UPPSALA UNIVERSITET

Institutionen för geovetenskaper
Geoinformatiklaboratoriet

INTRODUCTION TO ARC VIEW AND SWEDISH MAPS

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 on the earth server at
Geocentrum under
Earth2/_sharedfiles/geoinformatik/data/arbetsstuga2000/arcview/metria/rodakartan.

Objectives
This exercise will give an introduction to Arc View GIS, data types, menus, buttons and
  tools. To illustrate the exercise different Swedish data sources will be introduced,
  including GSD700 (Geografiska Sverige Data, scale 1:700 000), Röda kartan (scale
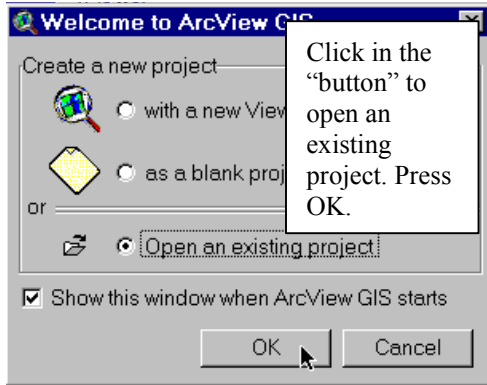 1:250 000) and Gröna kartan (scale 1: 50 000).

Task
This exercise should result in three maps. The first map should show the different communes
(or parishes) in Örebro county with data from Röda Kartan. You should work with the legend
editor and layout to create a colour scheme and label the communes (or parishes).

The second map should also include data from GSD700, which you use to create a layout
where the different counties in Sweden as well as the borders of the Scandinavian countries
and the ocean are displayed. To pass the exercise you must hand in two maps as specified in
the exercise.

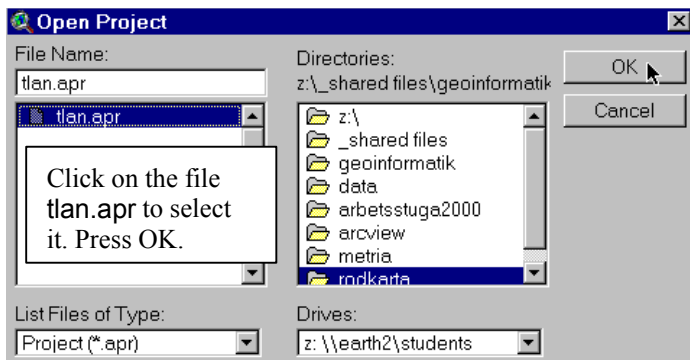The third map should be built from Gröna kartan by yourselves.

Part 1 - Röda Kartan

First, you should start ArcView. Use the Windows Start button in the lower left corner and
choose Programs, Esri and ArcView 3.1. In the Welcome window choose to Open an existing
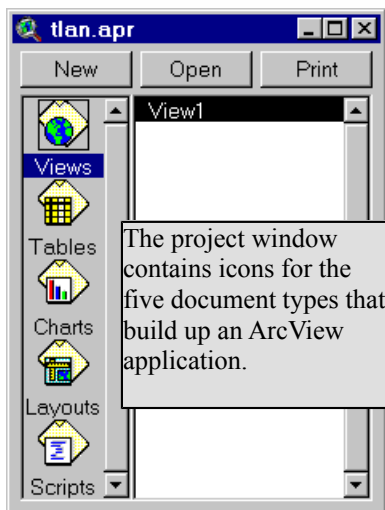project.

Welcome to ArcView GIS

Create a new project

○ with a new View

○ as a blank project

or

● Open an existing project

Click in the "button" to open an existing project. Press OK.

☑ Show this window when ArcView GIS starts

OK   Cancel

If you select cancel in the welcome window you can still open an existing or new project by going to the File menu.

Now you should navigate to the …/rodakartan directory as specified in the Requirements box above and open the project tlan.

Open Project

File Name:
tlan.apr

tlan.apr

Click on the file tlan.apr to select it. Press OK.

Directories:
z:_shared files\geoinformatik

 z:\
 _shared files
 geoinformatik
 data
 arbetsstuga2000
 arcview
 metria
 rodkarta

OK   Cancel

List Files of Type:
Project (*.apr)

Drives:
z: \\earth2\students

You should use the path specified above, i.e. you must open each of the folders until you see the project in the rodakartan folder. If you double click the tlan.apr it will open directly. Otherwise click once to select it and then press OK.

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tlan.apr

New   Open   Print

Views

Tables

The project window contains icons for the five document types that build up an ArcView application.

Charts

Layouts

Scripts

View1

In the left column of the project window you see the five types of *documents* that constitute ArcView - Views, Tables, Charts, Layouts and Scripts. It is important to remember that these objects are called documents. When you create a specific view (or table, chart, layout or script) this becomes an *instance* of the object class view (or table, chart, layout or script). Click Open.

