354400	2255	1829	1720	1714	-24.0%	
3	25017352400	17	352400	2586	1974	2094	1942	-24.9%	
4	25017352200	17	352200	1461	1687	1662	2021	38.3%	
5	25017354800	17	354800	2576	1898	1985	2049	-20.5%	
6	25017352300	17	352300	2327	1902	1937	2229	-4.2%	
7	25017352800	17	352800	2343	2402	2441	2385	1.8%	
8	25017354500	17	354500	3048	2488	2447	2405	-21.1%	
9	25017352700	17	352700	2707	2369	2197	2407	-11.1%	
10	25017353400	17	353400	1766	2102	2248	2430	37.6%	
11	25017354700	17	354700	2743	2166	2175	2481	-9.6%	
12	25017352900	17	352900	3781	2854	2499	2553	-32.5%	
13	25017353500	17	353500	2598	2478	2446	2599	0.0%	
14	25017352600	17	352600	2664	2673	2664	2652	-0.5%	
15	25017354100	17	354100	3426	2857	2883	2704	-21.1%	
16	25017355000	17	355000	2727	2955	2472	2712	-0.6%	
17	25017352100	17	352100	1988	1791	2181	3042	53.0%	
18	25017354200	17	354200	4143	3353	3110	3063	-26.1%	
19	25017353200	17	353200	2936	2556	2818	3143	7.1%	
20	25017354300	17	354300	2814	3507	3451	3266	16.1%	
21	25017352500	17	352500	2928	2720	2650	3312	13.1%	
22	25017353300	17	353300	4463	3762	3472	3636	-18.5%	
23	25017353000	17	353000	4217	3444	3656	3706	-12.1%	
24	25017354600	17	354600	3505	4160	4037	4409	25.8%	
25	25017353800	17	353800	4428	4228	4395	4636	4.7%	
26	25017354000	17	354000	4312	4155	4473	4649	7.8%	
27	25017353600	17	353600	5146	4874	4716	4742	-7.9%	
28	25017354900	17	354900	5226	5018	5046	5235	0.2%	
29	25017353700	17	353700	4691	5520	5323	5246	11.8%	
30	25017353900	17	353900	4955	5196	5481	5923	19.5%	
31	25017353100	17	353100	5601	6404	7123	8064	44.0%	
32	Total Population			100361	95322	95802	101355	1.0%	
33	Average Population Size			3345	3177	3193	3379		
34	1990 Maximum Tract Population Size					7123			

