



UPPSALA UNIVERSITET

Institutionen för geovetenskaper
Geoinformatiklaboratoriet

SKATING ON THIN ICE

Requirements

This exercise requires a PC with Windows 95/98 or Windows NT and the GIS software ArcView version 3.0 or later. The necessary data area available under the catalogue `.../data/arbetsstuga2000/arcview/metria/rodakartan` on the course CD or at Geocentrum on the Earth server under `earth2/_sharedfiles/geoinformatik/data/arbetsstuga2000/arcview/metria/rodakartan`.

Objectives


The aim of this exercise is to introduce the concept of aggregating data. In the exercise a set of data will be created through digitising and editing in the themes attribute table. The created table will be joined with existing tables for the presentation.


Task

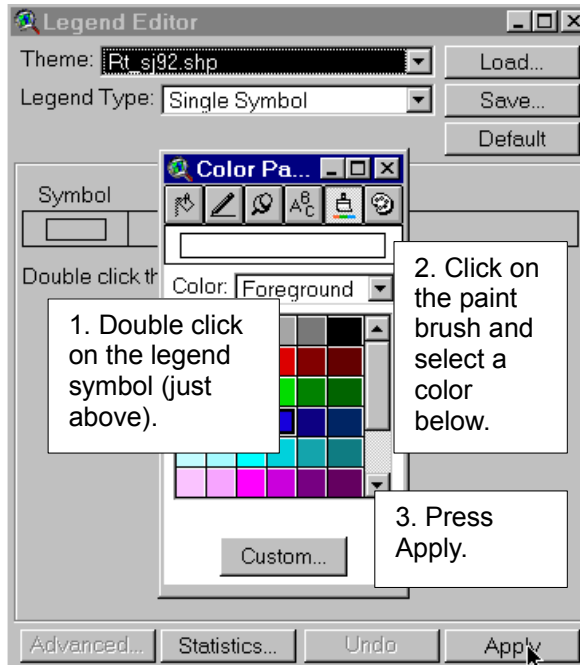
The exercise should result in a map where points on lakes in Örebro county where ice is likely to be thin are located and marked (digitised), i.e. the in- or out-flow of streams from lakes. The lakes where signs should be placed should be less than 5 km from any built up area. You should create a new theme that displays the location and status of the sign and the name and size of the lake. The map should also display roads so workers can easily find the way to the signs.

Hand in the produced map to the teachers in paper or digital form to pass the exercise.

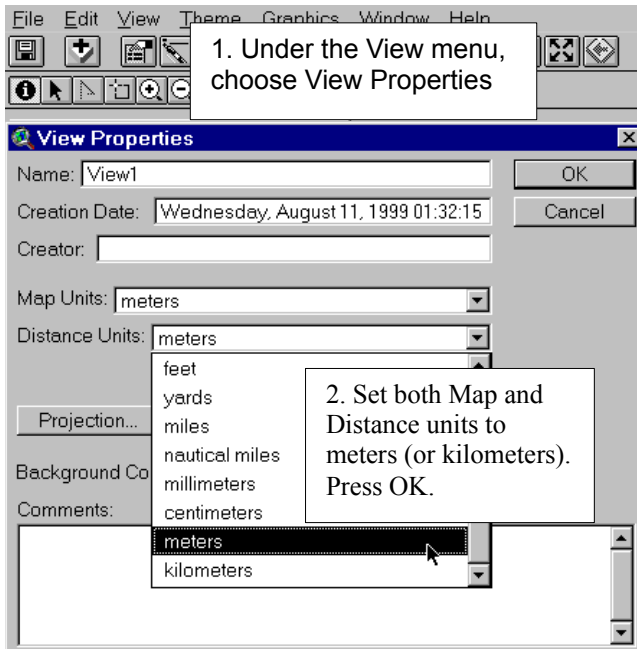
Part One – Selection Of Lakes.

