

Assignment 1: Introduction to ArcMap and data query

Goals: To introduce the ArcMap program and learn how to query data in order to answer questions of the data.

Objectives: When you are finished this lab you should gain the following:

- Mapping Science knowledge:
 - See the different kinds of data including vector (points, lines and polygons)
 - Get a feeling for how a GIS organizes and displays data
- ArcGIS software skills:
 - Open an ArcMap map document file (.mxd)
 - Navigate through the interface including zooming, panning, turning on and off layers
 - Open the GIS data layer attribute tables
 - Query the data to get information of interest
 - Add new data layers
 - Select features by pointing and attribute
 - Draw basic graphics on a map
 - Export a map to a PDF file or JPEG

Deliverables:

- You are responsible to correctly answer the numbered questions found throughout the lab exercise on the separate answer sheet.
- You are responsible to turn in an exported PDF map or JPEG map that shows the answer of the different questions

The map of Egypt has 4 layers:

- **ROADS**
- **BILDING**
- **NILE**
- **LANDMARK**

Using the previous layers and Geo database of Egypt located in (Egypt.mdb)

Create a Geo-database with unified projection system WGS1984 and name it Egypt.gdb

Task 1 – Data Management and Booting the Software

- **Copy the Exercise 01 to your flash drive**

Copy the folder named **lab_exercise01** and paste it to your flash drive.

- **Open the ArcMap software**

Instructions – Inside the **lab_exercise01** folder you will see a file named **Exercise_01.mxd**

The ArcMap software opens. You need to get familiar with the interface as you will be using it for the rest of the semester. You will see a *Map Window* which takes up most of the screen and displays the map data. You will see on the left the *Table of Contents* which lists the layers of data available to view. You will also see the *Tools* toolbar which is floating over the *Map Window*.

Screen snapshot here:

Task 2 – Navigating around in ArcMap

- **The ArcMap Table of Contents** - turning layers on and off, expanding legends, changing the draw order

On the left the *Table of Contents* which is the list of map layers available. You can see check boxes next to each map layer. **Click** the *check boxes* of some of the layers to see how to turn them on and off. You can also **Click** on the *plus* symbol that is next to the *map layers* to expand the *legend* for each map layer.

You will notice that the order in which the *map layers* are arranged in the table of contents is the order in which they are drawn. Map layers that are higher up on the list draw on top of the layers that are further down. If you want to change the order in which map layers are drawn, simply **drag** the map layer name higher or lower in the list. Try and move some of the layers to different levels.

- **The TOOLS toolbar** - Zooming in and out, zooming to a layer, zooming to previous/full extent

Q1: This graphic represents the *Tools* toolbar. Hover your mouse pointer over each tool to see what it is named. Match the name with each tool's icon.

A)		J)
B)		K)
C)		L)
D)		M)
E)		N)
F)		O)
G)		P)
H)		Q)
I)		R)

- **Changing scale, panning, using bookmarks**

Use the top six tools to teach yourself what each one does. Practice *zooming* and *panning* around.

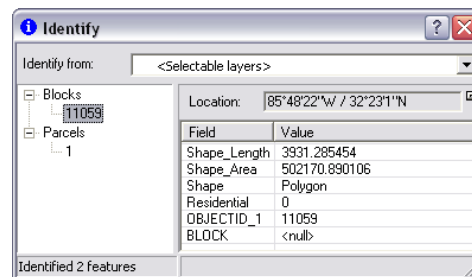
Sometimes you may become zoomed in to a very small part of the map and you may be lost. The button that looks like an earth (**Zoom to Full Extent**) is a helpful button when you want to get back to view the whole map as it zooms so that all data layers fill the map window. Try to **Click** on *Zoom to Full Extent*.

Task 3 – Getting information from the data

- **The Identify tool**

The little blue circle with the letter **I** in the middle is the **Identify** tool.

Click the identify button and click on some of the features on the screen. What happens? **Click** on the polygon for DOKKI with the *Identify* Tool. If the features you are trying to select do not show up/flash when you click them, make sure you have that specific layer selected. Specify the layer you want to query by selecting it in "Identify from:" at the top of the Identify window.



Q2: According to the Identify tool, What is the area of El Dokki and what is your location in Degrees Minutes, Seconds and in Meters?

- **Using the Measure tool for distance, area, features**

The Measure tool lets you draw on the map to measure lines and areas. By drawing a line or polygon on the map, the Measure tool will display your drawing's length or area. When you click the Measure tool, the Measure

window appears. This dialog box allows you to set different options for how you measure including whether to measure lines, areas, or features; use snapping; and set which units are reported.

Q3 Using the line measurement tool, how long is Eltahrir street in Km?

Q4 Using the polygon measurement tool, what is the Area of Elsaid club in Km square?

Task 4 –Opening GIS data attribute tables

- **Opening a layers attribute table**

An attribute table is a tabular view of the GIS data currently in the map frame. Let's take a look at the attribute table for one of the layers in our map. Right click on the "Do_Bank" layer in the Table of Contents and select "Open Attribute Table." Notice that the columns of the table correspond to the properties listed when a feature is clicked using the Identify tool. Each row is a vector feature in that layer.

- **Sorting on data fields**

Sorting the records based on the contents of a field can clarify the contents of an attribute table, especially if the layer has many records. Right click on the "NAME" field and choose "Sort Ascending." What happens?



- **Calculating statistics of attribute fields**

ArcGIS can also provide you with some basic statistics about the attributes within a layer. In the Do_Bank attribute table, right click on the "Shape_area" Field and choose "Statistics..."

Q5 The "Shape_area" Field explains the area of each bank in eldokki. How many Banks Located in Eldokki?