The view Röda kartan contains 3 themes (or layers), of which 2 are displayed. To the left in the view is the Table Of Content (TOC), where you can determine which layers to display, in what order to display them, as well as colour etc. The Community theme Rt_kn94 is active (it appears lifted). You can activate or deactivate a theme by clicking on its name (not in the box to the left of the name). By clicking the check-box to the left of the name you can display the theme. Display the lake theme Rt_sj92. If you click the name of the theme and hold the left mouse bottom pressed you can drag the theme to another position in the TOC, and thus rearrange the order of display. In the view below the line theme (waterways, Rt_vl92.shp) are on top of the polygons Rt_sj92 (lakes) and Rt_Kn95 (kommuner or communes). Click the check boxes and change the order of themes in the TOC. As you will see (or not see), a line theme must be on top of a polygon theme in order to be seen.


This is the Table Of Contents (TOC)
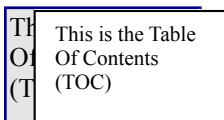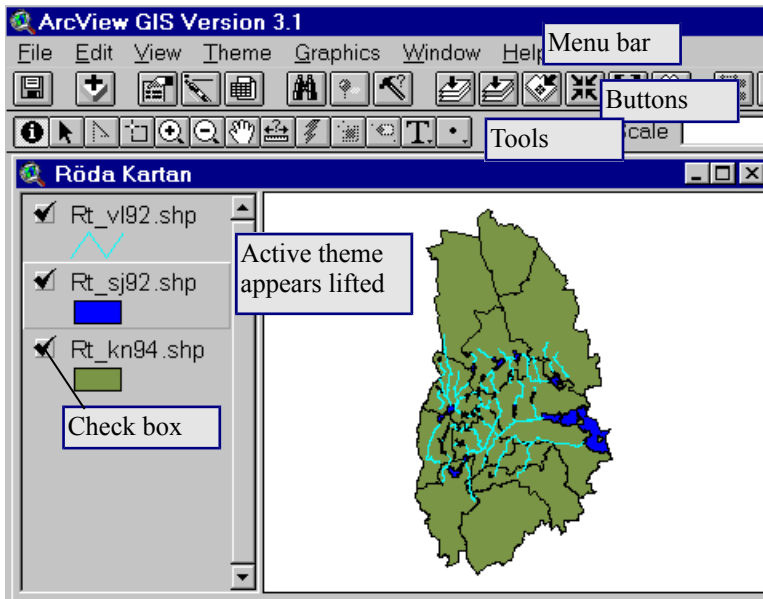
You might have noted that the TOC for waterways Rt_vl92.shp lacks a legend. You can hide/show legends from the menu - under the item Theme. Remember to activate the theme which legend you want to hide/show. You can activate several themes by holding down ctrl-shift while clicking the themes in the TOC.

Next try the buttons and tools for zooming and panning. If you need more information on how to use the buttons and tools have a look in the online manual.

The buttons execute a function directly when pressed.

With tools you first have to select the tool and then use the mouse to execute the function. If you want to zoom you can either click and drag with the mouse, or just click a point which then becomes the new centre, with zooming predefined to 125 %.

Each theme in a view is associated with a table that contains attribute data. Activate the theme Kn95.shp and press the Open Table button . The table for Kn95 will open directly.
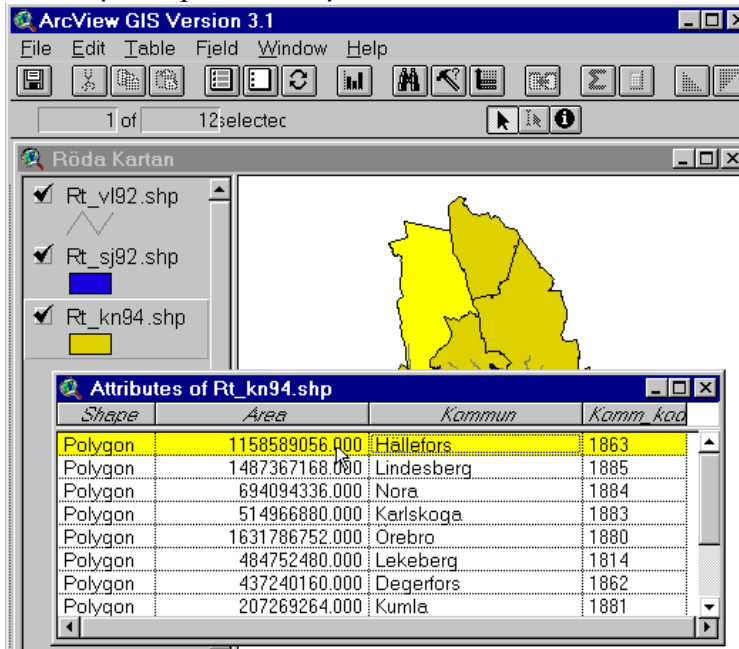

A table consists of records (rows) with one record per item in the view, and columns which are called fields, that contains data on various attributes. Select a field by clicking it. It should turn yellow, as should the corresponding item in the view. Click on the record for Hällefors, then click on the view and finally click on Zoom to Selected . That is how that button works.