Start the exercise by opening a new project. Use the Add theme button  to add the themes covering lakes, (`rt_sj`), streams (`rt_vl`), built up areas (`Rt_to`) and roads (`rt_av`) from `.../data/arbetsstuga2000/arcview/metria/rodakartan` from either the CD or `earth2/_sharedfiles/geoinformatik/data/`

When you have the themes displayed, double click on the legend symbol of a theme to change the colours of the theme. You can also use the Legend editor button  or choose **Edit legend** under the **Theme** menu. Roads are usually displayed in red, streams and lakes in different shades of blue etc.



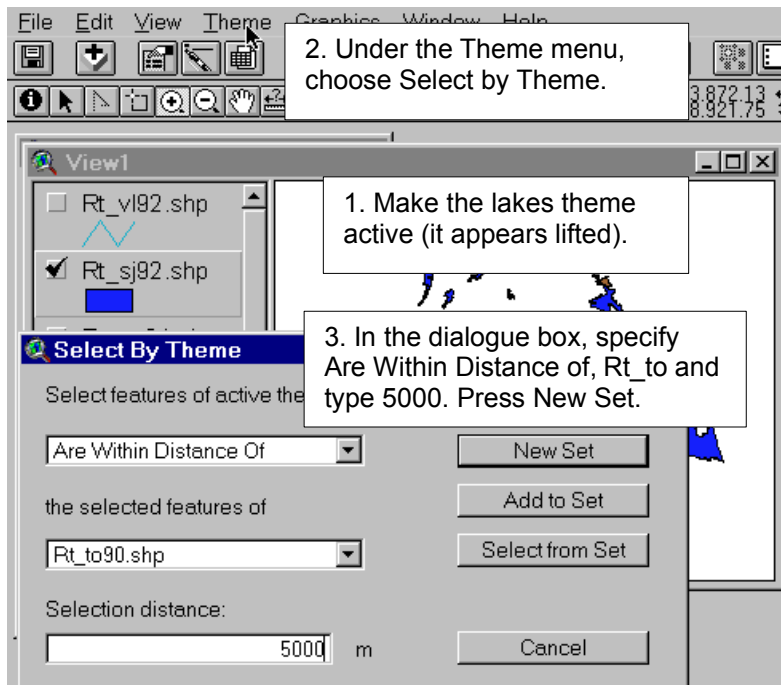
The decision was made to only place signs at lakes within 5 km of built up areas. You must thus first select these lakes. To do this you must first set the map and distance units in **View properties**. Go to the **View** menu and choose **View Properties**. All themes are in the co-ordinate system of rikets nät that uses meters as unit distance. Thus **Set Map units** to metres and **Distance units** to kilometres.



Setting distance and map units lets ArcView know in which units to measure, and to display a scale.

Look in the scale bar in the top right corner to see in which scale your View is projected.

Now you should select the lakes within 5 km of any built up areas. Make the lake theme (Rt_sj) active and under the Theme menu, find Select By Theme and choose Are Within Distance Of the selected features of should be Rt_to and type the distance 5000 m (or kilometres depending on your distance units). Press New Set.



After you have made the selection, convert the new selection to a shapefile, which is done under the Theme menu, navigate to your directory and save the file under the name sel_lakes. Add it to the view.

Part Two - Digitising

You must now find the points where streams flow to or from lakes. This must be done manually. Thus, display the theme with the streams and the selected lakes so you can see the intersection points. To capture the intersection points you must create a new theme and a corresponding table where your points (signs) will be digitised. The table should have information about the signs such a name or code for the sign, the id code for the lake, the name of the lake and the status of the sign.

To create the new theme, go to **New Theme** under the **View** menu and create a **Point Theme**. Name the new theme **Signs** and save it in your working directory. Open the **attribute table** for the theme **signs**, choose **start editing** from the table menu and add the following fields:

- **Signnameid** In this field you choose a number or name for the sign E.g. Våtjön or 1. If you choose a name, the datatype should be **string**, and if you choose a number the datatype should be **numeric**.

- **Lakeid** This field should contain the id number (found in the **Rt_sj92_id** field in the **Sel_lakes** table). This field will serve as the link to the **Sel_lakes** theme when you join the tables later. The data type should be **numeric**.

