UPPSALA UNIVERSITET

Institutionen för Geovetenskaper
Geoinformatiklaboratoriet

TIRES AND TRAVEL IN ÖREBRO COMMUNE

Requirements
This exercise requires a PC with Windows 95/98 or Windows NT and the GIS
software ArcView 3.0 or later. The necessary data are available under the archive
/Data/Arbetsstuga2000/arcveiw/ on the CD as well as the Earth server:
earth2/_Sharedfiles/geoinformatik/data/arbetsstuga2000/arcview/.

Objectives
The aim of this exercise is to manipulate tables and show statistics of those tables with
the chart functions in ArcVeiw. The student will receive an introduction to working with
tabular data and creating charts to display various properties.

Task
To pass the exercise you should hand in a map showing postal areas selected and pie
chart where size represents number of cars per household and the slices represents
number of households and number of cars respectively.

Adding the necessary data

The tire producer wants to distribute the advertisements in postal code areas surrounding
Örebro commune. He believes that people living within urban Örebro to a large extent
uses public transportation for their travel to and from work. Therefore he wants to select
postal code areas surrounding the urban areas, as people living further away are less
likely to work in Örebro commune.

Start the exercise by opening a new View. Open the themes Rt_to from
Metria/Rodakartan and P18ed from Scb. Make the Rt_to theme active and use
the Find Button 🔍 to select Örebro (you can also choose Find... in the Table
menu).

2. Press the Find button.

1. Make the Rt_to theme active.

3. Type Örebro in the "Search for" box. Press OK
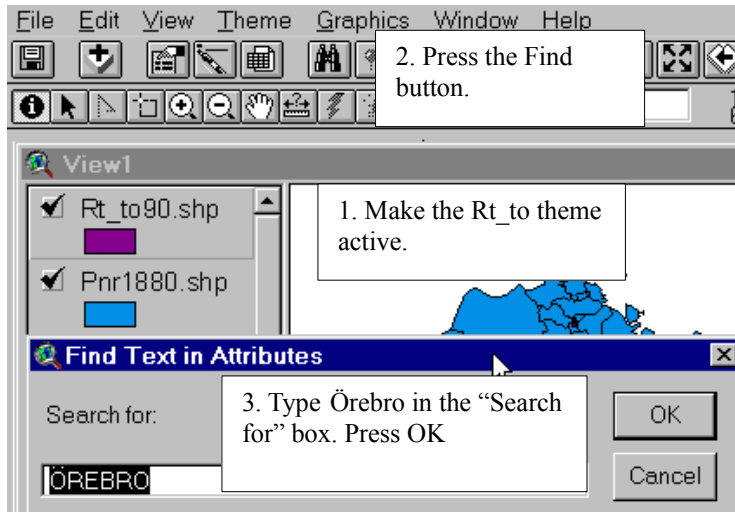
When ArcView has found Örebro (or any other searched feature) it will automatically select the feature. When this is done, go to the Theme menu and choose Convert to shapefile. The command convert to shapefile will convert selected features in to a shapefile containing only the selected features. If no features are selected the entire theme will be converted to a new shapefile.
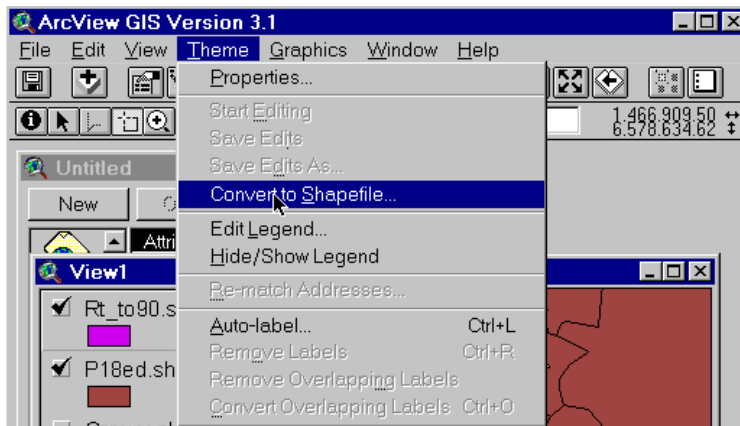
In the dialogue box that appears, navigate to your working directory and save the file as Öreurv.