Zoom to full and click on the Label tool [icon]. Click on any commune and it will be automatically labelled with its name. You can move or delete the label by first selecting the Pointer tool [icon] and then click the label. Grab the handle to move or press the DELETE key to delete it.

Try the identify tool [icon], press it and point and click at any commune in the view.
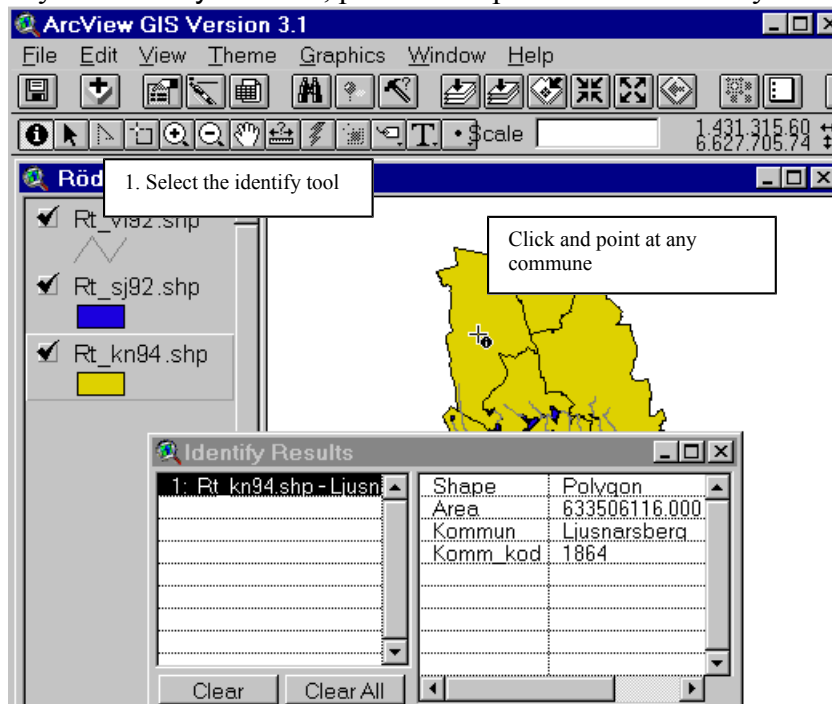
You will have noted that the theme Rt_vl (vattendrag for water ways) is of the colour grey, From a cartographic point of view light blue is preferred. Thus we shall change the colour of the theme Rt_vl. You change colour via the Legend Editor. Open the Legend Editor either by double clicking Rt_vl in the TOC or by pressing

the Legend editor button [icon]. In the legend editor double click on the symbol for line. Then double click the brush, and choose an appropriate colour. To put the colour on the theme in the view you have to press Apply.
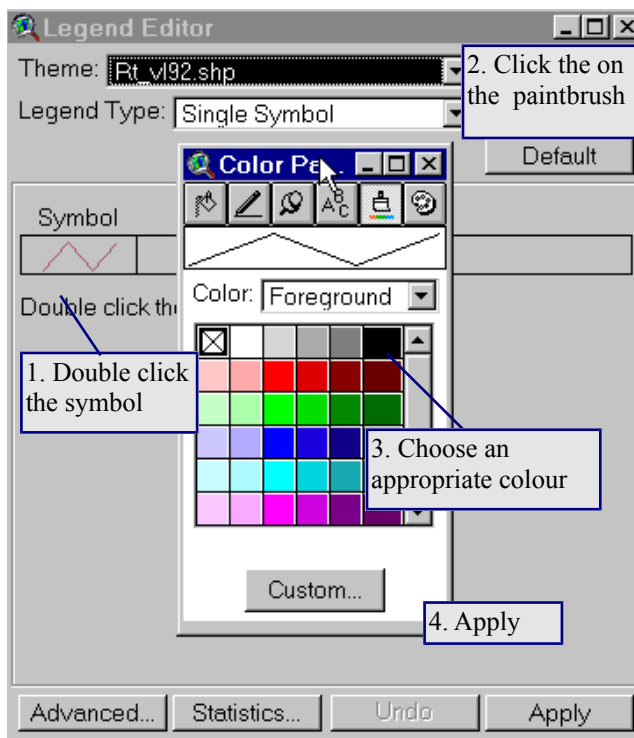
If you want to be able to measure distances in the themes you must set Map Units and Distance Units for the view. Under View, select Properties… and choose meters for both parameters.
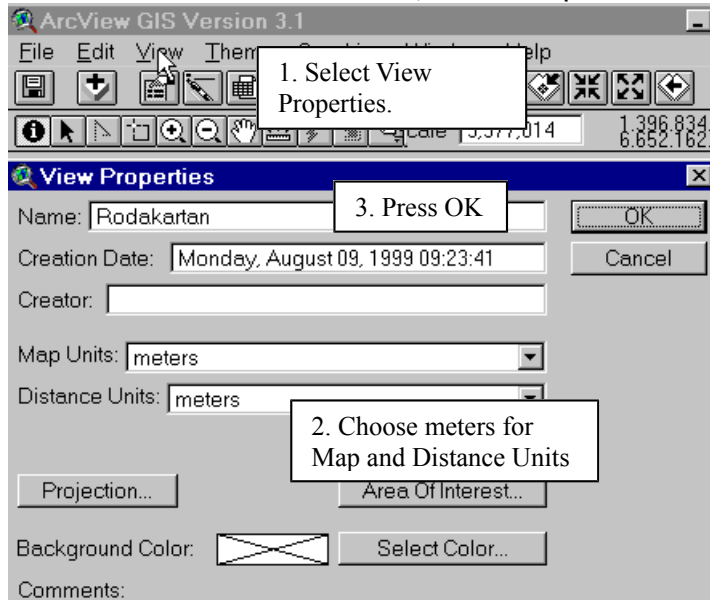
Now try the Measure tool [icon]. It measures the distance along a line drawn with the mouse. Check that the north to south extension of Örebro county is approximately correct.