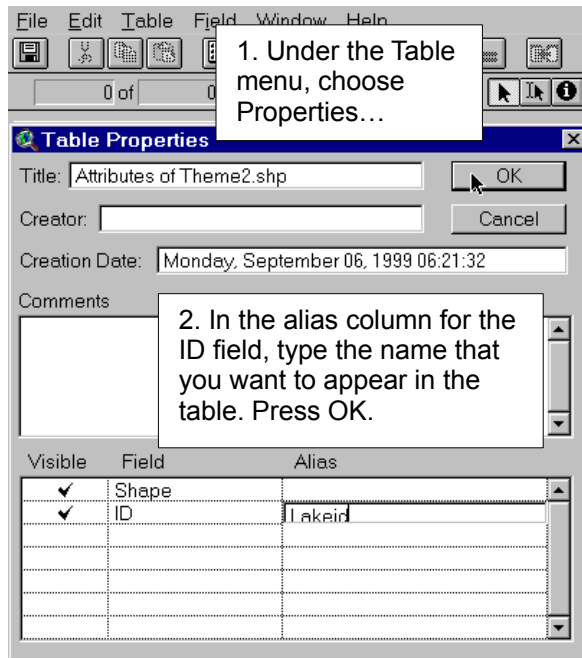
- **Lakenameid** This field should contain the name of the lake and serves as the link to the **Rt_text** theme in the join table operation. Since it is a name, the data type should be **string**. You find the name of the lake in the **textsträng** field.

- **Status** Here, you input the (imaginary) status of the sign – “OK”, “missing”, “needs paint”, or any other condition you could think of. The data type should be **String**.

Field name	Datatype	Content
Signnameid	String or Numeric	The name or number of the sign.
Lakeid	Numeric	The number from the field Rt_sj92_id field in the theme Sel_lakes .
Lakenameid	String	The name of the lake as it reads in the textsträng field in Rt_text theme.
Status	String	Terms indicating status of the signs (you make them up).

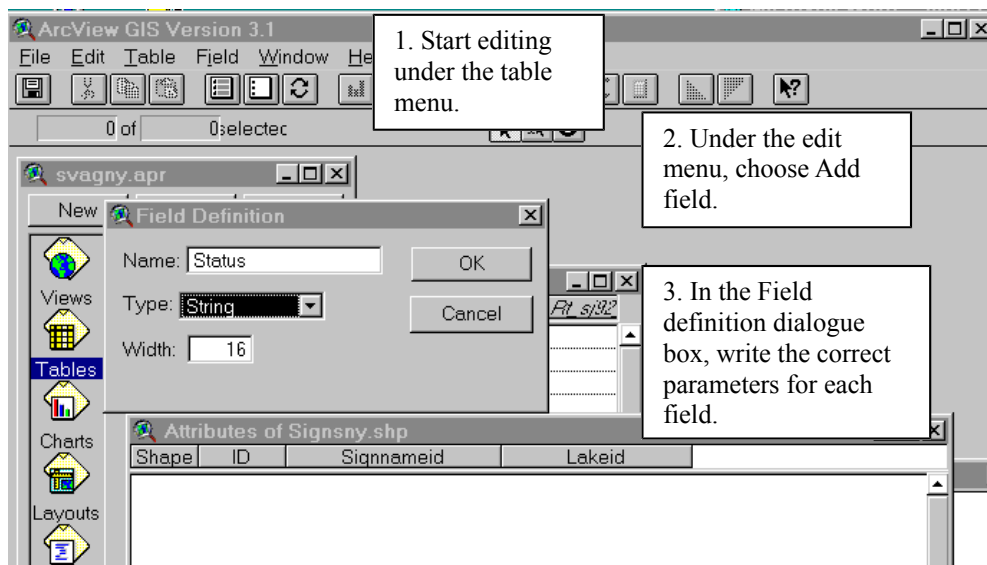
The new table is automatically opened with two fields, **shape** and **id**. The **shape** field is always present to indicate the data type of the theme. The **id** field is numeric and you

must thus assign it to one of your numeric fields, i.e. **Signnameid** or **Lakeid**. You should rename the id field by making the table the active document and choose **Properties**.