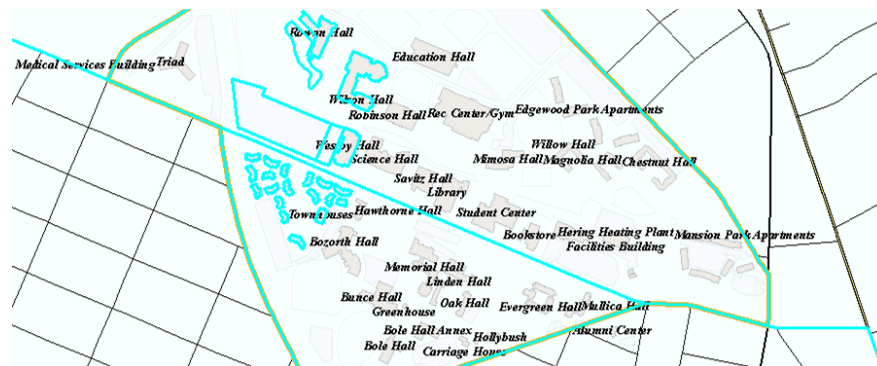
Task 5 – Selecting Features

- **Select Elements arrow versus the Select Features arrow**

Selecting features allows you to identify or more easily locate a subset of features on your map. Applying a selection is also a way of specifying the features for which you want to calculate statistics, view attributes, move, and so on. Using the Select Features tool , you can interactively select features in your map by clicking on them or dragging a bounding box around them. On the other hand, the Select Elements tool  allows you to select and manipulate graphic elements, such as titles, text, scale bars, north arrows, and any other graphics you have added to your map. You will add some text and graphics to your map by the end of this assignment, so remember to switch to the Select Elements tool when you want to edit them.

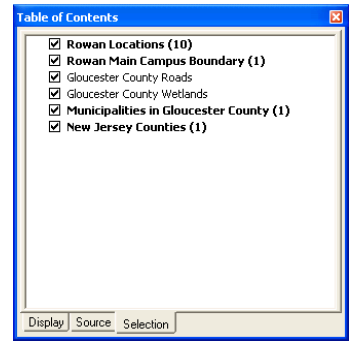
- **Using the Select Features arrow**

Q6: Using the Select Features tool, click on some of the schools on Eldokki. Notice that selected features appear outlined in cyan. Make print screen for this selected school



- **Setting which layers are selectable**

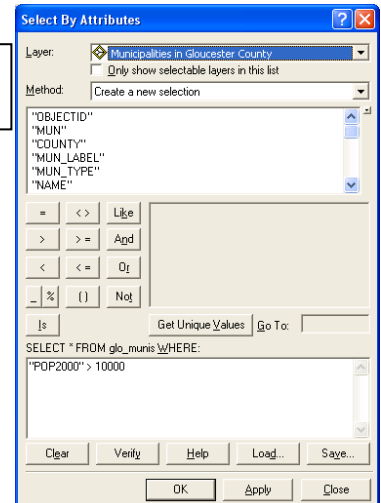
At the bottom of the Table of Contents (left hand panel in the ArcMap window) switch to the “Selection” tab. This tab within the Table of Contents allows you to see which layers are selectable using the Select Features tool. After selecting some vector features, you should be able to determine which layers have selected features and how many features were selected in each layer.



- **Selecting Features by Attribute**

Use the Gloucester County bookmark to view the entire county. Make sure both the Counties and Municipalities layers are visible. Under the Selection menu, you will find two of the most used tools in ArcMap – **Select By Attributes** and **Select by Location**. For this assignment, we will only deal with Select By Attributes.

Q7: Select all hotels from Landmark layers where the area is >1500m square Print screen of the map with the selecting feature



- **Clearing selected features**

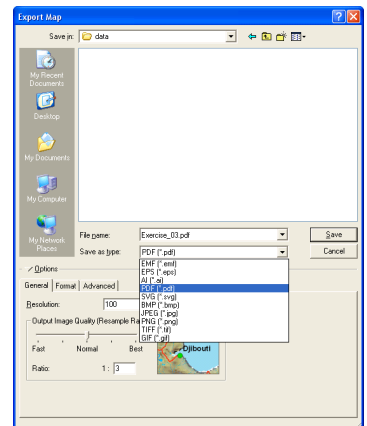
Clicking the “Clear Selected Features” button will clear **all** selected features from your map. If you want to clear selected features from just one layer, right click on that layer, and select Clear Selected Features under the “Selection” submenu.

Task 7 – Exporting Maps

- **Exporting a map as a PDF**

Under the File menu, select “Export Map...” You will now see a window similar to the one at right. Select a location to save your map that you will remember, as you will need to upload this PDF later. You must select “PDF” under “Save as type” to save as a PDF. Remember to set your resolution as “100” and your Output Image Quality to Normal.

Note the number of different formats the Export Map tool supports. For this assignment, **you must use PDF**, but we’ll be using other formats, such as JPEG and PNG, later in the semester.



Q8: Export your images in JPEG format with resolution 700dpi after putting all map components (verbal scale- north arrow – legend- date of production-Inset and locator map-Neat line-projection-and cartographer)

Q9: Using ArcToolbox select all school and export it into Do_school layer convert the Do_school layer into point layer and export your map in PDF format with nominal representation

Remarks:

- This Assignment should be performed individually (Alone😊).
- The assignment discussion will be held during the lab (**next Sunday 13th of November**)
- Answers should be written in the form of **DETAILED STEPS** on a paper and submitted to the TA on lab time and **not as a Soft Copy**.
- Detailed steps should be in the form of **print screen** for each step along with the textual description for this step.
- **NO LATE submission will be accepted.**
- **Copies will be marked as ZERO.**