To be a useful map we must add more thematic layers to our view. The layers that we have worked with so far are all from "Röda kartan" produced with the scale 1:250 000. To learn more about all the layers available for Röda kartan you can have a look under … arbetsstuga2000/html/rodkart.htm (on the CD or Earth server) or on the web site for Lantmäteriverket (Swedish Survey) - www.lm.se/kartplan.

To add a theme select View from the menu bar and then Add Theme. You can also add a theme by using the Add theme button [icon].

Add the following themes to the View

file	content
av94	Allmänna vägar (public roads)
nv88	Naturreservat (nature reserves)
mo88	Militära områden (military areas)
to90	Tätorter (built up area)
fs94	Församlingar (parish)

After you have added the themes the order of drawing will be rather arbitrary, as will the colours. Thus rearrange the order, and put more appropriate colours on each theme.

There are themes that need more than colour in order to facilitate Interpretation - for instance public roads. By putting different colour on different road types the theme would reveal more information. To do that open the legend editor for the theme Av. In the dialogue box for Legend type do select Unique value, and the select kkod as Classification field. To decode the information have a look at … arbetsstuga2000/html/vaginfo.htm. Then use the colour scheme to put individual colours on the roads. Remember to press Apply, or the changes will not be adopted. Also change the colour in a similar manner for communities and parishes, but instead of defining colours individually use one of the predefined Colour schemes.
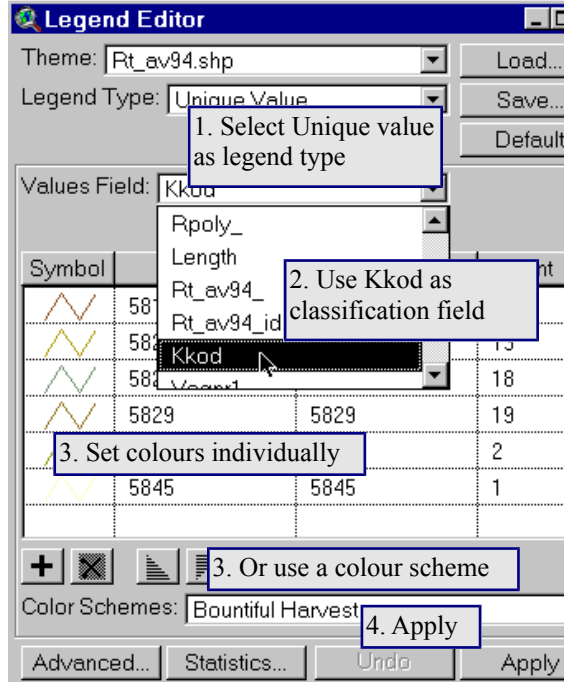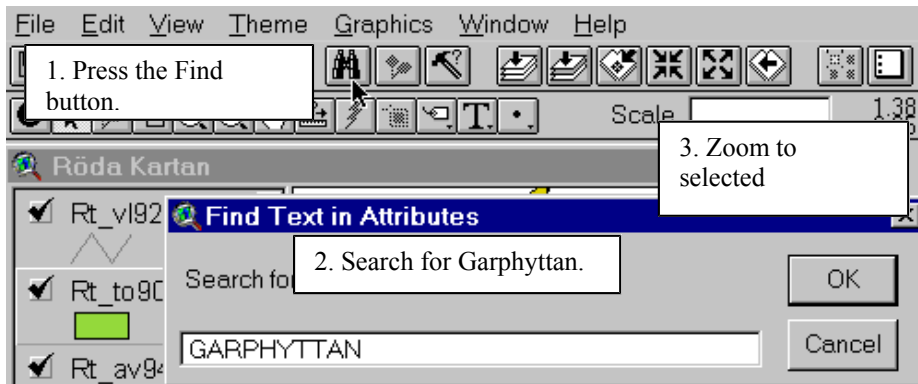