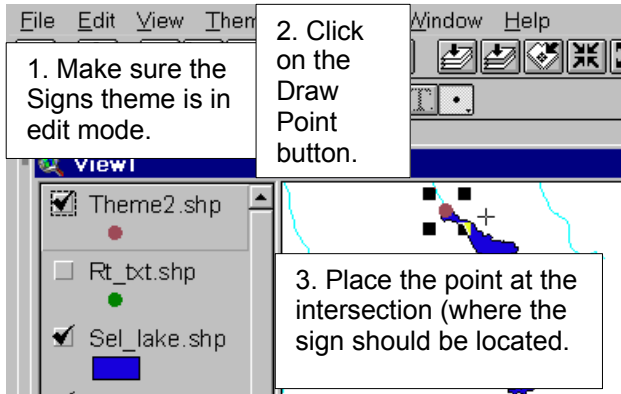
By changing the name of the ID field, it will be easier to remember which field represents the numerical id for the lake.

When you have changed the name of the ID field, you are ready to start adding the rest of the fields.




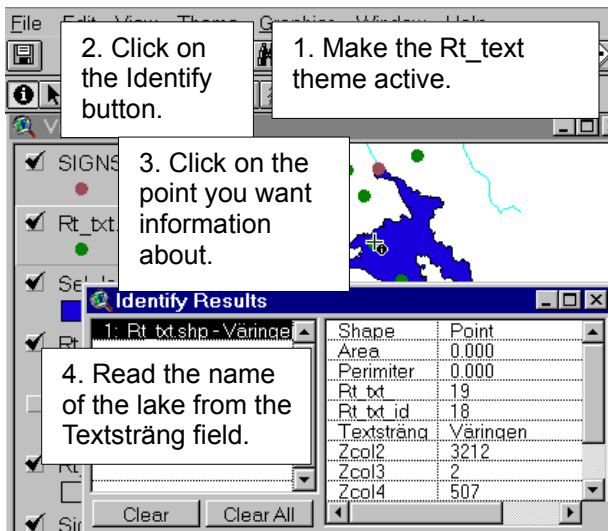
When you have added the new fields correctly, you are almost ready to start digitising. However, in the fields **Lakeid** and **Lakenameid**, you are later on going to input information from the **Rt_sj** and **Rt_text** themes to link to your new **Signs** theme in the **Join table** operation. You must therefore first add the **Rt_text** theme by using the **Add theme** button and navigating to `...data\arbetsstuga2000\arcview\metria\rodakartan`.

When you have added the `Rt_text` theme you can start digitising. Make the `Signs` theme the active document and if the theme is not in edit mode (there is a dotted line around the checkbox of the theme ) choose **Start Editing** under the **Theme** menu. Click on the **Draw point** button  and place a point at an in- or outflow of a stream.




To make the digitising easier, use the zoom and pan controls to zoom in on the point you are currently digitising.

When you have digitised a new point, you must input the id number of the lake from the `Rt_sj92_id` field in the `Sel_lakes` theme and the name of the lake (exactly as it reads) in the `Textsträng` field of the `Rt_text` theme. To find the correct number and name for the point you must make the respective themes active and use the **Identify** tool  on both of the themes.



Do the same thing with the `Sel_lake` theme active. Note the number in the `Rt_sj92_id` field.

When you have noted the name and number, make the table for the signs theme active and use the **Edit** button  to select the record and type in the name and number.

Finding the right point in the `Rt_text` theme can be tricky, make sure it is the name of a lake you find. (Hint; lakes have the code 3212 in the `Zcol2` field.)


For each point you digitise, you must repeat the same procedure so this requires some work. You will probably find it easier to identify the name and number after each point rather than digitising several points and then try to identify their names and numbers. It might also be a good idea to save the edits quite often. This is done under the **Table** menu where you choose **Save edits**.