Popu1970 Popu1980 Popu1990 Popu2000 Population

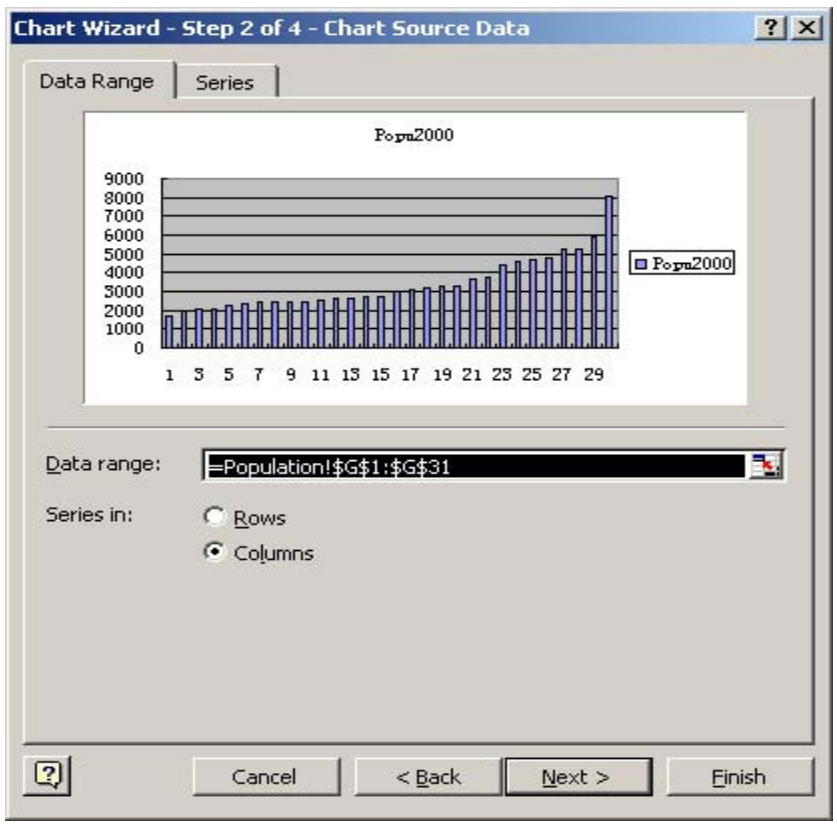
Ready Sum=7505316063504E NUM

Chart Wizard

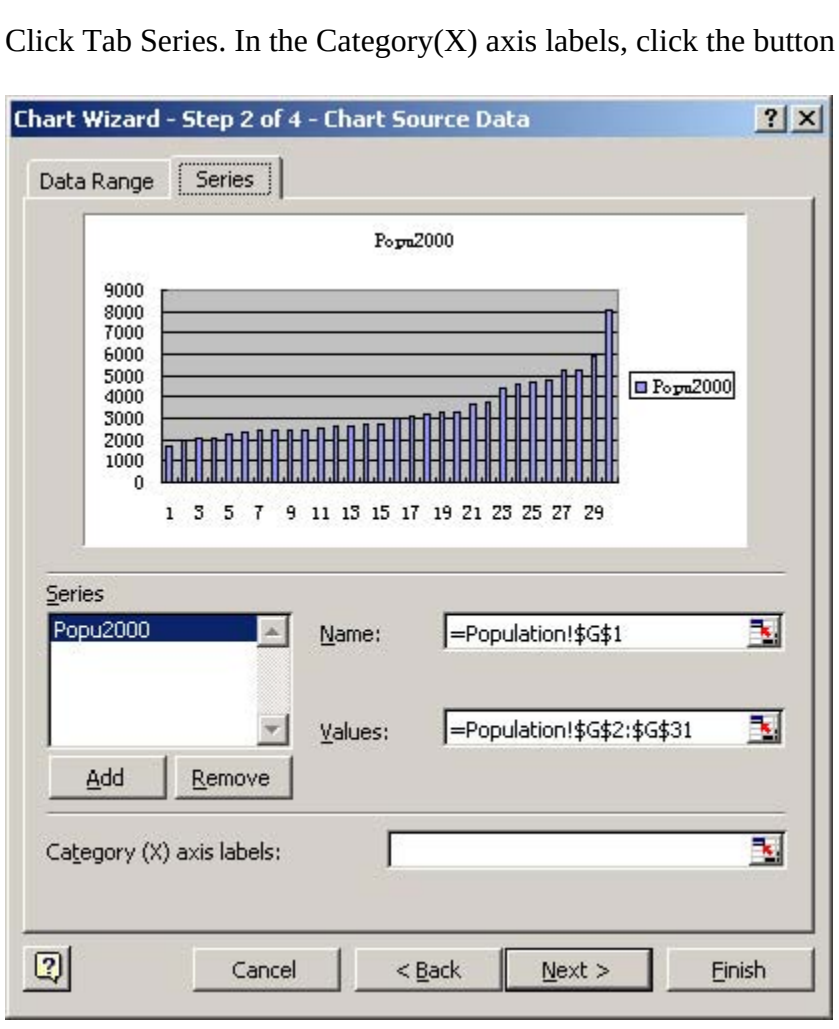
Select cells from G1 to G31. In Menu Insert, choose Chart. The Chart Wizard window pops up.



In the Standard Types, choose "Column" as the chart type and press Next.