As you will probably also have noted it is quite difficult to see anything if you display all the themes simultaneously in a small scale. Thus we shall set the Display properties so that lines only display when the scale comes above a certain threshold. This is done under Theme and Properties in the menu or by pressing the Theme properties button. Select Display in the content top the left and set Maximum scale to 1:2 000 000.
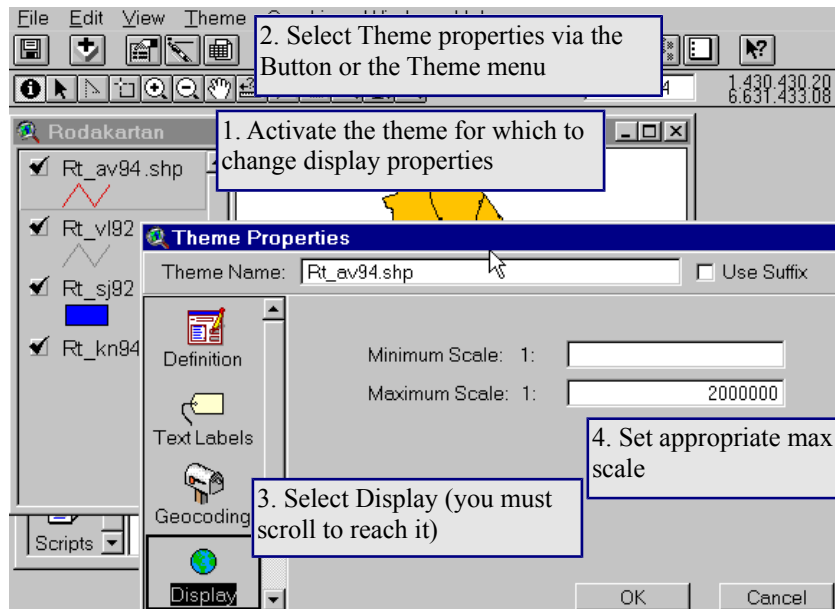
Check that the setting of display properties works as you want it to. Also set the display properties for the other line themes if appropriate. Now you have to decide which of the polygons you want to display as background - communities or parishes. And which of the other themes that shall be on top of the background.

When you are satisfied with your view you shall continue by seeking out lakes within a days biking distance from Garphyttan. Let us say that a days biking distance is 30 km round trip. Make sure that the built up theme Rt_to is active. Press the Find button and search for Garphyttan.

File Edit View Theme Graphics Window Help

1. Press the Find button.

3. Zoom to selected

Scale   1.388

Röda Kartan

☑ Rt_vl92

Find Text in Attributes

Search fo

2. Search for Garphyttan.

OK

GARPHYTTAN

Cancel

☑ Rt_to90

☑ Rt_av94

Once you have found Garphyttan you have to activate the themes you want to analyse in relation to Garphyttan. Thus activate the lake theme Rt_sj92 (hold down Ctrl+Shift to select more than one theme). Under Theme in the menu choose Select By Theme and you fill in the dialogue boxes.

File Edit View Theme Graphics Window Help

2. Under Theme choose Select By Theme

Scale

View1

☑ Rt_to90.shp

☑ Rt_sj92.shp

1. Activate the themes with lakes (Rt_sj92).

Select By Theme

Select features of active t

3. Select Are Within distance of

Are Within Distance Of

New Set

the selected features of

4. Select Rt_to as source

Rt_to90.shp

Select from Set

Selection distance:

15000

5. Set distance to 15000m Press New Set.

Again use Zoom to selected to view the identified lakes within biking distance from Garphyttan.

Before finishing working with Röda kartan we shall put on labels and make a Layout. Make Rt_to the active theme and select Auto-Label under Theme in the menu. Find the settings in the Auto-label box that gives the best result. Do the same thing for the Communities (or Parishes if they are your background), and rearrange the labels to look better if necessary.

When you have a view that you are satisfied with select Layout under View in the menu. Because of the shape of Örebro county it is better to produce the Layout as a portrait. You can create the Layout from the Project window as well, but there is a bug in choosing the layout format if you select that route. You can edit directly in the layout by using the tools in the Layout document