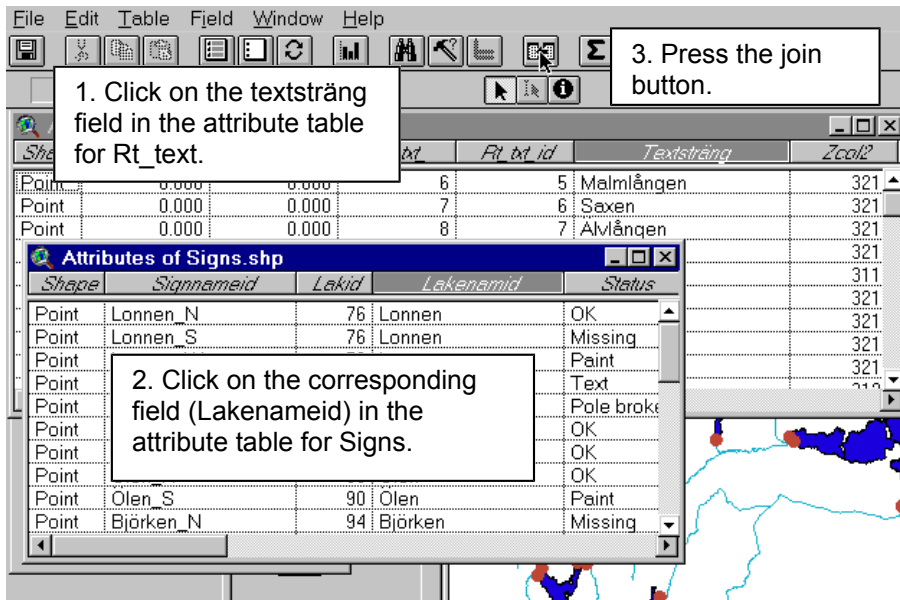
Part Three – Joining Tables

Now that you have created an attribute table for the theme **signs**, you shall join this table with the text (**Rt_text**) and lakes (**Rt_sj**) themes so that all the relevant information concerning the signs is displayed in the same table.

When a table is joined to an attribute table for a theme, all fields from the “joining” table will be transferred to the attribute table. A join is based on the values of a field that is present in both tables. The field name from the tables does not have to be identical, but the data type has to be the same, e.g. numeric with numeric, string with string but not numeric with string.

In the **Attribute table** to the theme **signs** we want to be able to display the name and the size of the lake at which a certain sign is situated. To do this we must join the attribute table for **Signs** with the tables for **text** and **lakes**. In the table **signs**, the field “**textsträng**” should be identical to the field “**Lakenameid**” in the **Signs** table and the field “**Rt_sj92_id**” should be identical to the field “**Lakeid**”.

First you should join the **Rt_text** table to the **signs** table. First, open the table for **Rt_text**. Click on the field **Textsträng**. Then open the table **signs** and click on the field **Lakenameid**. Press the join button . Do the same thing for the lake table. This time, click the fields **Rt_sj92_id** and **Lakeid** and press the join table button again.





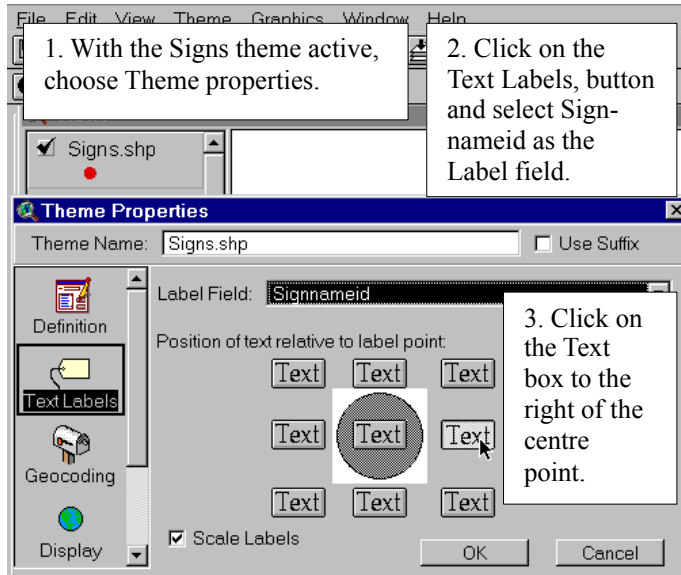
If this done correctly, you will now have information from both the text and lakes themes in your attribute table for **signs**. (You will see the fields and records from both joined tables in the attribute table for signs.)