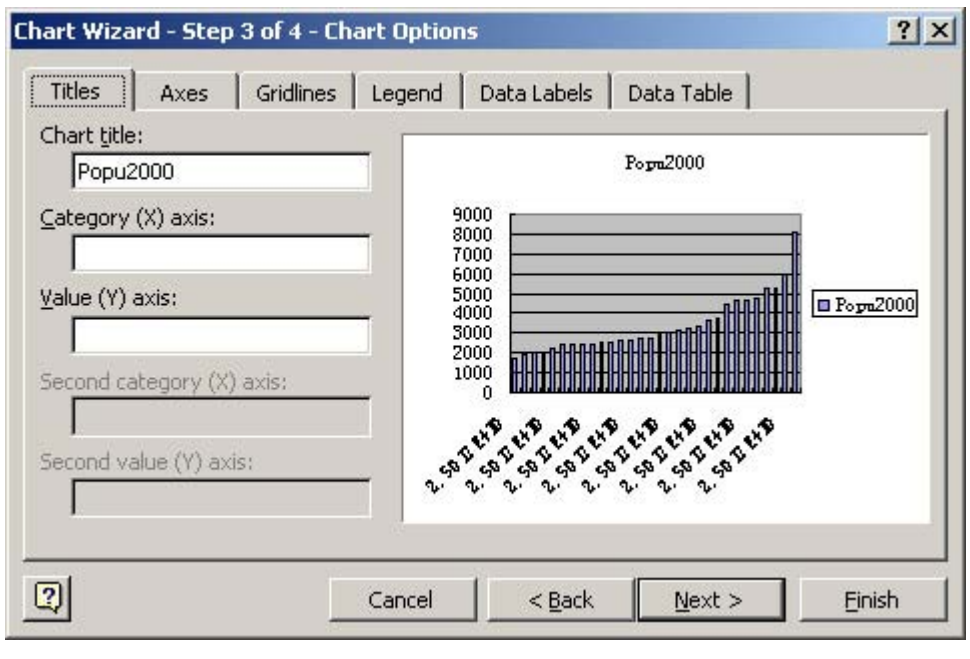


Click Tab Series. In the Category(X) axis labels, click the button .