Now that you have a theme which only displays the urban are of Örebro, you will use this theme to find out which postal areas that are surrounding urban Örebro. With the Select by theme function under the Theme menu you can select features in the active theme that have different relations to features in other themes.
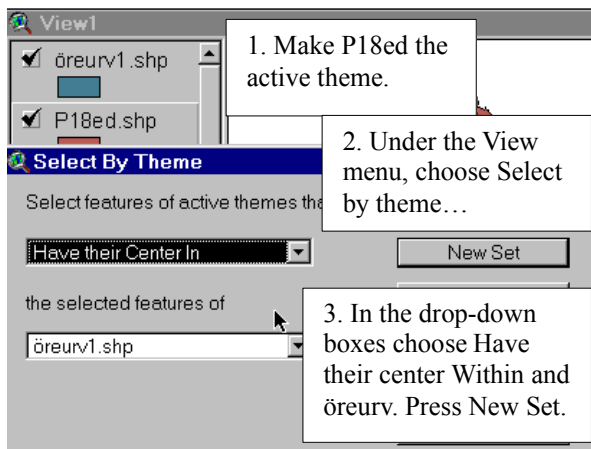
You want to select postal areas that are closely surrounding Örebro urban area but not actually within the area. To be able to make selection based on distance, you must first tell ArcView how to measure distance. This is done by setting the Map and Distance units under View properties menu.
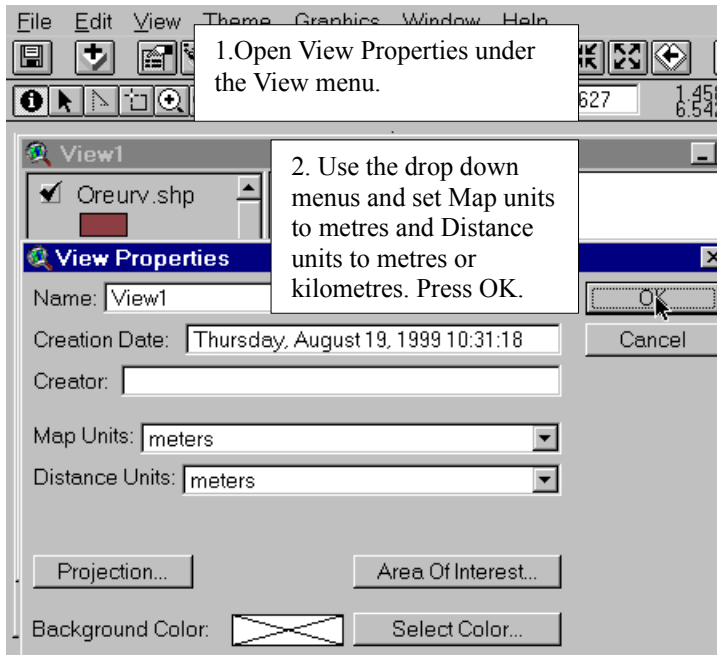
Map units is the co-ordinate units in which the data you have added is stored on your disk. Data from Rodakartan is stored in metres.
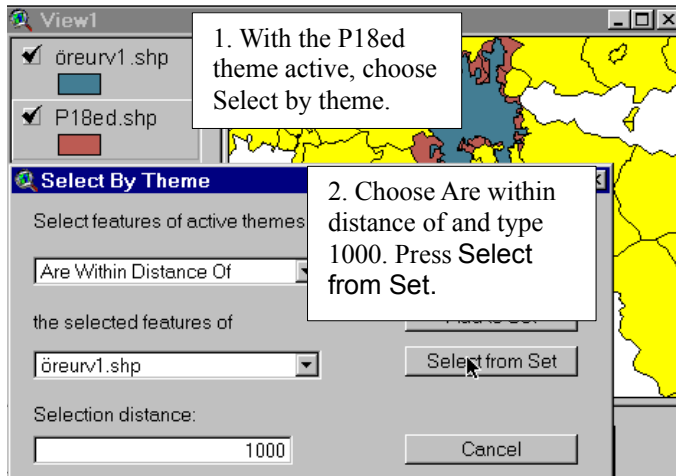
Distance units are the units in which ArcView will display measurements and dimensions while you work. This can be set to the units most suitable for each view, in this case metres or kilometres.

Screenshot annotations:

1. Open View Properties under the View menu.

2. Use the drop down menus and set Map units to metres and Distance units to metres or kilometres. Press OK.

View Properties
Name: View1
Creation Date: Thursday, August 19, 1999 10:31:18
Creator:
Map Units: meters
Distance Units: meters
Projection... Area Of Interest...
Background Color: Select Color...

Now you are ready to make the selection based on distance. By using the **Are within distance of** function under the **Select by theme** menu, you can select features that are within a certain distance (in this case 1000m is suitable) of Örebro. If you choose this command directly, ArcView will select all areas that are within 1000m, including those inside the urban area (which you do not want). To get around this problem, first use the select by theme command "**Have their centre within**" and choose **Öreurv** as the "receiving" theme. You must thus make the P18ed them active.