Graphical User Interface (GUI). For example choose the Pointer tool and click on the text Röda Kartan in the layout, change the text to "Örebro county" and the scale bar to kilometres for instance. You can also change the size of the text. Try to grab some other objects in the layout and rearrange them.
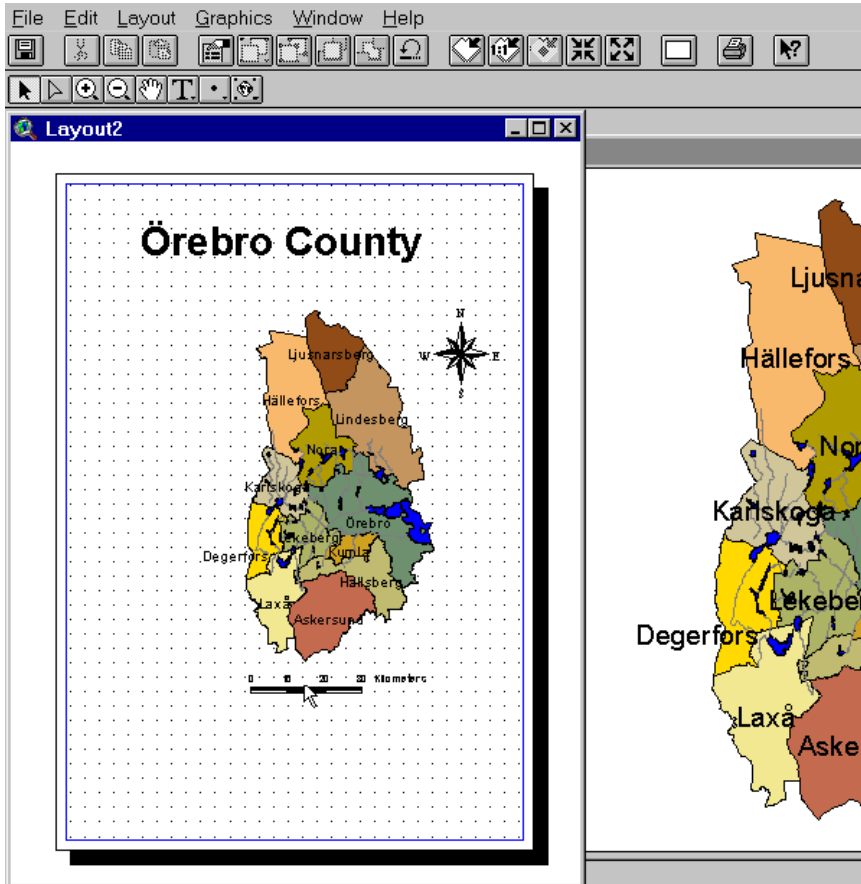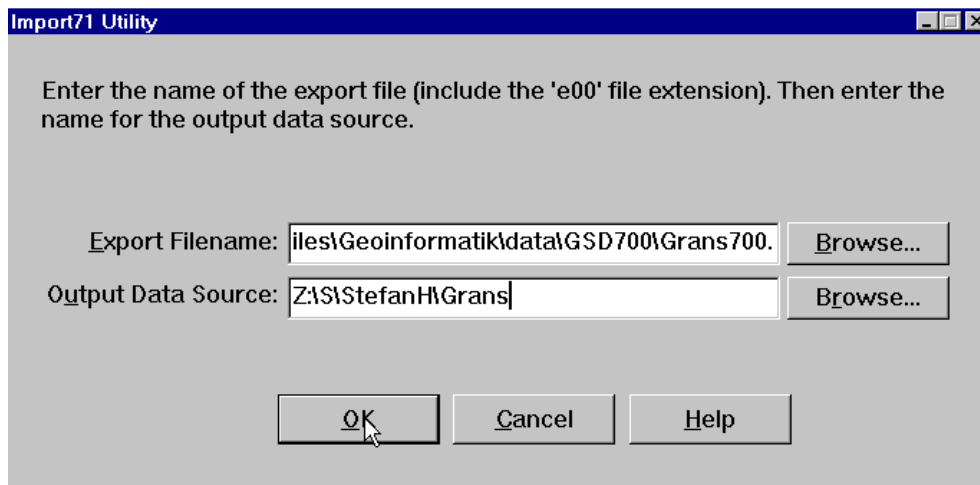

Return to the project window and save the project under your working directory. This map should be handed to the teachers along with the next one you are now going to produce. You shall now create a second view in the same project so do not exit the project.

Part 2 - GSD700

A very common format of GIS-data is the export format of Arc Info - the extension of such files is .e00. We have the National Atlas of Sweden in the scale 1: 700 000 (GSD 700) available as .e00 files and we will import them and add them to the existing layout as an overview.