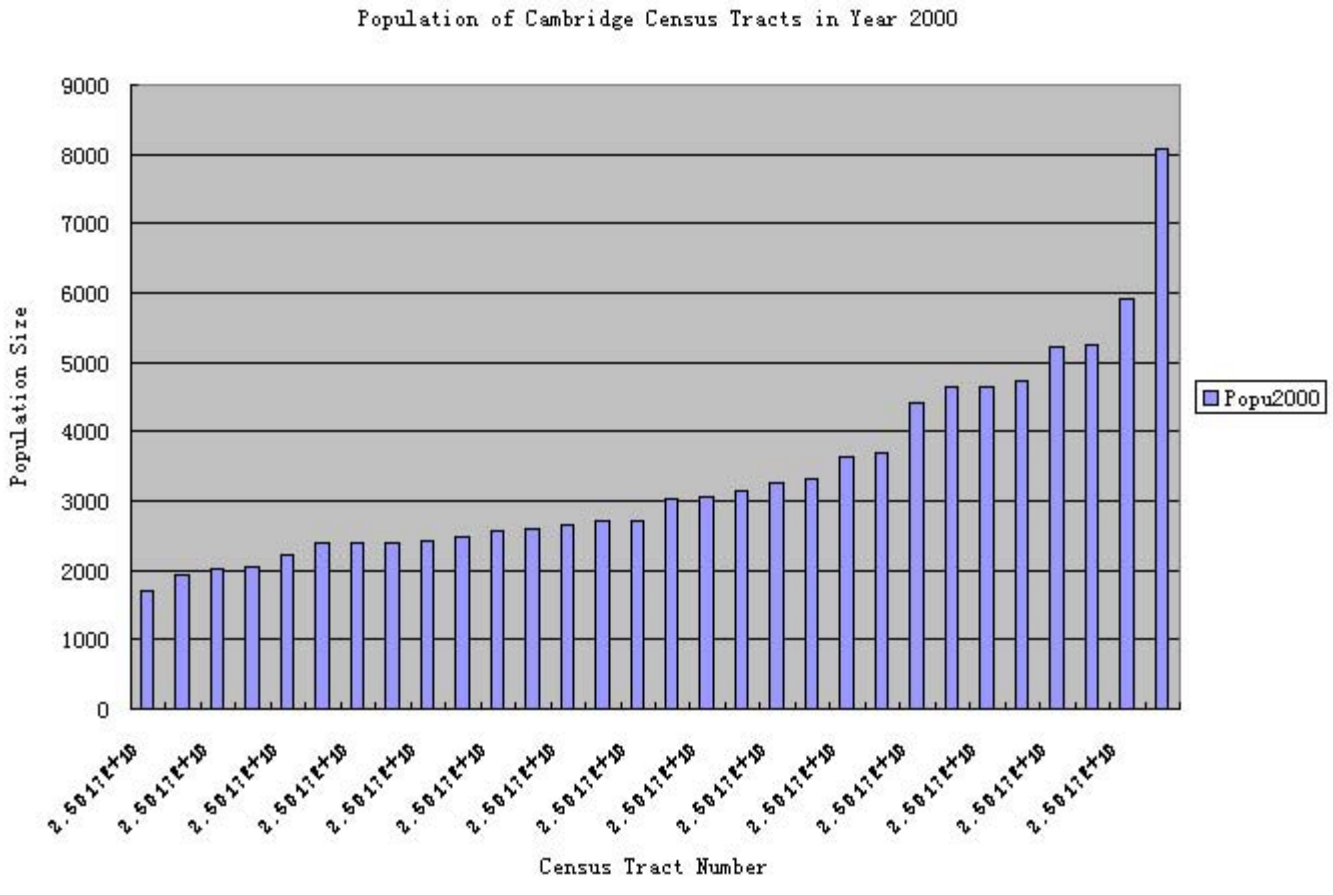


A Source Data selection window pops up. Drag the mouse from A2 to A31 and then click on the button . Return to Step Two of the Chart Wizard window and click Next.

In the Step 3 window, we can insert the title, x-axis name and y-axis name and click Next.



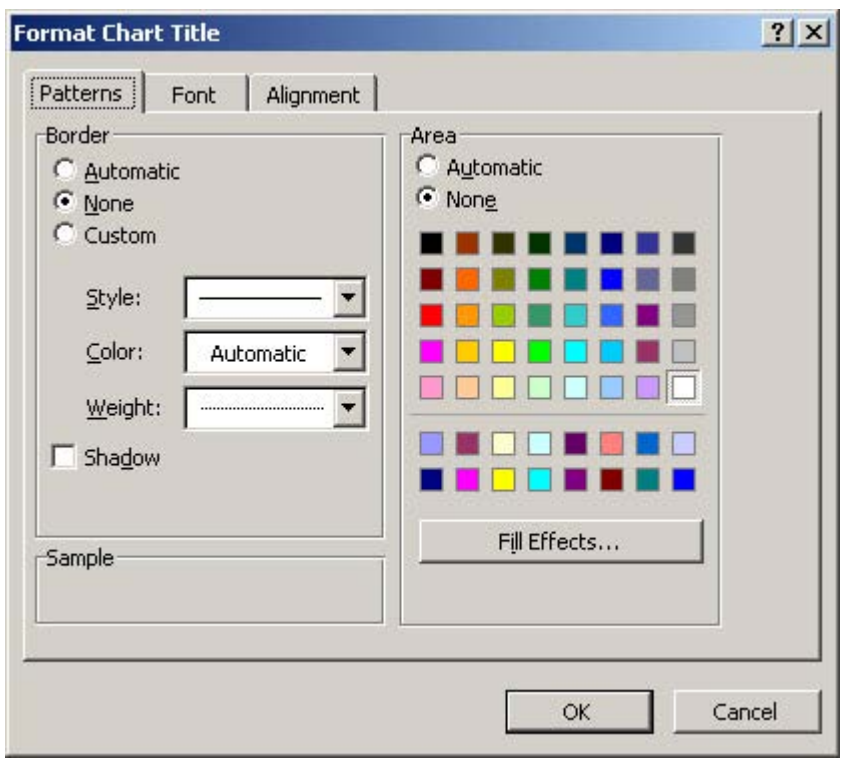
In Step 4, choose to place chart as "new sheet," name it "Chart1" then press Finish. Now we get the chart shown in Worksheet Chart1, **which is in a less than satisfactory format**.