Screenshot annotations:

1. Make P18ed the active theme.

2. Under the View menu, choose Select by theme…

3. In the drop-down boxes choose Have their center Within and öreurv. Press New Set.

Select By Theme
Select features of active themes tha
Have their Center In   New Set
the selected features of
öreurv1.shp

This will select all postal areas that are *inside* urban Örebro. Now open the attribute table for P18ed and use the

Switch selection button . This button selects all previously unselected records and deselects the selected ones so that you now have selected all postal areas that are *outside* of Örebro urban area.

After you have switched the selections, open the Select by theme dialogue box again. This time, choose are within distance of and type **1000** m (or 1 if you chose km as Distance units) to select all postal areas that are 100m from urban Örebro.

View1
✔ öreurv1.shp
✔ P18ed.shp

1. With the P18ed theme active, choose Select by theme.

Select By Theme
Select features of active themes
Are Within Distance Of
the selected features of
öreurv1.shp
Selection distance:
1000

2. Choose Are within distance of and type 1000. Press Select from Set.
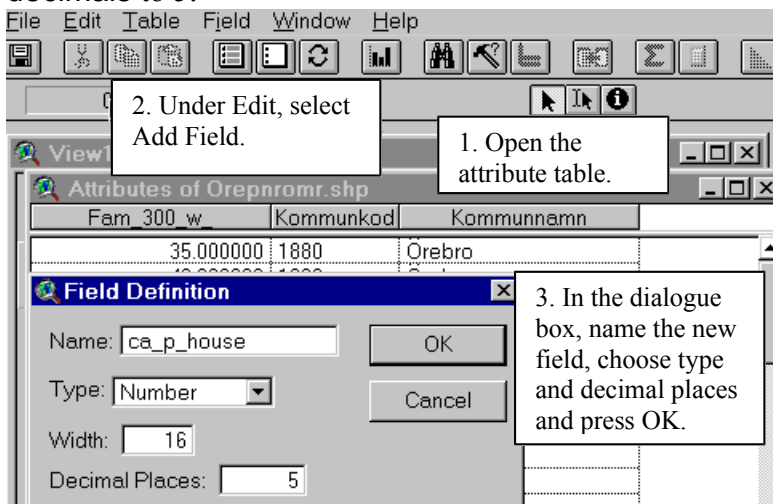
Select from Set

Cancel

In the Select by theme dialogue box, press Select from set to select postal areas from those *already selected*.

When this operation is finished, you have selected postal areas that are within 1000m of urban Örebro but outside the urban area.

You should now make this selection to a separate theme. This is done under the Theme menu where you choose Convert to shapefile (see above). Navigate to your working directory and save the file as Örepnromr.

We are now going to start working with the attribute data found in the table. The selection of postal areas should be based on how many cars there are per household, in order to reach the largest number of possible clients. In the table for P18ed, data is available for number of cars and number of households separately, why you have to create a new field showing number of cars per household.

To accomplish this, you must open the table for the Orepnomr theme and add a new field at the end of it, where your statistics on cars per household should be calculated. You need to press Start editing under the Table menu to start making changes in the table. When you are ready to start editing, go to the edit menu (the table should be the active document) and select Add field. Name the new field car_p_house. The values in this column should contain the number (thus select number as field type) of cars in the postal areas divided by the number of households in each postal area. Also set the number of decimals to 5.

File Edit Table Field Window Help

2. Under Edit, select Add Field.

1. Open the attribute table.

View

Attributes of Orepnromr.shp

Fam_300_w_	Kommunkod	Kommunnamn
35.000000	1880	Örebro

Field Definition
Name: ca_p_house
Type: Number
Width: 16
Decimal Places: 5

OK
Cancel

3. In the dialogue box, name the new field, choose type and decimal places and press OK.

To calculate the number of cars per household in each postal area you need to mark the new car_p_house column (it will appear darker like below). Choose calculate from either the field menu or the Calculate button ▣.
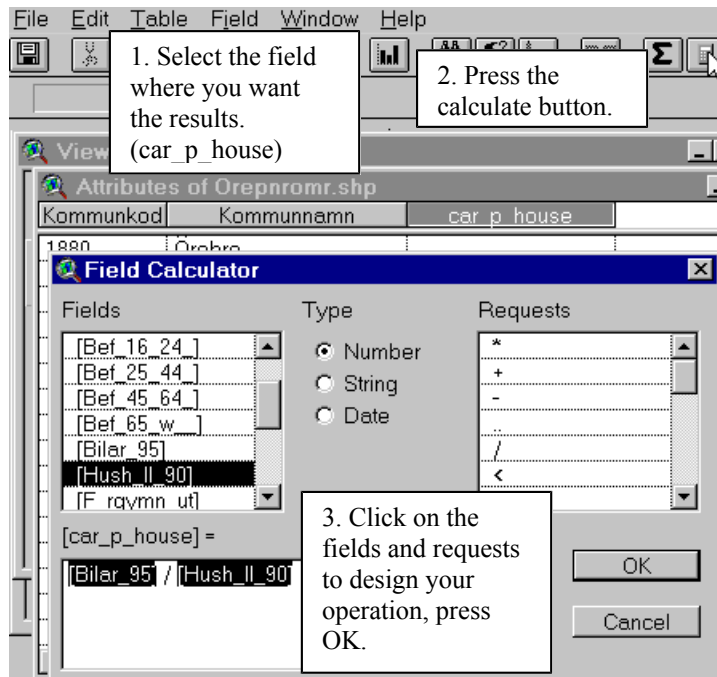
When the car_p_house field is selected, it appears shaded (see picture).