Arc Info export files (.e00) can not be retrieved directly by ArcView, they have to be imported with a stand alone program before they can be added. Use the NT explorer to find the program called Import71, which is located under …/data/GSD700. Create a short cut of the program icon and drop it on your desktop. Start Import71, use the Browse function to navigate to the data source (.../data/GSD700). Put the Output Data Source in your directory. Note that for each e00 *file* that you import you need to create a new *directory* (use the same root name as that of the file – as in the example below where the file Grans is entered into the directory Grans).
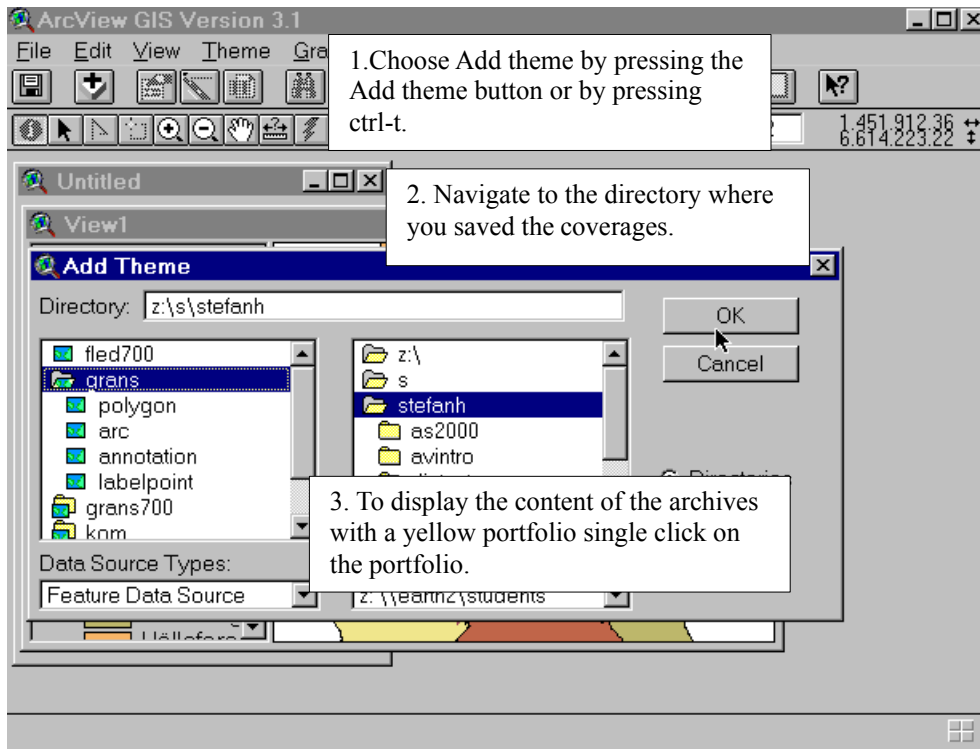
Import71 Utility

Enter the name of the export file (include the 'e00' file extension). Then enter the name for the output data source.

Export Filename: `iles\Geoinformatik\data\GSD700\Grans700.` [Browse...]

Output Data Source: `Z:\S\StefanH\Grans` [Browse...]

[OK] [Cancel] [Help]

You have to import all the .e00 files individually. The available coverages of the National Atlas include

| File	Content	data type
Grans700	Församlingar (Pasrishes)	polygon
Kom700	Kommuner (Communes)	polygon
Kust700	Ytor - markanvändning (land use)	polygons
Lan700	Län (Counties)	polygons
Vdrag700	Vattendrag (Streams)	arc

Start ArcView and open the project for Örebro county that you just created and create a New View. Once you have the View active, choose Add theme, either via the Add theme button , or under the View menu (or ctrl-t). The data in GSD700 (Geografiska Sverige Data) are not in the standard Arc View format (shape), but are represented as coverages. Each coverage holds a theme - however the theme can consist of several layers of different data types (polygons, arcs, points, labelpoints, annotations), and you must decide which data type(s) to load for each coverage.

When you get the add menu, do select the feature you want to add with one click on the mouse (do not double click), and do put the mouse marker over the *graphics* of the file not over the text! The features shadowed by *a yellow portfolio* are *coverages*. If you just double click a coverage you will get a default choice, which means that you can miss some information when bringing it up in Arc View. If you just click once on the graphics for a coverage you should get a subset list of available features to add.

1.Choose Add theme by pressing the Add theme button or by pressing ctrl-t.

2. Navigate to the directory where you saved the coverages.

3. To display the content of the archives with a yellow portfolio single click on the portfolio.

When you have added the themes you can start working with them to create a good layout.

Rearrange the map to show only counties (in different colours), and surrounding areas (sea and countries). To do that you must put kust700 on top of lan700, and only have those two displayed. You must also display both of the two using Unique values as Legend type. The colour for the terrestrial part of Sweden must also be set to transparent (for the lan700 theme to shine through). Here is an example of how it could look.