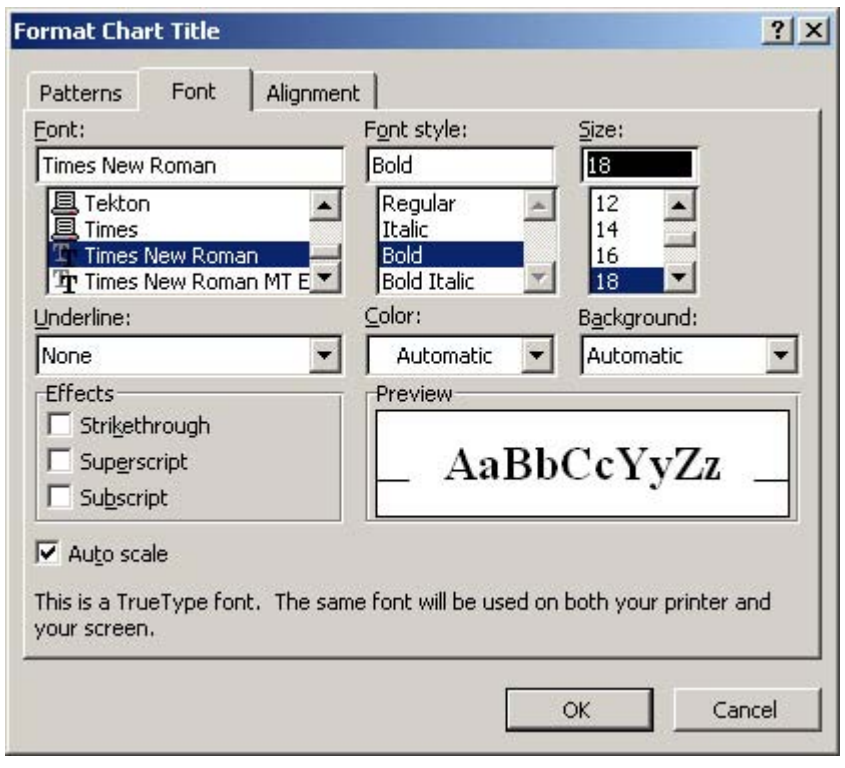
You can refine the chart by double-clicking on each of its individual elements and changing the font, size, style, pattern and alignment.

Alternatively, you can change the properties for all elements at once by double-clicking on the blank areas of the chart to open a new popup window. You might want to check off "Auto scale" function in this window. The "Auto scale" function, which is found in the Font properties, occasionally "ruins" the layout of the chart. That is, the function automatically designs the chart by changing the font size and other properties in a way that Excel considers the most appropriate (which is sometimes inappropriate).

Here is an example of setting properties for individual elements. Double-click on the title. In the popup window "Format Chart Title," there are three tabs. In Tab Patterns, you can set the border and color; in table font, you can choose the font, style and size; in the alignment, you can choose the text alignment and orientation.



Here we are only going to change the font and keep others as default. Choose Times New Roman, Bold, and 18. Click OK.



In the same way, you **must** format other elements in your chart to make sure that all elements appear on the chart. In the example shown above, not all Census tract numbers are appearing. You should click on the area to open a window to set properties for the area. You should change the alignment and the font size to make all the tract numbers appear.

Chart Two

You can follow the same method as in Chart One to produce your second chart. Some points for your reference:

1. Pay attention to your choices of the chart type. There are several possibilities depending on your preferences, however, certain types are not proper for this situation, such as a pie chart.

2. Choose the proper column or row as your input for the x-axis and y-axis of the graph and label them carefully.

3. Check that you have included all of the essential elements -- title, author, date and data resources.

4. Again, presentation matters. Make the numbers legible and the layout clear.

Created June 2002 by Jinhua Zhao. Updated August 2002 by Lorlene Hoyt. Updated June 2004 by Masa Matsuura.