To make the calculation, first press the Calculate button and then double-click on the Fields and Requests necessary to complete the calculation. Finally press OK.
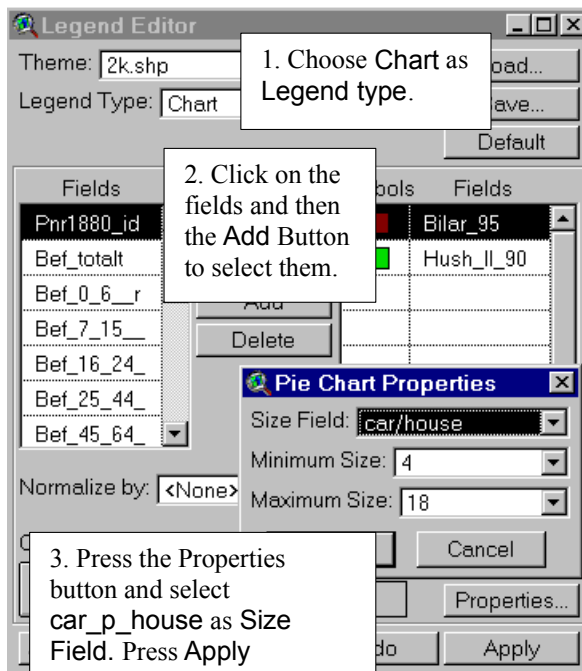
When you are done, go to the table menu and Stop editing.

Since there are only 2000 fliers you must find areas that together not exceed this number. These areas also must have a high ratio of cars per household. In the vicinity of Örebro, many people can be expected to commute to the urban areas for work. Many of these travel by car and thus need new tires more often.

To select the postal areas that together does not exceed 2000 households and that you have sorted according to number of cars per household you should make the attribute table of Örepnomr active. With the left mouse button, select a number household fields that you estimate will add up to 2000. Then select Statistics under the field menu. Add or remove fields until you get as close to 2000 as possible. When you are satisfied, save the new map as a shapefile and add it to the view. (Name it, e.g. 2k.)

When you have your selection you should make a map to present your findings. Further than needing information on which postal areas to distribute the fliers in, the tire producer also wants to be able to see in a convenient way the relationship between the number of households and number of cars per household within each selected postal area. A good way to represent this kind of information is to make a pie chart, where the total population decides the size of the pie chart and two sections, cars and households makes up the "slices" of the pie. Each of the slices will also scaled to represent their percentage of the sum of the two.

To accomplish this, you must make the 2k theme active. Open the Legend editor by either double clicking on the legend symbol for that theme or pressing the Edit legend button. When the legend editor is opened, you should choose Chart as Legend type. The legend editor will then change its appearance and you will find more choices. To the left, in the Fields menu, choose Bilar_95 and Hush_ll_90. These fields will be the two slices. At the bottom right corner of the editor, there you should now click on the Properties button.

1. Choose Chart as Legend type.

2. Click on the fields and then the Add Button to select them.

3. Press the Properties button and select car_p_house as Size Field. Press Apply

If you do not get a pie chart as default when you have selected chart as legend type, look in the lower left corner and click on the pie chart symbol.

In the properties box you should also select the size range of the charts. You probably have to change the sizes from the original settings so after you click Apply, do not close the legend editor.

Select suitable colours for the chart slices by clicking on their legend symbol in the legend editor.

Finally make a layout where you add an appropriate title and set the scale bar and north arrow. Also add the road theme from rodakartan to simplify orientation in the map.

To pass the exercise, hand in the layout as specified in paper or digital format to the teachers. To hand it in digitally, make the layout the active document and under the File menu, choose Export. Under the List of File Types, choose JPEG. Export the JPEG file to your working directory and send it as an attachment in an e-mail to one of the teachers.

Here is an example of how the final layout can look.