Part Four - Presentation

Finally make a presentation map that contains the signs, roads and lakes. Use the **signs** theme to **label** some of the signs. The labels should show the name of the sign and their

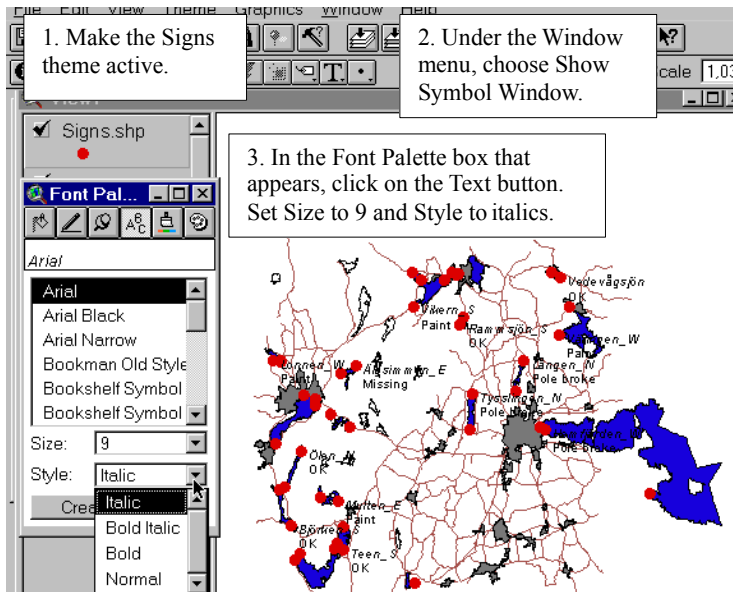
status. The sign names should be labelled in *italic* and the status in normal. Due to this, you have to label the signs twice, once for the name and once for the status.

To be able to show the names of the lakes on the map, you can use the Label button . If the label button is shaded it will not work and you have to designate the Signnameid field to use as the label field. To do this, you should click the Theme Properties button  and choose Text labels on the left side of the dialogue box. When you then label, the information that will be displayed is taken from the Signnameid field.



You also need to decide which position the label should have in relation to the sign. In the Theme Properties box, click on the Text button to the right of the centre in the Position of text relative to label point.

Further, the name should be in *italics*. This is done under the Show Symbol Window command under the Window menu.



You can decide the size and style of the label text by opening the Show Symbol Window command under the Window menu. When you have set the size and style to 9 and *italics*, go to the View and label 10-15 of the signs.

Now that the **names** of the signs are labelled, you should set another label at each of the signs you just labelled. The new label should give information about the **status** of the sign.

Again, go to the Theme properties button and choose text labels. This time set **Status** as the **Label** field. Also, in order for the two labels not to overlap you should click on the Text box in the lower right corner of the **Position** of text relative to label point figure. This way, the status of the sign will appear just below the name of the sign in the View. Also, this time the text should not be in italics, it should be normal, so in the **Font Palette**, set style to normal. When you are finished with the selections, use the label button to label the same signs that already have their displayed in the View.

Create a layout where the labels are present along with the signs, selected lakes and roads. To create the layout, choose **Layout** under the **View** menu. Select **Portrait** and press OK. In the layout, double-click on the title and **scalebar** to edit them. You might notice that the signs are not clearly visible in the layout. You should then change their size by using the **Legend editor** in the theme. Double-click on the symbol and use the **Marker palette** to change the size. Try a few different sizes and see which one works best. You do not have to create a new layout every time as the layout changes automatically with the changes you make in the theme. On the next page is an example of how the final map can look.

To pass the exercise, hand in the final map, as described above, to the teachers in paper or digital form. To hand in the exercise in digital format, make sure the **Layout** is the active document. Go to the **File** menu and choose **Export** and under the **List of File Type** drop down menu, select **JPEG**. Export the Layout in JPEG format to your working directory and then send it as an attachment in an e-mail to one of the teachers.