Set the colour of Sweden to transparent in order to let the counties be seen.
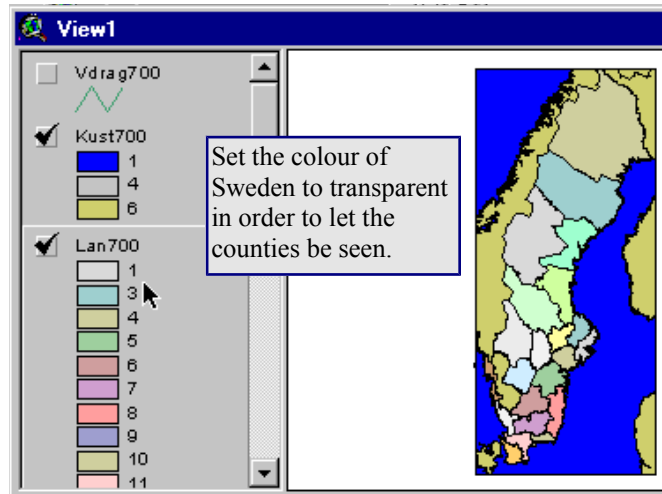
Open the layout that you created before, and press the View Frame tool and use the mouse to click and drag a small frame in the view. In the dialogue box that appears select the view of Sweden that you just created from GSD700 data. Rearrange the layout to fit both views. To pass the exercise, hand in the map to the teachers in paper or digital format.
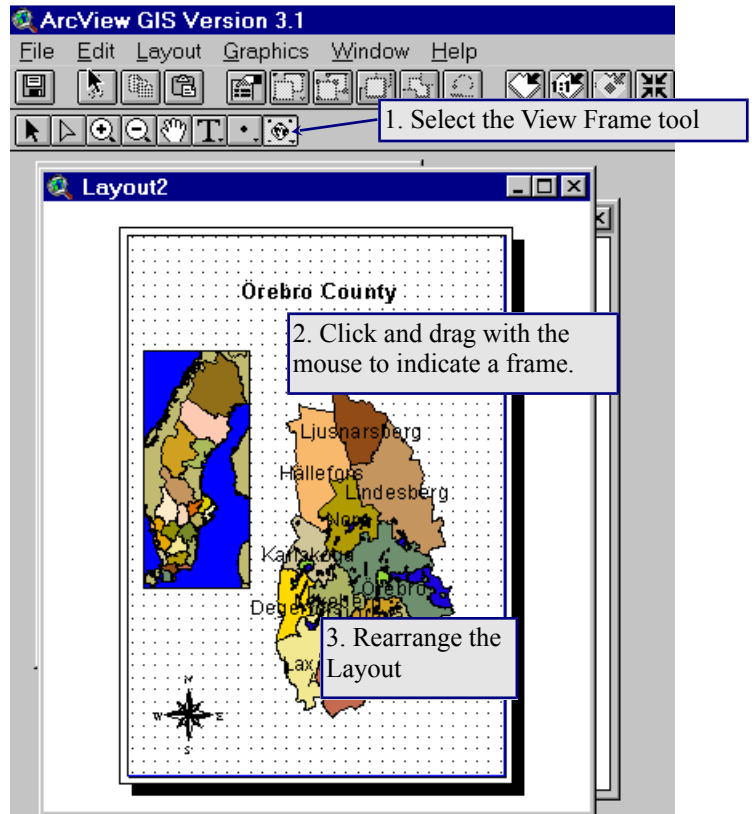
Part 3 – Your turn with Gröna kartan

Create a New View in your project. Add all the themes building up Gröna Kartan (the general topographical map of Sweden in he scale 1: 50 000).

Gröna kartan in digital form is built from 3 polygon themes, 2 line themes and 3 point themes – of which one is annotation and text labels. To know what is contained in the different themes you have to look at … arbetsstuga2000/ html/kodgron.htm.
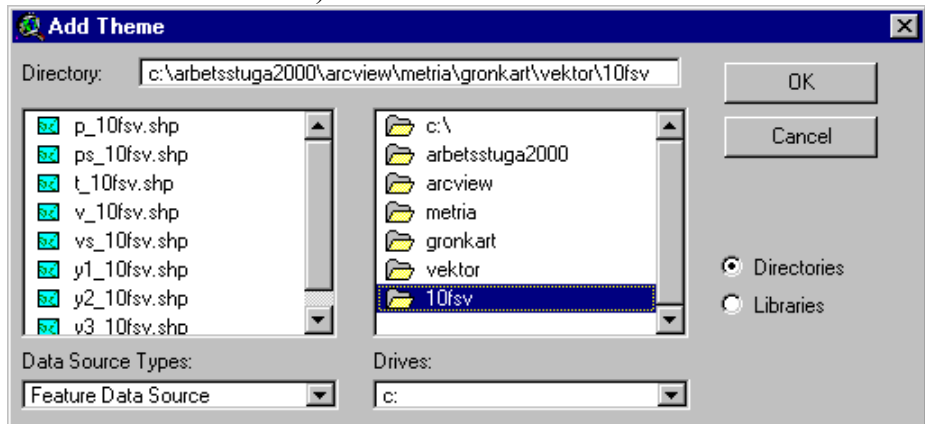
Use the themes of Gröna kartan over Örebro to create a thematic map. It is your choice to decide what the map should contain – but it must have at least one point, one line and one polygon theme – and it should have text labels. Below you see an example of a road map – which reveal more information as the scale increases. Colours are set to approximately match the printed version of Gröna kartan.

To pass the exercise, send the three maps in digital or analogue format to the teachers. To create a digital export make the layout the active document and choose Export under the File menu, and save the file in for instance JPEG format. Send the JPEG picture as attachment to the address of one of the teachers.